

## ePoster Sessions

**Saturday, May 23 2020**

**Ageing and dementia 1**

**EPO1001**

**Brain functional connectivity disruption in a large cohort of patients with primary progressive aphasia**

F. Agosta<sup>1</sup>, E. Canu<sup>2</sup>, M. Leocadi<sup>2</sup>, D. Calderaro<sup>2</sup>, G. Magnani<sup>3</sup>, P. Caroppo<sup>4</sup>, S. Prioni<sup>4</sup>, L. Tremolizzo<sup>5</sup>, I. Appollonio<sup>5</sup>, V. Silani<sup>6</sup>, V.S. Kostic<sup>7</sup>, P. Valsasina<sup>2</sup>, M. Filippi<sup>1</sup>

<sup>1</sup>Neuroimaging Research Unit, Institute of Experimental Neurology, Division of Neuroscience, IRCCS San Raffaele Scientific Institute and Vita-Salute San Raffaele University, Milan, Italy, <sup>2</sup>Neuroimaging Research Unit, Institute of Experimental Neurology, Division of Neuroscience, IRCCS San Raffaele Scientific Institute, Milan, Italy, <sup>3</sup>Neurology Unit, IRCCS San Raffaele Scientific Institute, Milan, Italy, <sup>4</sup>Unit of Neurology 5 - Neuropathology, Fondazione IRCCS Istituto Neurologico Carlo Besta, Milan, Italy, <sup>5</sup>Neurology Unit, "San Gerardo" Hospital and University of Milano-Bicocca, Monza, Italy, <sup>6</sup>Department of Neurology and Laboratory of Neuroscience, IRCCS Istituto Auxologico Italiano, Milan, Italy, <sup>7</sup>Clinic of Neurology, Faculty of Medicine, University of Belgrade, Belgrade, Serbia

**Background and aims:** To assess resting state (RS) functional connectivity patterns associated with each variant of primary progressive aphasia (PPA) in a large cohort of patients recruited from two clinical centres.

**Methods:** 40 nonfluent (nfvPPA), 28 semantic (svPPA), and 22 logopenic (lvPPA) patients and 62 healthy controls (HC) underwent neuropsychological/clinical assessments, and a MRI scan with T1-weighted and RS-fMRI sequences. Brain networks of interest were compared between groups accounting for gray matter atrophy.

**Results:** Compared to HC, all PPA patients showed reduced connectivity in the left posterior cingulum and inferior parietal cortex within the default mode network (DMN). Compared to HC and lvPPA, nfvPPA and svPPA patients showed: reduced connectivity in the left superior frontal and parietal gyri, and increased connectivity in the right lateral parietal cortex within the left frontoparietal network, in the bilateral insular cortices and anterior cingulum within the salience network, in the left cerebellar subregion VIII within the cerebellar network, and in the left anterior cingulate cortex within the frontostriatal network. Compared to HC, lvPPA patients showed increased connectivity in the right insula and thalamus within the salience network.

**Conclusion:** In all PPA variants, the DMN is affected

regardless the underlying pathology. NfvPPA and svPPA cases showed common alterations reflecting their common frontotemporal degeneration. Compared to the other 2 variants, lvPPA showed increased connectivity in anterior regions, as observed in patients with typical Alzheimer's disease.

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## EPO1002

### Clinical comparison of FTD cases carrying intermediate C9ORF72 expansions (16 to 25 repeats) versus cases carrying the full (>30 repeats) expansion

P. Agüero<sup>1</sup>, M.J. Sainz Artiga<sup>1</sup>, J. Gallego-Merlo<sup>2</sup>, C. Ayuso<sup>2</sup>, J. Pérez-Pérez<sup>3</sup>, E. Gómez-Tortosa<sup>1</sup>

<sup>1</sup>Neurology, Fundacion Jimenez Diaz, Madrid, Spain,

<sup>2</sup>Genetics, Hospital Universitario Fundación Jiménez Díaz, Madrid, Spain, <sup>3</sup>Secugen SL, Madrid, Spain

**Background and aims:** Full C9ORF72 hexanucleotide expansions (>30 repeats) are associated with frontotemporal lobar degeneration (FTLD) and amyotrophic lateral sclerosis (ALS).

There is evidence supporting that intermediate expansions (16-29 repeats) may also have pathogenic impact.

**Methods:** Retrospective study of a cohort with FTD recruited at a Dementia Unit.

**Results:** There were 18 probands carrying full expansions (plus 2 siblings n=20, 40% men, mean age at onset 62,6 years) and 17 with intermediate expansions (16 to 25 repeats, 29% men, mean age at onset 65,6 years). Each group corresponded to around 5% of the cohort. None of 216 controls had alleles with more than 14 repetitions.

All cases with the full expansion had a family history of dementia or ALS, while 7 of the cases with intermediate expansion had no family history. Behavioral variant was the most common phenotype in both groups, as well as symmetric frontotemporal atrophy on neuroimaging. ALS was more frequent in cases with full (3 probands plus another 4 proband having a sibling with ALS) versus intermediate expansions (1 proband plus another 2 probands with a sibling). Parkinsonism was present in around 14% of cases in both groups.

**Conclusion:** Intermediate C9ORF72 expansions are as prevalent as full expansions in our FTD cohort. Patients carrying intermediate expansions have a similar dementia phenotype but association with ALS is less frequent and they are less likely to have a positive family history.

**Disclosure:** Nothing to disclose

## EPO1003

### Nonsense mutation in ADAM10 (p.tyr167\*) associated with familial Alzheimer's disease: a clinical correlate of alpha-secretase haploinsufficiency

P. Agüero<sup>1</sup>, M.J. Sainz Artiga<sup>2</sup>, M.-S. García-Ayllón<sup>3</sup>, J. Sáez-Valero<sup>3</sup>, R. Téllez<sup>4</sup>, R. Guerrero-Lopez<sup>5</sup>, J. Pérez-Pérez<sup>6</sup>, A. Jimenez-Escrig<sup>7</sup>, E. Gómez-Tortosa<sup>2</sup>

<sup>1</sup>Madrid, Spain, <sup>2</sup>Neurology, Fundacion Jimenez Diaz,

Madrid, Spain, <sup>3</sup>Instituto Neurociencias Alicante, Universidad Miguel Hernández, Alicante, Spain,

<sup>4</sup>Inmunology, Hospital Universitario Fundación Jiménez

Díaz, Madrid, Spain, <sup>5</sup>Neurology-Genetics, Fundacion

Jimenez Diaz Hospital, Madrid, Spain, <sup>6</sup>Secugen SL, Madrid,

Spain, <sup>7</sup>Majadahonda, Spain

**Background and aims:** The disintegrin metalloproteinase 10 (ADAM10) is the main  $\alpha$ -secretase acting in the non-amyloidogenic processing of the amyloid precursor protein. Some ADAM10 gene variants have been associated with higher susceptibility to develop late-onset disease, though a clear clinical-genetic correlate has not been reported yet. We present a family in whom development of AD was associated with a nonsense ADAM10 prodomain mutation (p.Tyr167\*) causing haploinsufficiency.

**Methods:** Clinical-genetic and CSF biomarker study of a family with AD.

**Results:** The p.Tyr167\* mutation was absent from public databases and segregated with the disease. Age at onset for 3 affected siblings ranged from 58 to 68 years, and their clinical phenotypes have been noteworthy for the slow disease evolution. CSF Ab42, total tau, and phosphorylated tau biomarkers were consistent with AD. Haploinsufficiency was demonstrated by: a) ADAM10 isoforms in CSF decreased around 50%, and b) 70% reduction of CSF sAPP $\alpha$  peptide, both compared to controls. Sporadic AD cases had a similar decrease in CSF ADAM10 levels to that of mutants, though their sAPP $\alpha$  levels resembled those of controls.

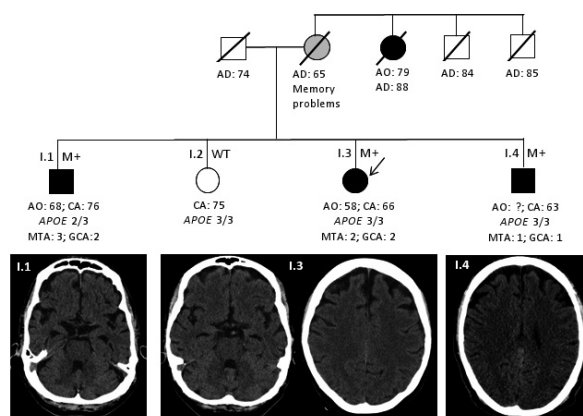


Figure 1 Family tree including ADAM10 Tyr167\* mutation and clinical status

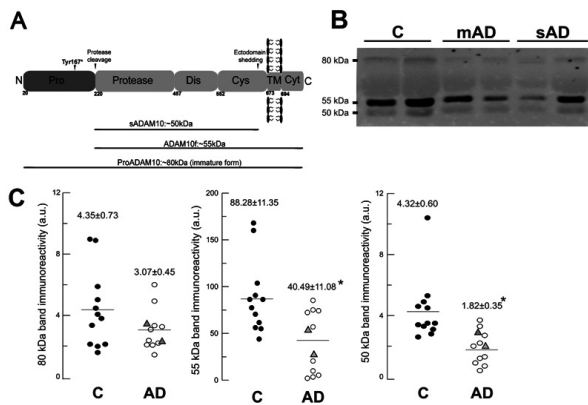


Figure 2 Levels of ADAM10 in AD CSF samples

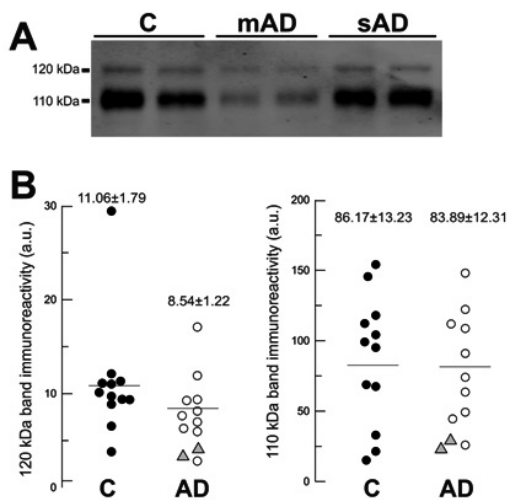


Figure 3 Levels of sAPPα peptide in CSF samples

**Conclusion:** This family provides the first example of a deleterious coding variant in ADAM10 associated with familial AD, and further implicates the amyloidogenic process in the development of the disease. Similarities between clinical and biomarker findings suggest that this family could represent a genetic model of sporadic late-onset AD due to an age-related down-regulation of α-secretase activity.

**Disclosure:** Nothing to disclose

## EPO1004

### Blood-brain barrier dysfunction in Alzheimer’s disease is different in female and male patients

I. Antunes Cunha<sup>1</sup>, M. Táguas Pereira<sup>1</sup>, C. Fernandes<sup>1</sup>, C. Maia<sup>2</sup>, J. Durães<sup>1</sup>, D. Duro<sup>1</sup>, H. Gens<sup>1</sup>, B. Santiago<sup>1</sup>, R. Pascoal<sup>1</sup>, M.J. Leitão<sup>1</sup>, I. Baldeiras<sup>1</sup>, I. Santana<sup>1</sup>  
<sup>1</sup>Neurology, CHUC, Coimbra, Portugal, <sup>2</sup>Neuroradiology, CHUC, Coimbra, Portugal

**Background and aims:** Blood-brain barrier (BBB) breakdown, measured by CSF/serum albumin ratio(Qalb), can be linked to Alzheimer’s disease (AD). Recent studies report that BBB impairment may be associated with sex-related differences and brain microvascular damage but doesn’t relate to amyloid pathology or APOE genotype. We assessed if the disruption of BBB was associated with demographic and clinical data, AD biomarkers and the APOE genotype. We also investigated possible risk factors for BBB damage.

**Methods:** We included 206 AD patients and compared demographic variables, cognitive and laboratorial measures, namely CSF protein electrophoresis, CSF amyloid β, total tau, and p-tau, and APOE4 genotype. BBB impairment was defined a priori as a CSF albumin index>9. Descriptive and comparative statistical analysis was performed, defining p<0.05 as statistically significant.

**Results:** BBB breakdown was more apparent in men (p=0.001). Patients with BBB impairment were more likely to be older (p=0.061) and have later onset (p=0.075), but didn’t have a higher prevalence of diabetes, hypertension or hypercholesterolemia. We didn’t find any associations between the Qalb and APOE genotype (p=0.306). Qalb was associated with coexisting obesity (p=0.003) and smoking (p=0.029). When adjusted for other variables, Qalb was only independently associated with sex (β=-0.001, -CI=[-0.002,-0.001], p=0.003).

**Conclusion:** BBB integrity isn’t directly associated with Aβ pathology or the APOE ε4 genotype. BBB impairment may be associated with obesity and smoking. The lower BBB integrity in males suggests a sex-specific difference, possibly related to different prevalence. Sex-specific BBB integrity may be important in therapeutic interventions, as it may modulate the drug SNC penetrance.

**Disclosure:** Nothing to disclose

## EPO1005

**A novel machine learning algorithm to predict the lewy body dementias using clinical and neuropsychological scores**

A. Bougea<sup>1</sup>, C. Gkoumas<sup>2</sup>, E. Efthymiopoulou<sup>1</sup>, P. Giannaki<sup>3</sup>, K. Zikos<sup>4</sup>

<sup>1</sup>First department of Neurology, National and Kapodistrian University, Eginition Hospital, Athens, Greece, <sup>2</sup>Psychology, University of Cyprus, Nicosia, Cyprus, <sup>3</sup>Maison Sofos elderly care unit, Hellenic Air Force Hospital, Athens, Greece

**Background and aims:** Parkinson's disease dementia (PDD) and Dementia with lewy bodies (DLB) are dementia syndromes that overlap in many clinical and neurocognitive features, making their diagnosis difficult in clinical practice, particularly in advanced stages. We propose a highly predictive machine learning algorithm, based only on non-invasively and easily in-the-clinic collectable predictors, to identify these disorders.

**Methods:** The algorithm was developed using dataset from 2 general hospitals, employing a sample of 58 PDD and 28 DLB subjects whose diagnosis was confirmed by 2 chief physicians. A restricted set of information regarding clinico-demographic characteristics, 7 neuropsychological tests (mini mental, PD Cognitive Rating Scale, Brief Visuospatial Memory test, Symbol digit written, Wechsler adult intelligence scale, trail making A and B) was used as predictors. 2 classification algorithms, logistic regression and K-Nearest Neighbors (K-NNs), were investigated for their ability to predict successfully whether patients suffered from PDD or DLB.

**Results:** The K-NN classification model classified with accuracy 91.2% of overall cases based on 15 best clinical and cognitive features achieving 96.42% sensitivity and 67% specificity on discriminating between the 2 conditions. Regarding the binomial logistic regression classification model, it achieved an accuracy of 87.5% on average based on 15 best features, showing 93.93% sensitivity and 57% specificity.

**Conclusion:** This algorithm has a high prognostic performance to predict these disorders with high accuracy using easy -to calculate- neuropsychological scores. Furthermore, it improves the recruitment in clinical trials, which could potentially be used as additional decision-making tools in the clinical practice.

**Disclosure:** Nothing to disclose

## EPO1006

**Progression of brain functional connectivity changes associated with altered cognition in amyotrophic lateral sclerosis**

E. Canu<sup>1</sup>, F. Agosta<sup>2</sup>, V. Castelnovo<sup>1</sup>, N. Riva<sup>3</sup>, D. Calderaro<sup>1</sup>, Y. Falzone<sup>4</sup>, B. Poletti<sup>5</sup>, V. Silani<sup>5</sup>, M. Filippi<sup>1</sup>

<sup>1</sup>Neuroimaging Research Unit, Institute of Experimental Neurology, Division of Neuroscience, IRCCS San Raffaele Scientific Institute, Milan, Italy, <sup>2</sup>Neuroimaging Research Unit, Institute of Experimental Neurology, Division of Neuroscience, IRCCS San Raffaele Scientific Institute and Vita-Salute San Raffaele University, Milan, Italy,

<sup>3</sup>Neurorehabilitation Unit, IRCCS San Raffaele Scientific Institute, Milan, Italy, <sup>4</sup>Neurology Unit, IRCCS San Raffaele Scientific Institute, Milan, Italy, <sup>5</sup>Department of Neurology and Laboratory of Neuroscience, IRCCS Istituto Auxologico Italiano, Milan, Italy

**Background and aims:** To investigate the progression of brain functional connectivity alterations in patients with amyotrophic lateral sclerosis (ALS) and to define the relationship between ALS cognitive alterations and Resting State-Functional Connectivity (RS-FC) changes over time.

**Methods:** At baseline and after 6 months, 23 newly diagnosed ALS patients underwent 3D T1-weighted MRI, RS-fMRI and a computer-based battery (Test of Attentional Performance-TAP). To assess RS-FC over time, an independent component analysis was performed. For each network of interest, general linear models accounting for grey matter atrophy assessed RS-FC changes over time and the relationship between RS-FC and cognitive changes.

**Results:** Longitudinally, ALS patients showed an increased FC in the left anterior cingulate cortex, left middle frontal gyrus and bilateral superior frontal gyrus within the frontostriatal network, and in the left middle frontal gyrus, right inferior frontal gyrus and bilateral inferior parietal gyri within the left frontoparietal network. We observed that a worse performance at baseline TAP divided attention subtest was related with increased FC over time in the left middle frontal gyrus within the frontostriatal network. No association emerged between RS-fMRI and cognitive changes over time.

**Conclusion:** Over 6 months, FC progressed beyond the brain motor network. Increased connectivity in frontal regions in relation with greater frontal-executive deficits at baseline suggests that it is likely not a mechanism of compensation but rather a sign of disease progression as observed in the frontotemporal lobar degeneration. These findings offer new potential markers for monitoring the ALS progression.

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## EPO1007

**Brain functional connectivity associated with the right temporal degeneration**

E. Canu<sup>1</sup>, M. Leocadi<sup>1</sup>, D. Calderaro<sup>1</sup>, V. Castelnovo<sup>1</sup>, F. Caso<sup>2</sup>, P. Caroppo<sup>3</sup>, S. Prioni<sup>3</sup>, L. Tremolizzo<sup>4</sup>, I. Appollonio<sup>4</sup>, P. Valsasina<sup>1</sup>, M. Filippi<sup>1</sup>, F. Agosta<sup>1</sup>  
<sup>1</sup>Neuroimaging Research Unit, Institute of Experimental Neurology, Division of Neuroscience, IRCCS San Raffaele Scientific Institute, Milan, Italy, <sup>2</sup>Neurology Unit, IRCCS San Raffaele Scientific Institute, Milan, Italy, <sup>3</sup>Unit of Neurology - Neuropathology, Fondazione IRCCS Istituto Neurologico Carlo Besta, Milan, Italy, <sup>4</sup>Neurology Unit, "San Gerardo" Hospital and University of Milano-Bicocca, Monza, Italy

**Background and aims:** The aim of the present study was to assess functional connectivity (FC) patterns associated with the right temporal variant of frontotemporal dementia (rtvFTD) in comparison with normal aging.

**Methods:** We enrolled 6 patients with a recent clinical and imaging-based diagnosis of rtvFTD and 20 age- and sex-matched healthy controls (HC). A comprehensive neuropsychological assessment targeting all cognitive domains and resting state functional MRI (RS-fMRI) were obtained from all participants. RS FC networks were identified using an independent component analysis (GIFT toolbox, SPM12). For each network of interest, comparisons between groups were performed. Differences in cognitive scores were also measured between groups.

**Results:** At the neuropsychological assessment, all patients presented with behavioural changes, difficulties in naming and language comprehension, abstract reasoning, and emotion and famous faces identification. Compared to HC, rtvFTD patients showed increased connectivity in the right fusiform gyrus within the anterior-temporal network, and in the right inferior temporal cortex (Brodmann area 20) within the right FPN.

**Conclusion:** This study showed that rtvFTD patients are characterized by altered FC in networks beyond the pure frontal and language circuits, mostly targeting pivotal regions involved in high-level visual processing. Whether the observed increased FC is a compensatory mechanism or rather reflects the underneath pathological process still needs to be determined. RS-fMRI is a fundamental tool which permits to improve the distinction between this rare and still poorly investigated condition and other variants of FTD.

**Disclosure:** Supported by: Italian Ministry of Health (GR-2010-2303035 and GR-2011-02351217); European Research Council (StG-2016\_714388\_NeuroTRACK).

## EPO1008

**Behavioural and psychological symptoms in mild cognitive impairment: could they differentiate Alzheimer dementia vs other dementia in very early stages?**

S. Caratozzolo<sup>1</sup>, A. Scalvini<sup>2</sup>, R. Turrone<sup>1</sup>, M. Cosseddu<sup>2</sup>, L. Rozzini<sup>2</sup>, A. Padovani<sup>3</sup>

<sup>1</sup>Neurology Unit, Department of Clinical and Experimental Sciences, University of Brescia, Brescia, Italy, <sup>2</sup>Neuroscience Section, Department Clinical and Experimental Sciences, Neuroscience Section, Department Clinical and Experimental Sciences - University of Brescia - Brescia, Italy, <sup>3</sup>Department of Neurology, University of Brescia, Brescia, Italy

**Background and aims:** Neuropsychiatric symptoms (NPS) are core features of Alzheimer's dementia (AD) and related dementias. These symptoms are currently to manifest in early disease such as Mild Cognitive Impairment (MCI). Depression, anxiety, apathy, sleep disorders have been hypothesized to represent a prodromal stage of dementia increasing the risk for conversion from minor to major neurocognitive disorder. We assessed frequency and severity of NPS in MCI patients evaluating their relationship with presence of amyloid biomarker assessment (PET or CSF).

**Methods:** 423 subjects affected by MCI were enrolled. Of those, 177 with unclear clinical diagnosis, were evaluated for amyloid biomarkers. Geriatric Depression Scale and Neuropsychiatric Inventory were administered to understand prevalence and severity of NPS.

**Results:** Female gender was prevalent (58.2%) in a sample with a mean age of 69.5 (5.8 SD). Of the amyloid positive patients, the 49.2% was positive for depressive symptoms, while only the 33.3% of the amyloid negative reported depressive symptoms. Total burden of NPS was higher in amyloid positive patients (26.4 SD 4.4) than negative ones (18.9 SD 3.7). Neurodegenerative dementia due to AD showed a rate of depression, anxiety and apathy are the prevalent NPS in amyloid positive patients while hallucinations, and sleep and appetite behaviour disorders are prevalent in amyloid negative patients.

**Conclusion:** AD prevalent NPS, (depression and apathy) were significantly more present in amyloid positive MCI patients. Those findings confirmed that NPS in prodromal phases could help physicians in defining diagnosis of dementia since prodromal phases.

**Disclosure:** Nothing to disclose

## EPO1009

### Preliminary data from a study on clinical and neuroradiological correlations between cerebral microbleeds and different subtypes of mild cognitive impairment

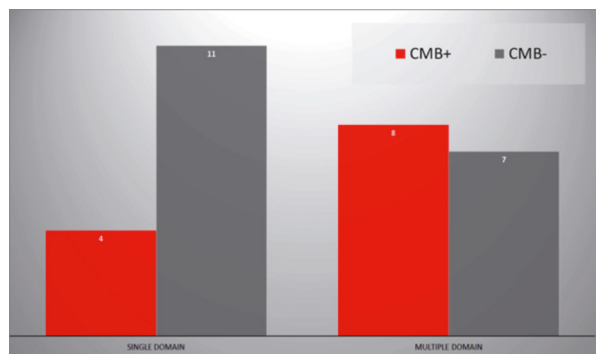
L. Cipriano<sup>1</sup>, M. Oliva<sup>1</sup>, D. Saracino<sup>2</sup>, S. Fantasia<sup>3</sup>, R. Conforti<sup>4</sup>, M. Cirillo<sup>5</sup>, L. Fulgione<sup>6</sup>, S. Bonavita<sup>5</sup>, C. Coppola<sup>3</sup>

<sup>1</sup>Second Division of Neurology, University of Campania "Luigi Vanvitelli", Naples, Italy, <sup>2</sup>ICM-Inserm U1127 - UPMC-P6 UMR S1127 Hôpital de la Pitié-Salpêtrière and University of Campania "Luigi Vanvitelli", Paris and Naples, France, <sup>3</sup>University of Campania "Luigi Vanvitelli", Naples, Italy, <sup>4</sup>Neuroradiology Unit, Second University of Naples, Naples, Italy, <sup>5</sup>Department of Medical, Surgical, Neurological, Metabolic and Aging Sciences, Second University of Naples, Naples, Italy, Division of Neuroradiology, Naples, Italy, <sup>6</sup>Neuroradiology Service, Department of Radiology, University of Campania "Luigi Vanvitelli", Naples, Italy

**Background and aims:** Mild cognitive impairment (MCI) is a cognitive decline greater than expected for an individual's age and education level but that does not interfere with activities of daily life. Cerebral Microbleeds (CMBs) are small hypointense lesions seen in specific MRI sequences, expression of impaired small vessel integrity, due to either hypertensive vasculopathy or cerebral amyloid angiopathy. Our aim is to explore correlations between the presence and location of CMBs and different subtypes of MCI.

**Methods:** Our cohort consisted of 30 patients with MCI who underwent an extensive neuropsychological assessment defining the subtype. We then performed a brain MRI-scan including T2\*Gradient-Recalled Echo and Susceptibility-Weighted Imaging sequences. Microbleed Anatomical Rating Scale was used to assess CMBs burden and location.

**Results:** Neuropsychological evaluation showed 15 multiple-domain and 15 single-domain MCI; 15 subjects were amnesic (aMCI) and 15 non-amnesic (naMCI). CMBs were present in 12 patients and absent in 18 patients. In the CMB+ group, 8/12 patients were MD (66.6%); in the CMBs- group only 7/18 patients were MD (38.8%). All CMBs+ patients had lobar-CMBs, with deep CMBs in 3 cases.



Comparison between CMB+ and CMB- groups in relation to the clinical subtype of MCI, showing a higher prevalence of CMBs in multiple domain MCI.

**Conclusion:** Although the number of patients is too small to outline definitive conclusions, the lobar location of all CMBs+ cases may indicate that amyloid deposition in the wall of vessels has probably a greater role than cardiovascular risk factors in determining CMBs formation. Another more interesting observation, never reported, is that CMBs seems to have a higher prevalence in MD subtypes, thus suggesting that the presence of CMBs may extend the cognitive spectrum of MCI.

**Disclosure:** Nothing to disclose

## EPO1010

**Approximating dementia prevalence in population-based surveys of aging worldwide: an unsupervised machine learning approach**

L. Cleret de Langavant<sup>1</sup>, E. Bayen<sup>2</sup>, A.-C. Bachoud-Levi<sup>3</sup>, K. Yaffe<sup>4</sup>

<sup>1</sup>Créteil, France, <sup>2</sup>Pitié-Salpêtrière Hospital, Paris, France, <sup>3</sup>Neurology, Mondor, Paris, France, <sup>4</sup>Psychiatry, Neurology and Epidemiology and Biostatistics, UCSF, San Francisco, USA

**Background and aims:** Estimating dementia prevalence in low and middle-income countries (LMIC) remains challenging. We sought to calculate dementia prevalence in high income countries (HIC) and LMIC using unsupervised machine-learning in population-based surveys of aging.

**Methods:** We applied hierarchical clustering after principal component analysis to participants' data from 10 studies: HRS (USA, 2014, N=18,290), SHARE (Europe and Israel, 2015, N=67,226) MHAS (Mexico, 2015, N=14,645), ELSI (Brazil, 2016, N=9412), CHARLS (China, 2015, N=16,262), IFLS (Indonesia, 2014-2015, N=7999), LASI (India, 2016, N=1083), SAGE-Ghana (2007, N=4294), SAGE-South Africa (2007, N=3840), SAGE-Russia (2007-2010, N=3643). We used demographics, health factors, functional status, cognition and neuropsychiatric symptoms (NPS) to identify individuals with high likelihood of dementia. We approximated dementia prevalence using weighting methods.

**Results:** Our classification identified individuals with high likelihood of dementia based on impaired functional status, mobility, cognition and higher NPS. Estimated number of dementia cases (standardized prevalence over age 50) was in China: 40.2 million (15.5%), India: 18.0 million (13.7%), Russia: 5.2 million (14.9%), European countries and Israel from SHARE: 5.0 million (4.6%), United States: 4.4 million (4.0%), Brazil: 2.2 million (8.0%), Mexico: 1.6 million (8.5%), Indonesia: 1.3 million (5.2%), South Africa: 1.0 million (19.2%), Ghana: 319 thousand (19.2%). Our estimations were similar to prior dementia estimates for HIC but much higher than previous ones in LMIC.

**Conclusion:** Unsupervised machine-learning can approximate dementia prevalence in population-based surveys. This approach suggests dementia affected almost 130 million people worldwide in 2015. It may be helpful to inform public policy and interventions.

**Disclosure:** LCL was supported by a Global Brain Health Institute and Alzheimer's Association grant for this research (GBHI\_ALZ-18-544248).

## EPO1011

**Amyloid PET imaging: potential applications to white matter pathology in neurodegenerative disorders**

A. Colombi<sup>1</sup>, T. Carandini<sup>2</sup>, A. Arighi<sup>2</sup>, G.G. Fumagalli<sup>2</sup>, M.A. De Riz<sup>2</sup>, G. Marotta<sup>3</sup>, M. Bozzali<sup>4</sup>, E. Scarpini<sup>5</sup>, D. Galimberti<sup>5</sup>, A.M. Pietroboni<sup>2</sup>

<sup>1</sup>University of Milan, Milan, Italy, <sup>2</sup>Neurology Unit, IRCCS Ospedale Maggiore Policlinico, University of Milan, Milan, Italy, <sup>3</sup>Nuclear medicine, University of Milan, Milan, Italy, <sup>4</sup>Neuroimaging Laboratory, IRCCS Santa Lucia Foundation, Rome, Italy, <sup>5</sup>Neurology, University of Milan, Milan, Italy

**Background and aims:** White matter (WM) pathology in dementia has been broadly attributed to cerebral microangiopathy. Previous studies speculated a role of  $\beta$ -amyloid ( $A\beta$ ) in this process accounting for the higher WM lesion load (LL) described in Alzheimer disease (AD). Recently, positron emission tomography (PET) with  $A\beta$  tracers (amy-PET) has been regarded as an emerging tool for the assessment of microstructural WM damage.

**Methods:** 45 cognitively impaired patients underwent brain magnetic resonance imaging (MRI), amy-PET and  $A\beta$  1-42 determination from CSF samples. 24 subjects exhibiting concordant results between amy-PET (evaluating also cortical amyloid deposition) and CSF analysis were recruited and splitted according to their amyloid positivity ( $Ab^+$  vs  $Ab^-$ ). LL quantification and brain volumes segmentation were performed. Standardized uptake values ratio (SUVR) were calculated in grey matter (GM), NAWM and in DWM after MRI coregistration.

**Results:**  $Ab^+$  showed a higher WMLL ( $p=0.05$ ) as well as higher SUVR in all brain tissues compared to  $Ab^-$  ( $p<0.001$ ). No correlation between CSF  $A\beta$  levels and DMW and NAWM SUVR was found in  $Ab^+$ , whereas in  $Ab^-$  CSF  $A\beta$  levels showed direct correlation with DMW ( $p=0.006$ ) and NAWM SUVR ( $p=0.05$ ). CSF  $A\beta$  concentration was the best predictor of DWM ( $p=0.003$ ) and NAWM SUVR ( $p=0.049$ ) in  $Ab^-$ . In  $Ab^+$  only direct correlations among WM and GM SUVR were found.

**Conclusion:** Our data support that amyloid pathology may be involved in microstructural myelin damage in non-AD dementia, whereas amy-PET seems unsuitable to assess WM damage in AD patients as a consequence of amyloid accrual therein.

**Disclosure:** Nothing to disclose

## EPO1012

**Transcranial magnetic stimulation evaluation in patients with cognitive impairment: a three-year follow up study**

F. Di Lorenzo<sup>1</sup>, C. Motta<sup>1</sup>, S. Bonni<sup>1</sup>, C.F. Caltagirone<sup>1</sup>, A. Martorana<sup>2</sup>, G. Koch<sup>1</sup>

<sup>1</sup>Non Invasive Stimulation Unit, IRCCS Fondazione Santa Lucia, Rome, Italy, <sup>2</sup>University of Rome Tor Vergata, Department of Neuroscience, Fondazione Santa Lucia, Rome, Italy

**Background and aims:** Alzheimer's disease (AD) is characterized by loss of synaptic connections, cell death and disruption of structural and functional networks. One of the most consistent findings is the impairment of cortical plasticity, especially Long Term Potentiation (LTP) mechanisms. Recently, the use of new diagnostic criteria allowed to consider AD as a clinico-biological entity identifiable in vivo on the presence of biomarkers. In light of these new criteria, aim of the current work is to investigate cortical plasticity in patients with hippocampal type memory impairment admitted for the first time in the memory clinic and stratified according to CSF biomarker profile; moreover we followed patients up to a period of three years to explore the relationship between neurophysiological, neuropsychological and CSF biomarker and clinical progression.

**Methods:** 73 patients were recruited and followed up for 36 months. They underwent CSF sampling and Transcranial Magnetic Stimulation to investigate LTP and intracortical circuits. According to the new AD criteria we divided patients in 3 groups: 1) Mild Cognitive Impaired (MCI) patients (n=21); Prodromal AD (PROAD) patients (n=24); AD Dementia (ADD) patients (n=28).

**Results:** ADD and PROAD showed a paradoxical reversal of LTP, while no difference was observed for intracortical circuits. Kaplan-Meier analyses showed that patients expressing the worst LTP were the ones to progress faster.

**Conclusion:** LTP impairment drives the clinical progression to dementia in patients at prodromal stages identifiable with the new criteria based on biomarkers' presence. These results pave the way for the identification of new therapeutic targets such as synaptic plasticity modulators.

**Disclosure:** Nothing to disclose

## EPO1013

**Altered cerebellar cortical plasticity in Alzheimer's disease patients**

F. Di Lorenzo<sup>1</sup>, S. Bonni<sup>1</sup>, S. Picazio<sup>1</sup>, C. Caltagirone<sup>1</sup>, A. Martorana<sup>2</sup>, K. Giacomo<sup>1</sup>

<sup>1</sup>Non Invasive Stimulation Unit, IRCCS Fondazione Santa Lucia, Rome, Italy, <sup>2</sup>University of Rome Tor Vergata, Department of Neuroscience, Fondazione Santa Lucia, Rome, Italy

**Background and aims:** Recent evidence suggested that cerebellum undergoes degenerative changes in Alzheimer's disease (AD): the posterior cerebellar lobes are significantly smaller in AD patients compared to healthy subjects, and atrophy of the posterior cerebellar regions is associated with poorer cognitive performance. Transcranial Magnetic Stimulation (TMS) of the cerebellum is able to activate underlying cerebello-thalamo-cortical pathways that are linked with distinct intracortical M1 circuits.

In AD patients it is already been described an altered cortical plasticity following M1 theta burst stimulation (TBS), but mechanisms of cerebellar plasticity have not been investigated yet. Thus we aimed at examining the effect of continuous and intermittent cerebellar TBS (respectively cTBS and iTBS) over M1 excitability in a sample of AD patients.

**Methods:** We recruited 15 newly diagnosed AD patients and 10 age-matched Healthy Control (HC). All subjects underwent in 2 different sessions cTBS and iTBS. 20 consecutive Motor evoked Potentials (MEPs) were collected before and after TBS.

**Results:** AD patients showed an impairment of cortical plasticity mechanisms, as detected by after effects of iTBS. Indeed, while HS showed the expected increase of amplitude of the MEPs after iTBS,

AD patients did not have any increase of MEPs, that instead seemed to decrease showing an impairment of Long Term Potentiation (LTP) mechanisms even after stimulating the cerebellum. No difference was observed for cTBS protocols, in which both populations exhibited the expected decrease of MEP amplitude

**Conclusion:** Cerebellum is affected by AD pathology and neuroimaging and neurophysiological studies showed alterations in morphometry and functions. Given its role in high order cognitive functions, new potential therapeutic strategies could be built up in the future to modulate cerebellum activity.

**Disclosure:** Nothing to disclose



## EPO1014

**Dyrk1a Inhibition as a treatment for AD**

T. Dunckley<sup>1</sup>, C. Foley<sup>2</sup>, C. Hulme<sup>2</sup>, R. Velazquez<sup>1</sup>  
<sup>1</sup>Arizona State University, Tempe, USA, <sup>2</sup>University of Arizona, Tucson, USA

**Background and aims:** The Dyrk1a kinase phosphorylates APP and tau, contributing to amyloid and tau pathologies of Alzheimer's disease. We previously demonstrated that inhibition of Dyrk1a in the 3xTg-AD mouse model improves memory, reduces amyloid plaques, and reduces insoluble and hyperphosphorylated forms of tau protein if inhibition occurs after pathology onset. However, overt neurofibrillary pathology was unaffected, a result not unexpected for an inhibitor of tau phosphorylation. Here we initiated treatment prior to pathology onset and tested for delay of amyloid and tau pathology in the 3xTg-AD mouse to determine if reducing tau phosphorylation can delay neurofibrillary pathology onset.

**Methods:** 3xTg-AD mice were dosed once daily with a Dyrk1a inhibitor (Dyr219) via IP injection starting at 6 months of age. At ages 9 and 12 months, amyloid and tau pathologies were assessed.

**Results:** Dyr219 significantly delayed the onset of amyloid and tau pathologies. No mice had either pathology at 9 months of age. At 12 months of age, mice had minimal plaque pathology and 25% of the cohort had no tau pathology. In contrast, vehicle treated mice had robust amyloid and tau pathology.

**Conclusion:** Dyrk1a inhibition significantly delays the onset of amyloid and tau pathology in the 3xTg-AD mouse model of AD. These results suggest that Dyrk1a inhibition may be a reasonable approach for the treatment of AD.

**Disclosure:** Research was supported by grants to TD from the Alzheimer's Drug Discovery Foundation and the Harrington Discovery Institute.

## EPO1015

**Dementia in patients with psychiatric disorders: neurodegenerative syndrome or pseudo-dementia?**

L. Fiondella<sup>1</sup>, G. Vinceti<sup>1</sup>, M. Tondelli<sup>1</sup>, M. Molinari<sup>2</sup>, S. Saleme<sup>1</sup>, A. Chiari<sup>2</sup>, G. Zamboni<sup>1</sup>

<sup>1</sup>Dipartimento di scienze Biomediche, metaboliche e neuroscienze, Università di Modena e Reggio Emilia, University of Modena and Reggio Emilia, Modena, Italy,

<sup>2</sup>Dipartimento Integrato di Neuroscienze, Azienda Ospedaliera-Universitaria di Modena (Italy), University of Modena and Reggio Emilia, Modena, Italy

**Background and aims:** The term pseudo-dementia (PDEM) refers to cases that closely mimic dementia, and has been especially used to describe the cognitive impairment occurring in patients with psychiatric disorders. However, neurodegenerative dementia syndromes (NDS) may also independently occur in these patients, therefore distinguishing between PDEM and NDS remains challenging. We studied baseline clinical, demographic and biomarkers differences between patients with psychiatric disorders subsequently diagnosed with PDEM or NDS.

**Methods:** We retrospectively recruited all patients with a diagnosis of psychiatric disorders and cognitive complaint referred to the Cognitive Neurology Clinic of Modena. They had undergone neuropsychological assessment, structural MRI and FDG-PET imaging, and measurement of CSF biomarkers for AD when indicated. We stratified them in PDEM and NDS according to the diagnosis received at clinical follow-up based on the presence/absence of progression of cognitive impairment and/or development of symptoms suggestive of dementia syndromes, then compared the two groups.

**Results:** We identified 46 eligible patients, of whom 15 were diagnosed with NDS (13 bvFTD, 1 AD, 1 VaD) and 31 with PDEM at clinical follow-up. There were no baseline significant differences in demographical and CSF biomarkers data. There were no baseline differences in tests of verbal and visuospatial memory, WAIS-IV test, Trial Making Test, Raven's progressive Matrices, and Frontal Assessment Battery. At baseline NDS patients had worse performance in the Stroop Test than PDEM patients ( $p=0.049$ ).

**Conclusion:** Our study highlights the limited usefulness of neuropsychological test and CSF biomarkers in this context. Neuroimaging and clinical follow-up are essential for a correct differential diagnosis.

**Disclosure:** Nothing to disclose

## EPO1016

**Epidemiology of early onset dementia in Northern Italy**

L. Fiondella<sup>1</sup>, A. Chiari<sup>2</sup>, G. Vinceti<sup>1</sup>, C. Galli<sup>2</sup>, M. Tondelli<sup>1</sup>, T. Filippini<sup>1</sup>, M. Vinceti<sup>1</sup>, G. Zamboni<sup>1</sup>  
<sup>1</sup>Dipartimento di scienze Biomediche, metaboliche e neuroscienze, University of Modena and Reggio Emilia, Modena, Italy, <sup>2</sup>Dipartimento Integrato di Neuroscienze, Azienda Ospedaliera-Universitaria di Modena (Italy), Modena, Modena, Italy

**Background and aims:** Early onset dementia (EOD), defined as onset of dementia <65 years, frequently present with atypical, fast-progressing clinical syndromes, and has a significant impact on families and society. EOD epidemiologic data in Italy are scarce, and international estimates of prevalence are variable. We aimed at establishing EOD epidemiology in a defined population of 700.000 inhabitants in the Modena province, Northern Italy. **Methods:** We identified patients diagnosed with EOD residing in Modena province retrospectively from January 2006 to December 2016, and prospectively from January 2017 to June 2019. We collected clinical data such as age at onset, time delay from onset to diagnosis, and data on residence and occupational status.

**Results:** At the census date 30 June 2019 there were 258 patients with EOD. Prevalence was 74.3/100000 (71.2/100000 in males, 77.4/100000 in females) in the population aged 30-64, and 119.9/100000 (117.1/100000 in males, 122.6/100000 in females) in the population aged 45-64. Overall prevalence was 36.4/100000 inhabitants. Alzheimer's disease (AD) was the most frequent clinical diagnosis (113 patients, 43,8%) followed by the frontotemporal dementia spectrum (FTD) (78 patients, 30.23%), vascular dementia (24 patients, 9.3%), and Lewy bodies dementia (9 patents, 3,49%). Incidence was estimated in 46 new cases per year in the period 2016-2019, corresponding to approximately 13.17/100000 inhabitants.

**Conclusion:** We provide the first epidemiological data on EOD in Italy. These are consistent with the estimates calculated by transposing European data to the population of Modena province (estimated prevalence=200 patients, detected prevalence=258 patients).

**Disclosure:** Nothing to disclose

## EPO1017

**Biomarkers in saliva for Alzheimer's disease and other neurodegenerative diseases**

H.S. Gleerup Fornitz<sup>1</sup>, P. Høgh<sup>2</sup>, S.G. Hasselbalch<sup>1</sup>, A.H. Simonsen<sup>1</sup>  
<sup>1</sup>Danish Dementia Research Centre, Department of neurology, Rigshospitalet Copenhagen University Hospital, Copenhagen, Denmark, <sup>2</sup>Denmark, Roskilde Hospital, Roskilde, Denmark

**Background and aims:** The pathological changes of a plethora of neurodegenerative diseases begin decades prior to their clinical expression, and therefore there is a need for an early, inexpensive and noninvasive diagnostic biomarker that can detect the changes in the pre-symptomatic phase. Currently neuroimaging biomarkers and analysis of cerebrospinal fluid (CSF) biomarkers are used to aid the diagnosis of AD and other neurodegenerative diseases. However, neuroimaging is expensive and causes radiation, while lumbar puncture is an invasive procedure. Saliva is an easily obtained source of biomarkers, and therefore saliva could be a valid alternative to CSF, neuroimaging or even blood.

**Methods:** A systematic review investigating biomarkers in saliva for the diagnosis of AD, was conducted in order to identify potential biomarkers. Following the systematic review, a total of 222 saliva samples from patients and healthy controls were collected. The patients were diagnosed with AD, dementia with Lewy bodies (DLB), vascular dementia (VaD), mixed dementia, frontotemporal dementia (FTD) or normal pressure hydrocephalus (NPH).

**Results:** In the systematic review 16 studies were included, and 10 out of the 16 studies identified biomarkers with statistical significance between patients with AD and healthy controls. It was concluded that amyloid beta 1-42 (A42β), tau, lactoferrin and selected metabolites have potential as future salivary biomarkers for AD. Results from the cross-sectional study will be presented.

**Conclusion:** In conclusion, non-invasive biomarkers for AD are needed, and saliva is a viable source of AD biomarkers. Potential salivary biomarkers are currently being verified in our cross-sectional study.

**Disclosure:** Funding obtained from: Lundbeckfonden, Absalonfonden, Frimodt Heineke Fonden, Augustinus Fonden, Fonden for Neurologisk Forskning, Grosserer L. F. Foghts Fond

## EPO1018

**Identification of subtypes for the behavioral variant of frontotemporal dementia based on the assessment of disinhibition and compulsion**

V. Godefroy, D. Tanguy, I. Sezer, I. Le Ber, A. Bouzigues, R. Levy, B. Batrancourt, R. Migliaccio  
*ICM, Paris, France*

**Background and aims:** The behavioral variant of frontotemporal dementia (bvFTD) is characterized by cognitive and behavioral decline due to the progressive brain damage of frontal and temporal regions. We aimed to: 1. identify bvFTD subtypes through the behavioral assessment of social disinhibition and perseveration/compulsion; 2. disentangle the underlying functional and anatomical correlates.

**Methods:** We assessed occurrences of 19 behaviors (derived from current clinical criteria of bvFTD) linked to disinhibition and perseveration/compulsion in a quasi-ecological setting in 17 bvFTD patients and 16 healthy controls (HC). Subjects also underwent neurocognitive tests and a structural MRI examination. Dimensions extracted through Principal Component Analysis from the behavior variables were compared between patients and HC. A clustering approach applied to behavioral scores allowed to isolate subgroups within the patients. Voxel based morphometry (VBM) was performed to identify specific grey matter atrophy patterns in each subgroup.

**Results:** We identified 2 principal behavioral dimensions significantly different between bvFTD and HC. Using scores on these 2 components (labelled as Compulsion and Disinhibition), we identified 2 different subgroups of bvFTD patients (bvFTD-G1 and bvFTD-G2). BvFTD-G1, characterized by high Disinhibition, had a small pattern of atrophy, centered on left medial anterior and posterior temporal cortices. BvFTD-G2, characterized by high Compulsion and cognitive impulsivity, presented a more diffuse and bilateral atrophy pattern largely involving frontotemporal and subcortical regions.

**Conclusion:** The assessment of disinhibition and compulsion symptoms in bvFTD patients allows the clinical stratification of bvFTD patients from less to more severe stages or forms, and the identification of specific brain circuits associated with disinhibition and compulsion.

**Disclosure:** Nothing to disclose

## Autonomic nervous system disorders

## EPO1019

**Cognitive performances in a cohort of pure autonomic failure patients**

L. Cani<sup>1</sup>, L. Sambati<sup>1</sup>, G. Giannini<sup>1</sup>, G. Calandra-Buonaura<sup>1</sup>, G.M. Asioli<sup>1</sup>, F. Oppi<sup>2</sup>, R. Poda<sup>2</sup>, P. Guaraldi<sup>1</sup>, P. Cortelli<sup>1</sup>

<sup>1</sup>Department of Biomedical and Neuromotor Sciences, University of Bologna, Bologna, Italy, <sup>2</sup>IRCCS Istituto delle Scienze Neurologiche, Bologna, Italy

**Background and aims:** Some patients with autonomic failure onset maintain a Pure Autonomic Failure (PAF) presentation for many years, others develop motor and/or cognitive deficits. While motor changes were exhaustively evaluated in previous cohorts, cognitive functions had been marginally examined with screening tests, like MMSE, to detect the presence or not of a dementia stage. To find out whether mild cognitive impairment is associated to phenotype conversion as well, we extensively assessed cognitive performances in a prospective cohort of PAF patients.

**Methods:** From the well-characterized IAF-BO cohort, we selected patients who meet PAF criteria and underwent a comprehensive neuropsychological evaluation (NPS).

**Results:** 24 patients performed NPS (mean age 59.75±8.66 years; disease duration 11.76±5.43 years). Although nobody had subjective complains, 10 out of 24 patients (41.7%) were cognitively impaired (CI), 9 on attentive-executive tests and 1 on short-term verbal memory. 5 out of 10 patients meet criteria for mild cognitive impairment (MCI). No differences in clinical variables, cardiovascular autonomic function parameters or sleep disturbances were found between cognitive normal, CI and MCI patients. After 2-8 years of observation, 3 patients converted to overt synucleinopathies. Nobody was cognitive impaired at NPS before conversion-time. None of PAF patients with CI patients converted during follow-up.

**Conclusion:** A comprehensive neuropsychological evaluation disclosed an attentive-executive dysfunction in 37.5% of PAF patients. Cognitive deficits are not strictly associated with phenotype conversion over 5 years. Further evaluations are mandatory to disclose the cause of cognitive impairment in PAF.

**Disclosure:** Nothing to disclose

## EPO1020

**Autonomic dysfunctions in males with Parkinson's disease: case control study**

B. Ciopleias<sup>1</sup>, N. Al-Masri<sup>1</sup>, T. Torok<sup>1</sup>, S. Diaconu<sup>2</sup>, R. Gioroc<sup>1</sup>, R. Zosin<sup>1</sup>, C.G. Falup-Pecurariu<sup>2</sup>  
<sup>1</sup>Neurology, County Emergency Clinic Hospital, Brasov, Romania, <sup>2</sup>Department of Neurology, Faculty of Medicine, Transilvania University, Brasov, Romania

**Background and aims:** Autonomic symptoms are frequent non-motor complains in Parkinson's disease (PD). The aim of this study is to assess the prevalence of autonomic symptoms in male PD patients and their impact on quality of life.

**Methods:** A case-control study including 63 male PD patients and 63 controls. The assessment of patients included the following instruments: Non-Motor Symptoms Questionnaire and Scale, Parkinson's Disease Questionnaire (PDQ-39) and SCOPA-AUT scale.

**Results:** In the study group, mean age was 66.8±14.3 years, mean duration of PD 6.2±4.7 years. PD patients disclosed a higher prevalence for all autonomic domains, compared to control group (p<0.05). The prevalence is higher for drug-naïve PD patients and increases with age and disease severity. The most affected domains were the urinary, gastrointestinal and sexual ones. There was a higher prevalence of autonomic symptoms in PD group vs control group: i.) erectile dysfunction in 63 (73.01%) vs 17 (26.98%) patients; ii.) constipation 38 (60.31%) vs 9 (9.52%); iii.) urgency 28 (44.44%) vs 4 (6.34%).

In the PD group there was at least one autonomic symptom described by 57 patients comparing with 12 in the control group. PD patients scored higher than controls in the total SCOPA-AUT score. Mean total SCOPA-AUT score was correlated with disease duration, disease severity and PDQ-39 scores.

**Conclusion:** Autonomic symptoms in PD have a high prevalence compared to control group. The actively assessment of these symptoms is needed in clinical practice.

**Disclosure:** Nothing to disclose

## EPO1021

**The autonomic innervation of hairy skin in humans: an in vivo confocal study**

V. Donadio<sup>1</sup>, A. Incensi<sup>2</sup>, V. Vacchiano<sup>1</sup>, R. Infante<sup>1</sup>, M. Magnani<sup>3</sup>, R. Liguori<sup>4</sup>

<sup>1</sup>Bologna, Italy, <sup>2</sup>UOC Clinica Neurologica, IRCCS Istituto Scienze Neurologiche Bologna, Bologna, Italy, <sup>3</sup>IRCCS Istituto Scienze Neurologiche di Bologna, Bologna, Italy,

<sup>4</sup>Department of Biomedical and Neuromotor Sciences, Alma Mater Studiorum, University of Bologna, Bologna, Italy

**Background and aims:** The chemical code skin autonomic innervation is complex and often difficult to ascertain and a detailed description of skin autonomic fiber subtypes is lacking in man. This study aimed to characterize subtypes of autonomic fibers in relationship to their target organs by means of an immunofluorescent technique and confocal microscopy

**Methods:** We studied 7 healthy subjects (5 males and 3 females) with mean age of 45±2 years. A combination of autonomic (i.e. tyrosine-hydroxylase- TH, and DbH and VACHT) and neuropeptidic (i.e. Calcitonin Gene Related Peptide-CGRP, substance P-SP, and vasoactive intestinal peptide-VIP) markers. Skin autonomic structures analysed included: 58 sweat glands (SG), 91 skin vessels mainly arterioles (SV) and 47 arrector pili muscle (APM)

**Results:** All skin structures presented sympathetic adrenergic and cholinergic innervations but with a different proportion. Sympathetic adrenergic fibers were particularly abundant around SV and APM whereas cholinergic fibers were mainly found around SG. Neuropeptides were differently expressed in sympathetic fibers: CGRP, SP and VIP were expressed in sympathetic cholinergic fibers but they were not found in adrenergic fibers. Pure cholinergic fibers expressing CGRP, SP or VIP were found in SV and APM and they likely represent parasympathetic fibers. Neuropeptidic fibers devoid of adrenergic and cholinergic markers were found in a small subset of fibers in all skin structures analyses with a likely sensory function.

**Conclusion:** Hairy skin contains sympathetic adrenergic and cholinergic fibers differently distributed around skin structures with different distribution of neuropeptides. The autonomic skin innervation also contains a small amount of likely parasympathetic and sensory fibers

**Disclosure:** This work was supported by Ricerca Finalizzata Ministero della Salute Grant RF-2016-02362047

## EPO1022

**The interplay between psychological distress and autonomic nervous system symptom burden**

A. Junakovic<sup>1</sup>, M. Skočić Hanžek<sup>2</sup>, M. Krbot Skoric<sup>3</sup>, M. Habek<sup>4</sup>

<sup>1</sup>Zagreb, Croatia, <sup>2</sup>Psychiatry Clinic, University Hospital Zagreb, Zagreb, Croatia, <sup>3</sup>University Hospital Center Zagreb, Zagreb, Croatia, <sup>4</sup>University of Zagreb, School of Medicine, Zagreb, Croatia

**Background and aims:** Psychological distress in the form of anxiety or depression is a common comorbidity in patients with disorders of the autonomic nervous system (ANS). Therefore, we aimed to evaluate the influence of depression, anxiety and stress on ANS symptom burden.

**Methods:** Consecutive patients referred to the Laboratory for testing of the ANS, Zagreb, Croatia for the evaluation of dysautonomia (N=524, mean age 43.98, 371 females) and healthy controls (N=88, mean age 41.15, 57 females) completed validated Croatian versions of the Depression Anxiety Stress Scales 21 (DASS-21) and Composite Autonomic Symptom Score 31 (COMPASS-31). There was no difference in age and sex between groups ( $p \geq 0.05$ ).

**Results:** Significantly more patients had severe or extremely severe depression, anxiety and stress compared to healthy controls (50 vs 2,  $p=0.036$ ; 143 vs 4,  $p=0.001$  and 63 vs 2,  $p=0.008$ ; respectively). All 3 subscales of DASS-21 and COMPASS-31 were significantly higher in patients compared to healthy controls (all  $p=0.001$ ). There was a significant correlation between depression, anxiety and stress subscales of DASS-21 and COMPASS-31 in both patients ( $r_s=0.444$ ,  $p=0.001$ ,  $r_s=0.501$ ,  $p=0.001$  and  $r_s=0.413$ ,  $p=0.001$ , respectively) and healthy controls ( $r_s=0.382$ ,  $p=0.001$ ,  $r_s=0.423$ ,  $p=0.001$  and  $r_s=0.461$ ,  $p=0.001$ , respectively). COMPASS-31 values were significantly higher in patients with DASS depression score  $\geq 9$ , anxiety score  $\geq 7$  and stress score  $\geq 14$  (all  $p=0.001$ ).

**Conclusion:** Reported psychological distress is common in patients referred to autonomic laboratory, and our study demonstrates that they are interwoven in the complex pathophysiological and clinical picture of ANS disorders.

**Disclosure:** Nothing to disclose

## EPO1023

**Psychiatric symptom burden in patients referred to the tilt-table test**

A. Junakovic<sup>1</sup>, M. Skočić Hanžek<sup>2</sup>, M. Krbot Skoric<sup>3</sup>, M. Habek<sup>4</sup>

<sup>1</sup>Zagreb, Croatia, <sup>2</sup>Psychiatry Clinic, University Hospital Zagreb, Zagreb, Croatia, <sup>3</sup>University Hospital Center Zagreb, Zagreb, Croatia, <sup>4</sup>University of Zagreb, School of Medicine, Zagreb, Croatia

**Background and aims:** To evaluate the difference in autonomic symptom burden and psychiatric symptom burden depending on the tilt-table test results.

**Methods:** Consecutive patients referred for testing of the ANS, Zagreb, Croatia, for the evaluation of dysautonomia (N=524, mean age 43.98, 371 females) and healthy controls (N=88, mean age 41.15, 57 females) completed validated Croatian versions of the Depression Anxiety Stress Scales 21 (DASS-21) and Composite Autonomic Symptom Score 31 (COMPASS-31). Furthermore, in all patients tilt-table test was performed. It was defined as abnormal if syncope, postural orthostatic tachycardia or orthostatic hypotension were diagnosed.

**Results:** In 168 (27.5%) patients the tilt-table test was abnormal. There was a significant difference in COMPASS-31 between patients with abnormal tilt-table test (group 1), patients with normal tilt-table test (group 2) and healthy controls (group 3), it was significantly lower in group 3 compared to groups 1 and 2 ( $p < 0.001$ ). Similarly, there was a significant difference in all 3 subscores of the DASS-21 between groups where healthy controls (group 3) had lower values in comparison with both groups of patients. We found an association between the results of the tilt-table test and pathological results of all 3 subscores of the DASS-21, where group 3 had the lowest and group 2 the highest percentage of people with depression score  $> 9$ , anxiety score  $> 7$  and stress score  $> 14$  (all  $p < 0.001$ ).

**Conclusion:** Psychiatric symptom burden is most prevalent in patients referred for evaluation of suspected ANS disorder with normal tilt-table test.

**Disclosure:** Nothing to disclose

## EPO1025

**Dysautonomia in children with inflammatory bowel disease and irritable bowel syndrome**

A. Geljić<sup>1</sup>, A. Junakovic<sup>2</sup>, I. Trivić<sup>1</sup>, S. Sila<sup>1</sup>, M. Krbot Skoric<sup>2</sup>, I. Hojsak<sup>1</sup>, M. Habek<sup>3</sup>

<sup>1</sup>Children's Hospital Zagreb, Zagreb, Croatia, <sup>2</sup>University Hospital Center Zagreb, Zagreb, Croatia, <sup>3</sup>University of Zagreb, School of Medicine, Zagreb, Croatia

**Background and aims:** To evaluate the presence of autonomic nervous system (ANS) abnormalities in children with inflammatory bowel disease (IBD) and irritable bowel syndrome (IBS).

**Methods:** In consecutive children with IBD (N=24, mean age 15.7, 16 females), IBS (N=18, mean age 14.8, 9 females) and aged and sex matched healthy controls (HC) (N=18, mean age 14.2, 9 females) we evaluated ANS symptoms with the Composite Autonomic Symptom Score (COMPASS-31). Heart rate (HR) and blood pressure (BP) responses to the Valsalva maneuver, HR response to deep breathing (RSA), BP response to passive tilt, heart rate variability (HRV) analysis and quantitative sudomotor axon reflex test (QSART) were performed.

**Results:** Children with IBS scored highest on COMPASS-31, followed by patients with IBD and HC (median 15.6, 8.7 and 2.3, respectively). No differences between groups were observed in HR and BP responses to the Valsalva maneuver, RSA and BP response to passive tilt. Children with IBS had higher sweat volumes on proximal lower leg on QSART ( $p = 0.039$ ). There was no difference in the HRV parameters between groups. However, children with IBS had significantly higher drop in total power of low frequency domain ( $p = 0.01$ ) and standard deviation of normal-to-normal intervals ( $p = 0.03$ ) and lowest drop in percentage of successive RR intervals that differ by more than 50ms ( $p = 0.01$ ) during tilt test compared to children with IBD and HC.

**Conclusion:** We found significant subjective and objective ANS abnormalities in children with IBS compared to children with IBD and HC.

**Disclosure:** Nothing to disclose

## EPO1026

### The relationship between autonomic regulation of cardiovascular function and body composition

T. Smoljo<sup>1</sup>, I. Stanić<sup>1</sup>, S. Sila<sup>2</sup>, U. Kovacic<sup>3</sup>, L. Crnošija<sup>4</sup>, A. Junakovic<sup>4</sup>, I. Adamec<sup>4</sup>, I. Hojsak<sup>2</sup>, M. Krbot Skoric<sup>4</sup>, M. Habek<sup>1</sup>

<sup>1</sup>School of Medicine, University of Zagreb, Zagreb, Croatia, Zagreb, Croatia, <sup>2</sup>Children's Hospital Zagreb, Zagreb, Croatia, <sup>3</sup>Institute of Pathophysiology, Medical Faculty, University of Ljubljana, Ljubljana, Slovenia, <sup>4</sup>University Hospital Center Zagreb, Zagreb, Croatia

**Background and aims:** The aim of this study was to investigate if there is a correlation between autonomic function tests and the body composition and shape in healthy young people.

**Methods:** In 32 healthy subjects (19 males and 13 females, mean age 22.1±1.9 years) cardiovascular reflex tests (heart rate (HR) and blood pressure (BP) responses to Valsalva maneuver and HR response to deep breathing) and the tilt table test were performed. Participants completed the Composite Autonomic System Score-31 (COMPASS-31), anthropometric measurement sequence (weight, height, upper arm, hips and waist circumference, triceps and subscapular skinfold), bioelectric impedance testing and hand grip strength measurement.

**Results:** Markers of obesity, other anthropometric measures, functional measures and basal metabolic rate (BMR) were significantly positively correlated with sBP and dBP in both supine and tilted positions. There was a positive correlation of  $\Delta$ HR with markers of obesity, functional marker of dominant handgrip strength (dHGS) and BMR. We have also found the correlation of HRV during rest and tilt with anthropometric measurements. Participants with body mass index (BMI) <25 had statistically significantly lower median values of HR, dBP in tilt-test, sBP at rest and sBP at tilt-test compared to participants who had BMI>25.

**Conclusion:** The results of this study have shown the relationship between higher sympathetic activity, evaluated by cardiovascular regulation, and higher share of adipose tissue in young healthy persons.

**Disclosure:** Nothing to disclose

## EPO1027

### Fibromyalgia and generalized anxiety disorder; common neurophysiological findings may be related to common clinical signs

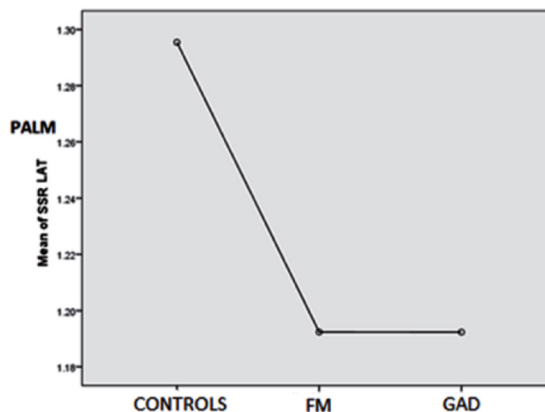
M. Papadopoulou<sup>1</sup>, A. Papapostolou<sup>1</sup>, I. Michopoulos<sup>2</sup>, L. Palaiodimou<sup>3</sup>, A. Theodorou<sup>3</sup>, M. Bregianni<sup>3</sup>, G. Tsvigoulis<sup>1</sup>, K. Voumvourakis<sup>1</sup>

<sup>1</sup>Athens, Greece, <sup>2</sup>Second Department of Psychiatry, University of Athens, Attikon University Hospital, Athens, Greece, <sup>3</sup>Second Department of Neurology, National and Kapodistrian University of Athens, Athens, Greece

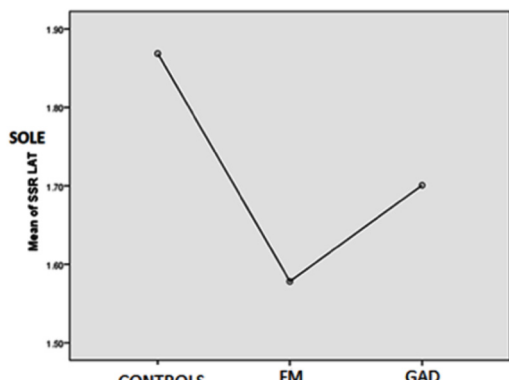
**Background and aims:** Fibromyalgia (FM) is characterized by widespread pain and is accompanied by fatigue, sleep and cognitive dysfunction, anxiety and depression. Generalized Anxiety Disorder (GAD) is characterized by excessive and persistent worry about everyday matters. Patients may also present with restlessness, fatigue, sleep disorders, irritability, difficulty in concentrating, muscle tension, aches and pain. Both diseases are of unknown aetiology, affect mainly young women, share common clinical features and worsen quality of life. Dysregulation of autonomic nervous system could be considered responsible for the overlapping symptoms.

**Methods:** We investigated 13 patients with GAD and 17 with FM. Demographic, biochemical, psychometric and neurophysiological (Sympathetic Skin Response (SSR), Cross Sectional Area of mid cervical vagus) data were collected and compared to each other and to healthy controls, matched for age and sex.

**Results:** Patients of the 2 groups did not differ in any biochemical, psychometric nor in neurophysiological parameter. When they were compared to controls, they differed in regard to the latency of SSR (Table 1) in both palm (standardized effect size: -0.5, CI 95%: -1.01 - 0.00), and the sole (standardized effect size: -0.70 CI 95%: -1.32 -0.07) (Figure 1,2).



SSR mean latencies recorded from the palm in controls and patients suffering from FM and GAD.



SSR mean latencies recorded from the sole in controls and patients suffering from FM and GAD.

Table 1

	CONTROLS	FM	GAD
Mean SSR latency palm (SD)	1,29 (0,21)	1,19 (0,19)	1,19 (0,18)
Mean SSR latency sole (SD)	1,86 (0,19)	1,57 (0,46)	1,70 (0,26)

Mean Values and Standard Deviations of SSR latency in palm and sole

**Conclusion:** Our study suggests that both conditions share not only common clinical features, but also common findings in autonomic nervous system tests (SSR latency) that can distinguish them from healthy controls. These findings might help further investigate the neurophysiological substrate in both conditions.

**Disclosure:** Nothing to disclose

## EPO1028

### Autonomic nervous system symptoms in relation to the social status

T. Pavicic, A. Junaković, B. Ruska, T. Gabelic, B. Barun, I. Adamec, M. Krbot Skoric, M. Habek  
 Neurology, University Hospital Centre Zagreb, Zagreb, Croatia

**Background and aims:** It has been shown that social status can influence the autonomic nervous system function. Therefore, we aimed to evaluate whether we can quantify the influence of social conditions on symptoms of autonomic nervous system (ANS) involvement.

**Methods:** Consecutive patients referred to the Laboratory for testing of the ANS, Zagreb, Croatia for the evaluation of dysautonomia (N=526, mean age 44.07, 371 females) completed validated Croatian version of the Composite Autonomic Symptom Score 31 (COMPASS-31). Following social parameters were collected: marriage status, education level, working status, number of children, smoking status and body mass index (BMI).

**Results:** Educational level, working status and smoking had a significant influence on COMPASS-31 results. COMPASS-31 was higher in participants with 12 years of education compared to those with ≥14 years of education (p=0.048), in participants who were unemployed compared to employed (p=0.032) and in participants who smoked compared to those who did not smoke (p=0.013). For further analysis, smoking, 12 years of education and unemployment were defined as risk factors, and summed in the social risk score (value 0 to 3). According to linear regression model, the social risk factor was a statistically significant predictor of COMPASS-31 results (B=2.845, 95% CI 1.162-4.529, p=0.001).

**Conclusion:** Parameters related to social status (education level, working status and smoking) play a significant role on the autonomic symptom burden.

**Disclosure:** Nothing to disclose



## EPO1029

**The influence of the social status on the objective testing of the autonomic nervous system**

B. Ruska<sup>1</sup>, A. Junaković<sup>1</sup>, T. Pavicic<sup>1</sup>, T. Gabelic<sup>1</sup>, B. Barun<sup>1</sup>, I. Adamec<sup>1</sup>, M. Krbot Skoric<sup>1</sup>, M. Habek<sup>2</sup>  
<sup>1</sup>Neurology, University Hospital Centre Zagreb, Zagreb, Croatia, <sup>2</sup>University of Zagreb, School of Medicine, Zagreb, Croatia

**Background and aims:** It has been shown that social status can influence autonomic nervous system function. Therefore, we aimed to define the influence of parameters related to the social status on the results of the objective testing of the autonomic nervous system (ANS).

**Methods:** In consecutive patients referred to the Laboratory for testing of the ANS, Zagreb, Croatia for the evaluation of dysautonomia (N=526, mean age 44.07, 371 females) heart rate and blood pressure response to deep breathing, Valsalva manoeuvre and tilt-table test were performed. Results were interpreted in the form of adrenergic index (AI) and cardiovagal index (CI) of the Composite Autonomic Scoring Scale (CASS). Following social parameters were collected: marriage status, education level, working status, number of children, smoking status and body mass index (BMI).

**Results:** People with BMI >25 had significantly higher involvement of sympathetic and parasympathetic nervous system measured with AI (p=0.003) and CI (p=0.006), respectively. CI was also influenced by marriage status, working status and number of children. Participants who were single had lower CI in comparison with participants who were in relationship (p<0.001) and widowed participants (p=0.025). People who were retired had higher CI compared to employed and unemployed participants and students (all p values <0.001). Participants without children had lower CI in comparison with participants with children (p=0.001).

**Conclusion:** Social status expressed through marriage status, working status, number of children and BMI has a statistically significant influence on the results of the parasympathetic nervous system function.

**Disclosure:** Nothing to disclose

## EPO1030

**Levodopa treatment and orthostatic hypotension: which effect on cognitive functions in a patient with Parkinson's disease and mild cognitive impairment?**

L. Sambati, I. Cani, L. Romano, G. Calandra-Buonaura, P. Guaraldi, P. Cortelli  
 Department of Biomedical and Neuromotor Sciences, University of Bologna, Bologna, Italy

**Introduction:** Patients with Parkinson's disease (PD) present concomitant non-motor symptoms including cognitive impairment (CI) and orthostatic hypotension (OH). Frequently CI and OH take place together. It is unclear whether OH cause or worse cognition in PD. Similarly, effect of Levodopa on cognition in patients with PD and OH is debated. Dopaminergic stimulation could improve executive dysfunctions related to dorsal striatum pathways impairment. Otherwise hypotensive effect of Levodopa could transitionally worsen attentive functions.

**Methods:** We report a case of a 71-year-old man with 4 years history of PD, who developed episodes of drowsiness and confusion 45 minutes after Levodopa assumption. To characterize episodes and their correlation with Levodopa assumption, we evaluate patient's cognitive performances in 4 conditions: supine without Levodopa (1, baseline), supine 60 minutes after Levodopa (2), tilt test without Levodopa (3) and tilt test 60 minutes after Levodopa (4).

**Results:** Baseline neuropsychological evaluation (1) showed multidomain CI (memory, attentive-executive, visuospatial). Levodopa assumption (2) gets worse cognition with a decrease of global efficiency. Notably the patient showed a slowing down on attentive-executive tasks (Barrage, Stroop tests, Digit span), functions that are usually improved by Levodopa assumption. Tilt test showed OH, slightly worsen after Levodopa assumption but asymptomatic for the patient. During tilt test (3), cognitive performances get worse in short-term verbal memory and verbal analogies, while Barrage test improved. Detrimental effects of Levodopa are even more enhanced in standing condition (4).

Comparing conditions 2 and 3, detrimental effect of Levodopa is greater than orthostatic hypotension.

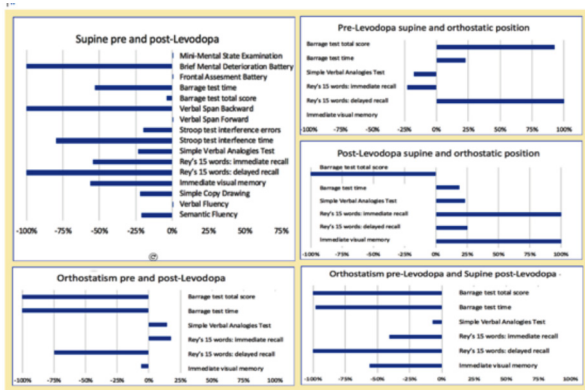


Figure 1: Rate of change of cognitive performances in the different conditions

	1 (baseline)	2	3	4
Position testing	Supine	Supine	Standing	Standing
Levodopa assumption	Pre	60' after	Pre	60' after
Blood pressure (mmHg)	154/84	166/85	113/65	120/62
Mini-Mental State Examination	28	28		
Rey's 15 words: immediate recall	22	10	17	20
Rey's 15 words: delayed recall	2	0	4	1
Immediate visual memory	16	7	16	15
Barrage test time (seconds)	132	202	102	240
Barrage test point	10	8	8	2
Barrage test errors	1	1	0	5
Barrage test total score	1,08	1,04	0,08	5,01
Simple Verbal Analogies Test	17	13	14	16
Brief Mental Deterioration Battery	0,28	-2,09		
Verbal Span Forward	5	5		
Verbal Span Backward	3	0		
Frontal Assesment Battery	12	12		
Stroop test interference time	62	111,5		
Stroop test interference errors	5	6		
Simple Copy Drawing	9	7		
Verbal Fluency	18	18		
Semantic Fluency	38	30		

Table 1: Neuropsychological evaluation in four conditions.

**Conclusion:** Levodopa could have a detrimental effect on cognitive functions independently to the hypotensive one.

**Disclosure:** Nothing to disclose

## EPO1031

### Improvement and stabilization of cardiovascular autonomic modulation three months after acute ischemic stroke

R. Wang<sup>1</sup>, K. Macha<sup>1</sup>, J. Koehn<sup>1</sup>, A. Marsch<sup>1</sup>, K. Winder<sup>1</sup>, S. Gerner<sup>1</sup>, M. Köhrmann<sup>2</sup>, S. Schwab<sup>1</sup>, B. Kallmünzer<sup>1</sup>, M.J. Hilz<sup>1</sup>

<sup>1</sup>Department of Neurology, University of Erlangen-Nuremberg, Erlangen, Germany, <sup>2</sup>Department of Neurology, University Hospital Essen, Essen, Germany

**Background and aims:** Previous studies showed that patients with acute ischemic stroke have reduced cardiovascular autonomic modulation (CAM) with too little parasympathetic but augmented sympathetic modulation. It is unclear whether CAM improves several months after stroke. Therefore, this study compared CAM of ischemic stroke patients assessed during the acute phase and three months after stroke.

**Methods:** In 52 patients with ischemic stroke [20 women and 32 men, mean age 64.6±9.1, median NIHSS 2 (interquartile range 1-5)], we recorded RR-intervals (RRI), systolic, diastolic blood pressure (BPsys, BPdia), and respiration (RESP) at rest, within the first 72 hours and 3 months after the acute stroke. We calculated parameters of total cardiac autonomic modulation [RRI-standard-deviation (RRI-SD), RRI-coefficient-of-variation (RRI-CV), RRI-total-powers], sympathetic [RRI-low-frequency-powers (RRI-LF), BPsys-LF-powers] and parasympathetic cardiovascular modulation [Root-Mean-Square-of-Successive-RRI-Differences (RMSSD), RRI-high-frequency powers (RRI-HF-powers)], sympathetic-parasympathetic balance (RRI-LF/HF-ratios), and baroreflex sensitivity (BRS). We compared acute and 3 months values using paired-t-tests for normally distributed values and Wilcoxon-tests for non-normally distributed values. Significance was set at p<0.05.

**Results:** After 3 months, RRIs were slightly higher (886.4±16.2 vs. 843.0±18.9 ms, p=0.032), i.e. heart rate was lower than in the acute phase. Three months BPsys-LF-powers were lower (10.1±1.2 vs. 16.0±2.3 mmHg<sup>2</sup>, p=0.017) and BRS was higher (5.2±3.0 vs. 3.9±3.1 ms/mmHg, p=0.001) than respective acute phase values. Otherwise, parameters remained unchanged.

**Conclusion:** Heart rate slowing, decreased sympathetic modulation, and enhanced BRS indicate significant improvement and stabilization of CAM within 3 months after acute ischemic stroke.

**Disclosure:** Nothing to disclose

## Cerebrovascular diseases 1

## EPO1032

**Characteristics of the main types of stroke in Uzbekistan in the first half of 2019 according to the Register of Stroke**Z. Abdullaev<sup>1</sup>, Y. Madjidova<sup>2</sup><sup>1</sup>Tashkent city, Uzbekistan, <sup>2</sup>Tashkent, Uzbekistan

**Background and aims:** Cerebrovascular disease is one of the urgent problems and the main cause of mortality in Uzbekistan. To determine the clinical and epidemiological data of cerebral stroke, the “Stroke Register” (RI) program is the optimal method, in which diagnostic criteria and research methods are standardized.

**Objective:** To determine the features of the course of cerebral stroke in patients with cerebrovascular accident in the first half of 2019 according to (RI) data.

**Methods:** (RI) was carried out by the population-territorial method in patients older than 18 years. More and more cases of cerebral stroke have been registered with permanent residents of the Republic. Information about cases of stroke has been received from doctors at ambulance stations, clinics and hospitals, as well as from the Republican Cardiology Center, the Republican Scientific Center for Emergency Medical Aid, and the Republican Centralized Anatomical Laboratory.

**Results:** During the study period, 28536 stroke patients were identified. Distribution by types of stroke: 69.4% of patients were diagnosed with ischemic stroke, 13.6% had cerebral hemorrhage, unspecified stroke was diagnosed in 14.8%, and 2.2% of patients developed subarachnoid hemorrhage.

Neuroimaging was performed in 15.9% of patients.

**Conclusion:** The true distribution of types of cerebral stroke in the first half of 2019 was revealed. A large share in the structure of the incidence of stroke is an unspecified stroke, which is probably due to the inaccessibility of neuroimaging methods.

**Disclosure:** Nothing to disclose

## EPO1033

**The epidemiological characteristics of stroke in Uzbekistan in the first half of 2019 according to the register of stroke**Z. Abdullaev<sup>1</sup>, P. Y. Majidova<sup>2</sup><sup>1</sup>Tashkent city, Uzbekistan, <sup>2</sup>Neurology, pediatric neurology and medical genetic, Tashkent Pediatric Medical Institute, Tashkent, Uzbekistan

**Background and aims:** Brain stroke (MI) is one of the most common causes of death in Uzbekistan. According to various sources, the frequency of cerebral strokes varies from 1.5 to 3 per 1000 people, and in our Republic there are no official epidemiological statistics on the register of stroke (RI).

**Objective:** To obtain reliable data on the main epidemiological indicator (RI) in the first half of 2019.

**Methods:** (RI) was carried out by the population-territorial method according to the questionnaire of the national stroke register for patients over the age of 18 years. All new and repeated cases and all deaths from (MI) have been recorded.

**Results:** During the 6 months of the program (RI) in the Republic of Uzbekistan, 28536 patients with stroke were identified. The average incidence of stroke was 1,73 per 1000 population. The maximum incidence of stroke was detected in the age group older than 50 years of age 81.1% and only 18.9% of patients in the age group under 50 years old. Mortality was -0.4 per 1000 population and the percentage of cases of stroke ending fatally, relative to all cases of stroke in percent- about 20%.

**Conclusion:** The true incidence, mortality and mortality from stroke in the first half of 2019 were revealed. The necessity of implementing preventive measures on the basis of (RI), which showed a high prevalence of the disease, low public awareness of stroke, and untimely seeking medical help, is substantiated.

**Disclosure:** Nothing to disclose

## EPO1034

### Analysis of data on the medical care system for patients with acute cerebrovascular accident according to the register of stroke

Z. Abdullaev<sup>1</sup>, Y. Madjidova<sup>2</sup>

<sup>1</sup>Tashkent city, Uzbekistan, <sup>2</sup>Tashkent, Uzbekistan

**Background and aims:** Currently, vascular diseases of the brain are a major medical and social problem. According to various statistics in the Republic of Uzbekistan for the year occurs from 60 thousand to 80 thousand new cases of stroke

**Objective:** To analyze and obtain reliable data on the distribution of patients with stroke in the primary health care chain

**Methods:** The program “stroke register” was carried out during the first 6 months of 2019 by the population-territorial method according to the questionnaire of the national stroke register of patients over 18 years of age. Information about the cases of stroke was received from ambulance stations, clinics and hospitals, as well as from the Republican Cardiology Center, the Republican Scientific Center for Emergency Medical Aid, and the Republican Centralized Anatomical Laboratory.

**Results:** As a result of the analysis of data on the medical care system for patients with stroke, it was found that in most cases the first medical examination was performed by an ambulance doctor (74%), less often by a local therapist (18.5%) and a neurologist at the polyclinic (7.5%) In most patients, stroke developed at home (77.9%). 76.5% of patients were hospitalized, of which about 30% were hospitalized in the first 6 hours after the onset of the disease and about 70% after 6 hours

**Conclusion:** Reliable data have been identified on the distribution of patients with stroke in the primary health care chain, which is valuable information for the Ministry of Health when planning a health care network.

**Disclosure:** Nothing to disclose

## EPO1035

### Ischemic stroke revealing a central nervous system vasculitis: study of 9 cases

Y. Abida<sup>1</sup>, M. Messelmani<sup>1</sup>, A. Riahi<sup>2</sup>, H. Derbali<sup>1</sup>, I. Bedoui<sup>1</sup>, M. Mansour<sup>2</sup>, J. Zaouali<sup>1</sup>, R. Mrissa<sup>1</sup>

<sup>1</sup>Neurology department, Military Hospital of Tunis, Tunisia, <sup>2</sup>Tunis, Tunisia

**Background and aims:** Ischemic stroke is an unusual heralding manifestation in central nervous system vasculitis. In order to make an etiologic diagnosis a comprehensive investigation need to be done. This study was conducted to analyse the clinical and radiological features and the diagnostic approach of central nervous system vasculitis revealed by an ischemic stroke.

**Methods:** We studied 9 patients who were admitted to the military hospital of Tunis department of neurology between 2011 and 2019 and underwent a comprehensive work up.

**Results:** Of the 9 cases that have been selected 3 were males, the median age was 47.3 years. All patients presented with an acute focal neurologic deficit. A first-line workup was normal. After carrying out a second line workup, 4 patients were diagnosed with a primary systemic vasculitis (2 Neurobehcet, 1 Microscopic polyangiitis, 1 Wegener's granulomatosis), 2 patients with a celiac disease, 1 patient with neuropsychiatric lupus erythematosus, 1 patient with Sjogren's syndrom and 1 patient with a primary angiitis of the central nervous system. All of them received corticosteroids and immunosuppressive therapy.

**Conclusion:** Ischemic stroke is an uncommon early manifestation in cerebral vasculitis, it occurs in younger adults especially females. its etiologic diagnosis remains difficult to be made and its frequently delayed, whereas its prognosis depends mainly on early treatment. Searching for extra-neurologic signs and conducting a comprehensive work up can be helpful.

**Disclosure:** Nothing to disclose

## EPO1036

**Stroke mimics: Clinical and Radiological approach**

S. Aggeloglou<sup>1</sup>, S. Xylogiannopoulou<sup>1</sup>,  
P. Bourazani-Lelouda<sup>1</sup>, M. Karagianni<sup>2</sup>, V. Katsiva<sup>3</sup>,  
I. Markakis<sup>1</sup>

<sup>1</sup>Nikaia, Greece, <sup>2</sup>Radiology, General Hospital of Nikaia, Nikaia, Greece, <sup>3</sup>Radiology, AgiosPanteleimon" General State Hospital of Piraeus. Nikaia, Greece

**Background and aims:** Ischemic stroke is the most common cause of acute focal neurologic deficit. Nevertheless, in 30% of patients with focal neurologic deficit, the causes are non-vascular and are referred to as stroke-mimics. The broad use of MRI has been an immense factor in differentiating the causes most often misdiagnosed as ischemic stroke.

**Methods:** A brain MRI was performed in 134 patients with acute focal deficit, admitted to our department. Intracerebral hemorrhage was excluded with brain CT. Topographic distribution along with magnetic properties in DWI, FLAIR, T2-GRE, T2 and contrast-enhanced sequences of the lesions were evaluated.

**Results:** In 14 patients the final diagnosis was not stroke. The most common pathologies identified as stroke mimics were epilepsy and postictal phenomena, posterior reversible encephalopathy syndrome, herpes encephalitis, Creutzfeldt-Jakob, brain tumor, mitochondrial myopathy, encephalopathy, lactic acidosis, stroke-like episodes, reversible cerebral vasoconstriction syndrome and medication toxicity.

**Conclusion:** In our department, 10.4% of cases with acute focal deficit were caused by stroke mimics. Nowadays, due to the routine use of iv stroke thrombolysis, it is crucial to identify these disorders. MRI plays a pivotal role in that area. In our diagnostic approach, first we evaluated whether DWI was normal or abnormal and then we analyzed the other sequences trying to correlate the MRI results with the clinical syndrome.

**Disclosure:** Nothing to disclose

## EPO1037

**Intracerebral hemorrhage (ICH) and epilepsy: a retrospective study**

P. Bourazani-Lelouda<sup>1</sup>, S. Aggeloglou<sup>1</sup>, K. Terzoudi<sup>2</sup>,  
K. Vadikolias<sup>2</sup>, I. Iliopoulos<sup>2</sup>, I. Xydakis<sup>1</sup>, V. Koukouni<sup>1</sup>,  
V. Chouliara<sup>1</sup>, I. Markakis<sup>1</sup>

<sup>1</sup>Neurology, St Panteleimon General State hospital, Piraeus, Greece, <sup>2</sup>Aleksandroupoli, Greece

**Background and aims:** Seizures are a serious complication following ICH with a frequency of 4-19%. We aimed to study the ICH patients' characteristics and try to correlate them with the occurrence of seizures and the decision to start prophylactic antiepileptic therapy.

**Methods:** This is a retrospective study including patients with spontaneous ICH treated in the neurologic clinic of General Hospital of Nikaia-Piraeus "Agios Panteleimon" during 2014-2017.

**Results:** 89 adult patients with ICH were included. Most of the ICH were in the basal ganglia (49.5%), followed by lobar subcortical hemorrhages (16.9%), lobar hemorrhages with cortical involvement (10.1%) and brainstem hemorrhages (12.4%). Other areas were affected in a much lesser percentage. Acute seizures occurred in 10 patients (11.2%), 70% of which during the first 24 hours. 6 were generalized tonic-clonic seizures, 3 were focal seizures with retained awareness and 1 was a focal seizure with impaired awareness. We prescribed prophylactic antiepileptic therapy in 12 patients (13.5%). Temporal and lobar location of the hemorrhage, intraventricular hemorrhage and cortical involvement were correlated with increased prescription of prophylactic antiepileptic drugs. Cortical involvement was found to be an independent risk factor for the development of acute seizures.

**Conclusion:** Our results correlate with those found in many international and randomized-control studies. There is no evidence-based recommendation for the use of prophylactic antiepileptic medication. Nonetheless, it is common practice among clinicians, especially in ICH with cortical involvement and intraventricular extension.

**Disclosure:** Nothing to disclose

## EPO1038

### Analysis of potential drug-drug interactions (pDDIs) which include angiotensin-converting enzyme (ACE) inhibitors in acute ischemic stroke patients

D. Aleksic<sup>1</sup>, G. Toncev<sup>1</sup>, S. Miletic Drakulic<sup>1</sup>, M. Milosavljevic<sup>2</sup>, S. Jankovic<sup>2</sup>, S. Stefanovic<sup>3</sup>

<sup>1</sup>Neurology, Faculty of medical sciences, Kragujevac, Serbia, <sup>2</sup>Pharmacology and toxicology, Faculty of medical sciences, Kragujevac, Serbia, <sup>3</sup>Pharmacy, Faculty of medical sciences, Kragujevac, Serbia

**Background and aims:** Some studies have shown that low doses of aspirin can have the effect of reducing the antihypertensive effect of ACE inhibitors, especially enalapril. Concomitant administration of ACE inhibitors and aspirin may exacerbate heart failure. Interactions between ACE inhibitors/aspirin and ACE inhibitors/non-steroidal anti-inflammatory drugs (NSAIDs) may lead to exacerbation of renal failure and hyperkalemia. ACE inhibitors and diuretics can lead to “first-dose hypotension” and acute renal failure.

**Methods:** 3-year retrospective research of 696 acute ischemic stroke patients was conducted at the Clinic for Neurology, Kragujevac, Serbia. Micromedex software was used to calculate severity (major, moderate, minor) and scientific documentation (excellent, good, fair) of the pDDIs of ACE inhibitors drugs. We calculated the factors associated with exposure to these pDDIs.

**Results:** pDDIs which include ACE inhibitors were present in 500 (71.8%) patients. A total of 86 pDDIs were detected, which include fosinopril, enalapril, ramipril, lisinopril, perindopril and quinapril (major 35, moderate 51; excellent scientific documentation 25, good 25, fair 36). The most frequent pDDIs were aspirin-ramipril (22.84%), aspirin-enalapril (19.68%), diclofenac-ramipril (19.50%), aspirin-fosinopril (19.25%) and diclofenac-enalapril (17.38%). Fatal outcome was statistically significantly more frequent in the group of patients with this pDDIs ( $\chi^2=7.595$ ;  $p=0.004$ ). The risk factor for pDDIs was the total number of used drugs (OR=1.110) and the protective factor was a chronic renal failure (OR=0.466).

**Conclusion:** pDDIs which include ACE inhibitors are very common in patients with acute ischemic stroke. The risk factor is the number of prescribed drugs. This pDDIs may have an impact on the hospitalization outcome of patients with stroke.

**Disclosure:** Nothing to disclose

## EPO1039

### Transient alien hand syndrome in Ischemic lesions of the corpus callosum: a report of 3 cases

T. Aliyeva<sup>1</sup>, M.F. Öztekin<sup>2</sup>, E. Toplutas<sup>3</sup>

<sup>1</sup>Neurology, Bezmialem Vakif University Faculty of Medicine, Istanbul, Turkey, <sup>2</sup>Department of Neurology, Ankara Diskapi Yildirim Beyazit Research & Education Hospital, Ankara, Turkey, <sup>3</sup>Neurology, Istanbul Medipol University Hospital, Istanbul, Turkey

**Background and aims:** Alien hand syndrome (AHS) is a rare neurological condition that seriously affects daily life. The common feature is the involuntary autonomic activity of the affected extremity and conflict between upper limbs. AHS has been reported most commonly in lesions of the medial frontal cortex and corpus callosum. We present three cases of AHS in the ischemic stroke of the corpus callosum, which were detected in the acute process and showed rapid improvement in clinical follow-up.

**Methods:** Cases: 1 female and 2 male patients were hospitalized with acute stroke either with mild hemiparesis or normal motor functions. 2 patients had ataxic gait and mild speech disorder. All patients had intermanual conflict between right and left upper limbs. 1e patient also described strange feeling like an electric current when touched to opposite arm and leg. In diffusion MRI (Magnetic resonance imaging) all patients have acute lesions of splenium of the corpus callosum. All patient improved with full recovery within 2-11 days.

**Results:** Because of a rich vascular structure, corpus callosal ischemic lesions are rarely seen and generally improve very rapidly. Therefore AHS due to ischemic events may resolve in a very short time. It is possible to detect AHS in the corpus callosum lesions with careful observation.

**Conclusion:** In addition to the limited number of cases reported in the literature, it is intended to draw attention to the presence of atypical presentiaions of lower limb involvement as in 1 of our cases.

**Disclosure:** Nothing to disclose

## EPO1040

### Ghost infarct area in a patient with an acute ischemic stroke and hemodynamic shock, a confounding factor when considering endovascular treatment

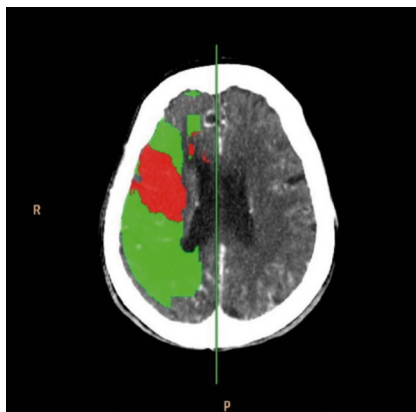
H. Antolí Martínez, N.L. Ciano Petersen,  
Y. López Moreno, C. MartínezTomás, V. Reyes Garrido,  
P. Serrano Castro

Neurology Department, Hospital Regional Universitario de Málaga, Málaga, Spain

**Background and aims:** Endovascular therapy (ET) has emerged as a highly effective treatment in acute ischemic stroke with large vessel occlusion. Treatment's decision is based on clinical and radiological features, such as Alberta Stroke Programme Early CT Score (ASPECTS) and CT perfusion (CTP) as well as clinical-neuroimaging mismatch. We present a case in which CTP was influenced by the patient's hemodynamic status.

**Methods:** We describe a 79-year-old woman with a Modified Rankin Scale (mRS) and previous history of hypertension, diabetes and bigeminated ventricular extrasystole. She presented a 2 hours right-hemispheric deficit with a National Institutes of Health Stroke Scale (NIHSS) score of 25, as well as slow atrial fibrillation with hemodynamic instability.

**Results:** Computed tomography (CT) and CT angiography showed an ASPECTS score of 8 and a proximal segment of the right middle cerebral artery occlusion, respectively. During the first CTP, the patient had a mean systolic blood pressure below 100mmHg, which showed a large hemispheric infarct core with no penumbra. After hemodynamic stabilization with an external pacemaker and inotropic drugs, CTP was repeated and a penumbra >30% was observed, which allowed the indication of mechanical thrombectomy. The mRS score at 3 months was 0.



CT perfusion, 6 hours after the onset of symptoms.

**Conclusion:** The CTP may overestimate the established infarct core in patients with hemodynamic instability and include a Ghost Infarct Area to the real infarct core. Therefore, hemodynamic status of the patients must be kept in mind during CTP interpretation in acute stroke.

**Disclosure:** Nothing to disclose

## EPO1041

### Predictors of the vertigo development in patients with posterior circulation stroke

K. Antonenko, L.I. Sokolova  
Kiev, Ukraine

**Background and aims:** Stroke is the underlying etiology in 17-25% patients presenting with acute onset of isolated vertigo. But affected patients do not usually receive the adequate medical attention and are more likely to consult a general practitioner.

**Methods:** We evaluated prospectively 145 consecutive patients (85 men and 60 women) aged 32 to 85 years in acute period of ischemic posterior circulation (PC) strokes. Comprehensive examination included analysis of the baseline characteristics, risk factors; attentive clinical study; assessment of neurological status with the use of scales NIHSS, B. Hoffenberth et al. Localization and volume of the ischemic lesion were assessed with the DWI MRI.

**Results:** All patients were classified into two groups—with vertigo 89 (61.4%) and without vertigo— 56 (38.6%). The presence of vertigo did not correlate with distribution of ischemic lesion to proximal, middle or distal territories of PC ( $p=0.073$ ). Patients with vertigo were predominantly females (44.9% versus 21.4%,  $p=0.036$ ), were less likely to have focal neurological deficits (56.7% versus 86.5%,  $p=0.006$ ), had frequently cardioembolic stroke subtype (48.1% versus 24.5%,  $p=0.046$ ), more combined lesions in PC (46.7% versus 23.5%,  $p=0.034$ ) and larger total infarction volume in comparison to non-vertigo patients ( $5.2\text{cm}^3$  versus  $0.68\text{cm}^3$ ,  $p=0.003$ ). In age- and sex-adjusted logistic regression, an infarction location either in the cerebellum or dorsal part of brainstem and total infarction volume of  $>0.54\text{cm}^3$  were found to be associated with vertigo ( $p=0.002$  and  $p=0.046$ , accordingly).

**Conclusion:** Infarction location, and infarction volume are stronger predictors of vertigo in posterior circulation strokes.

**Disclosure:** Nothing to disclose

## EPO1042

**Galena vein thrombosis under Noak treatment**

T. Aslan<sup>1</sup>, H. Ozdamar<sup>2</sup>, S. Ozakbas<sup>3</sup>

<sup>1</sup>Neurology, Dokuz Eylul University, Izmir, Turkey,

<sup>2</sup>Cardiology, Dokuz Eylul University, Izmir, Turkey, <sup>3</sup>Izmir, Turkey

**Background and aims:** Cerebral venous thrombosis (CVT) is a rare condition and less than 1% of stroke cases. Thrombosis of deep venous veins such as Galen vein accounts for approximately 10% of SVT cases. Clinical presentation is variable and should be kept in mind in unexplained mental state disorders.

**Methods:** A 65-year-old woman with nonvalvular atrial fibrillation and diabetes mellitus, receiving 20mg rivaroxaban and 2000mg metformin once daily was brought to the emergency department for three days of slowness of movement, confusion and excessive drowsiness.

**Results:** In neurological examination; Disorientation, bilateral dilated pupils and ataxic gait were detected. Motor and sensory deficits were not observed. Computed tomography of the brain showed hypodense lesions in the bilateral thalamic region with edema. In brain magnetic resonance imaging, T2 hyperintense in the bilateral thalamic region, T1 hypointense and diffusion-weighted imaging showed diffusion-restricted areas in the same regions. CT angiography showed thrombus in the galena vein, anticoagulant treatment, low molecular weight heparin, was initiated and the patient was admitted to the neurology clinic. There were no significant findings in the examinations performed for coagulopathy. She was discharged with warfarin treatment. There was no change in her neurological status.

**Conclusion:** SVT is a rare and serious condition early anticoagulant therapy should be initiated. Involvement of the deep venous structures is a rare condition and may present with a sub-acute onset. The severity of the condition may vary depending on the location of the thrombosis and the presence of collateral vessels. Diagnosis may be difficult in cases of partial thrombosis.

**Disclosure:** Nothing to disclose

## EPO1043

**Predictors of good clinical outcomes and successful revascularization after thrombolysis in acute ischemic stroke**

F. Aziouaz, M. Yassine

Neurology, CHU Mohammed VI oujda, Oujda, Morocco

**Background and aims:** Stroke is the first cause of disability and the third cause of death. The prognosis of strokes is improved by their management within the neurovascular units by thrombolysis which represents one of the therapeutic progress whose success is conditioned by the rigorous selection of the candidates. The objective of our study is to analyze the clinical and paraclinical profile of thrombolysed patients in order to determine the factors predicting success of thrombolysis.

**Methods:** This is a comparative retrospective study of the records of 105 patients admitted for ischemic stroke who benefited from thrombolysis by r-tPA.

**Results:** The average age of our patients was 67 years, a sex ratio of 1/2, an average time to admission at 1h45min, with an average needle-holder time of 53 minutes. Their initial NIHSS score varied between 4 and 20. the success of thrombolysis was noted in 76% of patients with an improvement in the NIHSS score of more than 70% after 24 hours of thrombolysis. This success rate was explained by the rigorous selection of candidates based on several parameters which influenced the success of thromolysis to varying degrees. Among these factors, we note mainly the shortness of the needle-holder delay, the presence of a radio-clinical mismatch, the site and size of the occlusion as well as the territory of the infarction.

**Conclusion:** Despite its limited effectiveness in certain cases, thrombolysis constitutes the first-line treatment in the management of acute ischemic stroke, it must be implemented as quickly as possible before resorting to other therapeutic alternatives, mainly thrombectomy.

**Disclosure:** Nothing to disclose



## EPO1044

**Diffusion tensor tractography as an early predictor of functional outcome after lacunar brain infarction**

W. Bahnasy<sup>1</sup>, R. El-Shafey<sup>2</sup>, M. Dawoud<sup>2</sup>, Y.I. Mabrouk<sup>2</sup>  
<sup>1</sup>Tanta, Egypt, <sup>2</sup>Diagnostic Radiology, Tanta University,  
 Tanta, Egypt

**Background and aims:** Lacunar infarctions (LIs) are ischemic strokes caused by occlusion of the deep penetrating arteries. They constitute about 25% of all ischemic strokes and have variable consequences based on affected tracts disruptions. The objectives of this study were to assess the role of MRI diffusion tensor imaging (DTI) fiber tractography as an early biomarker of LIs prognosis.

**Methods:** This work was conducted on 42 first-ever symptomatic motor or sensorimotor LIs patients submitted to stroke severity assessment using the National Institute of Health Stroke Scale (NIHSS), carotid duplex, Brain MRI to determine LIs diameter and occult small vessel disease imaging markers. Corticospinal diffusion tensor tractography (CS-DTT) was done within 48 hours from stroke onset. 38 patients continued a 3-months follow-up schedule, at the end of which their physical dependences were assessed using the Modified Barthel Index (MBI) scale which were compared with the baseline assessment parameters to determine the prognostic biomarkers.

**Results:** Dependent patients' group showed significant increase in their age, BMI, carotid intima media thickness and white matter hyperintensities grade than independent patients' group. The FA ratio was the earliest parameter showed significant changes which were lower in dependent than independent patients' groups. On the other hand, each of ipsilateral DTI fractional anisotropy, mean diffusivity and fiber number showed non-significant differences.

**Conclusion:** Reduced ipsilateral/contralateral FA ratio of the CS-DTT is a reliable early predictor of functional outcome and motor disability after motor and sensorimotor LIs.

**Disclosure:** Nothing to disclose

## EPO1045

**Predictors of early hematoma expansion after spontaneous intracerebral hemorrhage**

W. Bahnasy<sup>1</sup>, M. Rabie<sup>2</sup>, A. Ghali<sup>2</sup>, H. Helal<sup>2</sup>  
<sup>1</sup>Tanta, Egypt, <sup>2</sup>Neuropsychiatry, Tanta University, Tanta,  
 Egypt

**Background and aims:** Hematoma expansion (HE) is the leading cause of early neurological deterioration, poor functional outcome and increased mortality in patients with spontaneous intracerebral hemorrhage (S-ICH). The study aimed to estimate the risks and predictors of early HE in patients with S-ICH and the effect of this HE on patient's survival and functional outcome.

**Methods:** This study was carried out on 72 patients with S-ICH submitted to baseline non-contrast brain CT (NCCT) and CT angiography for determination of hematoma site, size, border irregularity, blend sign and spot sign score (SSS). Rescan was done 48 hours after stroke onset or on clinical deterioration to resize the HV and diagnose HE. Modified Rankin Scale (MRS) were done 3-months after stroke onset to assess the effect of HE on patients' physical dependence.

**Results:** HE occurred in 28/72 (38.9%) of included patients. Risks of HE included old age, smoking, elevated baseline mean arterial blood pressure and high admission modified national institute of health stroke scale. NCCT predictors of HE included large volume, irregular border and presence of blend sign. The presence of spot sign in early CTA is more accurate than NCCT predictors with 54%, 91%, 79% and 75% for sensitivity, specificity, positive predictive value, and negative predictive value respectively.

**Conclusion:** HE is a major cause of early clinical deterioration, increased mortality and poor functional outcome. Early CTA for detection of spot sign is indicated in patients with large volume, irregular border and/or blend sign in NCCT.

**Disclosure:** Nothing to disclose

## EPO1046

**Arterio-arterial embolism as a cause of cerebrovascular diseases in patients with a floating structure in the carotid system**

A. Bakhmetev<sup>1</sup>, A. Kursachenko<sup>2</sup>, R. Parsamyan<sup>3</sup>, E. Salina<sup>1</sup>

<sup>1</sup>Saratov, Russian Federation, <sup>2</sup>Radial diagnostics, Saratov State Medical University, Saratov, Russian Federation, <sup>3</sup>Pain Clinic, Saratov, Russian Federation

**Background and aims:** Since 2016, some ultrasound laboratories have noticed the presence of a thin intraluminal mobile fragment in carotid arteries in patients (Bakhmetev A.S., Costanzo L.). Every time the previously undescribed structure was an incidental finding and in most cases remained asymptomatic. However, as the material accumulated, it was noted that about 15% of such patients had suffered a transient ischemic attack (TIA) or stroke in the absence of any other causes. The aim was to identify the connection of cerebral circulation disorders with arterio-arterial embolism from carotid arteries.

**Methods:** We analyzed blood flow both at extra- and intracranial levels in 28 patients with TIAs (n=24) and strokes (n=4). After an ultrasound examination and a neurological examination, 9 patients underwent bitemporal transcranial Doppler monitoring of the middle cerebral arteries (MCA) in order to detect microembolic signals (MES). Control group included 30 asymptomatic patients with FS.

**Results:** All patients from group I had discernible blood flow turbulence in the FS zone, some of them had regurgitation under the structure. While monitoring MCA on the side with the FS, the average number of MES was 9.5, while in the territory of contralateral MCA, as well as in patients from the control group, MES were not detected.

**Conclusion:** We assume the arterio-arterial nature of stroke and TIA (due to slowing of blood flow, as well as significant turbulence) in patients with FS, which is a new form of destruction of the carotid artery wall, requiring further study and consideration of preventive measures against cerebral circulation disorders.

**Disclosure:** Nothing to disclose

## EPO1047

**Infarction of the corpus callosum in a patient with bilateral carotid occlusion**

J.M. Barrios López<sup>1</sup>, J.L. Ruiz Del Amo<sup>2</sup>, J.C. Romero Fábrega<sup>1</sup>, C. Muñoz Martínez<sup>1</sup>, A.J. Láinez Ramos-Bossini<sup>3</sup>, A.I. Dengra Maldonado<sup>2</sup>, S. Blanco Madera<sup>1</sup>, M.I. López López<sup>2</sup>, A. López Ferreiro<sup>1</sup>  
<sup>1</sup>Neurología, Hospital Universitario Virgen de las Nieves, Granada, Spain, <sup>2</sup>Neurology, Hospital San Cecilio, Granada, Spain, <sup>3</sup>Radiology, Hospital Universitario Virgen de las Nieves, Granada, Spain

**Background and aims:** Infarction of the corpus callosum (CC) only represents 3-8% of ischemic strokes. We present an atypical case of a patient with progressive neurological deterioration due to a lesion of the CC secondary to occlusion of both internal carotid arteries (ICAs).

**Methods:** Description and review of the literature apropos of a case of infarction of the CC associated with bilateral carotid occlusion.

**Results:** A 37-year-old male with history of arterial hypertension, dyslipidemia, diabetes mellitus type I with microangiopathy and heavy smoker, presented with a subacute episode (2 months) of altered speech production with a fluctuating course. Neurological examination revealed bradypsychia, motor dysphasia, mild left agraphia, acalculia, left-right confusion and right faciobrachial paresis. Multi-modal CT scanning showed a hypodensity in the CC with sparing of the splenium, and occlusion of both ICAs. Brain MRI confirmed a subacute ischemic lesion affecting the anterior 2 thirds of the CC (image 1), and the left centrum semiovale and frontal operculum. The ethiological study was completed in the Neurology Department and the final diagnosis was infarction of the CC secondary to bilateral atherothrombotic occlusion of the ICAs.

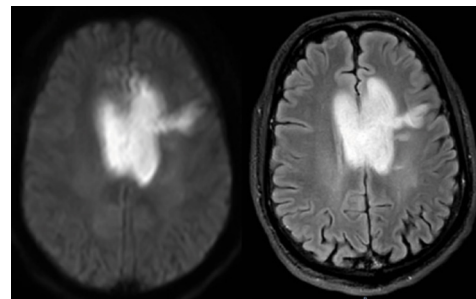


Image 1 - Brain MRI confirmed a subacute ischemic lesion affecting the anterior two thirds of the CC (image 1), and the left centrum semiovale and frontal operculum

Image 1

**Conclusion:** The blood supply of the anterior 2 thirds of the CC depends on perforating branches from the anterior communicating artery and the anterior cerebral artery. However, the splenium receives its blood supply from the posterior cerebral artery. Very few cases of lesions of the CC secondary to bilateral ICA occlusion have been reported. The etiopathogenic mechanisms proposed are atheroembolic or hemodynamic due to insufficient compensation via the collateral circulation.

**Disclosure:** Nothing to disclose

## EPO1048

## Cerebral venous sinus thrombosis as an uncommon complication in immune thrombocytopenia

J.M. Barrios López, J.C. Romero Fábrega, C. Muñoz Martínez, C. Madrid Navarro, I. Pérez Ortega  
*Neurology, Hospital Universitario Virgen de las Nieves, Granada, Spain*

**Background and aims:** The main clinical manifestations of immune thrombocytopenia (ITP) are mucocutaneous hemorrhages. Thrombotic events are less frequent, with cerebral venous sinus thrombosis (CVT) as an uncommon complication.

**Methods:** Description and literature review about a case of CVT in a patient with ITP and severe thrombocytopenia.

**Results:** A 59-year-old woman went to the emergency room for a self-limited episode of horizontal binocular diplopia. 2 weeks earlier, she started having oppressive and intense right frontoparietal headaches. She has a history of being overweight (BMI 28) and chronic corticosteroid resistant ITP treated with Romiplostim since 1 month ago. On examination, she presented bilateral papilledema, without other relevant findings. In the analytical emergency study, a thrombopenia of 41,000 cells/ $\mu$ L and a D-dimer of 19,030  $\mu$ g/L stood out. A brain CT and CT angiography with venous phase were performed and an extensive CVT was observed without parenchymal complications (image 1), starting heparin treatment, with progressive clinical and radiological improvement. After a negative study of thrombophilia and antiphospholipid syndrome, CVT of multifactorial etiology was diagnosed (treatment with Romiplostim and overweight).



Image 1 - CT angiography with venous phase: cerebral venous sinus thrombosis with predominant involvement of the upper longitudinal sinus

Image 1

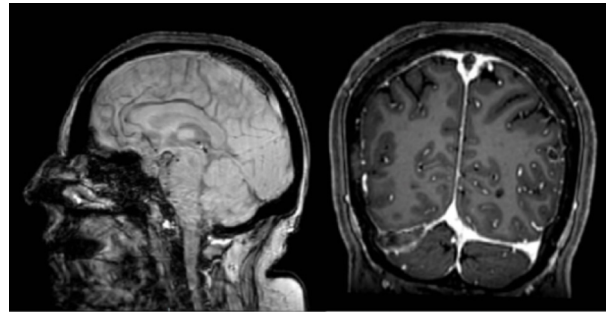


Image 2 - MRI angiography with venous phase (performed two days after heparin treatment onset): findings compatible with extensive cerebral venous sinus thrombosis, with predominant involvement of the upper longitudinal and right transverse sinus and recanalization of the left transverse sinus

Image 2

**Conclusion:** ITP has been associated with thrombotic events in 6-11% of cases, the most frequent being deep vein thrombosis and pulmonary thromboembolism. Thrombopoietin receptor agonists (TPA-ra), such as Romiplostim, increase thrombotic risk, although there are few described cases associated with CVT. In our patient, severe thrombocytopenia suggests that Romiplostim could increase the prothrombotic state by inducing platelet activation. Therefore, in patients with ITP in treatment with TPA-ra, we should suspect a CVT if headaches appear with warning signs.

**Disclosure:** Nothing to disclose

## EPO1049

**Etiology of first ischemic stroke and frequency of vascular risk factors in young patients**

D. Sanak<sup>1</sup>, A. Bártková<sup>1</sup>, P. Divisová<sup>1</sup>, T. Dornak<sup>1</sup>,  
M. Kral<sup>1</sup>, J. Zapletalová<sup>2</sup>, P. Kanovsky<sup>1</sup>

<sup>1</sup>Neurology, Palacky University, Olomouc, Czech Republic,  
<sup>2</sup>Department of Medical Biophysics, Faculty of Medicine and  
Dentistry, Palacky University and University Hospital,  
Olomouc, Czech Republic

**Background and aims:** Traditional risk factors (RF) may play role in the etiology of ischemic stroke (IS) also in young patients. The aim of our study was to assess the spectrum and frequency of RF in young IS patients.

**Methods:** In the prospective observational study, 434 consecutive patients (age 18-50, median 43 years, 56.2% males) with first IS (84%) or transient ischemic attack (16%) were enrolled. All patients underwent neuroimaging, extensive laboratory assessment, and detailed cardiologic examination. For the analysis, patients were divided into 2 groups according to age (under and over 40 years) and gender.

**Results:** The following types of IS were identified: atherosclerotic makroangiopathy (LVD) in 15 (3.5%), small vessel disease (SVD) in 49 (11.3%), cardioembolisation (CE) in 91 (21%), other determined cause in 76 (17.5%), undetermined cause in 149 (34%) and 2 or more causes 52 (12%) patients. Hypertension was present in 165 (37.2%) patients, hyperlipidemia (HLP) in 183 (42.4%), diabetes mellitus (DM) in 39 (9%) and smoking in 178 (43%). Among vascular RF only the presence of DM and smoking increased significantly the risk of IS recurrence OR=2.8; 95%CI:1.06-7.56 resp. OR=2.5; 95%CI:1.173-5.26), p=0.038 resp. p=0.018 in the all study population.

**Conclusion:** Traditional, modifiable RF occurred frequently in young IS patients. Although only the presence of DM and smoking increased the risk of recurrence in our study

**Disclosure:** Supported by the MH CR, grant no. 17-30101A

## Cerebrovascular diseases 2

### EPO1050

#### The study of depressive and speech disorders in post-stroke patients

A. Barulin<sup>1</sup>, O. Kurushina<sup>1</sup>, B. Kalinchenko<sup>2</sup>

<sup>1</sup>Volgograd, Russian Federation, <sup>2</sup>Neurology, Volgograd state medical university, Volgograd, Russian Federation

**Background and aims:** Determine a correlation between speech, depressive and motor disorders in patients after ischemic stroke.

**Methods:** A total of 95 people with ischemic stroke in the early recovery period was examined. Patients were divided into 3 groups: 30 with aphasia, 32 with dysarthria and 33 patients without speech disorders. The following research methods were applied: the Rivermid mobility index, the MMSE cognitive impairment scale, the Hamilton scale and the aphasic test.

**Results:** First group the average on the Hamilton scale was 10.2 points, 16.4 points on the MMSE scale and the Rivermid mobility index was 4.6. A strong correlation of  $r=0.67$  was found between the motor disorders and depressive manifestations. Applying the Hamilton scale was also difficult for this group. Indirect signs of depressive manifestations were common among the patients -83%. In a group of patients with dysarthria there were determined: the mean value on the Hamilton scale of 9.7 and the index of motor disorders of 4.3; also indirect signs of depressive manifestations (36%) were found. There was a strong correlation ( $r=0.78$ ) between the indicators of mobility index and the presence of depression on the Hamilton scale. In the second group, was 9.1 points, the cognitive impairment on the MMSE scale was 20.2 points, and the Rivermid mobility index was 4.8 points. The level of indirect signs of depressive manifestations was 20%.

**Conclusion:** The high prevalence of clinically significant depressive manifestations among patients with speech disorders was found.

**Disclosure:** Nothing to disclose

### EPO1051

#### Preliminary analysis of M2 occlusion endovascular treatment. Cerebrovascular uncertainty management

J.L. Batista Blasco<sup>1</sup>, H. Antoli<sup>2</sup>, I. Rodríguez Lavado<sup>2</sup>, G. Pons Pons<sup>2</sup>, N.L. Ciano Petersen<sup>2</sup>,

J.A. Tamayo Toledo<sup>1</sup>

<sup>1</sup>Neurology, Hospital Regional Universitario Málaga, Málaga, Spain, <sup>2</sup>Hospital Regional Universitario de Málaga, Málaga, Spain

**Background and aims:** Ischemic stroke caused by arterial occlusions in the M2 segment of the Middle Cerebral Artery (MCA M2) have been ambiguous, regarding the effectiveness of mechanical thrombectomy, as they were not included in many of the pivotal clinical trials. Clinical thrombectomy guides suggest this treatment based on an expert opinion, but there is no real evidence. In daily clinical practice we find a substantial number of patients with occlusion of this segment and many of them are treated with endovascular therapy with heterogeneous results regarding clinical efficacy and complication rates. In the pivotal trials there was not intracerebral hemorrhage (ICH) found.

**Methods:** We analyze the epidemiological features, clinical efficacy and complication rates of MCA M2 thrombectomies of our center.

**Results:** Among 234 thrombectomies, 35 were MCA M2 occlusions (14%), most of them (65%) of cardioembolic etiology, with a mean age of 73 years old (44.1% men, 55.9% women), mean NIHSS 10.1 (72% NIHSS  $\leq 4$ , 19%  $\leq 20$ , 9%  $\leq 25$ ), mean onset to door time 112.8 minutes (excluding 6 wake-up strokes), onset-to-groin puncture 239.2 minutes. We observed an ICH rate of 18%, not all of them clinically significant. Clinical efficacy (3 month RankinMS $\leq 2$ ) was favorable for 57% of the patients.

**Conclusion:** M2 MCA thrombectomy is performed in an important percentage of patients with stroke during clinical practice and it is advisable to communicate the results regarding clinical efficacy and complication rate outside of the ideal situation of clinical trials.

**Disclosure:** Nothing to disclose

## EPO1052

**Strokes complicating Crohn's disease**

W. Belbel, A. Nezzal, M. Louanchi, N. Toubal  
*Neurology, Hôpital Ibn Sina, Annaba, Algeria*

**Background and aims:** Crohn's disease (CD) is associated with a significant risk of thromboembolic events. It is most often venous thrombosis of the limbs and pulmonary embolism, arterial and cerebral venous thrombosis are rare and rarely reported in this context

**Methods:** Mr C.R., 48 years old, with a history of ileal CD diagnosed in 2017, present; during an attack treated with oral corticosteroid therapy and Azathioprine; weakness of the left hemibody associated with sudden onset headache. The neurological examination found a left hemiplegia with facial participation and an intracranial hypertension syndrome. Cerebral angio-MRI targets a large focus of right temporo-frontal infarction with a hemorrhagic component related to cerebral thrombophlebitis of the upper longitudinal sinus, transverse sinus, right sinus, and Galen's vein. The biological assessment finds hyperplaqueotose. The patient was put on an anticoagulant, stopped after a favorable clinical course and a re-sealing of the sinuses. 4 months later, while the bowel disease is in remission, the patient has a ischemic stroke in Sylvia due to thrombosis of the right internal carotid artery. The hemostasis assessment, the thrombophilia assessment, and the cardiology assessment (electrocardiogram, cardiac ultrasound, Doppler ultrasound of the supra-aortic trunks) are without particularities.

**Results:** In our case both phases of the disease are involved. The treatment of these thromboses is not consensual and is done like other cerebral thromboses, the recurrence in our patient makes discuss the interest of an anti coagulation in the short court in these patients.

**Conclusion:** Early recognition of these complications is essential to initiating life-saving treatment.

**Disclosure:** Nothing to disclose

## EPO1053

**Ophthalmological manifestations and outcomes in patients with direct carotid-cavernous sinus fistulae – a case series**

I.-F. Bratu<sup>1</sup>, A.C. Ribigan<sup>1</sup>, B. Dorobat<sup>2</sup>, A. Dimitriad<sup>2</sup>,  
 A. Carp<sup>2</sup>, R.S. Badea<sup>1</sup>, V.E. Tiu<sup>1</sup>, F. Antochi<sup>1</sup>,  
 O. Bajenaru<sup>1</sup>

<sup>1</sup>Neurology, University Emergency Hospital Bucharest, Bucharest, Romania, <sup>2</sup>Interventional Neuroradiology, University Emergency Hospital Bucharest, Bucharest, Romania

**Background and aims:** The most frequent clinical manifestations at onset in patients with direct carotid-cavernous sinus fistulae (DCCFs) involve the orbital-ocular-ophthalmic nerve complex.

The aim of this case series is to present the ophthalmological clinical characteristics, treatments and outcomes in patients with DCCFs.

**Methods:** Case series of 14 patients admitted to our Neurology Department between 2007-2019. All patients were diagnosed with DCCF by means of digital subtraction angiography of cervical-cerebral arteries. 13 of the DCCFs were posttraumatic (6 car, 1 boat, 1 bike and 3 home accidents, and 2 victim of domestic violence), only 1 being spontaneous (ruptured carotid aneurysm). 8 patients were male and 6 female, mean age being 43.07 (20-78).

**Results:** The mean period between the development of signs and symptoms and diagnosis was 58.92 days (10-150). 13 patients exhibited ocular motor control ailments as to cranial nerve involvement: oculomotor (71.42%), trochlear (28.57%) and abducens (64.28%). Fundoscopy revealed abnormalities in all cases. 9 patients exhibited chemosis, 5 secondary glaucoma, 13 exophthalmos, 6 bruit and 8 decreased visual acuity. 8 patients received topical ophthalmological treatment and 12 patients received endovascular treatment (31% stent graft, 46% platinum coils, 23% detachable balloon), 1 was pending treatment and 1 DCCF closed spontaneously. Follow-up at 1 month and 3-6-9-12 months revealed ophthalmological improvement in 8 of the treated patients while 3 were stationary.

**Conclusion:** This case series highlights the importance of multidisciplinary management (Neurology-Ophthalmology-Interventional Neuroradiology) and ophthalmological characteristics of DCCFs as they may have decisive influence on the outcome in such cases.

**Disclosure:** Nothing to disclose

## EPO1054

### The change of transfer time of stroke patients with new pre-hospital triage in Moravian-Silesian Region (Czech Republic)

M. Cabal<sup>1</sup>, J. Kral<sup>1</sup>, D. Václavík<sup>2</sup>, P. Jasso<sup>3</sup>, D. Holes<sup>3</sup>, O. Volný<sup>1</sup>, M. Bar<sup>1</sup>

<sup>1</sup>Neurology, University Hospital in Ostrava, Ostrava, Czech Republic, <sup>2</sup>Agel Research and Training Institute, Vítkovice Hospital, Ostrava, Czech Republic, <sup>3</sup>Emergency Medical Service of Moravian-Silesian Region, Ostrava, Czech Republic

**Background and aims:** The time from the onset to treatment (OTT) is important for clinical outcome in stroke. To shorten OTT, we need an effective pre-hospital triage.

**Methods:** Prospective multicentre study. In 2016 new pre-hospital triage has been introduced in Moravian-Silesian Region (MSR, 1.2mil. inhabitants). FAST PLUS test has started to be used (positive when severe hemiparesis was present) to predict large vessel occlusion (LVO). Patients with positive test are transported directly to mechanical thrombectomy (“mothership model”, before that we used to use “drip and ship model”). The sensitivity (93%) and specificity (47%) of FAST PLUS test in detecting of LVO have been published.

Transport time (TT) of all stroke patients treated with IVT or MT in 2015 and 2018 in all stroke centres of MSR was compared. The data were obtained from EMS of MSR database and SITS database.

**Results:** In 2015, 431 patients were diagnosed with ischemic stroke and treated either with tPA or mechanical thrombectomy (MT) -364 (85%) with tPA only and 89 (20%) with MT±tPA. In 2018, 691 patients were diagnosed and treated -654 (95%) with tPA only and 179 (26%) with MT±tPA. The median TT of tPA only patients was 48min both in 2015 and 2018, p=0.5. The median TT of MT±tPA patients was 118min in 2015 and 47min in 2018, p<0.001.

**Conclusion:** When the new triage was introduced, the TT of patients with MT was shortened, TT for IVT treated patients remained the same.

**Disclosure:** Supported by Ministry of Health, Czech Republic – conceptual development of research organization (FNOs/2018).

## EPO1055

### Contrast-enhanced transcranial Doppler for the diagnosis and monitoring of patients with patent foramen ovale and cerebral ischemic events – single center experience

B. Casaru<sup>1</sup>, R.S. Badea<sup>1</sup>, A.C. Ribigan<sup>1</sup>, F. Antochi<sup>2</sup>

<sup>1</sup>Bucharest, Romania, <sup>2</sup>Neurology, University Emergency Hospital Bucharest, Bucharest, Romania

**Background and aims:** Patent foramen ovale (PFO) is considered one of the possible aetiologies for ischemic stroke associated with cardiac pathology and has long been dependent on transoesophageal echocardiography (TOE) for its diagnosis. Given the fact that this pathology is present in almost 25% of the population, a more accessible method for its detection was required and that is where the contrast-enhanced transcranial Doppler (c-TCD) stepped in.

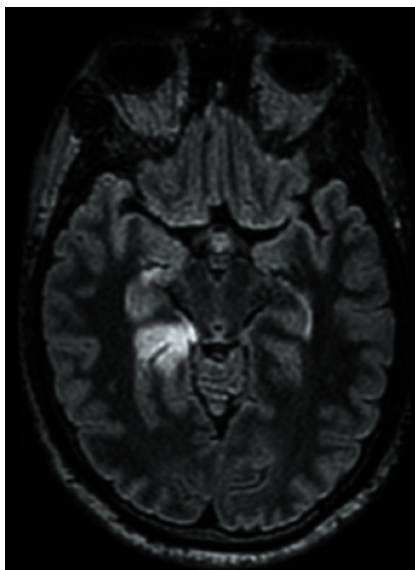
**Methods:** Throughout 2019, 123 patients were referred to our neurosonology laboratory after suffering an ischemic stroke/ transient ischemic attack without an identified cause or having asymptomatic ischemic lesions on the cerebral MRI. They underwent c-TCD and a TOE was recommended alongside medical treatment for those who tested positive.

**Results:** For 51 patients, transcranial Doppler emboli signals were detected after intravenous infusion of microbubbles and after the Valsalva manoeuvre. Spencer Logarithmic Scale was used for grading the right-to-left shunt. TOE confirmed the atrial defect for all patients who underwent this investigation. The decision for medical treatment or PFO closure by percutaneous procedure was made by a multidisciplinary team and follow-up with c-TCD was set for 1 and 6 months after the intervention.

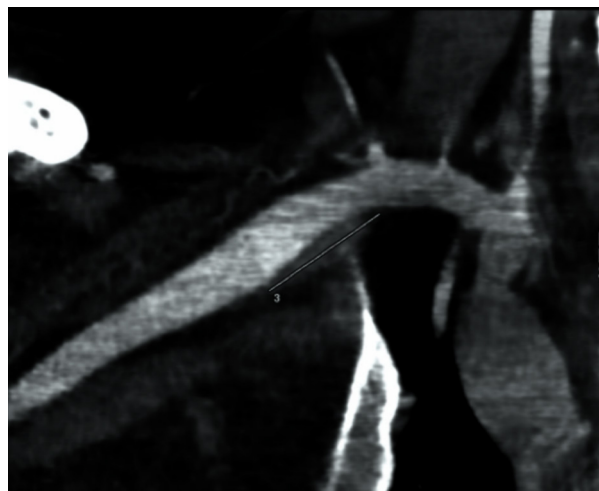
**Conclusion:** The purpose of this current paper is to share the data we have collected on patients diagnosed with PFO by the means of c-TCD in our clinic, bringing new evidence that this is a non-invasive valuable imaging technique, offering a high accuracy at a lower cost and at increased comfort for the patient.

**Disclosure:** Nothing to disclose

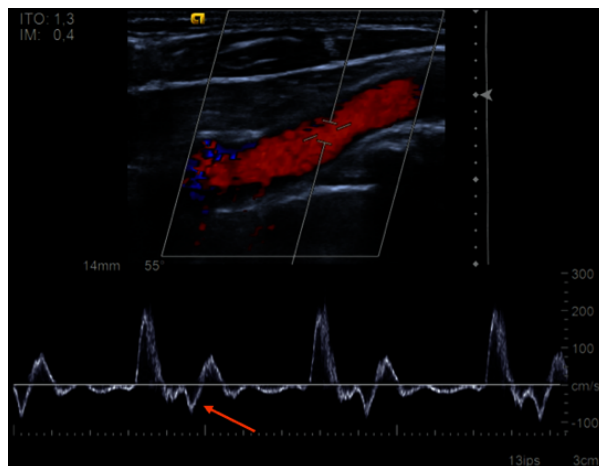
## EPO1056

**Posterior cerebral stroke by reverse flow embolism in thoracic outlet syndrome**A. Celier<sup>1</sup>, S. Chabay<sup>2</sup>, D. Stanciu<sup>3</sup>, F. Pico<sup>4</sup><sup>1</sup>Le Chesnay, France, <sup>2</sup>Angiology Unit, Versailles Mignot Hospital, Le Chesnay, France, <sup>3</sup>Neurology, Versailles Mignot Hospital, Le Chesnay, France, <sup>4</sup>Neurology department and Stroke Center, Versailles Mignot Hospital, Versailles, France**Background and aims:** Arterial thoracic outlet syndrome (aTOS) is a rare condition characterized by the compression of the subclavian artery in the thoracic outlet. It can be complicated by a cerebral infarction (CI). A retrograde embolism mechanism is often suspected, but rarely proven.**Methods:** A 24-year-old man presented with a transient memory disorder and paraesthesia of the left lower limb. His neurological exam was normal. In his medical history, he has a recently discovered aTOS. Surgery was planned shortly. Brain MRI revealed an CI of the right posterior cerebral artery (Fig. 1). CT angiography showed a 24.1mm thrombus in a post-stenotic aneurysm sac of the sub-clavian artery (Fig. 2). An doppler ultrasound (Fig. 3) showed retrograde reflux for approximately 0.45 seconds. During this reflux, the average maximum speed is -12.8cm/sec. Thus, the estimated amplitude of the reflux is 5.76cm. The distance from the edge of the mobile thrombus to the ostium from the right vertebral artery is 5cm. The rest of the CI work up was strictly normal. After anticoagulation, the patient underwent surgery.

FLAIR weighted brain MRI shows an hyperintense area in the right posterior cerebral artery territory



24.1mm thrombus in a post-stenotic aneurysm sac of the sub-clavian artery



Ultrasound in the sub-clavian artery showing a retrograde flux (arrow)

**Results:** We have found only 3 other cases in the literature with arguments in favor of an embolic mechanism by retrograde flow in CI associated with aTOS. The Doppler analysis that we report shows that the retrograde embolism mechanism was both possible and likely.**Conclusion:** Arterial thoracic outlet syndrome is a rare condition which can be complicated by a cerebral infarction linked to a retrograde embolism from a post stenotic aneurysmal sac.**Disclosure:** Nothing to disclose



## EPO1057

**Timing of carotid endarterectomy after intravenous thrombolysis**

D. Černík<sup>1</sup>, M. Orlický<sup>2</sup>, D. Sanak<sup>3</sup>, M. Sames<sup>4</sup>, K. Belinová<sup>5</sup>, P. Janoušová<sup>5</sup>

<sup>1</sup>Department Of Neurology, Masaryk Hospital KZ as, Usti nad Labem, Czech Republic, <sup>2</sup>Department Of Neurosurgery, Univerzity Hospital of L.Pasteur, Kosice, Slovakia,

<sup>3</sup>Department of Neurology, Univerzity Hospital Olomouc, Olomouc, Czech Republic, <sup>4</sup>Department of Neurosurgery, Masaryk Hospital KZ as, Usti nad Labem, Czech Republic,

<sup>5</sup>Department of Emergency, Masaryk Hospital KZ as, Usti nad Labem, Czech Republic

**Background:** The aim of this study was to identify optimal timing of Carotid Endarterectomy (CEA) in a patient with acute ischemic stroke after administration of intravenous thrombolysis (IVT) and with symptomatic carotid artery stenosis. We focused on clinical outcome 3 months after stroke.

**Patients and methods:** All CEA operated after the administration of IVT (from 2012-2019) were primary divided into the groups according to time interval between the IVT and surgery ((a) within 24 hours, (b) over 24 hours). Secondary were divided into the groups according to time interval between the IVT and surgery: within 6 hours, 6-12 hours, 12-24 hours, 24-72 hours, 72 hours- 14 days, over 14 days. Neurological deficit was assessed with National Institutes of Health Stroke Scale (NIHSS) and clinical outcome after 3 months with modified Rankin scale (mRS) with a score 0-2 for good outcome.

**Results:** 66 patients (44 males) were analyzed retrospectively. There was no significant difference in good clinical outcome between groups of operated patients within 24 hours and after 24 hours (76.7 vs. 75%). Median mRS after 3 months in both groups was 1. Second, in a more detailed breakdown, worse clinical outcomes are reported for groups within 6 hours and over 14 days. The good clinical outcome (mRS  $\leq 2$ ) in the groups was: within 6 hours -70%, 6-12 hours -78%, 12-24 hours -82%, 24-72 hours -77%, 72 hours -14 days -100%, over 14 days -67%.

**Conclusion:** The risk of stroke recurrence while waiting for CEA shows the importance of early surgery. Early CEA surgeries outside the first 6 hours following IVT administration are not burdened with a higher risk of worse clinical outcome.

**Disclosure:** Nothing to disclose

## EPO1058

**Increased brain plasmin levels following experimental ischemic stroke**

E. Mindel<sup>1</sup>, J. Chapman<sup>2</sup>, R. Weiss<sup>3</sup>, D. Bushi<sup>2</sup>, O. Gera<sup>2</sup>, D. Orion<sup>4</sup>, E. Shavit-Stein<sup>2</sup>

<sup>1</sup>Physiology and Pharmacology, Tel Aviv University, Ramat Gan, Israel, <sup>2</sup>Neurology, Sheba Medical Center, Ramat Gan, Israel, <sup>3</sup>Physiology and Pharmacology, Tel Aviv University, Tel Aviv, Israel, <sup>4</sup>Sheba Medical Center, Tel Aviv Yaffo, Israel

**Background and aims:** The fibrinolytic protease plasmin is induced by recombinant tissue-type plasminogen activator (tPA) therapy. We measured potentially harmful plasmin activity in brain tissue following experimental ischemic stroke.

**Methods:** We established a novel method for direct quantitative measurement of plasmin activity in mouse brain slices using a sensitive fluorescent substrate in the presence of specific protease inhibitors. This method was used in fresh coronal slices of the ipsilateral and contralateral hemispheres 3, 6 and 24 hours following permanent right middle cerebral artery occlusion (RMCAo) in wild type and tPA deficient mice. Infarct volume was measured by the TTC method.

**Results:** Plasmin activity was elevated in the ischemic and contralateral hemisphere after the induction of RMCAo in comparison to low levels in healthy mice ( $p < 0.0001$ ), increased with time ( $p < 0.0001$  by repeated measures ANOVA) and was significantly higher in the ischemic compared to the contralateral hemisphere 3 ( $1.07 \pm 0.17$  and  $0.66 \pm 0.06$ , respectively,  $p < 0.01$ ), 6 ( $1.04 \pm 0.35$  and  $0.46 \pm 0.07$ , respectively,  $p < 0.001$ ) and 24 hours ( $1.94 \pm 0.50$  and  $0.75 \pm 0.1$ , respectively,  $p < 0.001$ ) following RMCAo. Plasmin activity was concentrated in the ischemic core slices and was correlated with infarct volume ( $R^2 = 0.5289$ ,  $p < 0.01$ ). The specificity of the assay was verified utilizing tPA-deficient mice which had significantly 3 fold lower levels of plasmin 24 hours following ischemia compared to wild type mice ( $p < 0.01$ ).

**Conclusion:** Stroke induces increased plasmin levels in the brain which may represent a therapeutic target and suggest caution in the use of rtPA.

**Disclosure:** Nothing to disclose

## EPO1059

**LncRNA-U90926 aggravates ischemic brain injury via promoting neutrophils infiltration after experimental stroke**

J. Chen, Y. Xu  
Nanjing, China

**Background and aims:** Microglia are a key immune-competent cell type that exert elaborate functions to determine the outcome of ischemic stroke. However, the detail mechanisms under the post-stroke microglial activity remain elusive. Long non-coding RNAs (LncRNAs) play a vital role in the biological function of microglia in various of diseases. In this study, we explored the role of U90926 in the microglial activity after experimental stroke.

**Methods:** Oxygen-glucose deprivation (OGD) and transient middle cerebral artery occlusion (tMCAO) were used as in vitro and in vivo ischemic stroke models. Real-time polymerase chain reaction (RT-qPCR) was used to detect expression of U90926 and other cytokines. Infiltrating neutrophils were quantified by FACS and immunofluorescence staining. Fluorescence in situ hybridization (FISH) assay was performed to determine the localization of U90926. Elisa assay was performed to detect the chemokine CXCL2 level. Western blot was taken to detect the expression of involved molecules. Luciferase activity and RNA pull down assays were used to explore the correlation between miR-658-3p and its target gene U90926 and CEBPB.

**Results:** U90926 was markedly up-regulated in microglia exposed to MCAO and OGD. Microglial U90926 knockdown definitely attenuated brain infarct size and neurological deficits after experimental stroke. Fewer neutrophils infiltrated to the infarcted brain after U90926 knockdown. U90926 functioned as an endogenous miR-7658-3p sponge, resulting in the increase of miR-7658-3p target CEBPB level, which further up-regulated neutrophil chemoattractant CXCL2.

**Conclusion:** U90926 aggravates ischemic brain injury through facilitating neutrophils infiltration via up-regulating microglia-modulated neutrophils chemoattractant CXCL2.

**Disclosure:** Nothing to disclose

## EPO1060

**Endovascular treatment in patients with M2 segment of the middle cerebral artery occlusions in a tertiary hospital: real-life experience**

R. Sainz Amo, J.L. Chico García,  
A. De Felipe Mimblera, S. García Madrona,  
B. Baena Alvarez, A. Celdrán de Castro García,  
J. Gómez Corral, C. Matute Lozano, A. Cruz,  
R. Vera Lechuga, J. Masjuan Vallejo  
*Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain*

**Background and aims:** The benefit of endovascular treatment (EVT) in patients with acute ischemic stroke in proximal anterior circulation is established. However, the experience with distal occlusions is limited and benefit remains unclear. We present our clinical experience among patients with occlusion of the M2 segment of the middle cerebral artery undergoing EVT.

**Methods:** Retrospective analysis of prospective registry of EVT in our tertiary hospital between January 2018 and November 2019. Clinical and radiological variables of patients with M2-occlusions were collected.

**Results:** 23 patients were identified, mean age was 64.8±16.4 years, 60.9% women. 21.7% patients were older than 80 years. The etiology was cardioembolic in a 47.8% and ESUS in a 39.1%. 56.5% patients received intravenous alteplase before EVT. 69.6% had an occlusion of the dominant branch. Successful recanalization (TICI2b-TICI 3) was achieved in 91.3%, with no significant differences between dominant and nondominant (p=0.624). There was no hemorrhagic transformation in any patient. Median NIHSS at onset was 13.9±6.3, at discharge was 6.7±6.8 (p<0.001). At 3 months 59.1% patients were independent (mRS ≤2) with no significant differences between receiving previous intravenous alteplase or not (p=0.17). This percentage of functional independence is equal for patients over 80 years old. Mortality in the first 3 months was 23%.

**Conclusion:** EVT in patients with M2-occlusion is associated with good functional independence and recanalization rates in our experience with no increased risk of hemorrhage. Larger studies are needed to verify the benefits of EVT for different settings of M2 occlusions.

**Disclosure:** Nothing to disclose

## EPO1061

**The association between immature platelet and the early neurological deterioration in acute ischemic stroke**

B.-H. Cho

*Korea University Anam Hospital, Seoul, Korea, Republic of*

**Background and aims:** Early neurological deterioration (END) in acute ischemic stroke is a common event. The underlying pathomechanisms are heterogenous. Immature platelet fraction (IPF) is the useful marker of increased platelet production and turnover which could occur in patients with increased platelet activation. We investigated the association between the level of IPF and the prevalence of END in acute ischemic stroke patients.

**Methods:** A total 1655 of acute ischemic stroke patients in single tertiary academic center was enrolled from January 2013 to October 2018 via stroke registry. IPF levels were quantified by whole blood flow cytometry with automated assays (Sysmex XE-2100TM). High IPF was defined as the IPF level was more than 5%. Early neurological deterioration was defined as an increment change of at least one point in motor power or total National Institute of Health Stroke Scale (NIHSS) score deterioration  $\geq 2$  points within the first week after admission.

**Results:** A total of 72 patients (4.4%) experienced END. END was more prevalent in the patients with high IPF [13 (11.7%) vs 59 (3.8%),  $p < 0.0001$ ]. Multivariate logistic regression analysis showed high IPF was an independent predictor of the prevalence of END (adjusted odds ratio=1.32; 95% confidence interval=1.03–1.70).

**Conclusion:** A high IPF levels was associated with the prevalence of END in acute ischemic stroke patients.

**Disclosure:** Nothing to disclose

## EPO1062

**Association of blood pressure with functional outcomes after endovascular thrombectomy in acute basilar artery occlusion**B.-H. Cho<sup>1</sup>, J.-T. Kim<sup>2</sup><sup>1</sup>*Korea University Anam Hospital, Seoul, Korea, Republic of,*<sup>2</sup>*Chonnam National University Hospital, Gwangju, Korea, Republic of*

**Background and aims:** Blood pressure (BP) is associated with clinical outcome after acute ischemic stroke, but the exact mechanism and effect of BP are not well understood. BP levels related to prognosis after endovascular thrombectomy in patients with acute basilar artery occlusion remain unclear. We aimed to investigate the association between BP and clinical outcome in acute basilar artery occlusion patients treated with endovascular thrombectomy.

**Methods:** This study reports a retrospective analysis of a prospective registry of a comprehensive stroke center. Patients treated with EVT due to acute basilar artery occlusion were enrolled. BP was measured hourly during the first 24h after admission. Associations of various BP parameters, including BP variability, with functional outcomes at 3m, including good outcomes (modified Rankin Scale [mRS] score of 0-2), were analyzed.

**Results:** Of the 79 enrolled patients (mean age;  $71.5 \pm 11.5$  yrs, male; 53.2%), 70 (89.7%) achieved successful reperfusion after EVT, and 26 (32.9%) had good outcomes at 3m. Higher systolic successive variation (SV) (each 10% increase; OR 0.67 [0.53-0.87]) were associated with a reduced likelihood of achieving good outcomes.

**Conclusion:** The results showed that a higher systolic SV in patients with acute basilar artery occlusion during the first 24h of EVT reduced the likelihood of good outcomes at 3m.

**Disclosure:** Nothing to disclose

## EPO1063

**Elevated levels of D-dimer are associated with MRI hyperintensities in Patients with transient global amnesia**

M. Chovancova<sup>1</sup>, Z. Kosutzka<sup>1</sup>, M. Karlik<sup>2</sup>,  
M. Jezberova<sup>3</sup>, P. Valkovic<sup>1</sup>

<sup>1</sup>Bratislava, Slovakia, <sup>2</sup>Neurologic Clinic, Hospital of Acad. Dr. L. Derer Bratislava, Bratislava, Slovakia, <sup>3</sup>Dr. Magnet, Bratislava, Slovakia

**Background and aims:** Transient global amnesia (TGA) is a benign but self-limiting neurological syndrome, characterized by the development of anterograde and retrograde amnesia, without loss of consciousness and self-awareness. The pathophysiology of TGA remains to be obscure even after more than 60 years from its first description. The purpose of this study was to approval the hypothesis of a positive association of MRI confirmed hyperintensities with elevated D-dimer.

**Methods:** The study was conducted retrospectively on 33 patients diagnosed with an episode of TGA according to the criteria of Hodges and Warlow (Hodges and Warlow 1990). Out of this cohort, 24 patients (19 females, mean age 64.9) had MRI confirmed hyperintensities. D-dimer levels were taken during the admission and concurrent presence of clinical symptoms of TGA. It has been taken logistic binary regression with the presence of MRI hyperintensities (YES/NO) as dependent variable and levels of D-dimer as an independent variable. The cut-off values for D-dimer were 0.5.

**Results:** From the whole cohort, 21 patients (63.6%) had elevated levels of D-dimer. Presence of elevated D-dimer was connected with higher risk of hippocampal hyperintensities in 3T MRI (OR=6.000, 95% CI:1.134-31.735).

**Conclusion:** Positive association of MRI confirmed hyperintensities with elevated D-dimer supports the theory of small thrombi in the deep cerebral venous system as a potential pathophysiological hallmark of TGA.

**Disclosure:** Nothing to disclose

## EPO1064

**Assessing for depression following a stroke**

T. Dalli<sup>1</sup>, N. Aquilina<sup>1</sup>, M. Mallia<sup>2</sup>

<sup>1</sup>Dept. of Medicine, Mater Dei Hospital, Msida, Malta,

<sup>2</sup>Department of Neurology, Msida, Malta

**Background and aims:** Depression is a major source of morbidity on patients following a stroke and can hinder the patients' rehabilitation potential. The aim of the study was to determine whether depression is being actively screened for in our local national hospital.

**Methods:** Patients who experienced an ischaemic or haemorrhagic stroke over a predefined 3-month period were identified by performing a search through the imaging database. Note was taken whether patients were started on new psychiatric medication following the stroke and whether they were referred to a mental health specialist. At 3 months from onset of symptoms, patients under the age of 65 were screened using the hospital anxiety and depression scale (HADS) while patients over the age of 65 were screened using the brief assessment schedule depression cards score (BASDEC).

**Results:** 59 patients were found to have suffered a stroke. 28.8% of patients had cortical ischaemia while 32% of patients had lesions in the deep white matter. The majority of patients were not screened for mood disorders. Half of these patients felt they might have benefitted from such screening. A third of patients were screened as inpatients, with up to a third of them being referred to psychiatry and starting treatment. Screening tests at 3 months revealed a third of patients were at risk of depression following a stroke with only 27% of them being seen by psychiatrist.

**Conclusion:** A robust way to screen post stroke patients for depression needs to be implemented. We suggest for screening to be incorporated in local guidelines.

**Disclosure:** Nothing to disclose

## EPO1065

**A Study of Clinical, Radiological & Thrombophilia Profile in Cerebral Venous Thrombosis**

D. Dave, F.M. Khan, S. Rohatgi, S. Nirhale, P. Rao, P. Naphade

*Neurology, Dr. D. Y. Patil Medical College, Hospital & Research Centre, Pune, India*

**Background and aims:** Cerebral venous thrombosis (CVT) accounts for 10–20% of stroke in young which in turn accounts for nearly 30% of all cases of strokes in India. The study was done to describe the clinical, radiological and thrombophilia profile of CVT in an Indian population.

**Methods:** The study was carried out at a tertiary care multi-specialty hospital in Western Maharashtra. The study protocol was approved by the institutional ethics committee. The study design was a prospective, observational study with patients recruited over a 12 months period from December 2018 to November 2019. 45 patients were studied.

**Results:** Male preponderance was seen. The mean age of presentation was 30 years. Headache was the most common presenting complaint seen in 93.33%. Most common sinus involved was transverse sinus seen in 40% 43% had venous infarctions on the MRI brain. In 64% of cases, a prothrombotic state could be identified. MTHFR gene mutation (24%), Protein C deficiency (16%), APLA (12%), Factor V mutation (8%) and Protein S deficiency (4%) were seen.

**Conclusion:** CVT is an important cause of headache and stroke and modern MR imaging has allowed early and firm diagnosis. It is one of the treatable and reversible causes of stroke in young. Clinical presentation is extremely varied and symptoms may evolve over few weeks or even months. In contrary to recently published European guidelines, evaluation for an underlying procoagulant in provoked & unprovoked CVT, is useful for further planning of long term anticoagulation.

**Disclosure:** Nothing to disclose

## EPO1066

**Embolc stroke secondary to an aortic valve fibroelastoma: an increasingly recognized rare cause of stroke**

S. De la Fuente Batista<sup>1</sup>, L. Esteban Lucía<sup>2</sup>, M.A. García Torres<sup>1</sup>, I. Navas Vinagre<sup>1</sup>, M. Osés Lara<sup>1</sup>, M. Cortes García<sup>2</sup>, A. Pello Lazaro<sup>2</sup>, J. Tuñón Fernández<sup>2</sup>, E. Martínez Fernández<sup>2</sup>,

G. Aldamiz-Echevarria Del Castillo<sup>3</sup>, A.J. Fortes<sup>4</sup>

<sup>1</sup>*Neurology, Fundación Jiménez Díaz, Madrid, Spain,*

<sup>2</sup>*Cardiology, Fundación Jiménez Díaz, Madrid, Spain,*

<sup>3</sup>*Cardiac Surgery, Fundación Jiménez Díaz, Madrid, Spain,*

<sup>4</sup>*Pathological Anatomy, Fundación Jiménez Díaz, Madrid, Spain*

**Background and aims:** Cardiac papillary fibroelastomas (CPFEs) PFE are the second most common primary cardiac tumors after myxomas. Most PFE are found incidentally, but when they are symptomatic, stroke or TIA is the most common clinical presentation.

**Methods:** We report a case of a 59-year-old gentleman with sudden severe bilateral hearing loss, gait instability, dysarthria and left limbs clumsiness.

1 year before, he developed a right palmar digital artery thrombosis, without significant findings in the etiological study.

**Results:** A brain MRI, 15 days after the symptoms started, showed a subacute ischemic stroke involving both insular cortex and right frontotemporal lobes (Figure 1).

Blood tests, including hypercoagulability and autoimmunity, were normal. Duplex study of supraaortic arteries was normal and no potentially embolic arrhythmic events were found.

The transthoracic echocardiography (TTE) revealed a thickened aortic valve with a pediculate mobile 29mm-length mass anchored to the left coronary leaflet with preserved left ventricular ejection fraction, which suggested a vegetation or a cardiac tumor (Figure 2).

A multidisciplinary team decided on surgical treatment. After aortic valve resection a metallic aortic prosthesis was implanted, with favorable evolution.

Pathologic examination of the surgically removed pieces confirmed the CPFE diagnosis (Figure 3).

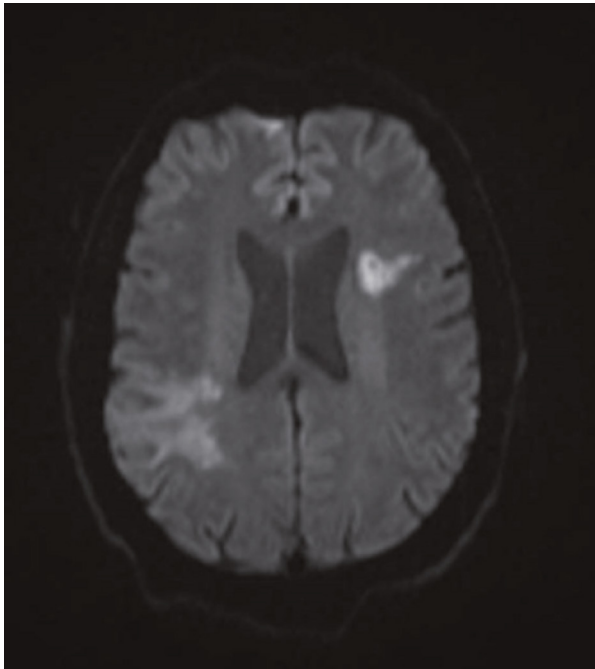


Figure 1: MRI diffusion weighted imaging of subacute ischemic stroke which involved both insular lobes and right frontotemporal lobe.

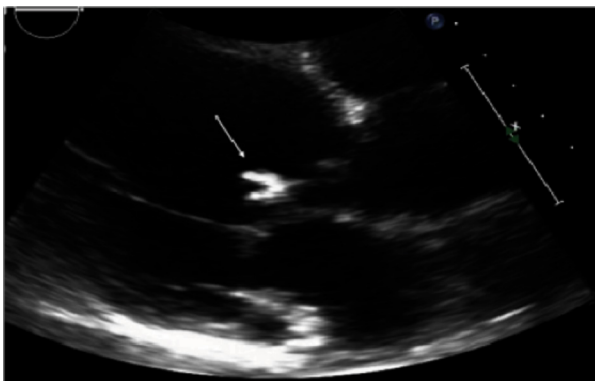


Figure 2: TTE imaging showing the thickened aortic valve with a pediculated mobile 29mm-length mass anchored to the left coronary leaflet.

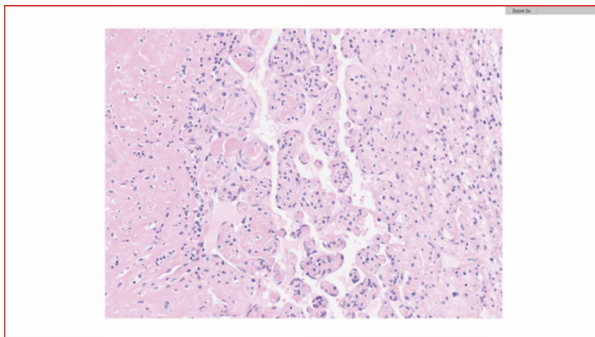


Figure 3: Pathology showed papillary structures lined by endothelium consisting of fibromyxoid stroma with dense areas of hyalinized stroma confirming the diagnosis of a papillary fibroelastoma of the aortic valve.

**Conclusion:** Primary cardiac tumors are an uncommon cause of systemic embolism, which can be easily diagnosed with non-invasive techniques and whose treatment eliminates the risk of recurrence. For this reason, they should be considered in the study of patients with cerebral ischemia of embolic profile without known cause.

**Disclosure:** Nothing to disclose

## EPO1067

### Cerebral amyloid angiopathy-related inflammation: a rare and treatable cause of severe subacute leukoencephalopathy

S. Delgado<sup>1</sup>, M.I. Ferreira<sup>2</sup>, C. Figueiredo<sup>1</sup>, C. Casimiro<sup>3</sup>, C. Costa<sup>1</sup>, M. Santos<sup>1</sup>

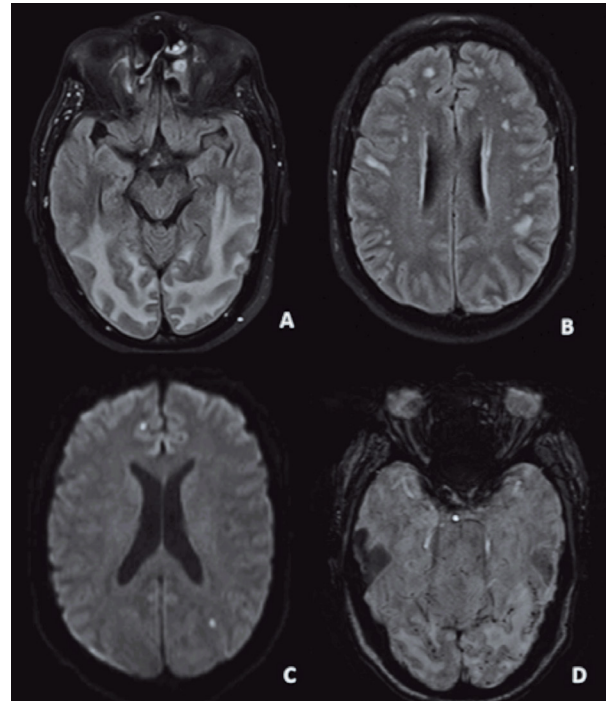
<sup>1</sup>Neurology, Hospital Prof. Doutor Fernando Fonseca, Amadora, Portugal, <sup>2</sup>Internal Medicine, Hospital Prof. Doutor Fernando Fonseca, Amadora, Portugal,

<sup>3</sup>Neuroradiology, Hospital Prof. Doutor Fernando Fonseca, Amadora, Portugal

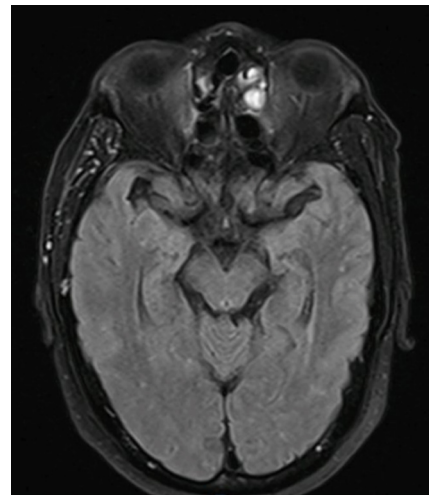
**Background and aims:** Cerebral amyloid angiopathy-related inflammation (CAAri) is a rare entity, characterized by inflammatory response to beta-amyloid deposits on cerebral vessels. It often presents with rapid cognitive decline and encephalopathy. Definitive diagnosis is only possible on brain biopsy, but probable diagnosis is based on characteristic clinical and imaging findings and ruling out of differential diagnosis.

**Methods:** Case report.

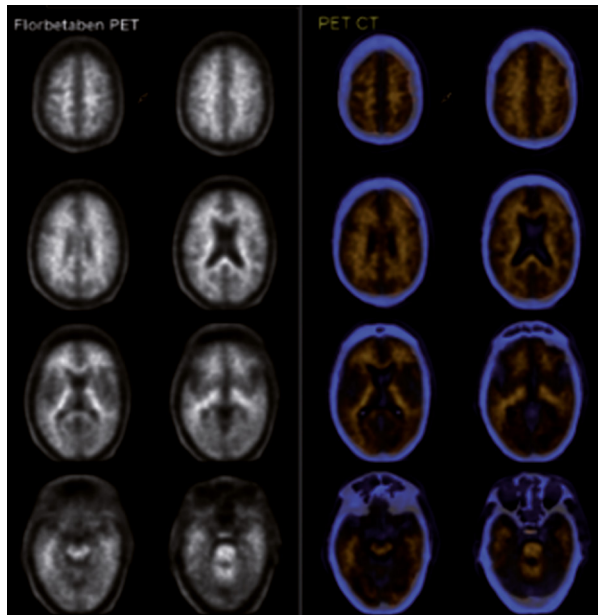
**Results:** 57-year-old male, presenting with acute disorientation, confusion and agitation, preceded by headache and transient upper left limb paresthesias. Blood tests were unremarkable, CT scan showed slight leukoencephalopathy and EEG had diffuse slowing without paroxysmal activity. Lumbar puncture revealed pleocytosis (107 cells/uL) with mononuclear predominance and high protein levels. Antibiotic and antiviral therapy were started, but repeat lumbar puncture revealed worsening of these parameters, and there was neurological worsening with severe cognitive deterioration, psycho-motor slowing, and marked bilateral visual deficit. Infectious and auto-immune studies were negative. MRI revealed bilateral temporo-occipital confluent white matter T2/FLAIR hiperintensity without contrast enhancement, multifocal subcortical white matter lesions (2 with restriction on DWI), and widespread cortical microbleeds. Digital angiography was unremarkable. The patient was treated with corticosteroids and cyclophosphamide, with significant cognitive and visual improvement, and remission of confluent posterior leukoencephalopathy on 3 month MRI. Florbetaben-PET showed diffuse deposition of beta-amyloid and APOE e4 was found in homozygosity, supporting the diagnosis of CAAri.



Initial MRI showing bilateral temporo-occipital confluent white matter T2/FLAIR hiperintensity (A), multifocal subcortical white matter lesions (B), 2 with restriction on DWI (C), and widespread cortical microbleeds on SWI (D).



3 month MRI showing remission of confluent posterior leukoencephalopathy.



Florbetaben-PET and PET/CT fusion images showing loss of white matter/cortex differentiation (as both take up the tracer), demonstrating abnormal beta-amyloid deposition.

**Conclusion:** We present an aggressive case of CAARI, a rare, probably underdiagnosed and potentially treatable cause of acute/subacute leukoencephalopathy. Studies and guidelines are in need, to clarify the best diagnostic and therapeutic approach.

**Disclosure:** Nothing to disclose



## Cerebrovascular diseases 3

## EPO1068

**C-reactive protein and neutrophil-to-lymphocyte ratio may suggest early cerebral venous thrombosis**

L. Dias, M.J. Pinto, M. Carvalho  
*Neurology, Hospital de São João, Porto, Portugal*

**Background and aims:** Time of onset of cerebral venous thrombosis (CVT) can be difficult to ascertain at patient admission, which may have implications in therapeutic decision. Our aim was to evaluate the association between blood biomarkers levels in CVT patients at admission and the temporal pattern of CVT.

**Methods:** We performed a retrospective analysis of adult CVT cases admitted to a tertiary hospital from 2006 to 2019. We excluded cases of infection at admission, autoimmune inflammatory and haematological diseases. Spearman correlation test and Poisson regression were used to assess the relationship between blood biomarkers at admission and symptoms duration until CVT diagnosis. We performed a group analysis according to reported onset of symptoms: acute (<2 days), subacute (2-30 days) and chronic (>30 days).

**Results:** Our cohort included 78 patients, 74.4% female, median age at diagnosis of 43 years old. Median duration of symptoms of 4 days (IQR 2-11). The chronic group included 8 patients (10.3%). Spearman correlation showed a weak but significant negative correlation between duration of symptoms and absolute neutrophil counts ( $p=0.028$ ,  $r=-0.251$ ), C-reactive protein (CRP) ( $p=0.038$ ,  $r=-0.240$ ), and neutrophil-to-lymphocyte ratio (NLR) ( $p=0.013$ ,  $r=-0.282$ ). Poisson regression confirmed a negative relation between timing of CVT and NLR ( $p=0.046$ , OR 0.889, CI 0.791-0.998) and CRP ( $p=0.021$ , OR 0.976, CI 0.955-0.996). The latter was confirmed by analysis of chronic and non-chronic (acute and subacute) group ( $p=0.037$ ; OR 0.804; CI 0.654-0.987).

**Conclusion:** In our cohort, higher CRP and NLR were associated with a shorter duration of symptoms. Nevertheless, more studies are needed to confirm these findings.

**Disclosure:** Nothing to disclose

## EPO1069

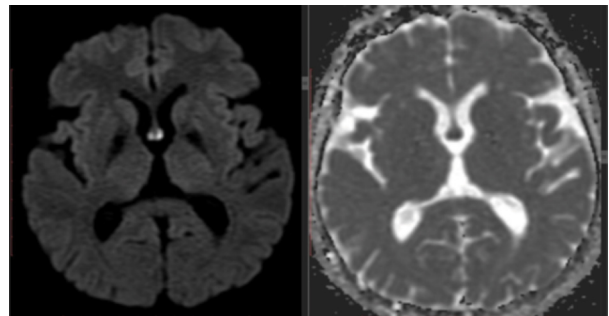
**Exceptionally rare cause of acute anterograde amnesia: fornix infarction following subcallosal artery stroke**

N.I. Dima<sup>1</sup>, L. Cozma<sup>2</sup>, D. Tulbă<sup>1</sup>, A. Lefter<sup>1</sup>,  
 M.C. Lupu<sup>1</sup>, B.O. Popescu<sup>2</sup>  
<sup>1</sup>*Department of Neurology, Colentina Clinical Hospital, Bucharest, Romania,* <sup>2</sup>*“Carol Davila” University of Medicine and Pharmacy, Bucharest, Romania*

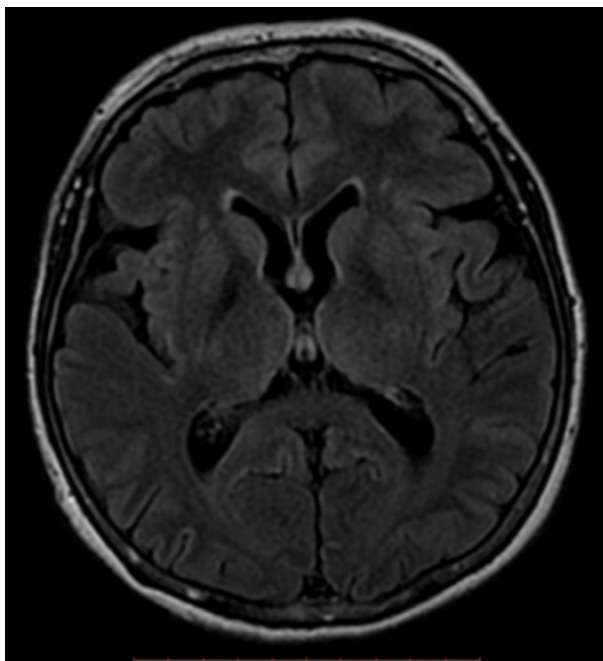
**Background and aims:** The fornix, as part of the Papez limbic circuit, plays an important role in the formation and consolidation of new memories. Fornix injuries cause an important spectrum of memory deficits. Although there is increasing awareness of stroke as a cause of acute isolated amnesic syndrome, fornix infarction rarely occurs.

**Methods:** We report the case of a 63-year-old woman with a history of untreated hypertension who presented with a sudden episode of anterograde amnesia beginning 12 hours prior to admission.

**Results:** Neurological evaluation revealed anterograde amnesia and disorientation in time and space. Brain computed tomography was unremarkable, but brain magnetic resonance imaging revealed restricted diffusion and increased T2/FLAIR signal in the bilateral fornix suggestive of subcallosal artery infarction. Electroencephalography and cerebrospinal fluid examination were normal. Carotid and vertebral ultrasonography showed moderate atherosclerosis and an ulcerated plaque on the internal carotid artery. The presumed pathophysiology is most likely cerebral small-vessel disease, in accordance with literature data. Concurrently, we conducted an extensive search of the literature using the Pubmed database and found 49 cases of anterograde amnesia due to fornix infarction, 28 of which were non-iatrogenic.



Brain MRI. Axial diffusion-weighted scan demonstrating restricted diffusion (increased DWI-left and decreased ADC-right signal) suggestive for a bilateral fornix infarction.



Brain MRI. Axial FLAIR-weighted imaging showing hyperintensity in fornix columns bilaterally.

**Conclusion:** Fornix infarction is a rare condition that should be considered in all patients presenting with acute-onset anterograde amnesia, especially if symptoms are isolated and persist for more than 24 hours.

**Disclosure:** Nothing to disclose

## EPO1070

### A right time and place for everything: - HR-MRI for the diagnosis and follow-up of primary angiitis of the central nervous system

A.A. Dimancea<sup>1</sup>, E. Meseguer<sup>2</sup>, P. Amarenco<sup>2</sup>

<sup>1</sup>Bucharest, Romania, <sup>2</sup>Neurologie, Bichat Claude Bernard Hospital, Paris, France

**Introduction:** Primary angiitis of the central nervous system (PACNS) is a rare disease, characterized by an exhaustive differential diagnosis and unfavorable prognosis, in the absence of aggressive therapy.

**Methods:** A 35-year-old, otherwise healthy female patient is hospitalized for 5 consecutive symptomatic ischemic strokes during a period of 2 months. Successive MRIs reveal consecutive ischemic strokes in the vertebrobasilar territory (right posteroinferior cerebellar, bilateral anteroinferior cerebellar and paramedian branches of basilar artery (BA). Cerebral angiography consistently showed a thrombosed distal BA, with stenosed BA branches. All recurrences are diagnosed despite intensive antithrombotic therapy. High-resolution MRI revealed basilar and vertebral arteries mural enhancement, suggesting cerebral vasculitis. An extensive diagnosis work-up included a transthoracic and transesophageal cardiac ultrasonography and lumbar puncture without pathological findings and an exploration of infectious, neoplastic and rheumatological etiologies successively excluded. Treatment induction with corticosteroids and cyclophosphamide is initiated, with no new clinical recurrences.

**Results:** 6-months HR-MRI follow-up revealed BA stenosis regression, with near-absence of mural enhancement. Corticosteroids are tapered over 3 years, with cyclophosphamide switched for methotrexate. Yearly HR-MRI and clinical evaluations showed absence of imagistic or clinical recurrences, thus permitting immunosuppressive treatment withdrawal after 3 years and follow-up thereafter without clinico-radiologic recrudescence.

**Conclusion:** Case particularities include the predilection of the vasculitic process for the vertebrobasilar territory as well as the favorable outcome, contrasting with the general disease prognosis. Our case highlights the role of HR-MRI in establishing the exclusion diagnosis of PACNS and contributing to the rapid treatment initiation and follow-up in an otherwise debilitating condition.

**Disclosure:** Nothing to disclose

## EPO1071

**Screening for atrial fibrillation in patients with cryptogenic stroke with telemonitoring**

M. Dimitrova<sup>1</sup>, M. Chukanova<sup>2</sup>, M. Milanova<sup>2</sup>

<sup>1</sup>Department of neurological diseases, University Multiprofile Hospital for Active Treatment and Emergency Medicine "N.I.Pirogov", Sofia, Bulgaria, <sup>2</sup>Clinic of Cardiology, University Multiprofile Hospital for Active Treatment and Emergency Medicine "N.I.Pirogov", Sofia, Bulgaria

**Background and aims:** Cryptogenic stroke (CS) is defined as cerebral ischemia of unknown origin and accounts for 30% of ischemic stroke. CS is more frequent in younger patients and most frequently due to cardiac embolism. The most frequent causes of cardiac embolism include paradoxical embolism via a patent foramen ovale (PFO), paroxysmal atrial-fibrillation (AF), valvular heart-disease, left ventricular aneurysm, atherosclerosis of ascending aorta. 24-hours holter-ECG is traditionally used in clinical practice. This method has some limitations especially the insufficient period for examination and the chance for misdiagnosing short episodes of AF.

The aim of the study is to find frequency of atrial fibrillation in a group of patients with cryptogenic stroke examined with telemonitoring.

**Methods:** The study includes 185 patients with stroke with undetermined reason. The patients were age between 33 and 75 years. Examination with monitoring system Pro Plus EHO EVENT MINI Holter was performed. The middle period for assessment of cardiac rhythm is 96 hours.

**Results:** Rhythmic pathology was identified in 48 patients, 3 of them were with periods of bradycardia and were transmitted for pacemaker implantation. Atrial fibrillation was diagnosed in 45 patients and anticoagulation therapy was initiated. The episodes of silent AF appeared between 24 hour and the end of examination in 31 patients. In this case, the use of 24 hour ECG holter could lead to misdiagnose.

**Conclusion:** Long term monitoring has advantage over 24 hour holter ECG in screening of AF in CS. New systems for telemonitoring are modern and useful approach for examination in patients with CS.

**Disclosure:** Nothing to disclose

## EPO1072

**Young cryptogenic ischemic stroke patients: a descriptive analysis of baseline epidemiologic characteristics, laboratory parameters and clinical outcomes**

P. Divisova<sup>1</sup>, D. Sanak<sup>2</sup>, T. Dornak<sup>2</sup>, P. Polidar<sup>2</sup>, M. Kral<sup>1</sup>, D. Franc<sup>3</sup>, T. Veverka<sup>1</sup>, A. Bártková<sup>1</sup>, P. Kanovsky<sup>1</sup>,

M. Hutýra<sup>4</sup>, M. Spacek<sup>5</sup>, J. Zapletalova<sup>6</sup>

<sup>1</sup>Olomouc, Czech Republic, <sup>2</sup>FNOL, Olomouc, Czech Republic, <sup>3</sup>Department of Neurology, FN Olomouc,

Olomouc, Czech Republic, <sup>4</sup>Department of internal medicine, University Hospital Olomouc, Olomouc, Czech Republic,

<sup>5</sup>Department of Cardiology, University Hospital, Olomouc,

Czech Republic, <sup>6</sup>Department of Medical Biophysics, Faculty of Medicine and Dentistry, Palacky University and University Hospital, Olomouc, Czech Republic

**Background and aims:** Approximately 25% of ischemic strokes (IS) occur in young adults and despite an extensive work-up the cause of young IS remains very often cryptogenic. Thus, effectiveness of secondary prevention may be unclear. We aimed to assess the relationship between traditional vascular risk factors (VRF), baseline clinical and laboratory parameters and outcomes including recurrent IS in young cryptogenic IS patients.

**Methods:** The study set consisted of young acute IS patients <50 years enrolled in the prospective HISTORY (Heart and Ischemic STrOke Relationship studY) study registered on ClinicalTrials.gov (NCT01541163). We perform extensive diagnostic work-up including specific cardiac and thrombophilia markers to assess cause of IS. 3-month clinical outcome was scored using the modified Rankin scale (mRS).

**Results:** Out of 294 young patients enrolled in the study, 208 (71%, mean age 41.6±7.2 years) were identified as cryptogenic. Hyperlipidemia (43%), smoking (40%) and arterial hypertension (37%) were the most frequent VRF and PFO was detected in 27% of patients. Good clinical outcome (mRS 0-2) reached 166 (80%) patients. Recurrent IS occurred in 7 (3.4%) patients during a mean time of follow up 24.2±22 months. Patients with RIS were older (47.4 vs. 41.1 years, p=0.007). Presence of VRF in patients with RIS were higher, but not significantly.

**Conclusion:** Despite a higher presence of VRF in young cryptogenic IS patients, the risk of recurrent IS was very low. Patients with recurrent IS were older, but did not differ in any other analyzed parameters or VRF.

**Disclosure:** Study was supported by the grant of Ministry of Health Czech Republic, n. 17-30101A and by the grant IGA LF UP\_2019\_005 and 2019\_008.

## EPO1073

**Branch atheromatous disease in isolated pontine infarction has more peripheral arterial disease than small vessel occlusion**Y. Do<sup>1</sup>, J.H. Kim<sup>2</sup>*<sup>1</sup>Department of Neurology, Catholic university of Daegu, School of Medicine, Daegu, Korea, Republic of, <sup>2</sup>Department of Cardiology, Gimcheon Jeil hospital, Gimcheon, Korea, Republic of*

**Background and aims:** Ischemic stroke patients with branch atheromatous disease (BAD) have worse neurologic deficits and prognosis compared with those with small vessel occlusion (SVO), although both disorder mechanisms are forms of deep brain infarction. The present study aimed to investigate an MRI-based etiological classification for acute isolated pontine infarctions and to assess differences in vascular risk factors and peripheral arterial disease among the etiological subtypes.

**Methods:** We reviewed the consecutive data of patients admitted for acute ischemic stroke or MR positive transient ischemic attack between August 2016 and July 2019. Acute isolated pontine infarcts were classified into 3 groups: BAD, SVO, and large artery atherosclerosis (LAA) according to basilar or vertebral artery steno-occlusion and infarct midline lesion extension from basal pontine surface on magnetic resonance images and angiography. The vascular risk factors, ankle-brachial index (ABI), brachial-ankle pulse wave velocity (baPWV) were analyzed among three groups.

**Results:** Among the 64 patients enrolled, BAD was the most common mechanism of isolated pontine infarct. BAD group had more frequencies of abnormal ABI (47.8%, 4.5%,  $p=0.002$ ) and hypertension (87%, 54.5%,  $p=0.023$ ) compared to SVO group. BAD group more frequently had abnormal ABI (47.8%, 15.8%,  $p=0.048$ ) and hyperlipidemia (87%, 47.4%,  $p=0.008$ ) than LAA group. There was no significant difference in either diabetes or baPWV between the BAD and SVO groups.

**Conclusion:** ABI and vascular risk factors in BAD group were more similar to the LAA group, rather than to the SVD group, suggesting the atherosclerotic mechanism of BAD.

**Disclosure:** Nothing to disclose

## EPO1074

**Cranio-cervical and spinal disease: two uncommon causes of sensory TIA mimics**

F. Dourado Sotero, P. Canhão

*Neurology Department, Stroke Unit, CHULN, Lisbon, Portugal*

**Background and aims:** The diagnosis of transient ischemic attack (TIA) is clinical and relies on the symptoms description. Main differential diagnoses for transient sensory symptoms are migraine with aura, focal seizures and functional disorder.

**Methods:** We report 2 uncommon causes of TIA mimics presenting with transient sensory symptoms.

**Results:** Case 1

A 82-year-old woman with a history of hypertension was admitted to the Stoke Unit because of occurrence of 2 episodes of sudden right hemi-hypoesthesia, lasting for 5-20 minutes. Neurological examination disclosed a slight right hyperreflexia. The following days after admission, she continued to present 1-3 similar episodes/day. The majority occurred in orthostatic position after cephalic rotation. Brain-MRI showed a basilar invagination, with brainstem and cervical spine compression. After using cervical orthosis, she had no symptoms recurrence.

Case 2

A 54-year-old man with a history of diabetes mellitus and hypertension was referred to the TIA Clinic for 2 episodes of sudden numbness of the left limbs lasting for 1 minute. 1 month before, he had been admitted for left hemiparesis. Despite normal CT-scan, he had been discharged with diagnosis of ischemic stroke. Neurological examination disclosed left upper limb hypoesthesia. Spine-MRI revealed 2 enhancing cervical lesions (C2, C6) and brain-MRI showed multiple lesions characteristic of multiple sclerosis. Methylprednisolone was prescribed, with complete clinical resolution.

**Conclusion:** Atypical clinical features of transient symptoms led to the suspicion of a diagnosis other than TIA. The craniocervical junction or spinal cord may be the sites of the pathology responsible for transient sensory symptoms, and can only be diagnosed with appropriate complementary examinations.

**Disclosure:** Nothing to disclose

## EPO1075

**Sturge-Weber syndrome with an unusual location of the meningeal angiomas – a case report**

E.D. Dumitrascu<sup>1</sup>, R.S. Badea<sup>1</sup>, A.C. Ribigan<sup>1</sup>,  
F. Antochi<sup>2</sup>, O. Bajenaru<sup>2</sup>

<sup>1</sup>Bucharest, Romania, <sup>2</sup>Neurology, University Emergency  
Hospital Bucharest, Bucharest, Romania

**Background and aims:** Sturge–Weber syndrome is a rare, sporadic neurocutaneous syndrome characterized by a classical triad of facial port wine nevus, ipsilateral meningeal angiomas and glaucoma. The incidence of Sturge-Weber syndrome is 1/50,000 live births, although it is more often underreported.

**Methods:** Case presentation of a 45-year-old female, diagnosed with Sturge-Weber syndrome, with a past medical history of hypertension, glaucoma, dyslipidemia, hypertensive cardiomyopathy and obesity, who was admitted for recurrent pain in the right side of her posterior vertebral thoracic region.

**Results:** Clinical examination revealed multiple angiomas, all of them being limited to the right side of her body (face, thorax and lower limb). Medullar thoracic magnetic resonance imaging examination showed a thoracic epidural gadolinophilic mass, suggestive for a venous malformation with an exerting mass effect on the adjacent structures. The vascular malformation was removed neurosurgically and the neurological symptoms remitted afterwards. Cerebral angiography established that the facial angiomas's arterial source was the right facial artery, without any other cerebral artery involvement. The right facial artery was subsequently ligated to diminish the size of the facial mass and to limit the extent of the future surgical excision. After 1 year, the patient underwent a new surgical intervention for the excision of the supra-orbital and infra-orbital angiomas.

**Conclusion:** This case emphasizes the variety of the pathological aspects of Sturge-Weber disease and the importance of extensive workup in patients with cutaneous vascular abnormalities.

**Disclosure:** Nothing to disclose

## EPO1076

**Factors affecting the fate of Raymond-Roy Grade 2**

A. Effat Abbas Mohamed<sup>1</sup>, N. Elsaid<sup>2</sup>, D. Lopes<sup>3</sup>  
<sup>1</sup>El Mansoura, Egypt, <sup>2</sup>Mansoura, Egypt, <sup>3</sup>Neurosurgery,  
Aurora Health Care, Aurora, USA

**Background and aims:** Raymond-Roy Classification is the standard for evaluating aneurysms occlusion (RG1: completely excluded, RG2: neck remnant, RG3: substantial residual filling). While RG1 carries the best long-term prognosis and RG3 carries the worst prognosis; the fate of RG2 is controversial. We aim to investigate factors affecting the fate of RG2 aneurysms occlusions over a period of 6 months follow-up.

**Methods:** We reviewed 156 aneurysms treated with endovascular coiling aided in some cases with single or Y-configuration stenting. The radiological outcome was assessed immediately postoperative and 6 months after treatment with the grading of the angiograms on the basis of Raymond scale.

**Results:** In terms of the RG, the initial angiographic outcome was RG1 in 88 (56.4%) cases, RG2 in 39 (25%) cases, and RG3 in 29 (18.6%) cases, while the final angiographic outcome at 6 months was RG1 in 117 (75%) patients, RG2 in 27 (17.3%), and RG3 in 12 (7.7%). Further analysis was done for the 39 aneurysms with initial RG2. Based on the angiographic outcome after 6 months, they were classified into 2 groups: regressive to RG1 group (n=21), and non-regressive group (RG2&3) (n=18). Demographic and clinical data (age, gender, presentation), aneurysm geometry (height, width, size, neck, dome-to-neck, aspect, maximum and size ratios) and treatment-related factors (modality, stent type) were analyzed. Only the aneurysm width showed statistically significant difference between the 2 groups (p=0.046). Aneurysm width cutoff value of 0.687 had 61.1% sensitivity and 90.5% specificity.

**Conclusion:** About 50% of the RG2 aneurysms spontaneously regress into RG1. The most important factor that influences the process of regression is the aneurysm width.

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## EPO1077

### Signs and symptoms of sleep apnea and acute stroke severity: is sleep apnea neuroprotective?

A. Rim<sup>1</sup>, E.B. Rouissi<sup>1</sup>, S. Marsli<sup>1</sup>, S. Bellakhdar<sup>1</sup>,  
B. El Moutawakil<sup>2</sup>, M.A. Rafai<sup>2</sup>, H. El Otmani<sup>2</sup>

<sup>1</sup>Neurology - Neurophysiology, Ibn Rochd University Hospital, Casablanca, Morocco, <sup>2</sup>Neurology, Ibn Rochd University Hospital, Casablanca, Morocco

**Background and aims:** Previous reports suggest that brief periods of hypoxemia or ischemia render the brain tolerant to subsequent ischemic insults. Sleep apnea (SA) leads to frequent episodes of nocturnal hypoxemia and may induce ischemic tolerance. In contrast, increase risk for cardiovascular events in patients with severe SA, arguing the presence of ischemic tolerance. We undertook this study to determine differences in stroke severity and early neurologic course in patients at risk for SA as determined by a sleep questionnaire.

**Methods:** Patients admitted with acute ischemic stroke completed the sleep questionnaire. It examines different features of SA and classifies patients into a high, low and no risk for SA groups. NIHSS and ASPECT score were determined on admission. Age, sex, cardiovascular risk factors, stroke mechanism and outcome were determined prospectively.

**Results:** We enrolled 471 patients with a mean age of 66 years, 48.6% were men. Hypertension was the cardinal cardiovascular risk factor (57.5%). The SA questionnaire classified 41 patients at high risk for SA, 246 patients at low risk, while 184 patients considered with no risk. The median NIHSS and ASPECT score on admission did not differ between the 2 groups, neither the mechanism of stroke and 90 days outcome. Examined separately, we found no effect of snoring, daytime sleepiness, obesity on stroke severity and outcome.

**Conclusion:** A large number of stroke patients were at low risk for having SA. We were not able to show that a constellation of symptoms and features highly suggestive of SA influenced stroke severity or early neurologic course.

**Disclosure:** Nothing to disclose

## EPO1078

### Prediction of acute ischemic stroke outcome with Alberta Stroke Program Early CT Score (ASPECTS)

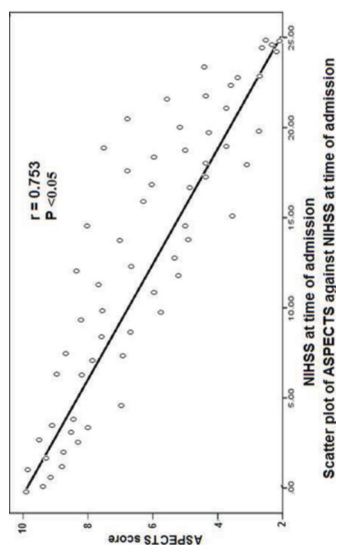
A. Esmael<sup>1</sup>, M. Abdelsalam<sup>1</sup>, A. Abdel Razek<sup>2</sup>,  
N. Tharwat<sup>2</sup>, M.A.G. El-Sherif<sup>3</sup>

<sup>1</sup>Department of Neurology, Faculty of Medicine, Mansoura University, Egypt, Mansoura, Egypt, <sup>2</sup>Department of diagnostic Radiology, Mansoura Faculty of medicine, Mansoura, Egypt, <sup>3</sup>Neurology Department, Mansoura University, Mansoura, Dakahlyia, Egypt

**Background and aims:** CT brain used for the diagnosis of acute ischemic stroke (AIS). The aim of this study is to predict the outcome of AIS with Alberta Stroke Program Early CT Score (ASPECTS).

**Methods:** A prospective study was done on 150 consecutive patients presented by AIS. Vascular risk factors were determined from history taking. Glasgow Coma Scale (GCS), National Institutes of Health Stroke Scale (NIHSS) and modified Rankin Scale (mRS) used to assess the severity. CT brain was done initially and after 7 days using ASPECTS.

**Results:** ASPECTS for all patients was  $8.23 \pm 1.87$  and ASPECT for patients with favorable and unfavorable outcomes were  $8.23 \pm 1.87$  and  $4.96 \pm 2.56$  respectively ( $p < 0.001$ ). The most commonly recognized risk factor for stroke in patients group were hypertension (68%), smoking (40%), DM (26%), AF (18.6%), hyperlipidemia (14.6%), ischemic heart disease (10%) and previous stroke (6.7%). The mortality rate after 3 months was 13.3%. The initial stroke severity (NIHSS) was  $12.9 \pm 7$ . ASPECTS was inversely correlated with NIHSS on admission in ischemic stroke ( $p < 0.001$ ). Lower ASPECTS  $\leq 7$  was associated with more hospital stay ( $p < 0.05$ ), lower GCS and development of inpatient complications ( $p < 0.05$ ), significant higher death rates and higher mRS at 3 months follow up ( $p < 0.05$ ).



Scatter plot of ASPECTS against NIHSS at time of admission

**Table 1: Correlation between risk factors, ASPECTS and stroke outcome after 3 months**

Variable	All patients	MRS 0-2 favorable outcomes	MRS 3-6 poor outcomes	P Value
Number	150	95 (63.3%)	55 (33.7%)	0.05
Age (years)	64.0 ±11.5	59.11 ±7.45	68.7 ±6.98	0.001
Male	79 (52.7%)	49 (51.5%)	30(54.5%)	0.725
Hypertension	102 (68%)	54(56.8%)	48(87.3%)	0.005
DM	39 (26%)	23(24.2%)	16(29.1%)	0.511
Smoking	60 (40%)	37(38.9%)	23(41.8%)	0.729
Hyperlipidemia	22 (14.6%)	13(13.7%)	9(16.4%)	0.654
AF	28 (18.6%)	17(17.9%)	11(20%)	0.749
IHD	15 (10%)	10 (10.5%)	5 (9.1%)	0.778
NIHSS on admission	12.9 ± 7	10.97 ± 4.64	18.92 ± 6.32	0.001
ASPECTS	8.23 ± 1.87	8.23 ± 1.87	4.96 ± 2.56	0.001

Table 1: Correlation between risk factors, ASPECTS and stroke outcome after 3 months

**Table 2: Correlation of ASPECTS and stroke severity (NIHSS) Outcome variables according to ASPECTS**

Variable	ASPECTS			Significance	
	Better 8-10 (n=66)	Worse			
		5-7 (n=68)	0-4 (n=16)		
Stroke severity (NIHSS)	Mild (0-5)	27	2	0	Spearman correlation <b>0.753</b>  P <0.05
	Moderate (6-15)	23	16	1	
	Severe (≥ 16)	16	50	15	
Primary outcome	GCS at admission	13.77 ± 1.23	11.21 ± 3.3	8.97 ± 2.41	P < 0.05 @
	NIHSS at admission	9.78 ± 3.24	17.2 ± 5.89	20.89 ± 4.1	P < 0.05 @
	Inpatient stay (days)	3.65 ± 4.87	12.08 ±6.67	15.66 ± 6.2	P < 0.05 @
	Inpatient complications	10 (15.1%)	20 (29.4%)	7 (43.8%)	P < 0.05 @
Secondary outcome	Death (N) 20 (13.3%)	3 (4.5%)	12 (17.6%)	5 (31.3%)	P < 0.05
	mRS at 3 months	1.23 ± 0.93	3.31 ±1.36	4.96 ± 1.04	P < 0.05

@ Significant only for group 1 & 3. mRS: modified Rankin Scale

Table 2: Correlation of ASPECTS and stroke severity (NIHSS) Outcome variables according to ASPECTS

**Conclusion:** ASPECTS is a simple, easy practical scale for assessment of prognosis of AIS and may predict 3 months outcome in ischemic strokes.

**Disclosure:** Nothing to disclose

## EPO1079

### How to choose the right patients when you have limited resources – the clinical utility of AS5F score in detecting paroxysmal atrial fibrillation in stroke patients

I. Enache, E. Terecoasa, C. Tiu  
Bucharest, Romania

**Background and aims:** AS5F (Age and Stroke Severity NIHSS >5 to Find AF) is a risk score based on clinical parameters developed for selecting patients with cryptogenic stroke for prolonged Holter-ECG monitoring to detect paroxysmal atrial fibrillation (pAF). We aimed to determine the utility of the AS5F score in current clinical practice in a group of patients with stroke of undetermined etiology.

**Methods:** We retrospectively assessed clinical data of 768 patients with acute ischemic stroke hospitalized in our department between 1st of January 2018 and 31st of December 2018, 51.7% (n=397) having a stroke of undetermined etiology (according to TOAST classification) for whom we calculated the AS5F score.

**Results:** The cut-off value for patients with high risk of developing pAF is 67.5 points. 50.2% had AS5F score greater/equal to 67.5. Compared to the low-risk group, the high-risk patients were older (78 years versus 63 years), more frequently women (51.76% versus 41.76%), had higher median NIHSS (8 versus 3) and a higher mortality (26.79% versus 3.53%). When compared with the group of cardioembolic stroke patients, the high-risk group had a similar profile for age, gender distribution, stroke severity and in-hospital mortality. Patients underwent Holter monitoring at the request of treating physicians and, by chance, 29.4% were in the low-risk group and only 15.3% patients in the high-risk group.

**Conclusion:** Considering the lack of sufficient resources in low and middle income countries, AS5F score can be extremely useful for the management of acute stroke patients in order to efficiently prioritize those needing prolonged-Holter monitoring.

**Disclosure:** Nothing to disclose

## EPO1080

### Black hole sign for predicting in-hospital and 90-day mortality

M. Erdoğan, S. Senadim, B. Tekin, D. Ataklı  
Neurology, Bakirkoy Prof. Dr. Mazhar Osman Research and Training Hospital for Psychiatry, Neurology, and Neurosurgery, Istanbul, Turkey

**Background and aims:** Spontaneous intracerebral hemorrhages constitute about 15% of all strokes and have a high mortality rate. Black hole sign is a novel computerized tomography (CT) finding which is shown to predict hemorrhage expansion and poor prognosis. We aimed to analyze the effect of black hole sign on prognosis and mortality.

**Methods:** We included spontaneous intracerebral hemorrhage patients who were admitted to our hospital between September 2018 and October 2019 and have a CT performed within 6 hours of onset. Hemorrhages related to secondary causes were excluded and patients who underwent to surgery were excluded from prognosis analysis. Demographic data and medical history were collected on admission. CT is examined for presence of black hole sign, ventricular extension of hemorrhage and hematoma volume using ABC/2 method. Modified Rankin Scale (mRS) was assessed on day 10 and 90.

**Results:** Of 88 patients admitted, 66 were included in the study. 47 of the patients were male and mean age was 63.08±14.33. Black hole positive patients had more anti-coagulant use, higher creatinine and initial hematoma volumes compared to black hole negative patients. 7 of the patients underwent surgery. Black hole positive patients had more in-hospital mortality (p=0.028) and 90-day mortality (p=0.028). Comparison of median mRS at day 10 (p=0.081) and 90 (p=0.059) between groups did not reach significance.

**Conclusion:** Black hole sign may be related to poor prognosis and can be used to predict mortality. It may be a useful marker for classifying patients for management and clinical studies.

**Disclosure:** Nothing to disclose



## EPO1081

**The perils of an elongated styloid process: carotid artery type Eagle syndrome**

P. Faustino<sup>1</sup>, A. Jorge<sup>1</sup>, L. Almendra<sup>1</sup>, B. Gomes<sup>2</sup>, M.I. Amado<sup>3</sup>, J. Vieira Barbosa<sup>1</sup>

<sup>1</sup>Neurology, Coimbra University and Hospital Center, Coimbra, Portugal, <sup>2</sup>Neuroradiology, Coimbra University and Hospital Center, Coimbra, Portugal, <sup>3</sup>Oral and Maxillofacial Surgery, Coimbra University and Hospital Center, Coimbra, Portugal

**Background and aims:** Eagle syndrome (EagleS) is a rare condition due to an elongation of the styloid process and/or calcification of the stylohyoid ligament. EagleS is divided in a classic type, with impingement of the last 4 cranial nerves, and a carotid artery type, with impingement of the external or internal carotid arteries.

**Methods:** We describe a patient with a carotid artery type EagleS.

**Results:** A 47-year-old male presented at the emergency department (ED) with a 1-week, left-sided, hemifacial pain and paresthesias. He described a sudden-onset, constrictive and persistent pain, despite treatment with nonsteroidal anti-inflammatory drugs, acetaminophen and opioids. Ipsilateral conjunctival injection and tearing were initially present, but temporal evolution was not suggestive of cluster headache. He denied nausea, vomiting or photophobia. At first observation, he had no focal signs and brain computed tomography (CT) was normal. Latter re-evaluation showed a mild left ptosis and anisocoria (OD>OS). Careful history review revealed a blunt left cervical trauma prior to symptom onset. Angio-CT revealed a left internal carotid artery (ICA) dissection and reformatted images showed a bilateral elongated styloid process (right: 47mm, left: 41mm), near to the ICA. The patient was admitted to stroke unit and treated according to the legis artis. He was latter discharged with no deficits, waiting for surgical correction.

**Conclusion:** EagleS diagnosis needs a strong clinical suspicion, since it may present with ordinary symptoms. This case highlights the importance of a structured evaluation, even in a busy ED.

**Disclosure:** Nothing to disclose

## PO1082

**Brainstem cavernoma presenting as a rare etiology of Benedikt syndrome**

C. Figueiredo<sup>1</sup>, S. Delgado<sup>1</sup>, P. Neves<sup>1</sup>, F. Ferreira<sup>2</sup>, R. Manaças<sup>3</sup>, M. Santos<sup>1</sup>, C. Costa<sup>1</sup>

<sup>1</sup>Neurology, Hospital Prof. Doutor Fernando Fonseca, Portugal, Portugal, <sup>2</sup>Hospital Prof. Dr. Fernando Fonseca, Amadora, Portugal, <sup>3</sup>Neuroradiology, Hospital Prof. Dr. Fernando Fonseca, Amadora, Portugal

**Background and aims:** Benedikt syndrome is characterized by a third nerve palsy with contralateral pyramidal signs and Holmes tremor (rest, postural and intentional tremor in increasing order of intensity) and localizes the lesion to the mesencephalon. It is most commonly associated with ischemic or hemorrhagic stroke. In rare cases, a cavernoma is the underlying cause and usually manifests as a partial syndrome.

**Methods:** Case report.

**Results:** We present the case of a 50-year-old male with hypertension but no other relevant medical or family history. The symptoms began 7 years before he presented to our department, with progressive worsening of continuous involuntary movements of the left limbs. Mild ipsilateral weakness and binocular diplopia were also noted. He presented to our emergency department due to the subacute worsening of his abnormal movements. His neurological exam revealed right ptosis and limitation of vertical movements of the right eye suggestive of a third cranial nerve lesion, as well as left central-type facial palsy, mild left hemiparesis, and Holmes tremor, leading to a diagnosis of a Benedikt syndrome. Dystonic posturing of the upper limb and subtle involuntary movements of the leg were also present. MRI revealed a right ponto-mesencephalic lesion, strongly hypointense on SWI, compatible with a cavernoma. There were no signs of recent hemorrhage. There was a moderate improvement of tremor with Clonazepam (2,5mg/day). Surgical resection is planned.

**Conclusion:** Although rare, cavernomas should be considered in the differential diagnosis of Benedikt syndrome. Medical and surgical management may be required for optimal treatment.

**Disclosure:** Nothing to disclose

### EPO1083

#### The role of blood flow and cerebrospinal fluid flow disturbances in the development of cognitive impairment in cerebral small vessel disease

Z. Gadzhieva<sup>1</sup>, L. Dobrynina<sup>2</sup>, B. Akhmetzyanov<sup>3</sup>, E. Kremneva<sup>4</sup>, L. Kalashnikova<sup>2</sup>, M. Krotenkova<sup>2</sup>

<sup>1</sup>Moscow, Russian Federation, <sup>2</sup>Research Center of Neurology, Moscow, Russian Federation, <sup>3</sup>Federal State Budgetary Scientific Institution "Research Center of Neurology", Moscow, Russian Federation, <sup>4</sup>Neuroradiology, Research center of neurology, Moscow, Russian Federation

**Background and aims:** Cerebral small vessel disease, cSVD, is the main cause of vascular cognitive impairment(CI) and the leading cause of mixed dementia. The objective of our study was to assess the role of arterial, venous blood flow and CSF-flow and their relationships in the development of CI in cSVDpatients.

**Methods:** 96 patients (64 female, mean age 60.6±6.3 years) with cognitive complaints and cSVD, according to the STRIVE criteria, were examined. The severity of CI was assessed based on the cognitive tests (MoCA, 10 words test, TMT B-A) and ADL scale. The phase-contrast MRI (PC-MRI,3T scanner) was used to measure blood flow in the internal carotid and vertebral arteries (the total arterial blood flow was taken into account), internal jugular veins (level of C2-C3vertebrae), in the straight and superior sagittal sinuses; CSF-flow in aqueduct.

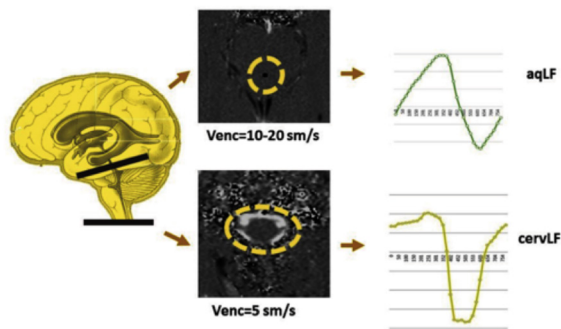


Fig.3

**Results:** Dementia and severe memory impairment were associated with an increase of arterial pulsation index, the intracranial compliance index and the aqueduct CSF-flow; severe executive dysfunction was additionally associated with a decrease in arterial blood flow, venous blood flow in the straight and superior sagittal sinuses. Parameters of blood flow and CSF-flow were interrelated, the arterial pulsation index had an influence on all parameters.

**Conclusion:** PC-MRI is simple and rapid way of performing noninvasive evaluation of vascular and CSF-flow and their dynamic coupling in cSVD patients throughout disease progression. The specific changes in blood flow and CSF-flow and their interrelation in patients with CI due to cSVD suggest the pathogenetic importance of cerebral hydrodynamic disturbances in the aetiology of brain damage and the development of CI in cSVD.

**Disclosure:** Nothing to disclose

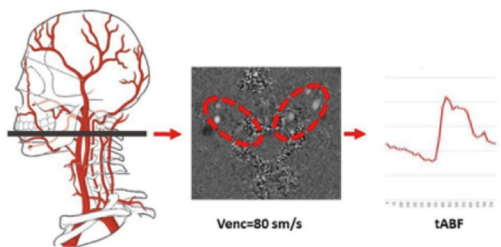


Fig.1

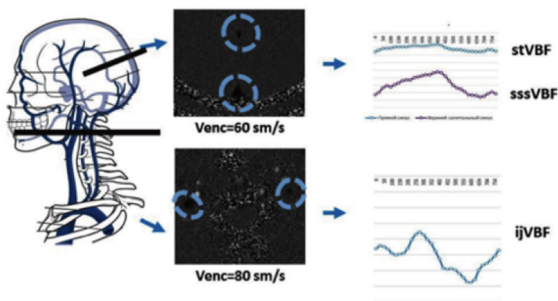


Fig.2

## EPO1084

### Taking a closer look at brain hemorrhage. A comparative study between hypertensive and amyloid etiologies

A. García Torres<sup>1</sup>, A. Herranz<sup>1</sup>, M. Osés<sup>1</sup>, I. Zamarbide<sup>1</sup>, L. Olivie<sup>1</sup>, J.L. Hernández Alfonso<sup>1</sup>, M. De la Calle Cuevas<sup>1</sup>, I. Navas<sup>2</sup>

<sup>1</sup>Neurology, Hospital Universitario Fundación Jimenez Diaz, Madrid, Spain, <sup>2</sup>Fundación Jiménez Díaz, Madrid, Spain

**Background and aims:** Cerebral hemorrhage carries a very high mortality rate. There are few studies evaluating the relationship between hemorrhage etiology and prognosis.

The object of this work is to describe the baseline characteristics and prognosis of patients with hypertensive (HTAh) and probable amyloid (Ah) cerebral hemorrhage.

**Methods:** We retrospectively analyzed the demographic characteristics, functional prognosis and mortality rate of patients with HTAh and Ah, admitted to our Neurology department between January 2014 and January 2016.

**Results:** There were 158 patients (90HTAh and 68Ah). Both groups had similar proportion of females (52% and 51.5% respectively), as well as similar median age (76 vs 77).

In the first group, there were more patients with hypertension (72% vs 68%) and with oral anticoagulants (21 vs 16%), less percentage of dyslipaemia (31 vs 41%) and smoking (11 vs 18%). Diabetes mellitus (18 and 20%), median systolic blood pressure (161 vs 158mmHg), ICH scale score (2.1 vs 1.8) and initial NIHSS (11 vs 10) were similar in HTAh and Ah groups.

We found a very high and similar mortality rate (34% in HTAh vs 33% in Ah), but there were more patients functionally independent (mRS $\leq$ 2) at discharge in the HTAh group (37% vs 28%).

**Conclusion:** Patients with HTAh and Ah have a high median age and high proportion of cerebrovascular risk factors. Although both groups have similar mortality rate, there is a trend towards a better functional outcome in those with HTAh. Larger and prospective studies are needed.

**Disclosure:** Nothing to disclose

## EPO1085

### Assessment of stroke risk in patients with atrial fibrillation – a different tale of an old clinical conundrum

C. Ghita, A.M. Niculescu, R.A. Radu, L. Purcaru, C. Tiu  
*Emergency University Hospital, Bucharest, Romania*

**Background and aims:** Patients with atrial fibrillation (AF) are at high risk for suffering a stroke but the risk is not the same for all patients. Several risk stratification scores with different performance are available to guide anticoagulation therapy in primary and secondary prevention.

**Methods:** We performed a cross-sectional study on 246 patients with AF admitted for acute ischemic stroke; CHADS2, CHA2DS2-VASC and modified ATRIA scores were calculated for all patients with and without taking the index stroke into account. Patients were grouped according to embolic risk: low risk (CHADS2 0-1; CHA2DS2-VASC 0; ATRIA 0-5), intermediate risk (CHADS2 2-3; CHA2DS2-VASC 1; ATRIA 6) and high risk (CHADS2 score 4-6; CHA2DS2-VASC score  $\geq$ 2; ATRIA 7-15).

**Results:** Mean age of the patients was 75.4 years and 58.8% were females. Our patients had the following estimated cardioembolic risk prior to suffering the stroke: CHADS2: 21.1% high risk, 53.7% intermediate risk, 25.2% low risk; CHA2DS2-VASC: 97.9% high risk, 2.1% medium risk; ATRIA: 66.3% high risk, 8.9% moderate risk, 24.8% low risk. After suffering the index stroke, the patients were classified according to the 3 risk scores as follows: CHADS2 -67.7% high risk, 33.3% intermediate risk, CHA2DS2-VASC and ATRIA - all patients were classified as high risk.

**Conclusion:** CHA2DS2-VASC was the score that most accurately predicted the high risk of cardioembolism in patients who suffered an ischemic stroke, while post stroke calculated CHA2DS2-VASC and ATRIA had similar performance in estimating the risk for subsequent cardioembolic events.

**Disclosure:** Nothing to disclose

## Child neurology/developmental neurology

### EPO1086

#### Specific Language Impairment (SLI) in children may be caused by epileptic brain activity

A. Esmael<sup>1</sup>, M. Abbas<sup>1</sup>, S. Elsherbeny<sup>2</sup>

<sup>1</sup>Department of Neurology, Faculty of Medicine, Mansoura University, Egypt, Mansoura, Egypt, <sup>2</sup>Departments of Phoniatic, Faculty of Medicine, Mansoura University, Egypt, Mansoura, Egypt

**Background and aims:** The objective of this study was to find out if there is a possible association and the impact of epilepsy and epileptiform activity in children with SLI.

**Methods:** The study was conducted on 80 children suffering from SLI and 80 age and sex match healthy control children. CT brain was performed and EEG was recorded for children. IQ level, cognitive age, social and phoniatic assessment were done for all patients.

**Results:** 80 children with SLI (51 males and 29 females) with a mean age of 4.11±1.93. Patients with SLI, showed significantly higher rates of abnormal EEGs ( $p = 0.006$ ) and epilepsy ( $p < 0.001$ ) compared to the control group. Spearman correlation showed a highly negative significant correlation between the language, IQ with abnormal EEG and epilepsy ( $r = -0.91$ ,  $p < 0.01$  and  $r = -0.91$ ,  $p < 0.01$  respectively). Also, there was a moderately negative significant correlation between the cognitive age, social with abnormal EEG and epilepsy ( $r = -0.70$ ,  $p < 0.05$  and  $r = -0.65$ ,  $p < 0.05$  respectively).

**Conclusion:** Epileptiform activities even without epilepsy in preschool children may alter normal language function. SLI was associated with lower IQ levels, social and cognitive age.

**Disclosure:** Nothing to disclose

### EPO1087

#### Pediatric optic neuritis

M. Akkari, K. Laabidi, H. Klaa, H. Ben Rhouma, A. Rouissi, I. Kraoua, I. Ben Youssef Turki  
Department of Child and Adolescent Neurology, National Institute Mongi Ben Hmida of Neurology, Tunis, Tunisia

**Background and aims:** Optic neuritis (ON) is rare in children in comparison to adults, but accounts for approximately 25% of pediatric acute demyelinating syndroms.

**Methods:** We conducted a retrospective study including 25 patients followed up for ON.

**Results:** The sex-ratio M/F was 0.27. The mean age of onset was 11.39 years (2-17). ON was characterized by acute or subacute vision loss, bilateral onset, pain with eye movement and dyschromatopsia in 73.9%, 69.5%, 30.4% and 14% of cases, respectively. All patients presented visual acuity worse than 5/10. 31 of patients had a mildly edematous optic disc. Visual evoked potentials revealed a demyelinating mechanism in 82.6% of cases. Orbit MRI showed enhancement of affected optic nerve in 38% of cases. Brain and spine MRI were abnormal in 52.3% and 37% of cases, respectively. Oligoclonal bands were identified in cerebral spinal fluid in 26% of cases. ON was inaugural of a neuroinflammatory disease in 21% of cases. The etiologies were dominated by idiopathic optic neuritis (11 patients) and multiple sclerosis (9 patients). 3 patients were diagnosed with neuromyelitis spectrum disease: 1 of them had AQP4-antibodies and the other had MOG-antibodies. 1 patient was diagnosed with acute demyelinating encephalomyelitis, and 1 with Behçet-disease. Visual disturbance resolves in 95% of cases after corticosteroids. The incidence of recurrence was 17.4%.

**Conclusion:** Compared to adults, ON in children is more likely to be bilateral, to occur following infection or vaccination, with poor presenting visual acuity, lack of pain, and anterior involvement. The majority of children experience full visual recovery.

**Disclosure:** Nothing to disclose

## EPO1088

### Slowly but surely: the possible relationship between electroencephalographic slow wave activity and brain myelination during early childhood

D. Chegodaev<sup>1</sup>, P. Pavlova<sup>1</sup>, T. Balueva<sup>2</sup>

<sup>1</sup>Laboratory of Brain and Neurocognitive Development, Ural Federal University, Yekaterinburg, Russian Federation,

<sup>2</sup>Neurological Department, City Clinical Hospital <sup>23</sup>, Yekaterinburg, Russian Federation

**Background and aims:** Ratio of frontal/occipital slow wave (1-4.5 Hz) activity (SWA) – F/O, observed within the stage of slow-wave sleep, is considered as a marker of myelination (Kurth S. et al., 2017; LeBourgeois M.K. et al., 2019). The reasoning of the choice of SWA during the sleep for the calculation of F/O ratio refers to the fact that SWA is more prominent during the sleep as well as to the observation of enhanced transcription in several genes involved in phospholipid synthesis and myelination during the sleep. However, we suppose that F/O-ratio during wakefulness remains rather informative index. It is well known, that preterm children are characterized by delay in myelination in central neuronal system.

**Methods:** Based on mentioned above, we calculated F/O-ratio (frontal electrodes: 10,11,15,16,18; occipital electrodes: 71,74,75,76,82) in two samples: 8 preterm infants (gestational age (GA) – 32.25 (SD=1.28) weeks; corrected age (CA)–5.0 (SD=0.66) months); 20 term infants (GA – 39.7 (SD=0.97) weeks; CA – 5.7 (SD=0.21) months).

**Results:** There were no significant between-group differences ( $p=0.051$ ). However, effect size (Cohen's  $d$ ) was rather big ( $d=0.9$ ), that allows us to suggest presence of significant differences with a sufficient increase of the sample. Values of F/O-ratio were 0.77 (SD=0.29) and 0.53 (SD=0.19) in term infants and preterm infants respectively, pointing to a relatively more pronounced «frontalization» of SWA in control group.

**Conclusion:** «Frontalization», apparently, correlates with better myelination. Given to the all mentioned above, we consider that it is possible to use F/O-ratio computed during wakefulness as a correlate of myelination.

**Disclosure:** This work was supported by a grant of Russian Science Foundation, 20-18-00343

## EPO1089

### Video labeling software for general movements assessment classification aim in machine learning field

I. Starodubtsev<sup>1</sup>, I. Gajniyarov<sup>2</sup>, I. Mikhailov<sup>2</sup>, E. Suleymanova<sup>3</sup>, O. Lvova<sup>4</sup>, T. Balueva<sup>5</sup>

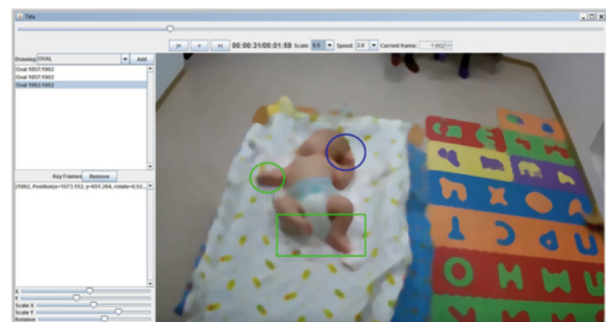
<sup>1</sup>Ural Federal University, Yekaterinburg, Russian Federation, <sup>2</sup>Department Of Computer Systems, N.N. Krasovskii Institute of Mathematics and Mechanics of the Ural Branch of the Russian Academy of Sciences, Yekaterinburg, Russian Federation, <sup>3</sup>Laboratory of Brain and Neurocognitive Development, Ural Federal University, Yekaterinburg, Russian Federation, <sup>4</sup>Laboratory of Neurotechnology, Ural Federal University, Yekaterinburg, Russian Federation, <sup>5</sup>Neurological Department, City Clinical Hospital, Yekaterinburg, Russian Federation

**Background and aims:** A common problem with automated general movements assessment (GMA) is that there is only a general expert assessment. It involves every event that needs to be distinguished from each other. These events happen arbitrarily during the child observation. There are two approaches to solve the problem. First, collect a huge dataset with any possible examples. Secondly, manually label necessary events on video with expert involvement.

**Methods:** Our research used the second approach. The program goal was labeling events and objects on video that corresponded to analysis by Prechtl's method. Labeling was carried out manually by certified expert. The option with automatic recognition of objects and generation of markup based on previously marked data is considered in future work.

**Results:** Available elements were rectangle and ellipse for highlighting an interest region. It was possible to rotate and scale these shapes. The rejection of more complex shapes was made deliberately in order to simplify the software interface.

The elements position was set using two key frames. Another elements position was calculated by linear interpolation between them. Also there was an opportunity to set up its name and color for each shape. It was necessary to distinguish different types of movements that appeared at the same time. In addition, it was possible to export both to video file with superimposed markup, and to independent json file, which contained only markup data (image).



**Conclusion:** The software helped to create dataset, which was suitable for test of GMA algorithmization hypothesis in the machine learning paradigm.

**Disclosure:** This work was supported by a grant of the Russian Science Foundation, 20-18-00343

## EPO1090

### Sleep architecture in Valproate-induced nocturnal enuresis in primary school and preschool children.

H. Egila<sup>1</sup>, M. Elsherief<sup>1</sup>, M. Abdelsalam<sup>1</sup>, L. Bendary<sup>2</sup>, A. Esmael<sup>1</sup>

<sup>1</sup>Department of Neurology, Faculty of Medicine, Mansoura University, Egypt, Mansoura, Egypt, <sup>2</sup>Department of Urology, Zagazig University Hospital Urology department, Zagazig, Egypt

**Background and aims:** Nocturnal enuresis (NE) is a common pediatric problems related to sleep.

**Objective:** We aimed at studying the sleep architecture, to evaluate the occurrence and the characters of nocturnal enuresis in children secondary to valproic acid antiepileptic drug.

**Patients and methods:** A retrospective study carried out in 260 pediatric patients diagnosed as idiopathic epilepsy and kept up on valproic acid antiepileptic drug. 28 children developed secondary nocturnal enuresis aged 5-12 years were subjected to a single overnight polysomnography and compared to 28 child age and sex matched controls.

**Results:** Enuretic children had significantly prolonged sleep latency and higher stage N1 percentage, less total sleep time, lower sleep efficiency, and lower rapid eye movement sleep percentage compared with the control group. Multivariate logistic regression, demonstrated that the independent factors associated with nocturnal enuresis, were younger age (OR 2.31, p=0.004), followed by weight and Serum level of valproic acid (OR 1.44, p=0.05 and OR 1.39, p=0.05 respectively). While, the therapeutic dose, or the treatment duration with valproic acid, were not significantly associated with the incidence of enuresis (OR 0.98, p=0.09 and OR 0.86, p=0.12 respectively).

**Conclusion:** Nocturnal enuresis is a common reversible side effect that accompanied the valproic acid use in children. The underlying mechanism may be related to increase sleep depth with valproic acid.

**Disclosure:** Nothing to disclose

## EPO1091

**Clinical characteristics of tuberous sclerosis patients with refractory epilepsy**

Y. Erdal<sup>1</sup>, A. Alnak<sup>2</sup>, P. Topaloglu Tekturk<sup>3</sup>, Z. Yapıcı<sup>3</sup>  
<sup>1</sup>Department of Neurology, Istanbul Training and Research Hospital, Istanbul, Turkey, <sup>2</sup>Department of Child and Adolescent Psychiatry, Sakarya Training and Research Hospital, Istanbul, Turkey, <sup>3</sup>Department of Child Neurology, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey

**Background and aims:** Refractory epilepsy is a common clinical manifestation in patients with tuberous sclerosis (TSC). In this study, we aimed to evaluate the clinical and neuroimaging characteristics of tuberous sclerosis patients with refractory epilepsy.

**Methods:** A total of 113 patients with tuberous sclerosis who were followed up at the Istanbul University Tuberous Sclerosis Unit between January 2010- June 2018 were included. Neurological and psychological examinations of all patients, characteristics of seizures, electroencephalography (EEG) and cranial magnetic resonance imaging (MRI) findings were recorded.

**Results:** Of the 113 patients screened, 85.8% had seizures at any time during life. Of the epilepsy patients, 62.9% developed refractory epilepsy. Onset of seizures occurred within the first year of life in 75.4% of these patients, and after the age of one in 51.4% ( $p < 0.05$ ). Clinical follow-up was available for 57% of these patients. 59.6% of those who were followed up developed multiple seizures. The difference between this group and that without resistant seizures was statistically significant ( $p < 0.05$ ). 67 patients underwent psychiatric and developmental assessment. Of the patients with refractory epilepsy, 59.5% had intellectual disability (ID) and 37.5% had autism spectrum disorder (ASD). In those without refractory epilepsy, 16.7% had ID and 13.3% had ASD. The difference was statistically significant ( $p < 0.05$ ).

**Conclusion:** This study suggests that refractory epilepsy has a close relationship with multiple types of seizures and psychiatric comorbidities. In order for the differences to be explained, detailed genetic examinations in large cohorts should be performed.

**Disclosure:** Nothing to disclose

## EPO1092

**The role of pro-inflammatory cytokines in different types of epilepsies in children**

T. Gakharia, S. Bakhtadze, N. Khachapuridze, N. Geladze, N. Kapanadze  
 Tbilisi State Medical University, Tbilisi, Georgia

**Background and aims:** The etiology of epilepsy is a definitive determinant of clinical course and prognosis. Following modern studies in experimental models were established the important role of the inflammation as a trigger in epileptogenesis. Activation of glial cells, disturbed completeness of hemato-encephalic barrier by the influence of cytokines present great pathogenic value in epileptogenesis, especially in resistant epilepsies and encephalopathies in childhood. Thus pro-inflammatory markers can reflect the pathogenesis of seizure generation and exacerbation.

We aimed to assess the clinical and predictive meaning of expressions of pro-inflammatory markers, which may have an elucidated role in the generation of seizure and the resistance in epilepsies. We measured in serum comparably unknown pro-inflammatory factors, in the particularly Vascular cell adhesion molecule 1 (VCAM-1), chemokines, including macrophage inflammatory protein (CCL2, CCL3, CCL 4), eotaxin (CCL11), prostaglandin-PGE2 in different types of epilepsies.

**Methods:** Serum samples were collected from children in both gender 0-16 age with pharmacosensitive epilepsies (N=20), with intractable, drug-resistant epilepsy children (N=20) and afebrile nonepileptic controls (N=16)

**Results:** Preliminary findings from the recently completed assessments demonstrated cytokines that were significantly elevated in patients with epilepsies in comparison to the control group: prostaglandin-PGE2 and CCL3, CCL4, CCL5. Furthermore, Prostaglandin-PGE2 and CCL3 levels were higher in resistant seizure patients than in pharmacosensitive group ( $p < 0.05$ ).

**Conclusion:** Precise correlation between expressions of pro-inflammatory markers, their quantitative concentrations, and levels of repeating seizures should be discussed as a prediction of resistance and supports possible future strategies of anti-inflammatory drugs as targeted, essential or additional therapy for prevention of recurrent epileptic seizures.

**Disclosure:** This work was supported by Shota Rustaveli National Science Foundation of Georgia Fundamental Research Foundation grant FR-18-16052.

## EPO1093

**Adaptive skills in 5-24 month-old children with family risk of autistic spectrum disorders**

S. Karpov<sup>1</sup>, M. Lavrova<sup>2</sup>, E. Suleymanova<sup>2</sup>, I. Tuktareva<sup>2</sup>, O. Lvova<sup>2</sup>, I. Vyshlova<sup>1</sup>

<sup>1</sup>Neurology, Neurosurgery And Medical Genetics, Stavropol state medical university, STAVROPOL, Russian Federation, <sup>2</sup>Laboratory of Neurotechnology, Ural Federal University, Yekaterinburg, Russian Federation

**Background and aims:** Adaptive behavior includes the ability to cope with environment requirements and daily needs. Infants use various skills (communication, motor activity, health and safety, self-regulation). The aim of the research was to assess the adaptive skills in children at 5-24 months age stage with family risk autistic spectrum disorders (ASD)

**Methods:** Cohort-study design. Experimental group included children with family risk ASD. Control group included typically development full-term infants without pathologies, matched by age and gender. The Bayley-III Adaptive Behavior Scale was used for assessment adaptive behavior at points: 5, 10, 14, 24 months

**Results:** There were no significant differences between groups at 5 and 10 month-stage (12 infants, mean age 6.0±1 months, 8 males; 17 babies, 10.8±0.8 months, 10 males). At 14 months-stage (15 toddlers; 14.6±0.4 months, 9 males) there were significant differences in scores Home Living (t=2.8 p=0.01), Self Direction (t=2.3 p=0.03), integrative skill Social communication (t=2.5 p=0.02). But at 24 months-stage (13 toddlers, 24.3±0.4 months, 6 males) there were significant differences (the Mann-Whitney test U) in scores Community Use (p=0.02); Home Living (p=0.001), Health & Safety (p=0.006) Self Care (p=0.003) Self Direction (p=.002), Motor (p=0.03).

**Conclusion:** There is an accumulation the number of adaptive skills with lower indicators in the group of children with family risk of ASD by the 24-months age compared to control group. The most differences were observed in the skills that can be taught by parents

**Disclosure:** The research was supported by the grant of the Russian Foundation for basic research №17-36-01100

## EPO1094

**Severe SCN8A-developmental and epileptic encephalopathy in a preterm infant presenting with malignant migrating focal seizures and early-onset movement disorder**

E.H. Kim<sup>1</sup>, H.-C. Kang<sup>2</sup>, J. Lee<sup>3</sup>, N.H. Kim<sup>1</sup>, J.-H. Jeon<sup>1</sup>  
<sup>1</sup>Pediatrics, CHA Gangnam Medical Center, CHA University, Seoul, Korea, Republic of, <sup>2</sup>Pediatrics, Severance Children's Hospital, Yonsei University College of Medicine, Seoul, Korea, Republic of, <sup>3</sup>Pediatrics, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea, Republic of

**Background and aims:** In the preterm neonates, most seizures are often an early indication of acute brain injury including intraventricular hemorrhage. While genetic epileptic encephalopathy is rarer in the preterm than the term neonates, there is growing evidence that specific genetic conditions are important etiologies of neonatal epilepsy.

**Methods:** We describe a preterm neonate diagnosed as severe SCN8A-developmental and epileptic encephalopathy presenting with malignant migrating focal seizures and severe non-epileptic movements.

**Results:** A female neonate presented paroxysmal non-epileptic episodes of severe tremor and hyperekplexia-like startles several hours after she was delivered at 32 and 1/7 weeks. Since the first week of life, she showed intractable focal or generalized seizures in the form of malignant migrating focal seizures or status epilepticus. Electroencephalography during the ictal period showed epileptiform discharges from left temporoparietal or bilateral frontal regions. Brain magnetic resonance imaging and metabolic tests were normal. Sequencing of the SCN8A gene revealed a de novo heterozygous missense mutation; c.2911C>G; p.Leu971Val (NM\_014191.3). Her seizures have been well controlled with multiple sodium channel blockers including oxcarbazepine, zonisamide, phenytoin, and lamotrigine. However, she has been on the support of home mechanical ventilator and gavage feeding due to severe global development delay.

**Conclusion:** This case is the preterm neonate with early and severe clinical phenotypes linked to the SCN8A gene mutation. A high index of suspicion for the genetic etiology of seizures in the preterm neonate must be kept in mind when confronted with intractable seizures and abnormal movements.

**Disclosure:** Nothing to disclose



**EPO1096**  
**Cancelled**

**EPO1097**  
**Cancelled**

EPO1099

Cancelled

EPO1100

**The results of MRI and CT imaging in children with arterial ischemic stroke – experience from one medical center**

I. Kopyta<sup>1</sup>, B. Sarecka-Hujar<sup>2</sup>

<sup>1</sup>Katowice, Poland, <sup>2</sup>Department of Pharmaceutical Technology, School of Pharmacy with the Division of Laboratory Medicine in Sosnowiec, , Medical University of Silesia in Katowice, Katowice, Poland

**Background:** Arterial ischemic stroke (AIS) in pediatric population is a rare condition. It's prevalence is estimated at 0.58 to 7.9 new stroke onset in 100,000 children a year. Risk factors for pediatric AIS as well as its clinical presentation and outcome are recently better known for the results of IPSS (International Paediatric Ischemic Stroke) research. Aim of the study was to analyze clinical presentation of pediatric AIS and outcomes in consideration of neuroimaging (CT, computed tomography and/or magnetic resonance imaging, MRI of brain) results.

**Material and methods:** The analysed group of patients consisted of 78 children (32 girls and 46 boys) at the age of 9 months to 18 years at stroke onset (mean age  $9.25 \pm 5.48$  years); the mean age of the children at follow-up was  $11.86 \pm 6.01$  years. The diagnosis of stroke was based on applicable criteria by thorough past history, neurological examination and results of neuroimaging (CT and/or MRI), in most cases also MR angiography and classical angiography. The study was retrospective. The consent of Ethical Committee was obtained.

**Results:** In analyzed group of patients AIS was more common in boys than girls, the mean age for stroke onset was 8.4 years. The most common type of stroke was TACI, ischemic focus was most commonly located in temporal lobe and in middle cerebral artery. It occurred most commonly in sleep and winter.

**Conclusion:** AIS occurs most commonly in boys than girls. Correlation between clinical presentation and neuroimaging results was found.

**Disclosure:** Nothing to disclose

## EPO1101

**Rett syndrome: analysis of 23 cases**

A. Kuzniatsova<sup>1</sup>, S. Kulikova<sup>2</sup>, I. Zajcev<sup>2</sup>, S. Likhachev<sup>2</sup>, A. Yakovlev<sup>1</sup>, S. Myasnikov<sup>3</sup>

<sup>1</sup>Minsk City Center of Medical Rehabilitation for Children with Psychoneurological Disorders, Minsk, Belarus,

<sup>2</sup>Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus, <sup>3</sup>Republican Scientific Practical Center Mother and Child, Minsk, Belarus

**Background and aims:** Rett syndrome (RTT) is an X-linked neurodevelopmental disorder which mostly affects females and in 95% caused by mutation in MECP2.

**Aim:** To provide clinical characteristics of RTT in 23 patients.

**Methods:** There are 23 patients with RTT under our observation, all of them - girls. Average age - 6.4 years old (range 2.6-12.4). MECP2 mutations were found in 20 (87.0%) cases, 3 (23.0%) were diagnosed clinically.

**Results:** Average age at onset of RTT was 16 months (from 6 to 24). 14 (61.0%) patients had walking skills before the onset, another 4 (17.4%) started walking later, 5 (21.7%) girls did not start walking at the time of the study. Speech was present in 19 (82.6%) patients before the onset and later it was lost in 18 (78.2%) cases. The most common comorbidity was abnormal breathing affecting 21 (91.3%) of the patients and appeared from 8 months to 5 years of age. Types of breathing disturbances included hyperventilation 7 (33.3%), apnoea 1 (4.7%) and combination of hyperventilation and apnoea 13 (62%). 11 (47.8%) patients of the cohort had epilepsy. Onset of seizures ranged from 1.9 to 6 years of age. 5 (45.5%) girls developed drug resistant epilepsy. 2 (18.2%) of them used ketogenic diet which decreased seizure frequency in the first case by 64.9% during the first quarter and 35.2% during the second quarter, in the second case - by 100%. Scoliosis was noted in 15 (65.2%) patients, sleep disturbance in 10 (43.5%).

**Conclusion:** Abnormal breathing, scoliosis and epilepsy are the most common comorbidity in RTT. A ketogenic diet may be effective in drug resistant epilepsy.

**Disclosure:** Nothing to disclose

## EPO1102

**Exogenous flupirtine and flupirtine aromatic carbamate derivative as potential treatment for CLN3 disease**

K. Maalouf<sup>1</sup>, J. Makoukji<sup>1</sup>, S. Saab<sup>1</sup>, B. Vaidya<sup>2</sup>, A. Carmona<sup>3</sup>, P.C. Trippier<sup>3</sup>, R.-M. Boustany<sup>4</sup>

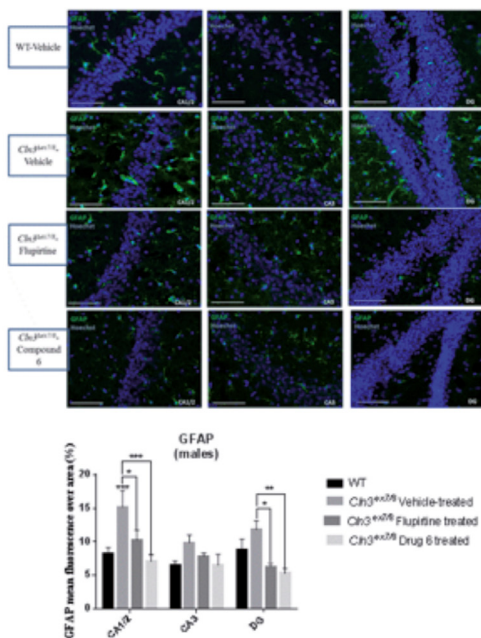
<sup>1</sup>Department of Biochemistry and Molecular Genetics, American University of Beirut, Beirut, Lebanon,

<sup>2</sup>Department of Pharmaceutical Sciences, Texas Tech University Health Sciences Center, Texas, USA, <sup>3</sup>Department of Pharmaceutical Science, University of Nebraska Medical Center, Omaha, USA, <sup>4</sup>Department of Pediatrics and Adolescent Medicine, American University of Beirut, Beirut, Lebanon

**Background and aims:** CLN3 disease is the most common form of Neuronal Ceroid Lipofuscinoses (a group of childhood neurodegenerative diseases). Hallmarks include brain atrophy, retinitis pigmentosa, accelerated apoptosis and ceramide elevation. Treatment regimens are symptomatic. Flupirtine and its novel aromatic carbamate derivative (compound 6) exert anti-apoptotic and neuroprotective effects, in vitro. This study aims at investigating, in vivo, beneficial effects of orally supplied flupirtine and compound 6 in Cln3Δex7/8 knock-in mice.

**Methods:** WT and Cln3Δex7/8 mice received flupirtine, compound 6 or vehicle for a period of 15 weeks. Effect of flupirtine or compound 6 on Cln3Δex7/8 mice was determined by performing behavioral tests (open field, pole climbing, Morris water maze, rotarod, wire suspension test), and biochemical tests (gene expression, proteome profiler assay, TUNEL assay, subunit C storage, astrogliosis and neuronal cell counts).

**Results:** Flupirtine and compound 6 were able to attenuate mobility, enhance gait locomotor measures, and increase exploratory behavior in Cln3Δex7/8 mice. Both were able to enhance spatial learning navigation and memory retention in Cln3Δex7/8 mice. Various apoptosis genes with dysregulated expression in Cln3Δex7/8 knock-in mice were restored to normal levels. NOSTRIN gene in males and XPA gene in female mouse brain were differentially modulated in response to Flupirtine/Compound 6 treatment as compared to Cln3Δex7/8 vehicle-treated mouse. Anti-apoptotic protein XIAP and BDNF were downregulated in Cln3Δex7/8 vehicle treated mice. Finally, high levels of astrogliosis in male Cln3Δex7/8 brains were significantly lowered after treatment with both drugs.



**Conclusion:** These findings establish that compounds analogous to flupirtine demonstrate anti-apoptotic activity with potential for treatment of CLN3 disease.

**Disclosure:** Nothing to disclose

## EPO1103

### Gilles de la Tourette syndrome: a Moroccan experience

*Y.M. Mekue Fotso, S. Bellakhdar, B. El Moutawakil, M.A. Rafai, H. El Otmani*

*Department of neurology-neurophysiology, IBN Rochd university health center, Casablanca, Casablanca, Morocco*

**Background and aims:** Gilles de la Tourette syndrome (GTS) is a neuropsychiatric disorder that is characterized by motor and vocal tics and psychiatric comorbidities, including attention deficit/hyperactivity disorder and obsessive-compulsive disorder. Our aim is to review the epidemiological, clinical, comorbidities as well as the various treatment options of GTS.

**Methods:** We performed a retrospective data analysis of patients diagnosed with GTS according to DSM V criteria over a period of 12 years. The severity of GTS was assessed through the Hopkins Motor and Vocal Tic Scale.

**Results:** 20 patients were included with an average age at onset of 8 years and a sex ratio M/F of 4. In past medical history we found repetitive angina and parents with tics. All patients had simple motor or vocal tics and 50% had complex motor or vocal tics. The most common phenomena associated with tics were self-harm (62.5%), arithmomania (60%), and touching (50%). GTS was mild in 3 cases; moderate in 7 cases; moderately severe in 4 cases and severe in 6 cases. The most commonly used treatments were SSRIs/Benzodiazepines (90%), haloperidol (65%), risperidone (40%) with improvement in the majority of patients.

**Conclusion:** GTS is a heterogeneous disease which treatments are discussed according to the severity of tics; it is essential to educate the patient and his entourage about the impact of disease on daily life. Our study has the advantage of being the first to report characteristics of GTS in Morocco. These characteristics do not seem to differ from those of the literature.

**Disclosure:** Nothing to disclose

Education in neurology; History in neurology; Ethics in neurology

## EPO1104

### Evaluation and treatment of mild traumatic brain injury in general medical practice in view of the need for further harmonization in advanced postgraduate medical education

Y. Alekseenko, I. Sauchanka  
*Neurology and Neurosurgery, Vitebsk State Medical University, Vitebsk, Belarus*

**Background and aims:** There are some common problems and controversies in evaluation and treatment of patients with mild traumatic brain injury (MTBI) in neurological as well as in general medical practice despite the introduction of modern standard clinical protocols. Our objective was to clarify the most significant issues in the management of MTBI patients for the further improvement of the program of advanced training of medical specialists.

**Methods:** We analyzed 215 medical records of consecutive admissions and referrals concerning MTBI twice during the last 5 years. Besides, we conducted structural interviews among neurologists and general practitioners in regard to the most difficult and relevant topics for advanced training of medical specialists.

**Results:** Standard protocols have been recently in use more often i.e. up to 79% of cases. At least 2 groups of difficulties and typical problems were identified. Along with the proper evaluation and interpretation of clinical symptoms some difficulties were revealed in regard to indications and timing of the appointment of CT, MRI and skull radiography during the initial management of MTBI (48%). The second group of problems was associated with the adequate medical treatment, pain control, follow-up recommendations, return to work, neurorehabilitation, detection and interpretation of possible posttraumatic consequences. Additionally, there exist some differences in approach to management of MTBI patients in neurological as well as in general medical practice.

**Conclusion:** The obtained data could be used as a basis for elaborating special advanced training programs for different categories of medical specialists.

**Disclosure:** Nothing to disclose

## EPO1105

### An observational survey 3 years after the French law on continuous and deep sedation until death (CDS)

V. Mesnage, S. Bretonniere, T. Goncalves, V. Fournier  
*Centre National des Soins Palliatifs et de la Fin de Vie, Paris, France*

**Background and aims:** Continuous and deep sedation until death (CDS) is a new right open to the patient under conditions since the Claeys-Leonetti Act of February 2016. It represents a new end-of-life medical practice for patients with serious and incurable diseases including neurological diseases. So far, there has been little data to assess its implementation in the field

**Methods:** After an initial national survey in 2018, the National Centre for Palliative and End-of-Life Care conducted a new survey, in April 2019, over a given week, in 14 hospitals throughout France. The objective was to characterize and account for CDS among palliative sedation practices.

**Results:** 36 CDS were identified ; these included 6 requests by patients and 30 proposals by physicians in the context of limiting or stopping active therapies in non-communicating patients. A collegial procedure was carried out in 33/36 cases. Information to families was provided in all cases. The average doses of midazolam and morphine at the time of death were 9.2mg/h and 5.5mg/h respectively with an average survival time of 33.5 hours.

**Conclusion:** The survey results show large differences in dosages and survival time, notably between the limitation of invasive treatments including assisted ventilation and the limitation of artificial feeding and hydration. Furthermore, the study highlights the persistent difficulty of characterizing CDS among palliative sedation end-of-life practices.

**Disclosure:** Nothing to disclose

## EPO1106

**Abnormal findings in peer neurological examination – ethical and management approaches after two “clinical” cases**

D. Carneiro, M. Tábuas Pereira, I. Santana  
Coimbra, Portugal

**Background and aims:** Peer Physical Examination (PPE), in which a medical student is used as a model or students examine each other, is a common approach to teach undergraduate neurology. It can, however, bring unpredicted events, namely “incidental findings”. The recent occurrence of two of these situations in our department raised a reflection that we find appropriate to share.

**Methods:** Case report.

**Results:** Case1- Abnormalities were found in an extraocular motricity examination performed by the instructor in a 22-year-old male student. After the class, the abnormalities were explained to the student and the Neurological Examination (NE) was completed. The student agreed in pursuing the investigation and a diagnosis of multiple sclerosis was determined.

Case2 - An absent right corneal reflex was found in a 22-year-old female student in a PPE. Since she remained anxious, the NE was performed after the class and was unremarkable. She agreed to undergo on a brain MRI which showed a sequaleae in the paramedian left pons. Clinical and imaging follow-up was made during the following year and then suspended by student request.

**Conclusion:** NE performed by peers carry some issues related to the possibility of finding abnormalities. This seems to occur despite absent awareness about it, since no results appear in a PubMed search. We discuss aspects related to the exigence of the NE teaching to undergraduate Medical Students in terms of amount of practice, recognition of normal anatomy and non-pathological findings and the risk of finding unexpected signs during Peer Neurological Evaluation, but also how to prevent and deal with them.

**Disclosure:** Nothing to disclose

## EPO1107

**Training in Epilepsy at the Psychiatric Hospital of Bouakée. Ivory Coast Does the training reduce the cultural and health gap?**

P. Gómez Iglesias<sup>1</sup>, E. Lopez Valdes<sup>1</sup>, I. Garcia Morales<sup>2</sup>, D. García Azorín<sup>3</sup>, M. Kurtis<sup>2</sup>, M. Molina<sup>4</sup>, C. Delgado Suarez<sup>2</sup>, M. Hernandez Gonzalez Monje<sup>5</sup>  
<sup>1</sup>Neurology, Hospital Clinico San Carlos, Madrid, Spain, <sup>2</sup>Madrid, Spain, <sup>3</sup>Valladolid, Spain, <sup>4</sup>Neurology, Hospital Severo Ochoa, Madrid, Spain, <sup>5</sup>Neuroanatomia, Universidad Autonoma Madrid, Madrid, Spain

**Background and aims:** Epilepsy has a high prevalence in Ivory Coast. It's a chronic and dynamic pathology that requires medical monitoring. Specialized health training in Ivory Coast is limited. Health personnel with general training take care of patients. The culture associates epilepsy with spirits, damns and religion. This beliefs are common even among the health personnel themselves, causing great stigmatization of patients. Some patients are not considered as sick, being separated from society in prayer fields. Most are valued by traditional medicine and a minority resorts to conventional medicine. The motley semiology of epileptic seizures makes them valued by Psychiatry. In this context, a Neurocooperation project in epilepsy is carried out

**Methods:** It has been made an intensive 3-day and 20-hour total course, in November 2019, at the Bouakée Psychiatric Hospital, to local healthcare staff by 3 Spanish neurologists  
**Results:** There were 11 participants, 1 Psychiatrist and 2 fellow, with 34.5 years old on average.

They attend an average of 14 patients/day, 10.5 of them with neurological pathology. Pretraining test is performed, results are showed at figures. The main topics were adjusted according to the results and suggestions from participants. Misconceptions persist about epilepsy. Drug availability is limited. The EEG study is not carried out due to lack of training resources. Training will continue for 1 year online with the aim of improving knowledge about epilepsy. The main topics will be reinforced with subsequent examination to know the formative impact.



## EPO1108

### Lev Yakovlevich Livshits – the founder of an effective original method for the surgical treatment of trigeminal neuralgia in the USSR in the middle of the 20th century

*E. Kuznetsova, E. Salina  
Saratov, Russian Federation*

**Background and aims:** The history of Russian neurosurgery as a practical science that studies the surgical treatment of trigeminal neuralgia is closely connected with the name of the famous neurosurgeon Lev Yakovlevich Livshits (1928-2005).

**Methods:** An important stage in the research biography of L.Ya. Livshits was his study on the surgical treatment of drug-resistant forms of trigeminal neuralgia by the method of directed hydrothermal destruction of its sensitive root by inserting a needle into the Meccel cavity through the oval foramen. As a physical factor of destruction, boiling distilled water was used; it was introduced fractionally with the total volume of 1.5ml, and the interval between portions reached 3-4 minutes.

**Results:** In 1968, L.Ya. Livshits successfully defended his dissertation on the topic: “Trigeminal neuralgia and its treatment by the method of directed hydrothermal destruction of a sensitive trigeminal root”. Putting the results of this work into practice brought relief to thousands of patients in the Soviet Union. Livshits became the head of the first Pain Center in Russia, which was located in Saratov and carried out the examination and treatment of patients from all over the USSR.

**Conclusion:** The concept of “growing radicalism” created by Professor Livshits allowed his students elaborating algorithms for treating severe chronic pain syndromes of any localization and etiology.

**Disclosure:** Nothing to disclose

**Conclusion:** Education programmes are a necessary tool to reduce the health and cultural gap in the treatment of epilepsy

**Disclosure:** Nothing to disclose

## EPO1109

**Descriptive analysis of absenteeism in patients with a first given appointment in an ambulatory neurological care office**

R. Manso Calderon

*Neurology Department, Complejo Asistencial de Salamanca (CAUSA), Salamanca, Spain*

**Background and aims:** Non-attendance in outpatient appointments represents human resources under-utilization, time lost, financial costs as well as possible health implications for absentee subjects. Our goal is to determine the main features of the non-attenders to a first given outpatient neurological appointment.

**Methods:** This is an observational case-control study based on patients sent to one outpatient neurology clinic of a third-level hospital. Data available electronically from patients who miss a first-given appointment between August 2018 and May 2019 (n=85) were prospectively recorded and compared to a control group of 187 consecutive first-time visitors.

**Results:** Non-attendance rate was 9.8% for the first appointment made in a neurological consultation. The mean age of the defaulters was 63 years (range: 15-96), of which 55.3% were older than 65 years and 57.6% were women. The most frequent reasons for reference in patients who miss appointments were cognitive impairment (32.9%) and headache (22.4%) followed by neuromuscular diseases (22.8%) and movement disorders (9.4%). 60% of the absentees were sent by their General Practitioner [GP], 21.1% came from Specialized Care [SP] and 18.8% were referred from the Emergency Department [ER]. No differences between attenders and defaulters were observed in age ( $p>0.05$ ), gender ( $p>0.05$ ), or reasons for reference ( $p=0.097$ ). A significantly higher percentage of patients referred from GP (79.7%) and lower from ER (13.3%) and SP (6.4%) was found among the attenders.

**Conclusion:** Patients referred by their GP, with continued follow-up, present less absenteeism in a neurological consultation. Hence, educational patient-centred approaches are required in order to reduce neurological non-attendance.

**Disclosure:** Nothing to disclose

## EPO1110

**The history of aspirin use in neurology**

A. Raskurazhev, P. Kuznetsova, M. Tanashyan  
*Department of Angioneurology, Research Center of Neurology, Moscow, Russian Federation*

**Background and aims:** Acetylsalicylic acid (aspirin) is one of the most widespread drugs – and the history of its use in neurology (in cerebrovascular disease, in particular) is quite remarkable. We present here a timeline of aspirin discovery with a special emphasis on its debut on the neurological “scene”.

**Methods:** A number of various scientific literary and historical works have been analysed.

**Results:** The medicinal use of salix has been dated back to ancient Egypt (15-16<sup>th</sup> centuries BC). It was widely used in ancient Greece and Rome. In the XVIIIth century Rev. Edward Stone described an infusion of salix alba which he used as “cure of agues”. It was he who in 1763 described salicylic acid. In 1852, Charles Gerhardt was the first to synthesize acetylsalicylic acid. In 1897, 29 year old Felix Hoffmann from Friderich Bayer & Co developed a more stable form of ASA - he was working under the supervision of Prof. Arthur Eichengrün. For nearly half a century aspirin was used as an anti-inflammatory drug until the early 1950s when Dr. Lawrence Craven started prescribing small doses of ASA for prevention of coronary and carotid thrombosis. This launched the use of aspirin in stroke prevention with numerous clinical trials which followed.

**Conclusion:** The history of aspirin depicts how old, well-known drugs offer new clinical possibilities which may totally shift the current therapeutic paradigm.

**Disclosure:** Nothing to disclose



## EPO1111

**Differentiating neuronal circuits to store an auditory information from those to define a sequence of sounds**

G. Sandin, G. Freitas, I. Oliveira, V. Dias, A. Belasques, A. Godoy  
*Medicine , Sao Caetano do Sul University , Sao Paulo, Brazil*

**Background and aims:** Auditory memory is one of the sensory memories. This study aimed to evaluate medical students' auditory memory.

**Methods:** Volunteers were 35 third year medical students (aged 19 to 31 years), 20 women. They listened to 3 samples of rock and 3 of classical songs. Soon after, answered 8 questions (Q). Q1-Q2: what was the position of the song in the sequence (5th and 1st); Q3-Q4: what was the song listened in a given position (2nd and 4th); Q5-Q6: what song they had not listened; Q7-Q8: what song they had listened. Q3- Q8: they had to choose among 3 presented songs. We got written approval from all of them.

**Results:** Q1: 46.7% males and 50% females got the right answer. For Q2:73.3% and 60%, respectively. Q3:6.7% and 15%. Q4: 0% and 20%. Q5, Q7 and Q8: 100%. Q6:95%.

**Conclusion:** Only about half of the students could remember the position of the song when it was the 5th. A higher percentage of students could remember the first song listened, particularly men. When we mentioned the position and they had to choose among 3, they scored poorly. In this case, women got higher scores. Our data suggests that the process of memorizing a sequence of sounds is much less effective than the 1 to store the auditory information. For medical students it is of great importance to recall the sequence of information they get from a patient. Therefore, it is of relevance to develop training methods to improve that ability.

**Disclosure:** Nothing to disclose

## EPO1112

**Monosynaptic Reflexes (MSR) – the first systematically used parameters for psycho-physiological activation. History of methods and results**

B. Sczesni  
*Private Practice, Bochum, Germany*

**Background and aims:** The importance of testing reflexes is evident to every neurologist, little is known of systematic studies of MSR as indicator of tonic and phasic activation. Only recently the author noticed that MSR were the first parameters used in psychophysiology, even before electrodermal parameters.

**Methods:** A literature overview is given on history of research on monosynaptic reflexes.

**Results:** Lombard (1887, first volume of *AmJPsychol*) with his hammer of defined drop height and registration of reflex amplitudes in millimeters found variations under many conditions (e.g. fatigue, exciting vs. relaxing music or literature, sudden external stimuli). Bowditch & Warren (1890) with their complicated pendulum apparatus for eliciting reflexes after defined stimuli (auditory, visual, an even touch by air blasts) showed activation curves in the time range up to 2000ms, similar to those in later studies of activation with other parameters.

Paillard (1955) was the first to study simultaneously mechanically elicited T reflexes and electrically H reflexes, T reflexes being more reactive to activation. Later investigations (Bathien and coll., 1969, 1971, Brunia 1970, 1971, Sczesni & Kröner 1985) will be presented.

The technical features, representing the best technologies of their times, neurophysiological and neuropsychological aspects, and limitations of the methods are discussed.

**Conclusion:** H reflexes are more sensitive than T reflexes. Changes can represent phasic as well as tonic influences. MSR in some areas of research were used for decades with some profit, but they were no longer carried out, presumably because of the vast technical equipment needed.

Key words: monosynaptic reflexes, activation,, relaxation, psychophysiology

**Disclosure:** Nothing to disclose

## EPO1113

### The history of neurological service of Kyiv Institute of traumatology and orthopedics

O. Yuryk

*Pain Problems Laboratory, Institute of Orthopaedy and Traumatology, Kiev, Ukraine*

**Background and aims:** In June 2019, the Institute celebrated its 100 years since establishment.

**Methods:** We researched archive materials of the institution.

**Results:** In 1919, in country seat of Count Shteingel Kyiv Institute of the crippled child was organized. In 1924, it was transformed into All-Ukrainian state pediatric orthopedic institute with maternity department, later transferred to building on 7 Revoliutsii Str. 1919–1941 at Institute worked neuroscientist Arinshtein. He gave professional advice to children with congenital malformations of musculoskeletal system, consequences of poliomyelitis, neurological complications of bone tuberculosis, consequences of infantile cerebral paralysis. During postwar years, consultative neurological service of Institute was headed by doctor O. Rabinovych. Scientific neurological activity began in late 1950s, when methods of conservative, surgical treatment of children with poliomyelitis, spastic paralysis began to develop. Significant contribution to study of pathology was made by Frumin, Talko, Haiko, Putilina, Mezhenina. Since 1976, Ulis was neurological consultant at in-patient hospital, who in 2013 published monograph “Neuro-ortopedia”. 1985–2001, Guba worked as consultant of outpatient department, which in 1997 published “Handbook of neuro-orthopedics”. 1982–1988 at Institute was department of involuntary nervous system diseases. In 1990, laboratory of neuro-orthopedics and pain issues was established within department of rehabilitation of Institute, which since May 2006 became independent scientific unit. Today laboratory staff solve clinical, theoretical issues of pain of people with kinetics, musculoskeletal pathologies and conduct diagnostic monitoring of neurological disorders of such patients; develop new, improve existing treatments for acute, chronic pain syndromes. Activity of laboratory gained international recognition.

**Conclusion:** Issues of neuroorthopaedy need to be further deeply studied.

**Disclosure:** Nothing to disclose

## Epilepsy 1

EPO1114

### Combination of advanced structural and functional MRI methods in the pre-surgical evaluation of patients with drug-resistant epilepsy

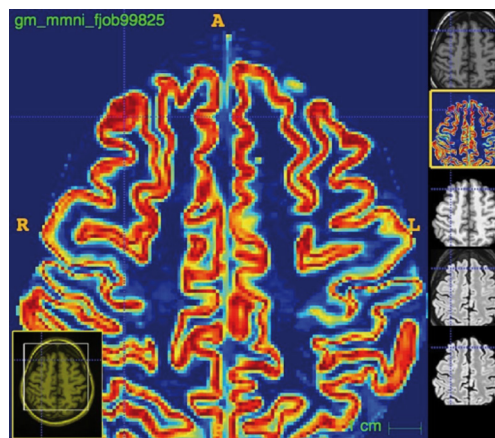
I. Alexandratou<sup>1</sup>, C. Zachariadi<sup>1</sup>, M. Stefanatou<sup>2</sup>,  
A. Verentzioti<sup>3</sup>, P. Patrikelis<sup>3</sup>, L. Hermoye<sup>4</sup>, A. Soddu<sup>5</sup>,  
S. Gatzonis<sup>3</sup>, V. Katsaros<sup>6</sup>

<sup>1</sup>Dept of Neurology, Evangelismos Hospital, Athens, Greece, <sup>2</sup>Aeginiteion Hospital, <sup>1st</sup> Department of Neurology, Athens, Greece, <sup>3</sup>A' Dept of Neurosurgery, National and Kapodistrian University of Athens, Evangelismos Hospital, Athens, Greece, <sup>4</sup>ImagilyS, Brussels, Belgium, <sup>5</sup>Brainet, Ontario, Canada, <sup>6</sup>Dept of Advanced Imaging Modalities, General Anti-Cancer and Oncological Hospital of Athens "St. Savvas", Athens, Greece

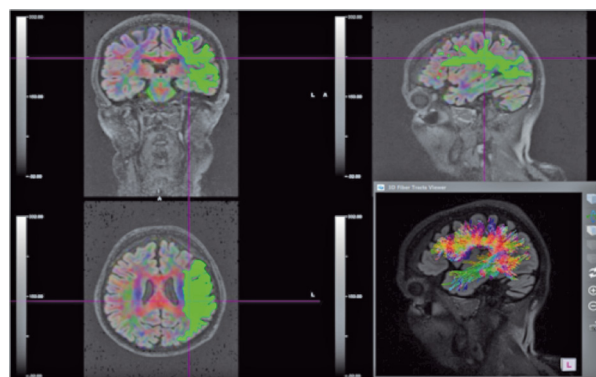
**Background and aims:** Epilepsy surgery leads in significant seizure reduction in patients with drug resistant focal onset epilepsy. Localization of the epileptogenic zone is required for surgical planning prior to a focal cortical resection. Odds of becoming seizure-free after surgery are 2.5 times higher in patients with MRI lesions related to epileptogenic network. Conventional imaging often fails to reveal these lesions, demanding the practice of harmonized neuroimaging of epilepsy structural sequences-(HARNES)-MRI protocol and post-processing methods such as Volumetry.

**Methods:** We selected eleven patients with drug-resistant epilepsy and a "non-lesional" MRI. They were further examined with advanced MRI techniques by 3D-T1 before and after administration of 15ml Gadovist, 3D-T2 weighted and 3D-FLAIR sequences. Echo-planar BOLD (Blood Oxygenation Level Dependent) for task-based and resting state fMRI (RS-fMRI), and diffusion tensor imaging (DTI) were acquired for language/memory lateralization, and if possible, to visualize epileptogenic zones.

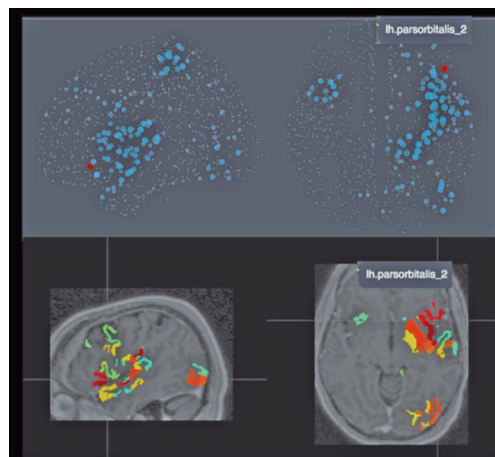
**Results:** All eleven patients had a "non-lesional" MRI. Applying advanced and quantitative imaging techniques, abnormal findings were revealed in six patients. After surgery, five out of six patients were free of disabling seizures (Engel class I), with one-year follow-up. Among five patients with the non-lesional MRI, only one was free of disabling seizures after surgery.



Volumetry



DTI



RestingState fMRI

**Conclusion:** Revealing lesions unseen with conventional imaging, the HARNES-MRI protocol and advanced and quantitative imaging techniques transforms MRI-negative into MRI-positive cases. Thereby, applying the technical advances and developments in neuroimaging more systematically in everyday clinical routine, we succeed in offering the life-changing benefits of epilepsy surgery to a greater number of patients.

**Disclosure:** Nothing to disclose

## EPO1115

**Clinical features of patients treated with very-low dose of anti-epileptic drugs in focal epilepsy**

F. Moreau<sup>1</sup>, V. Foulon<sup>1</sup>, C. Pincon<sup>2</sup>, Y. Chen<sup>3</sup>,  
B. Decaudin<sup>1</sup>, G. Baille<sup>3</sup>

<sup>1</sup>Service de pharmacie clinique, University of Lille, Lille, France, <sup>2</sup>Biostatistics, University of Lille, Lille, France, <sup>3</sup>Lille, France

**Background and aims:** The prescription of a dose of antiepileptic drugs (AED) below the minimum effective dose stipulated in the summary of product characteristics (SmPC) is a relatively common situation, mainly for patients with or at risk of cognitive and/or behavioural disorders. We aimed to determine the clinical features of the patients treated with very-low dose of lamotrigine, lacosamide and levetiracetam and to display factors associated with a diminution of the dose.

**Methods:** In this retrospective study (between November 2017 and October 2018), adult patients with focal epilepsy and a stable dose of lamotrigine, lacosamide or levetiracetam (more than 3 months) hospitalized in Lille university medical centre were included. They were divided into 2 groups: treated with a dose above or below the guidelines of the SmPC.

**Results:** 118 patients with complete data were included (age= 65±18 years old; H/F=0.75; age of onset of epilepsy= 59 years old; 79% of structural cause). 90 were treated with a dose in agreement the SCP guidelines and 28 were treated with a dose below the guidelines). A history of neurovascular or neurodegenerative disease and a history of delirium during the preceding year were associated with a AED dose below the guidelines (OR=3.43 [1.1;10.7] and OR=16.7 [3.8;74.9] respectively) but age, weight and creatinine clearance were not.

**Conclusion:** Physicians spontaneously adapted the dose of AED by relying on clinical factors. The efficacy of very-low dose AED needs to be investigated even if this strategy seems to be relevant for fragile patients.

**Disclosure:** Nothing to disclose

## EPO1116

**Is it easy to switch antiepileptic treatment from valproate to others?**

S. Bek, G. Kutlu, Y. Ünal

Neurology, Mugla University Schol of Medicine, Mugla, Turkey

**Background and aims:** Although prospective studies have provided information on the teratogenicity, patients on valproate (VPA) are generally reluctant to change treatment. We present the results of our epilepsy department patients whose the treatment regimens were switched from VPA.

**Methods:** We evaluated the patient files whose VPA were switched. Age, daily dosage of VPA, seizure type, alternative regimen (lamotrigine:LMT or levetiracetam: LEV) choice, maintenance dosage, seizure frequency before and after switching, side effects and pregnancies during treatment were evaluated.

**Results:** Total of 20 patients in our outpatient clinic were on VPA in childbearing age. Average age of 29.45 years (±5.80). VPA dosage 787.50 mg/daily (±259.99). 11 of 20 were having myoclonic-tonic-clonic and 9 were having tonic-clonic sz. Maintenance dosage of LEV was 1308 mg/daily (±809mg) and LMT was 239mg/daily (±124mg). Sz freedom in 2 of LEV, 50%- 75% sz reduction in 3 LEV patients were achieved. Sz free on VPA were still sz free in 4 LEV and in 6 LMT patients. Increase in sz frequency was observed in 2 of LEV and in 2 LMT patients. Skin rash was the only side effect in one LMT patient. Increased aggression were seen in 3 LEV patients. Three patients had healthy pregnancy and deliveries.

**Conclusion:** Either LEV or LMT are both safe alternatives. Although treatment switching procedure might have idiosyncratic problems as stated here, each patient should be handled individually and VPA should be switched as recommended.

**Disclosure:** Nothing to disclose

## EPO1117

**Relationship between plasma concentrations and clinical effects of perampanel. An observational study**

M. Contin<sup>1</sup>, S. Mohamed<sup>1</sup>, L. Ferri<sup>1</sup>, F. Pondrelli<sup>1</sup>, M. Santucci<sup>1</sup>, P. Tinuper<sup>2</sup>, C.S.G. Multicenter Clinical Study Group<sup>3</sup>, F. Bisulli<sup>1</sup>  
<sup>1</sup>IRCCS Istituto delle Scienze Neurologiche, Bologna, Italy, <sup>2</sup>Bologna, Italy, <sup>3</sup>IRCCS-ISNB, Bologna, Italy

**Background and aims:** To investigate the correlation between plasma concentrations of perampanel (PMP) with both tolerability and seizure control in adults and children with drug-resistant epilepsy.

**Methods:** Plasma samples were collected in the morning at 12-h distance from once-a-day bedtime PMP dose. Patients had to be on stable therapy for at least 3 weeks. Tolerability was assessed on the day of drug monitoring by clinical examination and patients' interview. The response was based on average seizure frequency estimation and defined as  $\geq 50\%$  decrease from PMP pretreatment. The main outcomes were the comparisons of PMP plasma concentration-to-weight-adjusted dose ratio (C/D) [ $(\mu\text{g/mL})/(\text{mg/kg})$ ] between patients with and without adverse effects (AEs) and between responders and non-responders.

**Results:** 79 patients (52 males) aged (mean $\pm$ SD)  $36\pm 14$  years (range 12-70 years) were enrolled. The mean PMP dose was  $6.7\pm 2.2\text{mg}$  (range, 2-12mg), drug treatment averaged  $46\pm 34$  weeks (6-161 weeks). The mean plasma concentration was  $376\pm 295\text{ng/mL}$  (39-1641ng/mL). 39 patients (40%) reported AEs, mainly agitation and irritability. No significant difference was found in median PMP C/Ds between patients with (3.02) and without (2.79) AEs. 45 patients (46%) resulted in responders, at a median PMP C/D of 3.16, similar to the value of 2.80 found in non-responders. These 2 groups also overlapped for all the above mentioned clinical and therapeutic variables.

**Conclusion:** PMP plasma levels largely varied in relation to both tolerability and efficacy. We did not identify a reliable reference range for PMP plasma concentrations in our cohort of patients.

**Disclosure:** none

## EPO1118

**Evaluation of cognitive and language side effects of topiramate in patients with epilepsy, and effectiveness of counseling and speech therapy interventions**

G. Carlucci<sup>1</sup>, A. Sodero<sup>1</sup>, V. Buti<sup>2</sup>, Y. Failli<sup>3</sup>, M. Paganini<sup>4</sup>, L. Massacesi<sup>2</sup>  
<sup>1</sup>Florence, Italy, <sup>2</sup>University of Florence, Florence, Italy, <sup>3</sup>Ospedale Careggi, Florence, Italy, <sup>4</sup>Neurology, Careggi, Florence, Italy

**Background and aims:** Topiramate (TPM) is a highly effective antiepileptic drug. Up to 10% of patients experience TPM-related cognitive side effects, especially on language (impaired word finding and verbal fluency), with a drug discontinuation rate up to 70%. We investigated early cognitive and language deficits in patients on TPM for epilepsy and the possible favorable effect of counseling and speech therapy interventions.

**Methods:** Patients enrollment: age  $\geq 18$  years, on TPM therapy for epilepsy with good efficacy and tolerability, MMSE $>23$ . Baseline evaluation: clinical-functional (TIB, mRS, VAS-Depression) and cognitive-linguistic (Verbal Fluency, Token Test, naming and calculation tests, Digit Span, Corsi Test, Symbol Digit Modalities Test, FAB). Administration of 4 biweekly outpatient sessions of lexical enhancement exercises by a speech therapist, and inter-session home exercises. After the 2-month treatment the cognitive-linguistic assessment was repeated, patients were provided with maintenance home exercises and re-evaluated 4 months later.

**Results:** Out of 380 outpatients screened, 29 were on TPM and 10 met the study inclusion criteria. All patients showed good participation and increasing engagement in the study, excepting for 1 who discontinued it for personal reasons. At baseline all participants showed normal verbal and total IQ scores. 5 patients (56%) showed frankly pathological verbal fluency, either phonemic or semantic, and improved up to normal values at the end of treatment ( $p<0.05$ ). This improvement persisted after the 4-month maintenance period.

**Conclusion:** Our results suggest the effectiveness and feasibility of a counseling and speech therapy treatment in patients with TPM-related language involvement, warranting future studies on wider sample and follow-up.

**Disclosure:** Nothing to disclose

## EPO1119

**The effects of GPR39 agonist on BDNF signaling in the pentylenetetrazole model of epilepsy**

U. Doboszewska<sup>1</sup>, K. Socala<sup>2</sup>, D. Nieoczym<sup>2</sup>, M. Pierog<sup>2</sup>, B. Szewczyk<sup>3</sup>, P. Wlaz<sup>2</sup>

<sup>1</sup>Lublin, Poland, <sup>2</sup>Animal Physiology, Maria Curie-Skłodowska University, Lublin, Poland, <sup>3</sup>Maj Institute of Pharmacology Polish Academy of Sciences, Cracow, Poland

**Background and aims:** The G-protein coupled receptor 39 (GPR39) is activated by zinc ions and has been suggested as a novel drug target for epilepsy. However, the results which have been obtained by our group generally argue against the hypothesis that activation of GPR39 alleviates seizure. We found, e.g., that TC-G 1008, a potent and selective GPR39 agonist, facilitated the development of pentylenetetrazole (PTZ) kindling. Here, we aimed at assessing the mechanisms that may underlie the effects observed after administration of TC-G 1008 in the PTZ model of epilepsy.

**Methods:** Male Albino Swiss mice received TC-G 1008 (10mg/kg i.p.) 30min (based on previous pharmacokinetic analysis), zinc chloride (ZnCl<sub>2</sub>) (8mg Zn/kg) or valproic acid (VPA) (150mg/kg) before each dose of PTZ. Following completion of the kindling paradigm, the expression levels of proteins: phosphorylated CREB (p-CREB), brain-derived neurotrophic factor (BDNF) and phosphorylated high-affinity tropomyosine-related kinase B receptor (p-TrkB) were measured using western blot in the hippocampi (Hp).

**Results:** PTZ kindling significantly increased p-CREB and p-TrkB in the Hp of mice. There was also a tendency towards increased BDNF level. Administration of TC-G 1008, ZnCl<sub>2</sub> and VPA significantly decreased the level of p-CREB in the Hp of kindled mice. Moreover, there was a tendency towards decreased p-TrkB level in the Hp of kindled mice after treatment with these compounds.

**Conclusion:** Although inhibition of BDNF signaling has been suggested as a strategy for the treatment of epilepsy, our data shows that facilitation of epileptogenesis may also be associated with inhibition of BDNF signaling.

**Disclosure:** The study was supported by a grant from the National Science Centre, Poland (2016/20/S/NZ7/00424)

## EPO1120

**Prediction of vagal nerve stimulation efficacy – validation of statistic model on external data set, pilot study**

I. Doležalová<sup>1</sup>, J. Chladek<sup>2</sup>, E. Koritáková<sup>3</sup>, J. Chrastina<sup>4</sup>, M. Brázdil<sup>5</sup>

<sup>1</sup>The First Department of Neurology, St. Anne's University Hospital and Masaryk University, Brno, Czech Republic,

<sup>2</sup>The Czech Academy of Sciences, Institute of Scientific Instruments, Brno, Czech Republic, <sup>3</sup>Institute of Biostatistics and Analyses, Faculty of Medicine, Brno, Czech Republic, <sup>4</sup>St. Anne's University Hospital, Brno, Czech Republic, <sup>5</sup>Brno, Czech Republic

**Background and aims:** Vagal nerve stimulation (VNS) offers a possibility for a substantial seizure reduction in approximately 50% of implanted patients. However, there is a large group of patients who do not profit significantly from this therapy. At the moment, there is no widely-accepted method for prediction of VNS efficacy based on pre-implantation data. Our group has developed and published a statistic classifier based on pre-implantation routine EEG, which was able to predict VNS response in a given patient with high accuracy. The crucial limitation of our previous work was its monocentric nature and the use of only one type of EEG recording system.

**Methods:** We retrospectively identified a pre-implantation EEG in a group of patients with drug-resistant epilepsy treated with VNS (all EEG recorded by different EEG system than in our previous work). The EEG was mathematically post-processed the same way as in our previous work. Subsequently, the patients were classified by their statistic outcome (statistic responders vs. statistic non-responders). The statistic outcome was compared to the patients' real-life outcomes (real-life responders vs. real-life non-responders).

**Results:** We identified 10 patients with drug-resistant epilepsy treated with VNS: 9 real-life responders and one real-life non-responder. We were able to predict their response by our classifier with 0.750 accuracy, 0.714 sensitivity, and 1 specificity.

**Conclusion:** We managed to prove the possibility of applying our statistic classifier in different EEG systems. This universal application is a crucial step for design a prospective multicenter study which we plan to initiate in the future.

**Disclosure:** The project is supported by the Ministry of Health of the Czech Republic, grant NV19-04-00343.

## EPO1121

**Results of TMS using in patients with pharmacoresistant epilepsy which using levetiracetam**

A.E. Dubenko<sup>1</sup>, T. Muratova<sup>2</sup>, I. Babkina<sup>3</sup>

<sup>1</sup>Department of Neurology, Institute of Neurology, Psychiatry & Narcology of the NAMS of Ukraine, Kharkiv, Ukraine,

<sup>2</sup>Neurology department, Odessa Medical University, Odessa, Ukraine, <sup>3</sup>Luban Medical Center, Luban, Poland

**Background and aims:** The TMS is promising for additional therapy of patients with pharmacoresistant epilepsy, but there is no unambiguous data on its use in patients taking using different AED.

**Methods:** We examined 35 patients with pharmacoresistant epilepsy with focal seizures with or without evolution to tonic-clonic seizures. All patients took AED in adequate doses. The AED regimen was stable for at least 3 months before being included in the study. All patients used Levetiracetam as AED.

The frequency of seizures was evaluated. For evaluation severity of seizures NHS3 scale was used.

Patients were observed for 3 months before the course of TMS and 6 months after the course of TMS.

TMS was done in the sitting position to the occipital zone of the head fixedly. Exposition was 10 seconds, pulse induction of 2.0T and a frequency of 5Hz by a biphasic pulse generation. The interval between the series was 20 seconds, the number of series-20, total duration-10 minutes. Stimulation was carried out daily for 20 days with a break of 5 days after the first 10.

**Results:** There was a positive effect - decreasing number of seizures compared to the baseline level, which was short-term (decreasing frequency of more than 50% - 82% and 86%, respectively) and after 6 months there was no significant difference from the baseline level. Similar data were obtained by dynamic evaluation using NHS3 scale.

**Conclusion:** Thus, effect of TMS is extremely unstable. After 6 months, the frequency of seizures and their severity return to the original level.

**Disclosure:** Nothing to disclose

## EPO1122

**Valproate-induced nocturnal enuresis in children**

A. Esmael<sup>1</sup>, M.A.G. El-Sherif<sup>2</sup>, M. Abdelsalam<sup>1</sup>, L. Bendary<sup>3</sup>, H. Egila<sup>1</sup>

<sup>1</sup>Department of Neurology, Faculty of Medicine, Mansoura University, Egypt, Mansoura, Egypt, <sup>2</sup>Neurology Department, Mansoura University, Mansoura, Dakahlyia, Egypt,

<sup>3</sup>Urology Department, Faculty of Medicine, Zagazig University, Zagazig, Egypt

**Objective:** The objective of this research study was to evaluate the occurrence and the characters of nocturnal enuresis in children secondary to valproic acid antiepileptic drug and to discuss the suspected reasons.

**Methods:** A retrospective study carried out in pediatric patients (aged 5 to 15 years) diagnosed as idiopathic epilepsy and kept up on valproic acid antiepileptic drug. Side effects recorded by parents were reported at each subsequent visit especially enuresis. The occurrence of enuresis was assessed and its association with different factors.

**Results:** 260 children (153 males and 107 females) aged 5 to 15 years were investigated for nocturnal enuresis which, was reported in 28 (10.7%) of the cases after a mean exposure time to valproate of 18.78±8.4 days. Enuresis halted in most of cases either spontaneously or after cessation of valproic acid. Multivariate logistic regression, demonstrated that the independent factors associated with nocturnal enuresis, were younger age (OR 2.31, p=0.004), followed by weight and Serum level of valproic acid (OR 1.44, p=0.05 and OR 1.39, p=0.05 respectively). While, the therapeutic dose, or the treatment duration with valproic acid, were not significantly associated with the incidence of enuresis (OR 0.98, p=0.09 and OR 0.86, p=0.12 respectively)

**Conclusion:** Nocturnal enuresis is a common side effect that accompanied the valproic acid use in children, which is mostly reversible. The underlying mechanism is unclear may be related to increase sleep depth with valproic acid which require further studies with polysomnography.

**Disclosure:** Nothing to disclose

## EPO1123

**The influence of neonate convulsion on the neurodevelopment of the child**

L. Feghiu

*Neurological, the National Center of Epileptology of Moldova, Chisinau,*

**Background and aims:** Neonatal seizures are a common neurological dysfunction of the neonatal period, apparently from birth to the end of the neonatal period. The incidence of neonatal seizures is in range of  $1^{5/3}$  per  $1^{/000}$  live births, in the neonatal period - with an index of 1.2. the evolution of neonatal seizures is often dependent on the cause that led to seizures.

**Methods:** The results on the neurodevelopment of 67 newborn children who had neonatal seizures of various etiologies werw evaluated. Assessment period - 5 years. Examinations were performed: neurophysiological, imagistic.

**Results:** Among the 67 children who had neonatal seizures during the newborn period, the following neurodevelopmental problems were registered: behavioral disorders (42 children, 63%), cognitive disorders (35 children, 53.7%), speech and language disorders (39 children, 58%), attention disorders (49 children, 73%), hyperactivity disorder (33 children, 49%), socializing disorders (31 children, 46%), epilepsy (20 children, 30%), cerebral palsy (22 children, 33%), intellectual disability (19 children, 28%).

**Conclusion:** Triggering causes of neonatal seizures determine long-term prognosis and outcomes, as they are associated with various brain injuries, can have a negative impact on the child's neurodevelopmental outcomes.

**Disclosure:** Nothing to disclose

## EPO1124

**Evaluation of quality of life and stigma among epileptic patients in French-speaking Belgium**

O. Feys, M. Ossemann

*Yvoir, Belgium*

**Background and aims:** Epilepsy has been associated with poor life quality especially with poor seizure control. 30% of patients remain refractory to currently available treatment and more than 30% of treated patients experience adverse events compromising life quality. Lack of access to knowledge about the disease might have a negative influence on disease outcome and result in a poorer life quality and more stigma. This survey evaluate life quality of epileptic patients in French-speaking Belgium.

**Methods:** An online survey was published and addressed to epilepsy patients including demographic data, open-ended questions (based on Gilliam's paper 1997), a life quality scale (QOLIE 31) and the stigma scale of epilepsy (SSE). Linear regression was applied to different scores and sub-scores and compared on the demographics.

**Results:** 279 patients responded to the online questionnaire. The mean age at the time of the first seizure was  $20 \pm 13.33$  years and the time between first seizure and diagnosis was  $4 \pm 9.91$  years. Demographically, there was a significantly higher representation of single and unemployed patients. The life quality is lower than in the control population, mainly in men, patients with no qualifications, or with a high seizure frequency. Seizure frequency also influences stigma. There is a correlation between reduced life quality and stigma.

**Conclusion:** Life quality is reduced in patients with epilepsy, decreasing mainly with increasing seizure frequency, or in low level of education. Stigma also increases with seizure frequency. Public educational programs on epilepsy for epileptic patients and epileptic-free population should be developed to prevent stigma.

**Disclosure:** Nothing to disclose



## EPO1125

**Impact of ammonia measurement on therapy decisions in an adult status epilepticus cohort treated with valproic acid**

S. Folkestad Habhab<sup>1</sup>, L.B. Ulvin<sup>2</sup>, E. Tauboll<sup>2</sup>, K.B. Olsen<sup>2</sup>, M.A. Horn<sup>2</sup>, K. Heuser<sup>2</sup>

<sup>1</sup>Oslo, Norway, <sup>2</sup>Oslo University Hospital, Oslo, Norway

**Background and aims:** Status epilepticus (SE) is a neurological emergency in which immediate intervention is required to prevent permanent brain damage and death. Intravenous (IV) valproic acid (VPA) is considered a safe drug and is frequently used for the treatment of SE. However, IV VPA frequently increases blood ammonia levels, the clinical relevance of which is uncertain. In this retrospective observational study, we highlight the impact of increased ammonia levels on further treatment management

**Methods:** We retrospectively included adult patients ( $\geq 18$  years) treated at Oslo University Hospital between January 2006 and October 2019. All patients were admitted to the hospital with the clinical presentation of SE, were treated with IV VPA, and had at least one ammonia level measurement. Laboratory results and clinical information from medical records were registered. Correlations were tested using the Pearson's correlation coefficient. Patients were also graded after the West Haven Criteria to assess signs of encephalopathy.

**Results:** 30 out of 31 patients had increased ammonia level during IV VPA treatment. In 16 out of 30 patients, VPA was discontinued and in 6 patients the dose was reduced. Other blood tests related to liver function at time of the peak ammonia level were within normal range.

**Conclusion:** Increased blood ammonia level is common in SE patients treated with IV VPA. In our patient material increased blood ammonia level had a substantial impact on further treatment management. To date, no guideline exists on how to handle VPA induced hyperammonemia. As treatment outcome could potentially be affected, further studies are warranted.

**Disclosure:** Nothing to disclose

## EPO1126

**Side effects, tolerance and abandonment of perampanel in the neurology service of the General University Hospital of Ciudad Real**

A. Franco<sup>1</sup>, A. Camacho<sup>2</sup>, L. Ruiz-Escribano Menchén<sup>2</sup>, F.J. Villanueva Ruiz<sup>2</sup>, L. Quirós<sup>1</sup>, M. Gudin<sup>1</sup>, M.J. Corrales Arroyo<sup>2</sup>

<sup>1</sup>Neurology, Hospital General Universitario de Ciudad Real, Ciudad Real, Spain, <sup>2</sup>Ciudad Real, Spain

**Background and aims:** We describe the baseline characteristics of our patients treated with Perampanel.

**Methods:** We selected the total patients of our service in whom Perampanel was indicated during the years 2016, 2017 and 2018, a total of 99 patients (43% women and 57% men).

**Results:** In our patients, the main indication was epilepsy treatment, 71%. In 95% of cases it was indicated as an adjuvant drug, and in 5% as a single treatment. The second indication, 29% of patients, was control of tremor and other non-epileptic involuntary hyperkinetic disorders. Regarding adverse effects: 17% abandoned treatment due to side effects. Of these, 70% were older than 75 years of age ( $>75y$ ) and 65% were male. Among the most common side effects were: 60% dizziness and instability of gait. 68%  $>75y$  and 67% were male. Greater with associated pluri-pathology. Psycho-behavioral alterations were also evident in 25%, higher in patients with previous intellectual disability (21%), cognitive impairment (11%) and  $>75y$  (43%). Changes in the sleep cycle, were seen in 15%. Also more frequent in  $>75y$  (79%) and with cognitive impairment (13%) or prior intellectual disability (24%) The incidence of side effects was lower both with lower doses, regardless of age group or cognitive situation.

**Conclusion:** According to our results, it would be necessary to conduct studies that support both a dose or a dose escalation schedule according to specific groups of patients. Probably the addition of a marker or titration of the serum levels of the drug would help in the selection of the dose to be used.

**Disclosure:** Nothing to disclose

## EPO1127

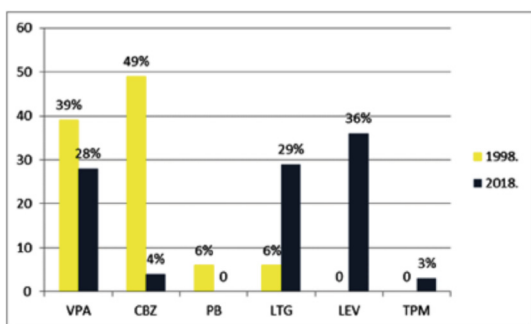
### Changes in prescription pattern of first antiepileptic drug for childhood and adolescent epilepsy over the last two decades

K. Gebauer-Bukurov, Z. Zivanovic, D. Dobrenov  
Novi Sad, Serbia

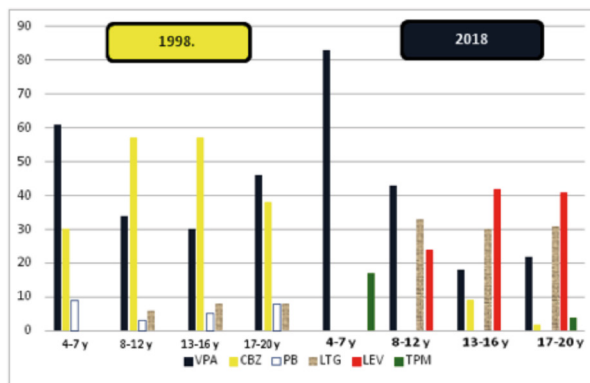
**Background and aims:** Newer generation of antiepileptic drugs (AED) and conventional AED are equally heterogeneous groups in terms of their mechanism of action and pharmacological characteristics. However, newer AED are prioritized primarily due to their improved safety profile even in patients with well-controlled seizures.

**Methods:** This was a retrospective and prospective cross-sectional study of medical records of children and adolescents with epilepsy, who were admitted as inpatients or outpatients at a tertiary referral center in Novi Sad, Serbia during 1997-1998 and 2017-2018.

**Results:** In 1997/98, the most commonly initially prescribed AED was carbamazepine (49%), followed by valproate (39%), phenobarbitone and lamotrigine (6%). In 2017/18, the most commonly initially prescribed AED was levetiracetam (36%), followed by lamotrigine (29%), valproate (28%), carbamazepine (4%), topiramate (3%), while phenobarbitone was not prescribed as the initial AED. Comparing the results between 1997/98 and 2017/18 regarding the seizure type and type of epilepsy with respect to newer and older generation of AED, we noticed that pattern of prescribing initial AED has been significantly reversed. The most important difference was reflected in the treatment of generalized seizures and in the population of adolescents. The prevalence of valproate usage in the population of girls at puberty has decreased significantly during 2017/18, compared to the 1997/98.



Percentile representation of initially prescribed AED during 1997/98 and 2017/18



Age related percentile representation of initially prescribed AED during 1997/98 and 2017/18

N (%)	VPA		CBZ		PB		LTG		LEV		TPM		statistic P
	1998	2018	1998	2018	1998	2018	1998	2018	1998	2018	1998	2018	
4-7 y	14 (32)	5 (17)	7 (13)	0 (0)	2 (3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (33)	0.46
8-12 y	12 (28)	9 (30)	20 (38)	0 (0)	1 (1)	0 (0)	2 (3)	7 (23)	0 (0)	5 (15)	0 (0)	0 (0)	0.00
13-16 y	11 (26)	6 (20)	21 (40)	3 (7)	2 (3)	0 (0)	3 (5)	10 (32)	0 (0)	14 (37)	0 (0)	0 (0)	0.00
17-19 y	6 (14)	10 (33)	5 (9)	1 (2)	1 (1)	0 (0)	1 (1)	14 (45)	0 (0)	19 (50)	0 (0)	2 (6)	0.00
boys	17 (40)	22 (73)	32 (60)	3 (7)	1 (1)	0 (0)	3 (5)	6 (19)	0 (0)	4 (11)	0 (0)	1 (3)	0.07
girls	26 (60)	8 (27)	21 (39)	1 (3)	5 (8)	0 (0)	3 (5)	25 (81)	0 (0)	34 (89)	0 (0)	2 (6)	0.00
focal seizures	1 (2)	7 (23)	25 (47)	3 (7)	0 (0)	0 (0)	3 (5)	4 (13)	0 (0)	4 (10)	0 (0)	0 (0)	0.08
general seizures	41 (96)	16 (54)	27 (51)	0 (0)	6 (10)	0 (0)	3 (5)	8 (26)	0 (0)	23 (61)	0 (0)	1 (3)	0.00
both seizures	1 (2)	7 (23)	1 (2)	1 (2)	0 (0)	0 (0)	0 (0)	19 (61)	0 (0)	11 (29)	0 (0)	2 (6)	0.81
idiop. etiol.	19 (44)	20 (67)	2 (4)	0 (0)	1 (1)	0 (0)	0 (0)	6 (19)	0 (0)	22 (58)	0 (0)	1 (3)	0.00
crypt. etiol.	19 (44)	6 (20)	32 (60)	2 (5)	4 (6)	0 (0)	5 (8)	16 (52)	0 (0)	8 (21)	0 (0)	1 (3)	0.00
sympt. etiol.	5 (12)	4 (13)	19 (36)	2 (5)	1 (1)	0 (0)	1 (1)	9 (29)	0 (0)	8 (21)	0 (0)	1 (3)	0.00
total (%)	43 (100)	30 (100)	53 (100)	4 (100)	6 (100)	0 (100)	6 (100)	31 (100)	0 (100)	38 (100)	0 (100)	3 (100)	108/106 (100)

Comprehensive comparison between 1997/98 and 2017/18 result data in regard to age, gender, seizure type and etiology of epilepsy with respect to newer and older generation of AED

**Conclusion:** The trend of prescribing initial AED has changed significantly over the last 20 years. Newer generation AED are significantly represented primarily in the female adolescent population. The results are in line with modern guides and recommendations.

**Disclosure:** Nothing to disclose

## EPO1128

**Analysis of sleep-related movement disorders, parasomnias and physiological sleep variants in adult patients with generalized epilepsy: a polysomnographic study**

L. Giuliano, G. Mainieri, A. Lanzafame, G. Battaglia, A. Guccione, G. Maira, A. Nicoletti, V. Sofia, M. Zappia  
*Department of Medical and Surgical Sciences and Advanced Technologies "G.F. Ingrassia", University of Catania, Catania, Italy*

**Background and aims:** The interplay between epilepsy and sleep is widely recognized. In particular, in Genetic Generalized Epilepsies (GGE), a close link of seizures to the sleep-wake cycle has been demonstrated. The objective of our study is to evaluate the frequency of sleep disorders and physiological sleep variants in patients with GGE as compared with controls, by means of polysomnography.

**Methods:** We performed a retrospective observational study in the Neurological Clinic of the University of Catania. We enrolled patients with diagnosis of GGE and controls without epilepsy who underwent a polysomnography in the 2007-2019 period. Exclusion criteria were: obstructive sleep apnoea syndrome and epileptic encephalopathy. The following sleep disorders were considered: disorders of arousal from NREM, REM sleep behaviour disorder, periodic sleep movements in sleep, bruxism, propriospinal myoclonus at sleep onset, alternating leg muscle activation, excessive fragmentary myoclonus, and neck myoclonus.

**Results:** 30 patients (mean age  $28.7 \pm 12.3$  years, 11 [36.7%] males) and 56 controls (mean age  $32.7 \pm 11.5$  years, 18 [32.1%] males) were enrolled. A significant higher percentage of sleep disorders was found in patients (83.3% vs 50%,  $p=0.002$ ) compared to controls. In particular, we found a higher frequency of disorders of arousal from NREM (60% vs 30.3%;  $p=0.01$ ), bruxism (26.7% vs 5.3%;  $p=0.005$ ) and neck myoclonus (26.7% vs 5.3%;  $p=0.01$ ) in patients.

**Conclusion:** Our study demonstrated a high frequency of sleep disorders in patients with GGE. This should be taken into account in order to ensure an optimal seizures control in these patients.

**Disclosure:** Nothing to disclose

## Epilepsy 2

## EPO1129

**Seizure freedom in patients treated with lacosamide and levetiracetam**

S. Gómez Enjuto<sup>1</sup>, J. Lapeña Motilva<sup>1</sup>,  
G. Ogando Durán<sup>1</sup>, V. Hernando Requejo<sup>1</sup>,  
N. Huertas Gonzalez<sup>2</sup>

<sup>1</sup>Neurology, Hospital Universitario Severo Ochoa, Leganés, Spain, <sup>2</sup>Neurology, Hospital Universitario Severo Ochoa, Leganes, Spain

**Background and aims:** Lacosamide is a sodium channel blocker (SCB) approved as adjunctive therapy for partial onset seizures and more recently as monotherapy. We wanted to evaluate the effectiveness of lacosamide and levetiracetam compared to the other combinations.

**Methods:** We have evaluated the patients treated with lacosamide in the last 10 years in a secondary hospital obtaining a total of 99 patients of which, 14 were treated with levetiracetam and 48 were treated with other double therapies of antiepileptics. Other treatments with less than 5 patients and sodium channel blocker drugs were not evaluated. The minimum follow-up was 6 months.

**Results:** Comparing the double therapy of lacosamide and levetiracetam with the other combinations it shows a clear tendency to seizures free patients [64.28% Vs 33.33 (OR=3.6; p=0.077)]. On the other hand, the percentage of seizures reduction of lacosamide and levetiracetam is 71.66% (SD 44.68) Vs 62.56% (SD 38.51) without levetiracetam. In general, no combination has shown to be more effective than others regarding the percentage of seizures reduction (f unilateral=0.16 ; p=0.85).

**Conclusion:** The addition of lacosamide and levetiracetam in our series achieve a tendency of greater proportion of seizure free patients in comparison to other treatments, which is important to consider in our daily medical practice. It is necessary to have studies with greater sample to confirm the results.

**Disclosure:** Nothing to disclose

## EPO1130

**Long-term efficacy and safety of adjunctive cenobamate in patients with uncontrolled focal seizures: experience in a single center**

B. González Giráldez, P. Martínez Ulloa,  
M.T. Montojo Villasanta, M. Machio Castillo,  
J.M. Serratosa

Neurology, Hospital Universitario Fundación Jimenez Diaz, Madrid, Spain

**Background and aims:** To assess the long-term efficacy and safety of cenobamate in adult patients with focal onset seizures participating in an open-label, safety and pharmacokinetic study of cenobamate as adjunctive therapy (study C021).

**Methods:** Review of adult patients with focal epilepsy treated with at least a single dose of cenobamate as adjunctive therapy. Outcomes included analysis of responder and seizure-free rates at 6 and 12 months (compared with the mean monthly seizure frequency in a 3-month baseline period), frequency and severity of adverse events and retention rates at 6 and 12 months and for the entire evaluation period.

**Results:** 14 patients older than 18 years with drug-resistant focal epilepsy [mean epilepsy duration 25.5 years (1-20 years), mean number of concomitant AEDs 2.6 and previous AEDs 9] were included. Responder rates at 6 and 12 months were 57% (8/14 patients) and 61.5% (8/13 patients). 6-month and 12-month retention rates were 85.7% and 84.6%. 9 patients continued on cenobamate for a mean follow-up period of 32 months (28-34 months), the majority (78%) with sustained seizure frequency reductions of 50% or more. 4 patients (30%) were seizure-free for the last 12-months (mean dose=266mg/day, range=150-400mg/day). The most common adverse effect was somnolence (13/14 patients) which was usually mild and led to drug discontinuation in 2 patients.

**Conclusion:** Our results show high and sustained efficacy of cenobamate as adjunctive therapy for the treatment of drug-resistant focal seizures. Adverse effects were common but usually well-tolerated rendering high long-term retention rates.

**Disclosure:** JM Serratosa has been invited speaker or participated in advisory boards for Eisai, UCB, Esteve, Bial, Arvelle Therapeutics, UNEEG medical

## EPO1131

### Cefepime-Induced Neurotoxicity (CIN): Report of three cases and systematic review of the literature

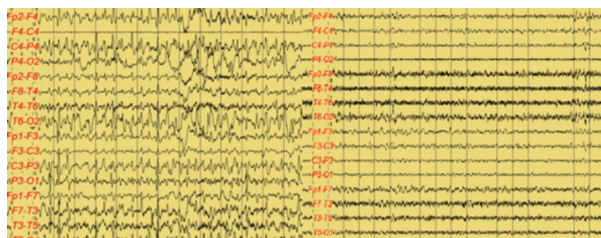
Z. Grana, P. Stamatelos, D. Georgouli, N. Markoglou, A. Sarantis, P. Gklinos, H. Leloudas, E. Papathanasiou, G. Aposporos, M. Terzoudi, E. Makri, A. Agathonikou  
*Department of Neurology, "KAT" General Hospital of Attica, Athens, Greece*

**Background and aims:** Cefepime is a 4th generation cephalosporin antibiotic. Its use is associated with neurotoxicity (CIN), including encephalopathy, myoclonus and non-convulsive status epilepticus (NCSE).

**Methods:** We present 3 cases of NCSE induced by cefepime in our hospital. We also performed a systematic review of the literature, searching for case reports or series of patients with CIN. The search was applied to MEDLINE and we initially identified 82 articles. After screening titles, abstracts and references of the selected articles, 55 articles were included.

**Results:** Our patients were 2 females (82 and 86 years old) and 1 male (60 years old). All of them had acute impairment of level of consciousness during Cefepime treatment, with EEG findings compatible with NCSE. No patient had a history of epilepsy and 1 patient had impaired renal function. After cessation of Cefepime there was a rapid clinical and electrophysiological improvement in 1 patient (Image), while the other 2 patients were also treated with antiepileptic drugs (AED's), with a favorable outcome.

After literature review we found 18 retrospective Case-Series, 35 Case-Reports and 2 review articles. The most common presentations are impaired level of consciousness, NCSE and epileptic seizures (including myoclonus). The predisposing factors are age and impaired renal function. Cessation of Cefepime combined in selected cases with AED'S is the treatment of choice.



Generalized spike-waves 2,5 Hz on the 3rd day of Cefepime treatment (left). Rapid improvement after cessation of Cefepime, with only few bursts of theta waves (right).

**Conclusion:** Physicians must be alert for CIN in hospitalized patients taking Cefepime, especially among the elderly and those with renal failure. Early diagnosis is essential for the favorable prognosis of these patients.

**Disclosure:** Nothing to disclose

## EPO1132

### MRI changes in status epilepticus patients with unknown etiology

M.E. Guven Azap, N. Kuloğlu Pazarıcı  
*Neurology, Sisli Hamidiye Etfal Education and Research Hospital, Istanbul, Turkey*

**Background and aims:** Our purpose was to investigate MRI (Magnetic resonance imaging) signal changes in patients with status epilepticus (SE) and to evaluate clinical semiology, seizure type, corresponding electroencephalography (EEG) findings and prognosis.

**Methods:** A retrospective review of our records from 2013 to 2019 identified 210 patients with SE. The patients had any intracranial pathology were excluded. We analyzed the demographics, medical history, provocative factors, EEG records, localization of MRI signal changes attributable to SE of all patients admitted to our hospital.

**Results:** 44 patients who met the inclusion criteria were found to have significant abnormalities. Series of 44 patients (15 men, 29 women, mean age 56.5 years) with non-convulsive SE (13/29.5%) and convulsive SE (31/70.5%). On diffusion weighted imaging (DWI), the neocortex was affected in 20/45.5% cases, often in combination with other brain areas (18/40.9%), in particular the hippocampus was affected in 11/25% patients. Bilateral DWI and susceptibility weighted imaging (SWI) changes were found in respectively 22/50% and 6/14.6% patients. No correlation with a provocative factor was observed. EEG abnormalities correlated with lateralization of MRI abnormalities in 11/25% patients. MRI and EEG with corresponding clinical semiology were found in respectively 30/68.2% and 15/34.1% patients. Brain atrophy, the presence of epilepsy, age, seizure type showed no difference in prognosis. 3rd step therapy was correlated with poor prognosis ( $p < 0.001$ ).

**Conclusion:** Combined MRI and EEG analysis provides clues to seizure localization and propagation. These findings demonstrates MRI can be useful as EEG to evaluate SE patients have unknown etiology.

**Disclosure:** Nothing to disclose

## EPO1133

**De Morsier syndrome as etiology of drug-resistant epilepsy: case review**

M.J. Hernandez Garcia, D. Garcia Alvarez, L.D. Iacampo Leiva, G.R. Gonzalez Toledo, C. Hernandez Javier, M. Crespo Rodriguez, F.J. Carrillo Padilla

*Hospital Universitario de Canarias, San Cristobal de La Laguna, Spain*

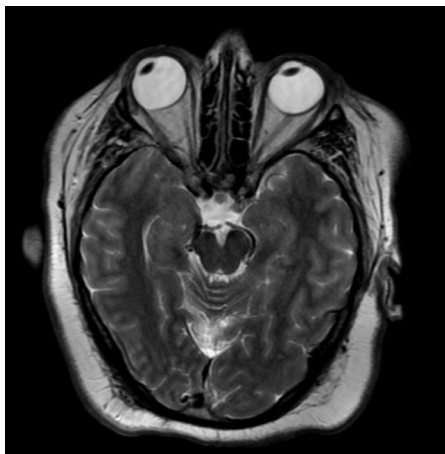
**Background and aims:** Septo-optic dysplasia (SOD) or De Morsier syndrome is a rare disorder (1/10000) characterised by classic triad of absence of septum pellucidum, optic nerve hypoplasia and pituitary dysfunction, which is only complete in 30%. It's called SOD-plus when associates disorders of cortical organization.

**Methods:** We report 3 patients with SOD assisted in our epilepsy clinic.

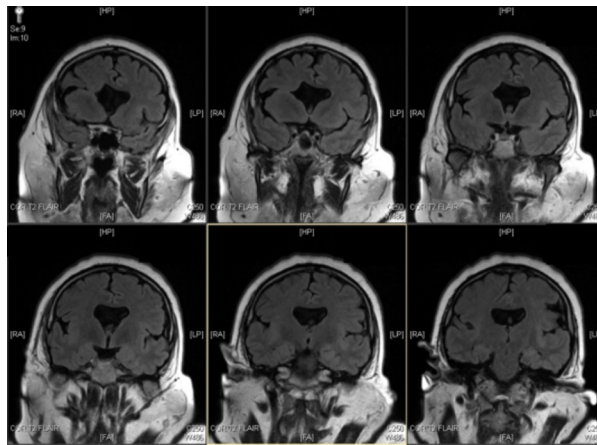
**Results:** Patient 1: 40-year-old woman, diabetes mellitus since age 6 and development generalized seizures since 8. Diagnosed at childhood of SOD-plus with absence of septum pellucidum and hypoplasia of optic chiasm and nerves, frontal left lobe schizencephaly and left frontoparietotemporal cortical dysplasia and polymicrogyria. After 10 years seizure-free with phenobarbital and carbamazepine, developed atonic seizures that showed response to levetiracetam and implantation of VNS.

Patient 2: 66-year-old man, moderate psychomotor retardation since childhood. Started at age 50 with focal aware seizures with non-motor onset, not controlled with lamotrigine, zonisamide and carbamazepine. MRI showed partial absence of corpus callosum and septum pellucidum and hypoplasia of optic chiasm and nerves.

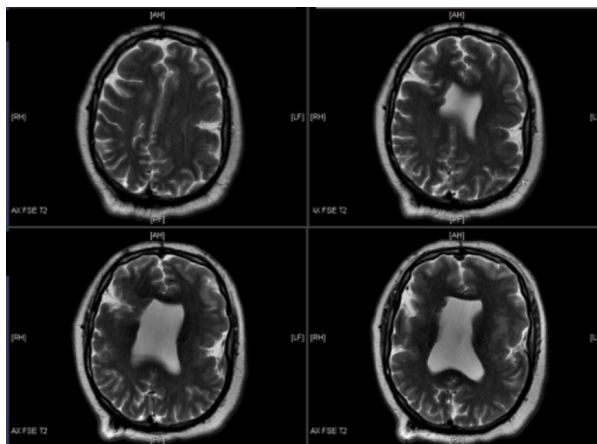
Patient 3: 28-year-old man with normal psychomotor development. At age 11 started with daily focal impaired awareness seizures, not controlled with lacosamide and levetiracetam. MRI showed SOD-plus with absence of septum pellucidum and hypoplasia of left optic nerve, as well as parietal right lobe schizencephaly and left external capsule polymicrogyria.



MRI, sagittal T2. Bilateral optic nerves hypoplasia



MRI, coronal FLAIR. Absence of septum pellucidum



MRI, axial FSE T2. Frontal right lobe schizencephaly and left frontoparietotemporal cortical dysplasia

**Conclusion:** De Morsier syndrome is a rare disorder that frequently associates other cerebral malformations. Clinical manifestations are variable, with drug-resistant epilepsy being an important source of morbidity. Seizures tended to be multifocal and they are not usually good surgical candidates.

**Disclosure:** Nothing to disclose

## EPO1134

## The quality of life of the patients with idiopathic epilepsy

K. Jezowska-Jurczyk, P. Jurczyk, S. Budrewicz,

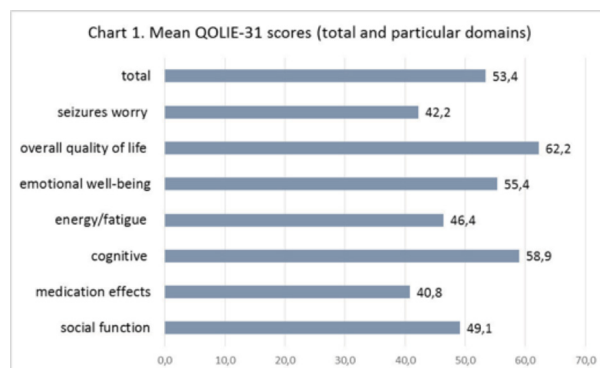
A. Pokryszko-Dragan

Department of Neurology, Wrocław Medical University,  
Wrocław, Poland

**Background and aims:** The aim of the study was to assess the quality of life (QOL) in the patients with idiopathic epilepsy with regard to demographic, clinical and psychological factors.

**Methods:** The study was conducted in a group of 50 patients with idiopathic epilepsy (44 women and 6 men, average age 35,6 years). Quality of Life in Epilepsy Inventory (QOLIE-31) was used for the assessment of the quality of life and Beck Depression Inventory (BDI-II) - of depression. Their results were referred to demographic and clinical data based on medical records.

**Results:** Mean total QOLIE-31 score in the patients was  $53.4 \pm 19.1$ , with the highest score in overall QOL ( $62.2 \pm 18.3$ ) and the lowest – in medication effects ( $40.8 \pm 31.2$ ) domain (Chart 1). According to BDI, 21 patients were depressed (9 – mildly, 6 – moderately and 6 – severely). Frequency of seizures, duration of the disease, focal epilepsy, concomitant psychogenic non-epileptic seizures, as well as coexisting diseases and low level of education negatively influenced the total QOLIE-31 score (Table 1). No such relationships were found for polytherapy or abnormal interictal electroencephalographic findings. QOLIE-31 scores in most domains were lower in the subgroup of patients with subjective cognitive complaints. QOLIE-31 scores correlated significantly with BDI results (Table 2).



Factor	p-value
<b>total</b>	
low education	p=0,0188
longer epilepsy length	p=0,0358
focal epilepsy	p=0,0464
higher seizure frequency	p=0,0025
concomitant psychogenic seizures	p=0,0307
concomitant somatic diseases	p=0,0396
complains of cognitive dysfunction	p=0,00004
<b>seizures worry</b>	
higher seizure frequency	p=0,0296
complains of cognitive dysfunction	p=0,00278
<b>overall quality of life</b>	
higher seizure frequency	p=0,0090
complains of cognitive dysfunction	p=0,0391
<b>emotional well-being</b>	
complains of cognitive dysfunction	p=0,0412
<b>cognitive</b>	
higher seizure frequency	p=0,0363
concomitant psychogenic seizures	p=0,0177
concomitant somatic diseases	p=0,0224
complains of cognitive dysfunction	p=0,00000
<b>medication effects</b>	
complains of cognitive dysfunction	p=0,0176
<b>social function</b>	
low education	p=0,0109
unemployment	p=0,0427
focal epilepsy	p=0,0269
higher seizure frequency	p=0,0001
concomitant psychogenic seizures	p=0,00067
concomitant somatic diseases	p=0,0113
concomitant mental disorders	p=0,0459
complains of cognitive dysfunction	p=0,0129

QOLIE-31	BDI-II
<b>total</b>	p=0,00000
<b>seizures worry</b>	p=0,00003
<b>overall quality of life</b>	p=0,00000
<b>emotional well-being</b>	p=0,00000
<b>energy/fatigue</b>	p=0,00000
<b>cognitive</b>	p=0,00000
<b>medication effects</b>	p=0,00359
<b>social function</b>	p=0,00533

**Conclusion:** The patients with idiopathic epilepsy declare low quality of life, especially associated with fear of seizures and side effects of medications. Epilepsy-related factors, as well as concomitant depression, cognitive dysfunction and other comorbidities significantly affect the quality of life.

**Disclosure:** Nothing to disclose

## EPO1135

**Adjusting to a life with epilepsy: does seizure control equate to a good quality of life?**

A. Kabeer Ali, S. Samarasekera  
*Neurology, University of Birmingham/Queen Elizabeth Hospital, Birmingham, United Kingdom*

**Background and aims:** Depression is well recognized among patients with epilepsy (PWE); Although it is associated with increased seizure frequency and exacerbated by polypharmacy, many PWE with infrequent seizures report fears regarding the ongoing risk of seizures and this impacts on quality of life. This adjustment response to living with a chronic condition has been identified in other fields such as cardiology, but is not well recognized in PWE. We characterized the extent and nature of adjustment symptoms in PWE in a UK tertiary center, the QEBH Birmingham.

**Methods:** The well validated NDDI-E and QOLIE-10-P were given to patients to self-report prior to their consultation. Those lacking capacity to complete the questionnaires independently were excluded from data collection.

**Results:** 43 completed questionnaires were analysed. 23 patients were depressed (NIDDIE >15) of whom 14 (60.1%) had good seizure control of  $\leq 1$  seizure/month. 29 had reduced quality of life (QOLIE 10P Q11  $\leq 3$ ) despite 11 (37.9%) having good seizure control. Despite having good seizure control 13 patients (30.2%) reported fear of having a seizure in the subsequent month.

**Conclusion:** PWE struggle with low mood and adjusting to living with a chronic condition, often in spite of attaining good seizure control. These patients would potentially benefit from early psychological support to reduce their fears around the risk of future seizures and help to maintain their sense of role in the wider community.

**Disclosure:** Nothing to disclose

## EPO1136

**The impact of irregular dosage regimens on levetiracetam plasma concentration: pharmacokinetic modeling**

D. Klement  
*Department of Neurology, Third Faculty of Medicine, Charles University and Thomayer Hospital, Prague, Czech Republic*

**Background and aims:** Levetiracetam is a frequently used antiepileptic drug with high efficacy on seizure control, predictable pharmacokinetics and minimal drug interactions. Both therapeutic and adverse toxic effects of levetiracetam are related to plasma concentration. The aim of this study was to investigate the influence of dosage regimens on the concentration range of levetiracetam.

**Methods:** Levetiracetam plasma concentration was calculated by means of a one-compartment pharmacokinetic model with 1st order kinetics. Parameters of the model were taken from published pharmacokinetics studies. The dosage regimens had a structure of 2 drug-consumption periods separated by 2 drug-free periods. They reflected dosing habits of patients from our department (n=68).

**Results:** In the 1st part we characterized the impact of dosing regimen parameters on the minimum and maximum concentrations and in the 2nd part we calculated the maximum and minimum concentrations for dosing regimens reported by the patients. With pharmacokinetic parameters set at representative values, the minimum concentration decreased, in comparison to the perfect regular dosing, by 9% at median and 27% at the lower range; the maximum concentration increased by 4% at median and 21% at the upper range, respectively.

**Conclusion:** Dosing regimens, considered by epileptic patients as an acceptable therapy adherence, comprises different drug intake habits. The extreme plasma concentrations reached in these dosing regimens differ up to tens of percents from the perfect regular dosing. In some cases, changing the drug intake habit could possibly improve seizure control similarly to drug dose increase.

**Disclosure:** Supported by Charles University (PROGRES P35/3LF).



## EPO1137

**Internalized stigma in people with epilepsy**

N. Kozuch<sup>1</sup>, M. Konopko<sup>1</sup>, A. Bochynska<sup>1</sup>, P. Świtaj<sup>2</sup>, H. Sienkiewicz-Jarosz<sup>1</sup>

<sup>1</sup>1<sup>st</sup> Department of Neurology, Institute of Psychiatry and Neurology, Warsaw, Poland, <sup>2</sup>1<sup>st</sup> Department of Psychiatry, Institute of Psychiatry and Neurology, Warsaw, Poland

**Background and aims:** Epilepsy is a strongly stigmatized health condition. Some people with epilepsy internalize public stigma, which may have negative impact on their psychosocial functioning.

**Aims:** To investigate the level of internalized stigma and its associations with social network, depression and life satisfaction among patients with epilepsy.

**Methods:** A total of 65 patients diagnosed with epilepsy (mean age 42.9 years, 24 males) were recruited from a neurological ward and neurological outpatient clinic at the Institute of Psychiatry and Neurology. They were assessed with the Internalized Stigma of Mental Illness (ISMI) scale adapted for epilepsy, the abbreviated version of the Lubben Social Network Scale (LSNS-6), the Center for Epidemiologic Studies Depression Scale-Revised (CESD-R), and the Satisfaction with Life Scale (SWLS).

**Results:** The ISMI total score was 1.89\* (SD=0.56), meaning a relatively low level of internalized stigma. Pearson correlations indicated significant positive associations of stigma with the intensity of depressive symptoms ( $r=0.43$ ,  $p<0.001$ ) and significant negative associations with the size of social network ( $r=-0.52$ ,  $p<0.0001$ ), and with the degree of life satisfaction ( $r=-0.51$ ,  $p<0.0001$ ).

\*Possible scores range from 1 to 4, with higher scores indicating more severe internalized stigma. According to Ritsher & Phelan (2004), scores above the midpoint of the scale denote high internalized stigma.

**Conclusion:** Since internalized stigma is related to various indicators of psychosocial functioning, it should be considered as important target of treatment and rehabilitation of people with epilepsy.

**Disclosure:** Nothing to disclose

## EPO1138

**Ictal EEG quantification in epilepsy of infancy with migrating focal seizures (EIMFS): from seizure dynamics to EEG-based markers**

M. Kuchenbuch<sup>1</sup>, P. Benquet<sup>2</sup>, A. Kaminska<sup>3</sup>, F. Wendling<sup>4</sup>, R. Nabbout<sup>1</sup>

<sup>1</sup>Imagine, Necker-enfants malades, UMR 1163, centre de référence des épilepsies rares, Paris, France, <sup>2</sup>LTSI UMR1099, Rennes University, Rennes, France, <sup>3</sup>Clinical Neurophysiology, Centre De Référence Des Épilepsies Rares, Necker-enfants malades, Paris, France, <sup>4</sup>Université de Rennes, LTSI, Renne, France

**Background and aims:** We aimed to quantify EIMFS seizures related to the KCNT1 mutation, to determine if these seizures diffused randomly or not, and specific EEG markers.

**Methods:** We included EEGs of 7 EIMFS patients with KCNT1 mutations (115 seizures) and of 17 patients with other early-onset epilepsies (30 seizures). 1st, we developed an algorithm to detect seizures' onset and offset in each EEG channels. Then, we quantified seizures spatiotemporal characteristics and analyzed their dynamics using chronograms and phase coherence. Finally, we compared these data with other epileptic syndromes in children under one year of age to determine specific EEG markers.

**Results:** Seizures started and were localized predominantly in temporal and occipital areas, and evolved with a stable frequency (4-10 Hz). They showed inter and intrahemispheric migrations in 60% of them with high intraindividual reproducibility of temporo-spatial dynamics. Interhemispheric migrating spread in 71% from temporal or occipital areas to the homologous contralateral ones. Intrahemispheric seizures involved mainly frontal-temporal, temporal and occipital channels. In migrating seizures, we found causality links between ictal activities. Finally, time delay index (based on delays between the ictal onsets) and phase correlation index (based on coherence of ictal activities) identified EIMFS seizures and non-EIMFS seizures (specificity of 91.2% and sensitivity of 84.4%).

**Conclusion:** This study characterized migration as a specific pattern of propagation. The EEG markers could facilitate the diagnosis of EIFMS at early stage. In addition, these results will help to validate future computational models.

**Disclosure:** This work was supported by funds from the French Pediatric Society (PhD 1-year grant) and the French Institute of Health and Medical Research (PhD 2-year grant: poste d'accueil Inserm, M.K.). This work was carried out with the support of the Institute of Clinical Neurosciences in Rennes (INCR).

## EPO1139

**Lacosamide as add-on in combination with other sodium channel blocker**

J. Lapeña Motilva, G. Ogando Durán, S. Gómez Enjuto, V. Hernando Requejo, N. Huertas Gonzalez  
*Neurology, Hospital Universitario Severo Ochoa, Leganés, Spain*

**Background and aims:** Lacosamide is a sodium channel blocker (SCB) approved as adjunctive therapy for partial onset seizures and more recently as monotherapy. We wanted to evaluate the effectivity of this drug when is used in combination with other SCB versus when is combined with other antiepileptic drugs.

**Methods:** We have evaluated the patients treated with lacosamide in the last 10 years in a secondary hospital obtaining a total of 99 patients of which, 75 were in polytherapy (35 as second drug, 30 as 3rd drug, 7 as 4th drug and 3 as 5th drug) in the moment when lacosamide was started and 40 of them were treated with other SCB.

**Results:** The combination of lacosamide with antiepileptic drugs, other than SCB, shows more effectivity in the percentage of reduction of seizures (62.86% [SD 40.23%] vs. 22.95% [SD 74.43%]) and an increase in seizure free patients (OR=3.778, p=0.018) than the combination with others that act on the same channels.

**Conclusion:** Lacosamide, as was previously known, is effective in polytherapy, and more if is combined with other drugs with a mechanism of action other than SCB so we must take this into consideration when prescribing lacosamide to a patient.

**Disclosure:** Nothing to disclose

## EPO1140

**Status epilepticus with prominent motor symptoms: a retrospective single-center cohort study**

H. Machado<sup>1</sup>, J. Vitor<sup>2</sup>, V. Silva<sup>2</sup>, A.R. Pinto<sup>3</sup>, N.M.M. Canas<sup>3</sup>

*<sup>1</sup>Neurology, Centro Hospitalar Universitário do Algarve, Faro, Portugal, <sup>2</sup>Neurology, Hospital Beatriz Ângelo, Lisbon, Portugal, <sup>3</sup>Neurophysiology, Hospital Beatriz Ângelo, Loures, Portugal*

**Background and aims:** Status epilepticus (SE) is a neurological emergency associated with high mortality and morbidity. The purpose of this study is to evaluate the demographic data, clinical presentation, etiology, treatment and outcome of a cohort of patients with SE with prominent motor symptoms.

**Methods:** Retrospective cohort study (2012-2019) of adults with SE with prominent motor symptoms, excluding myoclonic SE. We used the latest International League Against Epilepsy (ILAE) definition and classification of SE.

**Results:** Among 52 patients with SE with prominent motor symptoms, 15 (28.8%) had generalized convulsive SE and 37 (71.2%) had focal motor SE (29 repeated focal motor, 7 *epilepsia partialis continua* and 1 *adversive*). 26 (50%) females and 26 (50%) males, with a median age of 70 years (18-95 years), 17 (32.7%) with a previous epilepsy. Etiology was identified in 47 (90.4%) of patients being the most common systemic infections (n=19, 36.5%), cerebrovascular disease (n=18, 34.6%) and metabolic disease (n=13, 25%). Most patients (n=37, 71.2%) required 2 or 3 antiepileptic drugs (AED), being levetiracetam (n=48, 92.3%), valproate (n=33, 63.5%) and phenytoin (n=22, 42.3%) the most commonly used. 14 patients (26.9%) progressed to refractory SE, 12 had sequelae (23.1%) and 7 (13.5%) died in hospital.

**Conclusion:** Etiologies were similar to those described in other studies except for the higher rate of infection. In this cohort SE was challenging to treat, requiring multiple AED and often progressing to refractoriness. In-hospital mortality and morbidity was significant.

**Disclosure:** Nothing to disclose

## EPO1141

**Defining EEG stages in Lafora disease**

M. Machio Castello, B. González Giráldez,

J.M. Serratosa

Madrid, Spain

**Background and aims:** Lafora disease (LD) is an ultra rare form of Progressive Myoclonus Epilepsy. Since the evolution of the EEG is not well defined, we aimed to investigate the EEG changes in different stages.

**Methods:** We performed a cross sectional study of LD patients seen in our center during 2019. Patients were classified according to a clinical scale based on seizure control, cognitive impairment, motor function and performance of daily living activities. We reviewed EEGs (background activity, reactivity to eye opening, frequency of epileptiform activity and photosensitivity).

**Results:** We studied 11 patients. Patients in presymptomatic stage (2/11) had normal EEG or slow background activity (6-7 Hz), with non-continuous focal and generalized epileptiform activity. Patients in early stage (4/11) had normal or slow background activity (6-7 Hz), normal reactivity, mostly preserved sleep stages and very frequent focal and generalized epileptiform activity. Patients in middle stage (2/11) had slow background activity (4-5 Hz), absence of reactivity, moderate loss of sleep stages and almost continuous focal and generalized epileptiform activity. Patients in advanced stage (3/11) had slow background activity (3-4 Hz), absence of reactivity, loss of sleep stages and continuous focal and generalized epileptiform activity. In all patients epileptiform discharges decreased during sleep, almost disappearing in early stages. Only 4 patients had photosensitivity (1 presymptomatic, 2 early stages, 2 advanced stages)

**Conclusion:** We can differentiate 3 EEG stages in LD with good correlation with clinical stages. During sleep, epileptiform activity decreases significantly. The EEG may be a valid biomarker to follow the progression of LD and can detect presymptomatic individuals.

**Disclosure:** Part of this work was founded by Ionis Pharmaceuticals and Valerion Therapeutics.

## EPO1142

**Sub-Saharan study of photoparoxysmal response in a reference epilepsy lab**

A.M. Magnerou<sup>1</sup>, D.H. Toffa<sup>2</sup>, A.M. Basse<sup>3</sup>, A.D. Sow<sup>3</sup>, L.B. Seck<sup>3</sup>, M. Ndiaye<sup>3</sup>

<sup>1</sup>Internal medicine, Douala Gyneco-obstetric and Pediatric Hospital, Douala, Cameroon, <sup>2</sup>Neurology, CHUM, Montreal, Canada, <sup>3</sup>Neurosciences, Fann national teaching hospital, Dakar, Senegal

**Background and aims:** The photoparoxysmal response (PPR) is defined as the occurrence of generalized spike, spike-wave or polyspike-wave discharges consistently elicited by intermittent photic stimulation (IPS). PPR is not well studied in African black subject.

**Methods:** We prospectively studied the epidemiological, clinical and EEG characteristics of PPR among consecutive epileptic patients seen in the EEG laboratory at Fann University Hospital at Dakar in Senegal.

**Results:** Among 3065 pathological EEG for 1 year, we collected 56 EEG (1.8%) with PPR, including 31 women and 25 men (sex ratio: 0.8). The mean age was 13.3 years (range: 8 months to 59 years). The peak of photosensitivity was found in the range of 6 to 10 years. Of the PPR cases, 12 had had clinical manifestations during IPS. Generalized epilepsy was diagnosed in 23 (41%) patients and 18 (32%) had focal epilepsies. The most epileptogenic stimulation frequencies are between 12 and 24 Hz. PPR were obtained most often when the eyes are closed (64%) and 41 patients (73% of patients) were classified as Type 4 (Waltz classification).

**Conclusion:** Our results suggests lower rates of photosensitivity in sub-Saharan people compared with Caucasians. Therefore, subject to consistent larger cohort's data, it would be interesting to study a probable epigenetic protective value of sunshine against photosensitivity.

**Disclosure:** Nothing to disclose

## EPO1143

**Sleep features of patients with psychogenic non-epileptic seizures (PNES)**

G. Mainieri, L. Giuliano, C. Leanza, G. Battaglia, A. Guccione, G. Maira, V. Sofia, M. Zappia  
*Department of Medical and Surgical Sciences and Advanced Technologies "G.F. Ingrassia", University of Catania, Catania, Italy*

**Background and aims:** Sleep complaints are frequently reported by patients with psychogenic non-epileptic seizures (PNES) but, up to now, few studies evaluated hypnic features by means of polysomnography. Objective of our study was to assess the polysomnographic sleep features of a group of patients with PNES.

**Methods:** We performed a retrospective observational study in the Neurological Clinic of the University of Catania. We enrolled patients for whom a diagnosis of PNES was made, after excluding all other possible diagnoses. We also enrolled a group of controls without epilepsy and a group of drug-naïve patients with newly diagnosed epilepsy. We excluded subject who were taking antiepileptic treatment. All subjects underwent a long-term EEG monitoring, including at least one night of sleep.

**Results:** 33 patients with PNES [mean age  $33.4 \pm 13.7$  years; M=9 (27.3%)], 34 controls [mean age  $38 \pm 15.5$  years; M=17 (47.1%)] and 46 patients with epilepsy [mean age  $29.5 \pm 15.3$  years; M=17 (37.0%)] were enrolled. At the multivariate analysis, adjusting for age, sex and psychotropic therapy, patients with PNES displayed a significant reduced latency of REM sleep ( $73.2 \pm 22.1$ , mean) both compared to controls ( $98 \pm 54.8$ ,  $p=0.025$ ) and patients with epilepsy ( $110.5 \pm 51.6$ ,  $p<0.0001$ ), while an increase in REM sleep percentage ( $22.8 \pm 6.4$ ) was recorded compared to patients with epilepsy ( $18.2 \pm 5.2$ ,  $p=0.005$ ).

**Conclusion:** The results of our study show significant differences, mainly in REM sleep structure, in patients with PNES, resembling the sleep structure of patients with mood disorders.

**Disclosure:** Nothing to disclose

## Headache and pain 1

## EPO1144

**The PEARL study protocol: a pan-european prospective observational study of fremanezumab effectiveness in patients with chronic or episodic migraine in the real world**

M. Ashina<sup>1</sup>, F.M. Amin<sup>1</sup>, P. Kokturk<sup>2</sup>, J.M. Cohen<sup>2</sup>, M. Konings<sup>2</sup>, C. Tassorelli<sup>3</sup>, D.-D. Mitsikostas<sup>4</sup>

<sup>1</sup>Danish Headache Center, Department of Neurology, Rigshospitalet, Glostrup, Denmark, <sup>2</sup>Teva Pharmaceuticals, Amsterdam, Netherlands, <sup>3</sup>Headache Science Center, IRCCS Mondino Foundation, and Department of Brain and Behavioral Sciences, University of Pavia, Pavia, Italy, <sup>4</sup>National & Kapodistrian University of Athens, Athens, Greece

**Background and aims:** Migraine is a common but highly disabling disease, and adherence to traditional migraine preventive treatment is low. Fremanezumab is a fully-humanized monoclonal antibody (IgG2 $\Delta$ a) that selectively targets calcitonin gene-related peptide (CGRP) and has been approved in the US and EU for the preventive treatment of migraine in adults. The PEARL study aims to provide real-world evidence of fremanezumab treatment outcomes in European clinical practice in patients with episodic migraine (EM) or chronic migraine (CM).

**Methods:** PEARL is a 36-month (12-month recruitment and 24-month follow-up), multicenter, pan-European, prospective, observational study conducted in adults with EM ( $\geq 4$  migraine days per month) or CM in real-world clinical practice. The primary endpoint is the proportion of patients reaching  $\geq 50\%$  reduction in monthly average number of migraine days during the 6-month period after the 1st dose of study drug. Secondary effectiveness endpoints include changes from baseline in monthly average number of migraine days, disability scores, and monthly average number of days of acute headache medication use. Adherence and persistence with fremanezumab treatment over the 24-month follow-up, as well as reasons for and outcomes of fremanezumab cessation and re-initiation, will also be examined.

**Results:** The study is planned to be conducted in approximately 100 centers in 11 European countries, with an estimated sample size of 850 patients.

**Conclusion:** Through the assessment of a range of effectiveness outcomes and patient-reported measures in clinical practice, PEARL will generate precious information about real-world effectiveness, treatment adherence, and treatment persistence of fremanezumab in patients with EM or CM.

**Disclosure:** This study was funded by Teva Pharmaceuticals.

## EPO1145

**Correction of biomechanical disorders by the original method of biofeedback for cervicogenic headache**

A. Barulin<sup>1</sup>, O. Kurushina<sup>1</sup>, A. Drushlyakova<sup>2</sup>

<sup>1</sup>Volgograd, Russian Federation, <sup>2</sup>Neurological department, Volgograd state medical university, Volgograd, Russian Federation

**Background and aims:** Determine the role of correction of biomechanical disorders in cervicogenic headache.

**Methods:** 71 patients with cervicogenic headache (CGH) were examined. The average age is  $32.7 \pm 3.6$  years. Patients were divided into 2 groups (35 and 36 participants). The 1st group: pharmacotherapy+physiotherapy. The 2nd group: pharmacotherapy+stabilometric training. Biomechanical parameters (biauricular, biacromial lines) were assessed by visual-optical analysis (VOA). Stabilometric parameters were studied: the statokinesiogram area, displacement of the center of pressure, energy spent.

**Results:** The method of correction of biomechanical disorders in CGH based on the principle of biofeedback has been developed and tested. After treatment: 67.6% of patients relapse of CGH occurred a month later after pharmacological treatment, 32.4% - after pharmacological treatment and treatment on the stabilometric training ( $p < 0.05$ ). The 'statokinesiogram parameters': the best dynamics of return to the norm of the 2nd group was  $107 \pm 10.3 \text{ mm}^2$ , while in the 1st only  $151 \pm 10.7 \text{ mm}^2$ . The degree of displacement of the center of pressure in the 1st group decreased by 17.1%, in the 2nd group by 52.8%. Analysis VOA showed a significant approximation of the degree of deviation of biauricular, biacromial lines to the norm in the 2nd group of participants.

**Conclusion:** Clinical manifestations of CGH are mainly associated with biomechanical disorders in the cervical region. The use of the biofeedback method (the stabilometric training) for the correction of biomechanical disorders improves the diagnosis and results of the treatment of CGH.

**Disclosure:** Nothing to disclose

## EPO1146

### The effects of repetitive pericranial nerve blocks on neutrophil / lymphocyte, platelet / lymphocyte ratios and mean red cell distribution width in patients with chronic migraine

D.H. Ertem<sup>1</sup>, F. Ilik<sup>2</sup>, H. Buyukgol<sup>2</sup>

<sup>1</sup>Istanbul, Turkey, <sup>2</sup>Konya, Turkey

**Background and aims:** The pathophysiology of migraine is attributed to neurogenic inflammation and neurovascular disorder in which contractile dysfunction of cranial blood vessels plays a role. There is a limited number of studies evaluating the changes of inflammatory markers such as neutrophil/lymphocyte ratio (NLR), platelet/lymphocyte ratio (PLO) and Mean Red Cell Distribution Width (RDW) following the treatment of chronic migraine. The aim of this study was to investigate the effects of repetitive pericranial nerve blocks on inflammatory markers.

**Methods:** The diagnosis of migraine was made according to the ICHD 3<sup>rd</sup> edition version. The socio-demographic and clinical characteristics were recorded for 16 patients with chronic migraine who underwent at least 3 pericranial nerve blocks with local anaesthetics (great occipital, supraorbital, infraorbital nerves and sphenopalatine ganglion) and attended at least 4 follow-up appointments. Change in the Numeric Pain Rating Scale (NPRS) was used to assess the response to GON blocks.

**Results:** The mean age of patients was 42.375±11.18 years; 94% were female. The duration of the headache was 20.10±11.15 years. From 3-months post-treatment, a significant decrease in NPRS and number of headache days were found ( $p < 0.001$ ). There were no statistically significant changes in the mean NLR, PLO and RDW values before and after the injections ( $p = 0.616$ ,  $p = 0.677$ , and  $p = 0.720$ ).

**Conclusion:** Although repetitive pericranial nerve blocks are an effective interventional treatment option for chronic migraine, no significant decrease in RDW, neutrophil/lymphocyte and platelet/lymphocyte ratios within 3 months after injections supports that these inflammatory markers do not play an important role in prognosis monitoring for migraine.

**Disclosure:** Nothing to disclose

## EPO1147

### Impulsivity traits between chronic headache and healthy population

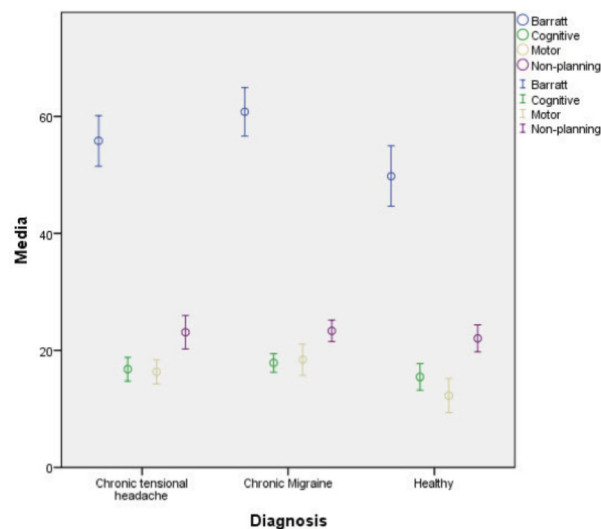
J.L. Camacho Velasquez<sup>1</sup>, A. Assialoui Essanhaji<sup>1</sup>, S.M. Alba<sup>2</sup>

<sup>1</sup>Neurology, Hospital de Mollet, Mollet del Valles - Barcelona, Spain, <sup>2</sup>Neurology, IMECBA-Hospital CIMA, Barcelona, Spain

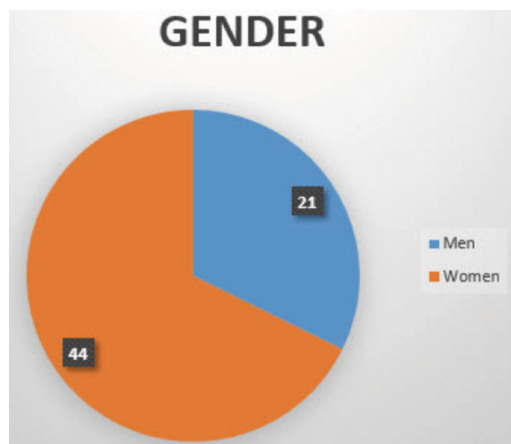
**Background and aims:** Chronic migraine and tensional headache are associated with psychological and psychiatric comorbidities. Amongst those comorbidities, impulsivity has been poorly explored. This survey aims to evaluate impulsivity traits between healthy people and patients with chronic headache (migraine and tensional headache).

**Methods:** The Barrat Impulsivity Scale (BIS) was filled by patients with chronic headache (migraine or tensional headache). Data about gender, age, type of headache, number of days with headache and days taking medication were collected and analysed by SPSS software.

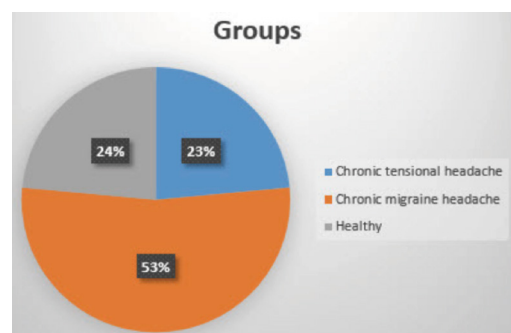
**Results:** A total of 65 patients filled the tests, the mean age was 37.5 years-old (SD 11.84); 44 (67.7%) were women. 16 (24.6%) had a chronic tensional headache, 33 migraine (50.8%) and 16 (24.6%) were healthy. The mean BIS score was 60.79 in migraine patients, 55.81 in tensional headache and 49.81 in healthy people ( $p = 0.04$ ). Furthermore, the mean score of the Motor subset of the BIS was 18.42; 16.37 and 12.31 respectively ( $p = 0.01$ ). The mean days with painkillers was 12.6 in migraine patients and 18 in tensional headache group ( $p = 0.2$ ). Moreover, the mean days with headache was 25.69 and 20.27 in patients with migraine and tensional headache respectively ( $p = 0.01$ ).



BIS



GENDER



GROUPS

**Conclusion:** BIS and the motor subset score showed significant differences between healthy and patients with chronic headache. These findings are not related to the use of analgesics as we demonstrated in a previous study of impulsivity and medication overuse headache.

**Disclosure:** Nothing to disclose

## EPO1148

### Cerebrospinal fluid oligoclonal bands in headache with neurological deficits and lymphocytosis (HaNDL) do not support an immune-mediated pathogenesis

J.L. Chico<sup>1</sup>, B. Baena Álvarez<sup>1</sup>, P. Lapuente-Suanzes<sup>2</sup>, F. Rodríguez Jorge<sup>1</sup>, P. Parra Díaz<sup>1</sup>, Á. Beltrán Corbellini<sup>3</sup>, R. Sainz-Amo<sup>1</sup>, J. Gómez Corral<sup>1</sup>, L.M. Villar Guimerans<sup>2</sup>, Í. Corral Corral<sup>1</sup>  
<sup>1</sup>Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain, <sup>2</sup>Immunology, Hospital Ramon y Cajal, Madrid, Spain, <sup>3</sup>Hospital Ram, Madrid, Spain

**Background and aims:** The syndrome of headache with neurological deficits and lymphocytosis (HaNDL) is an entity with an unknown pathogenesis. An autoimmune etiology has been postulated, with some attempts to relate it to specific antibodies. Nevertheless, there are not specific studies of intrathecal synthesis of antibodies in HaNDL.

**Methods:** Retrospective study of cases fulfilling diagnostic criteria for HaNDL (ICH-3) who underwent CSF study for the presence of IgG and IgM oligoclonal bands (OCB).

**Results:** A total of 16 patients were included (6 males, median age 28 years, range 15-51). Neurological deficits were aphasia in 15 patients, hemiparesis in 7, hemihypoesthesia in 5 and hemianopia in 3, with 12 patients showing more than 1 deficit. Median lymphocytic count in CSF was 59 (range 17-351). Median of episodes was 1.5 (range 1-6), with a median duration of 72 hours (range 3-720). 5 patients displayed minor alterations in MRI (leptomeningeal enhancement or unspecific white matter hyperintensities). Positive IgG OCB were present in 2 patients (6.25%) while mirror pattern was found in other 2. IgM OCB were negative in the 13 patients studied. There were no differences in clinical presentation or CSF or MRI findings between positive and negative OCB groups, except for higher frequency of hemianopsia in positive OCB group (100% vs 7.1%, p 0.025). Positive PCR for HHV-7 was detected in one patient with positive OCB.

**Conclusion:** CSF OCB, indicative of specific intrathecal immune activation, are uncommon in HaNDL. Our findings suggest that HaNDL may have a heterogeneous ethio-pathogenesis and an

infectious/parainfectious etiology cannot be ruled out.

**Disclosure:** Nothing to disclose

## EPO1149

**Chronorisk in a chronic cluster headache patient: analysis of 2292 attacks**

P. Coelho<sup>1</sup>, M. Leal Rato<sup>1</sup>, I. Pavão Martins<sup>2</sup>

<sup>1</sup>Department of Neurology, Centro Hospitalar Universitário Lisboa Norte, Lisbon, Portugal, <sup>2</sup>Language Research Laboratory, Lisbon Faculty of Medicine, Lisbon, Portugal

**Background and aims:** A key finding of cluster headache (CH) is the presence of a chronobiological rhythm. This characteristic is quite relevant in episodic cluster headache, but has also been described in chronic CH (cCH). We report the time analysis of attacks in a 59-year-old male with a 19 year history of cCH.

**Methods:** Retrospective analysis of 15 years of attacks in a single case of cCH. Study variables include date, intensity, starting hour of an attack and intensity (rated in a VAS scale 0-10).

**Results:** There were 2292 CH attacks in 5049 days of registry, corresponding to an attack every 2.2 days and 3678 days (72%) free of headache, showing that attacks tend to cluster. The most frequent hour of attack was 10-10:59PM (n=596) and mean attack intensity was 4.55 (s=0.94). The majority of attacks (59%) occurred in the late evening, between 8-12PM (n=1346), which also corresponded to the highest mean attack intensity (4.76 vs 4.25, p<0.001). There was a correlation between attack hour frequency and intensity of an attack (p=0.324, p<0.01). Attack frequency and mean attack intensity was unrelated to months with >12 hours of sunlight (March-September) and months with <12 hours of sunlight (October-February) (p=0.16). Although the patient reported an aggravation of attack intensity in warmer months (June-September), this was not confirmed when compared to the other seasons; p=0.056).

**Conclusion:** Chronorisk analysis in CH patients could become an important tool for new acute and prophylactic therapeutic strategies and pathophysiological knowledge of CH.

**Disclosure:** Nothing to disclose

## EPO1150

**Megadose of botulinum toxin type A in chronic migraine: our experience in a tertiary hospital in Madrid**

S. De la Fuente Batista, A. Jaimes Sanchez, J. Rodriguez Vico

Headache Unit, Fundación Jiménez Díaz, Madrid, Spain

**Background and aims:** Chronic migraine is a disabling neurologic condition that affects 2% of the general population. Patients with chronic migraine have headaches on at least 15 days a month, with at least eight days a month on which their headaches and associated symptoms meet diagnostic criteria for migraine. The PREEMT studies have already demonstrated the effectiveness of Onabotulinumtoxin A in the treatment of chronic migraine at a maximum dose of 195U.

**Methods:** Describing our experience with doses of botulinum toxin type A between 250-300U in patients with chronic migraine refractory to the standard dose.

**Results:** We identified 16 patients with chronic migraine refractory to the dose of 195U in whom we used doses between 250-300U. 12 of them presented a partial subjective improvement measured in decrease of days and intensity of headache and more effectiveness to triptans, with few treatment-related adverse events.

**Conclusion:** Chronic migraine is a disabling neurologic condition, associated with a substantially greater personal and societal burden, more frequent comorbidities, and possibly persistent and progressive brain abnormalities. Many patients are poorly responsive to, or noncompliant with, conventional preventive therapies. Higher dose of Onabotulinumtoxin A (195U) has demonstrated to be superior to standard dose (155U) in several trial. We thought, as occurs in many drugs, a higher dose in some patients will be beneficial. In our experience, higher doses (250-300U) in selected patients could be a good alternative before adding new oral medication (usually bad tolerated) or new anti CGRP monoclonal antibodies. It's necessary to perform more studies to confirm our experience.

**Disclosure:** Nothing to disclose



## EPO1151

## Slovenian experience with erenumab

A. Fabjan<sup>1</sup>, G. Klanjšček<sup>2</sup>, L. Savšek<sup>3</sup>, J. Magdic<sup>4</sup>, M. Kolenc<sup>5</sup>

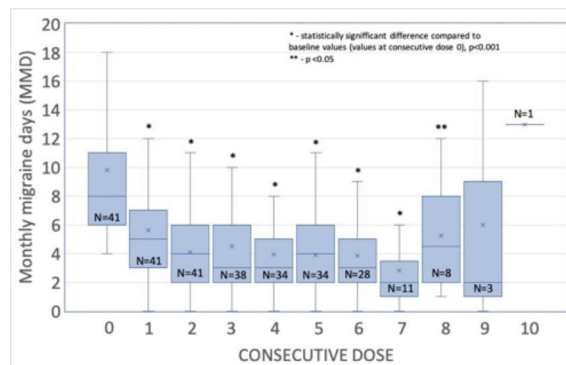
<sup>1</sup>Ljubljana, Slovenia, <sup>2</sup>Department of Neurology, General hospital Nova Gorica, Šempeter pri Gorici, Slovenia,

<sup>3</sup>Department of Neurology, General Hospital Celje, Celje, Slovenia, <sup>4</sup>Maribor, Slovenia, <sup>5</sup>Neurology, General hospital Novo mesto, Novo mesto, Slovenia

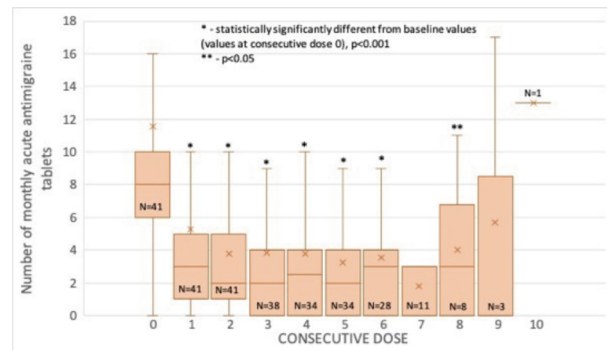
**Background and aims:** Erenumab is novel monoclonal antibody against canonical CGRP receptor for prophylaxis of migraine. In Slovenia its use is approved for the treatment of patients with 4 or more monthly migraine days and 2 or more failed prophylactic drugs.

**Methods:** We are prospectively monitoring 41 patients that have received erenumab from December 2018. We are recording number of monthly migraine headache days (MMD) and number of monthly acute antimigraine tablets (MMT) as well as side effects.

**Results:** These are interim results of a one-year study. Mean age of patients is  $44.4 \pm 10.4$  years and there are 35 (85%) women. In patients treated at least 3 months (N=38) baseline MMD was  $9.1 \pm 0.7$  and was reduced to  $4.7 \pm 0.4$  for 3-month period ( $p < 0.001$ ). In patients treated at least 6 months (N=28) baseline MMD was  $11.3 \pm 2.8$  and was reduced to  $4.2 \pm 0.6$  for 6-month period ( $p < 0.001$ ). Similar results were observed for MMT (box plots 1 and 2). The most common side effects were constipation (41%), reaction at the site of applicator (17%) and fatigue (12%). Other reported side effects were signs upper respiratory tract infection, muscle cramps, flue-like symptoms and anxiety. There were no serious side effects noted.



Box plot 1. Number of monthly migraine days at consecutive doses of erenumab.



Box plot 2. Number of monthly acute antimigraine tablets at consecutive doses of erenumab.

**Conclusion:** In our experience erenumab is effective and safe for reducing migraine burden in patients with 2 or more failed prophylactic treatments. This is in line with previously published data from clinical randomized studies.

**Disclosure:** Nothing to disclose

## EPO1152

**Sinus headache:  
an overdiagnosed problem**

P. Faustino<sup>1</sup>, D. Carneiro<sup>1</sup>, I. Saavedra<sup>2</sup>, H. Correia<sup>3</sup>, A. Mascarenhas<sup>4</sup>, L. Cabral<sup>5</sup>, T. De Santis<sup>6</sup>, A. Martins<sup>7</sup>, P. Bairrada<sup>8</sup>, B. Oliveiros<sup>9</sup>, S. Batista<sup>1</sup>

<sup>1</sup>Neurology, Coimbra University and Hospital Center, Coimbra, Portugal, <sup>2</sup>Cruz de Celas Family Health Unit, Coimbra, Portugal, <sup>3</sup>Progresso e Saúde Family Health Unit, Cantanhede, Portugal, <sup>4</sup>Montemor-o-Velho Personalized Health Care Unit, Montemor-o-Velho, Portugal, <sup>5</sup>Briosa Family Health Unit, Coimbra, Portugal, <sup>6</sup>Marquês de Marialva Family Health Unit, Cantanhede, Portugal, <sup>7</sup>Mondego Family Health Unit, Coimbra, Portugal, <sup>8</sup>Fernando Namora Family Health Unit, Condeixa-a-Nova, Portugal, <sup>9</sup>Laboratory of Biostatistics and Medical Computational Sciences, Faculty of Medicine, Universidade de Coimbra, Coimbra, Portugal

**Background:** Although the International Classification of Headache Disorders (ICHD-3) recommends avoiding the term “sinus headache”, it is still widely used in daily practice. Recent series show that over 80% of these patients have other types of headache, mostly migraine.

**Aims:** Identify the types of headache diagnosed as “sinus headache”. Recognize barriers to the correct diagnosis.

**Methods:** We performed an observational and prospective study, and included adult patients diagnosed with “sinus headache”, from March to November 2019. We applied a structured questionnaire and classified the headache according to ICHD-3.

**Results:** We included 18 adult patients with the initial diagnosis of “sinus headache”, 15 (83.3%) were female. Mean age was 41.3 (18-61 years). After our evaluation, 2 patients (11.1%) had headache attributed to chronic or recurring rhinosinusitis. 1 patient (5.6%) had chronic tension-type headache. The remaining 15 patients (83.3%) fulfilled the criteria for migraine: 2 patients (11.1%) had migraine without aura, 5 (27.8%) migraine with typical aura, 1 (5.6%) probable migraine with aura, 6 (33.3%) chronic migraine and 1 (5.6%) chronic migraine and non-opioid analgesic-overuse headache. Atypical features in these patients included: atypical location – bifrontal and/or paranasal (73.3%), nasal congestion (60.0%) and worsening with exposure to allergens (26.7%), weather changes (33.3%) and altitude changes (33.3%).

**Conclusion:** Many patients with “sinus headache” actually have migraine. The most common barriers to the correct diagnosis appear to be atypical location and worsening/association of the headache with well-known symptoms and triggers of sinus disorders.

**Disclosure:** Nothing to disclose

## EPO1153

**Neurophysiological, biomolecular and psychological predictors of response to Erenumab in chronic migraine**

G. Fiamingo<sup>1</sup>, R. De Icco<sup>1</sup>, R. Greco<sup>2</sup>, A.M. Zanaboni<sup>3</sup>, S. Bottiroli<sup>4</sup>, E. Guaschino<sup>5</sup>, M. Allena<sup>5</sup>, V. Grillo<sup>5</sup>, C. Tassorelli<sup>1</sup>, G. Sances<sup>5</sup>

<sup>1</sup>Headache Science Centre - Department of Brain and Behavioral Sciences, IRCCS Mondino Foundation - University of Pavia, Pavia, Italy, <sup>2</sup>Laboratory of Neurophysiology of Integrative Autonomic Systems, IRCCS Mondino Foundation, Pavia, Italy, <sup>3</sup>Laboratory of Neurophysiology of Integrative Autonomic Systems – Department of Brain and Behavioral Sciences, IRCCS Mondino Foundation - University of Pavia, Pavia, Italy, <sup>4</sup>Headache Science Centre - Faculty of law, IRCCS Mondino Foundation - Giustino Fortunato University, Benevento, Pavia, Italy, <sup>5</sup>Headache Science Centre, IRCCS Mondino Foundation, Pavia, Italy

**Background and aims:** The aim of this study is to investigate the role of neurophysiological, biomolecular and psychological parameters as potential predictors of the clinical outcome of Erenumab treatment in chronic migraine (CM) with or without medication overuse (MO).

**Methods:** We enrolled 36 patients, 30 of whom had MO. All patients were treated with 3 doses of Erenumab (every 28 days). The study protocol included: V1: baseline; V2: 28 days after V1; V3: end of study, 56 days after V2.

At V1, V2 and V3 we recorded headache days (HDs) and days of drug intake (DDs).

At V1 and V3 all subjects underwent neurophysiological recording of the Nociceptive Withdrawal Reflex (RTh: Reflex threshold), blood essays for micro-RNAs expression (miR-382-5p and miR-34a-5p), and a psychological assessment.

**Results:** HDs and DDs markedly and progressively decreased over time ( $p=0.001$  for both). At V3, 52.7% were considered Responder as they achieved a reduction in HDs of 50% or more.

Responder patients showed a significant lower baseline RTh and a longer duration of chronic migraine ( $p=0.019$  and 0.035 respectively). A multivariate analysis confirmed a pivotal role of RTh even after a statistical correction for age, sex, MO, preventive therapy and disability scale.

Biomolecular and psychological parameters significantly improved at the end of treatment, but we fail to find a significant association with clinical outcomes.

**Conclusion:** Neurophysiological recorded spinal sensitization may represent a predictor of response of Erenumab in the management of CM associated or not with MO.

**Disclosure:** Nothing to disclose

## EPO1154

**Stroke-like Migraine Attacks after Radiation Therapy (SMART) Syndrome – two new cases and systematic review of the literature**

S. Grenho Rodrigues, R. Gil Gouveia

*Neurology, Hospital da Luz de Lisboa, Lisbon, Portugal*

**Background and aims:** SMART Syndrome is characterized by reversible episodes of headache with cortical neurological symptoms occurring as a late complication of cranial irradiation.

**Methods:** We report 2 male patients (38 and 47 years old), treated with cranial radiation for cerebellar astrocytoma at ages 14 and 8. We performed a systematic review of Pubmed and Cochrane Library and report all published cases of SMART Syndrome up to date.

**Results:** The younger patient presented with headache and visual disturbance. Initial MRI was normal but 4 days later revealed right subcortical occipital acute lesion. He suffered 2 more episodes, in which MRI showed reversible right temporal-parieto-occipital gyriiform enhancement. The older patient presented a migraine-like attack with visual disturbances and psychomotor slowing. Cranial MRI showed reversible right occipito-temporal cortical enhancement; he had 3 further similar episodes. Regarding systematic review, 51 manuscripts were included, total of 100 patients (60 males); median age at presentation was 48 years (5-81). 59 patients had cranial irradiation for primary brain tumor with cumulative dose from 12 to 134.8 Gy. Clinical presentation included focal signs in all patients, headache (81%), seizures (52%) and encephalopathy (31%). Symptoms were reversible in most patients, lasting 30 minutes to 8 months. 82% of patients had cortical gyral enhancement in MRI, that reverted in 4 days to 6 months. Treatment included antiepileptic drugs, steroids, and aspirin.

**Conclusion:** SMART Syndrome should be considered in patients with history of cranial radiotherapy that present neurological symptoms and headache. Clinic is not always reversible and there is no consensual treatment.

**Disclosure:** Nothing to disclose

## EPO1155

**Lacrimal neuralgia: seven new cases of an emerging pain syndrome**

M. Gutiérrez, A. Chavarría-Miranda,

B. Talavera de la Esperanza, J. Trigo Lopez, E. Martinez,

D. García Azorín, A.L. Guerrero Peral

*Valladolid, Spain*

**Background and aims:** Lacrimal nerve is one of the 3 terminal branches of the ophthalmic nerve. It supplies the lateral upper eyelid and a small part of temporal periorbital skin. Lacrimal neuralgia was first described in 2013 and proposed diagnostic criteria included pain in the skin area supplied by the nerve, tenderness upon palpation on its emergence, and relief with an anaesthetic blockade. Only 9 cases have been published. We aim to describe clinical characteristics of a series of 7 new cases of lacrimal neuralgia.

**Methods:** From October 2013 to December 2019, we prospectively screened all patients fulfilling the proposed diagnostic criteria of lacrimal neuralgia in a headache clinic in a tertiary hospital. We gathered their clinical and demographic characteristics.

**Results:** We included 7 patients (1 male, 6 females). Neuroimaging was obtained in all cases to exclude underlying lesions. Left side was affected in 6 patients. Mean age at onset was  $33.5 \pm 21.1$  years (8-70) and latency between onset and diagnosis was  $44.4 \pm 47.5$  months (4-120). In 3 patients the neuralgia was triggered by a mild trauma. In 6 cases there was an oppressive or burning background pain with intensity of  $6.6 \pm 2.7$  (3-10), and in 3 electric or stabbing paroxysms rated as 8 in all cases. In 3 patients there were spontaneous remissions and the 3 post-traumatic cases presented only background pain with no exacerbations.

**Conclusion:** Lacrimal neuralgia is uncommon and probably difficult to diagnose, but must be taken into account in patients with orbital and periorbital pain. We need further reports to better characterize its phenotype.

**Disclosure:** Nothing to disclose

## EPO1156

**Premonitory symptoms in patients with episodic migraine**

H. Güven, B. Güven

*Neurology, Ankara Dışkapı Yıldırım Beyazıt Training and Research Hospital, University of Health Sciences, Ankara, Turkey*

**Background and aims:** It is important to understand the premonitory phase of the migraine both for elucidating the pathophysiology of the events that initiate the migraine attack and for early treatment. The aim of this study is to investigate the frequency of premonitory symptoms (PSs) during migraine attacks and its association with different characteristics of migraine.

**Methods:** Patients with episodic migraine with or without aura were evaluated using questionnaires and diaries to determine the characteristics of headache and PSs.

**Results:** Of the 330 patients included in the study, 196 had PSs during migraine attacks (59.4%). The most common PSs in patients with migraine were neck stiffness (21.2%) and yawning (19.1%). Older age ( $p=0.025$ ), female gender ( $p=0.021$ ), migraine with aura ( $p=0.020$ ), longer disease duration ( $p<0.001$ ), more severe headache ( $p=0.030$ ), unilateral+ bilateral lateralization of headache ( $p=0.003$ ) and pure menstrual or menstrually related migraine attacks ( $p=0.045$ ) were more frequent in patients with PSs compared to without. Accompanying vomiting, photophobia, cranial autonomic symptoms, and cutaneous allodynia were also more common in patients with PSs ( $p=0.026$ ,  $p=0.026$ ,  $p=0.047$  and  $p<0.001$ , respectively). In multivariate logistic regression analysis, PSs were independently associated with duration of disease, headache severity, and allodynia ( $p=0.005$ ,  $p=0.026$  and  $p=0.016$ , respectively). Longer disease duration and accompanying photophobia were more common in patients having  $>3$  PSs than those with 1 symptom ( $p=0.005$  and  $p=0.010$ ).

**Conclusion:** Longer disease duration and diversity of accompanying symptoms in patients with PSs may suggest that these symptoms facilitate the occurrence of each other and reflect the increase in brain excitability over time.

**Disclosure:** Nothing to disclose

## EPO1157

**Do patients with chronic migraine and daily headache respond to preventatives? Analysis of a series of 265 patients treated with Onabotulinumtoxin A**I. Hernandez<sup>1</sup>, M. Gutiérrez Sánchez de la Fuente<sup>1</sup>, B. Talavera de la Esperanza<sup>1</sup>, C. Martínez Badillo<sup>2</sup>, C. García Iglesias<sup>3</sup>, A. Sierra Mencia<sup>4</sup>, D. García Azorín<sup>3</sup>, A.L. Guerrero Peral<sup>3</sup>*<sup>1</sup>Neurology Service, Valladolid, Spain, <sup>2</sup>Headache Unit, Hospital Clínico Universitario de Valladolid, Valladolid, Spain, <sup>3</sup>Valladolid, Spain, <sup>4</sup>Valladolid, Castilla y Leon, Spain*

**Background and aims:** Efficacy and safety of Onabotulinumtoxin A (OnabotA) in Chronic Migraine (CM) have been established in controlled trials and real-world data. We have less information regarding patients with daily headache, commonly excluded from clinical trials. We aim to evaluate efficacy and predictors of response in a large single-center series of CM patients treated with OnabotA.

**Methods:** From May 2012, we offered OnabotA to adult CM patients not responding to previous treatment 2 preventatives including topiramate. OnabotA was administered according to PREEMPT protocol. We gathered clinical and demographical variables. Efficacy was assessed 3 months after 2 procedures and it was defined as a reduction of at least 50% in number of headaches per month.

**Results:** We included 265 patients (230 female, 35 male). 84 (31.6%) with daily headache and 204 (77%) with symptomatic medication overuse. Efficacy was achieved in 185 patients (69.8%). Among responders we observed a shorter duration of migraine ( $22.6\pm 12.2$  vs  $26.6\pm 14.0$  years,  $p=0.04$ ), shorter duration of chronic migraine ( $27.4\pm 34.9$  vs  $53.1\pm 63.2$  months,  $p=0.001$ ) and a smaller number of days with headache per month ( $22.0\pm 6.0$  vs  $25.7\pm 5.1$  days,  $p<0.001$ ). Medication overuse (66.2% vs 82.0%,  $p=0.018$ ), and daily headache (54.8% vs 76.8%,  $p<0.001$ ) were predictors of lack of response in our series.

**Conclusion:** A larger number of days of headache per month and, specifically, the presence of daily headache before initiating OnabotA therapy implied a worst outcome after 2 procedures in our population. These patients might require a longer duration of treatment to achieve improvement.

**Disclosure:** Nothing to disclose

## EPO1158

## Diagnostic and therapeutic relevance of headache clinic according to a university hospital experience

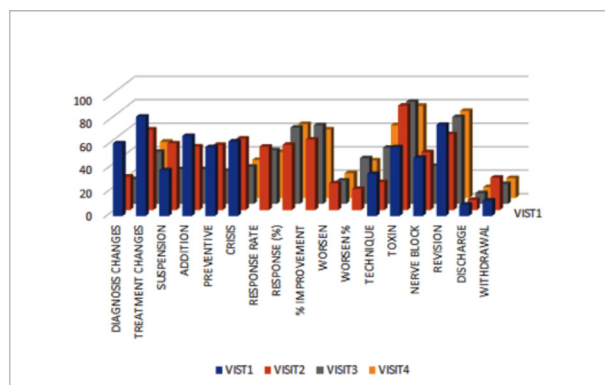
A.P. Herraiz<sup>1</sup>, S. Secades García<sup>2</sup>, R.J. Martínez Marín<sup>3</sup>, J.A. Membrilla López<sup>2</sup>, M. Sastre Real<sup>3</sup>, M. Lara Lara<sup>4</sup>, F.J. Díaz de Terán Velasco<sup>3</sup>

<sup>1</sup>Madrid, Spain, <sup>2</sup>Neurology, La Paz University Hospital, Madrid, Spain, <sup>3</sup>Neurology, Hospital Universitario La Paz, Madrid, Spain, <sup>4</sup>Hospital Universitario La Paz, Madrid, Spain

**Background and aims:** Our aim was to analyse the impact of referrals to a headache clinic: diagnostic and therapeutic modifications and patients' outcome.

**Methods:** We included patients attended for 1<sup>st</sup> time in a headache clinic over 1 year. Data from medical records were retrospectively collected. Response rate was defined as at  $\geq 50\%$  reduction on headache frequency.

**Results:** 283 patients were included: 60% referred from neurologists, 13% from emergency department and 8% from primary. 27.8% had episodic, 26.8% chronic migraine, 31.1% other primary headache and 3.2% secondary headache. 108 patients (38.1%) completed 1 year of follow-up (4 visits). 29.6% had episodic migraine, 36.1% chronic migraine, 29.6% other primary headache and 3.7% secondary headache. At visit 1 22.4% of patients had not received any preventative previously, 25.3% had received 1 preventative, 23.5% 2 preventatives and 28.9% 3 or more preventatives. Definitive diagnosis was done in 175 patients (61.8%) at visit 1. The treatment was modified in 84.5% of patients and 35.7% were treated with OnabotulinumtoxinA and/or anaesthetic injections in the first visit. The response rate was 53.88% at visit 2, 45.77% at visit 3 and 39.05% at visit 4. At visit 4, 62.9% reported a subjective overall improvement from baseline, 58.5% had received OnabotulinumtoxinA and 24.6% had received anaesthetic blockade.



**Conclusion:** Patients referred to a headache clinic benefitted from a more accurate diagnosis and therapeutic optimization. These results also contribute to increase awareness of the importance of improving management of headaches by general neurologists and primary physicians.

**Disclosure:** Nothing to disclose

## Motor neurone diseases 1

### EPO1159

#### Cutaneous silent period in patients with spinal muscular atrophy type 2 and type 3

M. Aktan Suzgun<sup>1</sup>, A. Gunduz<sup>1</sup>, M. Kofler<sup>2</sup>, M. Tütüncü<sup>1</sup>, F. Karaali Savrun<sup>1</sup>, N. Uzun Adatepe<sup>1</sup>, M. Kiziltan<sup>1</sup>

<sup>1</sup>Department of Neurology, Istanbul University Cerrahpaşa Faculty of Medicine, Istanbul, Turkey, <sup>2</sup>Zirl, Austria

**Background and aims:** Cutaneous silent period (CSP) is the sudden inhibition of voluntary muscle contraction as a result of a painful stimulus. The aim of this study was to examine CSP changes in the presence of pure lower motoneuron loss. For this purpose, we recorded CSPs in SMA type 2 and type 3 patients

**Methods:** 14 patients with SMA and 14 healthy individuals were included. CSPs were recorded from thenar muscles after painful stimulation of the index finger while the participant performed slight thumb abduction. Onset latency, duration and magnitude of total CSP, inhibitory phases I1 and I2, and of the long-loop reflex as well as magnitude of post-CSP excitatory period (E3%) were measured. Suppression indices of CSP, I1 and I2 were calculated. The values were compared between SMA patients and healthy subjects, and between ambulatory and non-ambulatory SMA patients

**Results:** CSP parameters except E3% were not different between SMA patients and healthy individuals. E3% was significantly smaller in patients than healthy subjects. CSP duration and CSP end latency were significantly longer in non-ambulatory vs. ambulatory SMA patients. Hammer-smith scores of SMA patients correlated negatively with CSP duration and positively with E3%

**Conclusion:** CSP duration is longer in non-ambulatory SMA patients, irrespective of SMA subtype. This finding concurs with a lower motoneuron firing rate in more severely affected SMA patients, otherwise a feature of central lesions. The magnitude of E3 is significantly smaller in SMA patients compared to healthy subjects, in line with motoneuron loss, and hence fewer residual motoneurons available for resynchronization following the CSP.

**Disclosure:** Nothing to disclose

### EPO1160

#### HDAC4 protein expression and microRNAs in ALS muscle

R. Marozzo<sup>1</sup>, V. Pegoraro<sup>1</sup>, C. Angelini<sup>2</sup>

<sup>1</sup>Clinical Neurobiology lab, IRCCS San Camillo, Venice, Italy, <sup>2</sup>Neuromuscular Center, IRCCS S. Camillo, Venice, Italy

**Background and aims:** MicroRNAs are small non-coding RNAs that regulate the expression of specific genes by binding to the 3' untranslated region of the target mRNA. HDAC4 belongs to the class IIa of HDACs (histone deacetylases) family and plays an important role during the denervation and regulation of miR-206 in ALS pathophysiology.

Amyotrophic lateral sclerosis (ALS) is a progressive neurodegenerative disease characterized by the degeneration of upper and lower motor neuron and the progressive loss of synaptic connection between nerve and muscle. While the majority of ALS cases are sporadic (SALS), about 10% of ALS cases have a familial inheritance (FALS). The most frequent genetic cause of ALS is associated with an expanded repeat in the 3' untranslated region of C9orf72 gene (C9-ALS). Another frequent genetic cause is due to mutation in the gene SOD1, coding for a superoxide dismutase enzyme (SOD1-ALS). A different form of ALS is upper motor neuron disease (UMN).

**Methods:** We analyzed the expression levels of muscle-specific myomiRNAs (miR-1, miR-133a, miR-133b, miR-206), inflammatory microRNAs (miR-27a, miR-221, miR-155) and HDAC4 protein content by Western Blot in muscle cryostat sections of 18 ALS patients: 8 genetic forms (C9-ALS and SOD1-ALS), 5 SALS and 5 UMN.

**Results:** Our results show a strong up-regulation of miR-206 in C9-ALS and SOD1-ALS patients, a decreased expression of HDAC4 protein levels. We also observed an increase of inflammatory miRNAs in genetic ALS.

**Conclusion:** The different expression of miRNAs and HDAC4 in genetic ALS versus SALS and UMN cases might be correlated to different pathogenic mechanisms.

**Disclosure:** Nothing to disclose

## EPO1161

### Cyanate could be a plausible toxin contributing to konzo, contrary to thiocyanate: preliminary experimental results

M. Baguma<sup>1</sup>, B. Brône<sup>2</sup>, V. Bito<sup>2</sup>, J.-M. Rigo<sup>2</sup>, J.N. Chabwine<sup>3</sup>

<sup>1</sup>Department of Internal Medicine, Université Catholique de Bukavu (U.C.B.), Hôpital Provincial Général de Référence de Bukavu (H.P.G.R.B.), Bukavu, Congo, Democratic Republic of, <sup>2</sup>Biomedical Research Institute (BIOMED), UHasselt – Hasselt University, Diepenbeek, Belgium, <sup>3</sup>Faculty of Science and Medicine, University of Fribourg, Fribourg, Switzerland

**Background and aims:** Cassava-derived cyanide toxicity and protein malnutrition are main risk factors of konzo, a tropical spastic paraparesis of unknown cause. This preliminary study assessed neurotoxic effects of thiocyanate and cyanate, two cyanide metabolites hypothesized to be plausible toxic agents in konzo.

**Methods:** Cultured mouse neuroblastoma (Neuro-2A) and human neuroblastoma (SH-SY5Y) cell-lines were incubated in MEM-medium containing sodium cyanate (NaOCN) and sodium thiocyanate (NaSCN) in a disease-relevant concentration range. Cells viability was evaluated after 24, 48 and 72 hours using the MTT-assay.

**Results:** Both NaOCN and NaSCN were toxic in a dose-dependent way, even if NaOCN toxicity appeared at concentrations 100-300 times higher than normal plasmatic levels, contrary to NaOCN (1-3mM). The 2 cell lines tended to exhibit opposite sensitivity to the 2 compounds. Strikingly, Neuro-2A and SH-SY5Y viability dropped drastically between 24 and 48 hours (~60% lowering) and even further between 48 and 72 hours (~80%) in Neuro-2A cells (~65% reduction in SH-SY5Y cells between 24 and 48 hours) under NaOCN (3mM) treatment, whereas no additional viability reduction was observed after 24 hours incubation in NaSCN (30mM) (respectively ~20% and ~21% drop in Neuro-2A and ~4% in SH-SY5Y).

**Conclusion:** Our results suggest NaOCN as a neurotoxic agent, while NaSCN toxicity could be questioned at such high concentrations. Furthermore, the gradual/delayed NaOCN toxicity and the differential sensitivity of neuronal cell lines are compatible with konzo, especially knowing that cyanate synthesis results from cyanide metabolization only in sulphur amino-acid-deprived conditions (like in konzo patients) and provoked spastic quadriplegia in primate experiments.

**Disclosure:** This work was supported by the VLIR-UOS Team Project 2017 Ref. No. CD2017TEA439A104

## EPO1162

### Comprehensive genetic analysis of an italian amyotrophic lateral sclerosis cohort

A. Bartoletti Stella, V. Vacchiano, S. De Pasqua, I. Bartolomei, F. Pastorelli, S. Piras, G. Mengozzi, F. Salvi, P. Parchi, R. Liguori, S. Capellari  
IRCCS Istituto delle Scienze Neurologiche di Bologna, Bologna, Italy

**Background and aims:** 5-10% of patients with amyotrophic lateral sclerosis (ALS) have a positive family history (fALS). More than 25 genes have been identified associated with ALS/Frontotemporal-dementia spectrum disorders. However, mutations in 4 major genes (C9orf72, SOD1, FUS, TARDBP) account for 60%-70% of fALS. Recent studies have highlighted the role of genetic risk factors even in “sporadic” patients (sALS), in which the inheritability component would represent at least 21.0% (Mejzini et al., 2019). We aimed to evaluate the genetic contribution to the pathogenesis of fALS and sALS in an Italian cohort.

**Methods:** 200 ALS patients (age-of-onset 63±12years) were analyzed. 26% were fALS, of which 10.5% had a positive family history for ALS (fALS-ALS), and 15.5% for other neurodegenerative diseases (fALS-ND). The C9orf72, SOD1, and other genes linked to several ND were analyzed as in Bartoletti-Stella et al., 2018.

**Results:** We identified 34 mutations in the major ALS genes (C9orf72 n=17; SOD1 n=9; FUS n=4; TARDBP n=4). Considering the double mutants, these variants explain 85.7% of fALS-ALS, 19.35% of fALS-ND, and 6.7% of sALS. Another 43 patients presented likely pathogenic variants in other ALS-related genes (14 genes), or to other ND-related genes (8 genes). As expected, these variants were mainly identified in fALS-ND (38.70%) compared to fALS-ALS (9.5%). Interestingly, 29 carriers were sALS (19.59%).

**Conclusion:** This study reports a different genes involvement between fALS-ALS and sALS-ND, and the presence of rare causal variants even in sALS. These findings are useful for the development of genetic screening protocols and for counselling strategies for these patients.

**Disclosure:** Nothing to disclose

# EPO1163

## Stapedial reflex: a novel biomarker of early bulbar involvement in ALS patients

A. Bombaci<sup>1</sup>, C. Lazzaro<sup>2</sup>, D. Ndrej<sup>2</sup>, M. Lacilla<sup>2</sup>, A. Chiò<sup>1</sup>, A. Canale<sup>3</sup>, A. Calvo<sup>1</sup>

<sup>1</sup>Turin, Italy, <sup>2</sup>Department of Surgical - Molinette Hospital, University of Turin, Turin, Italy, <sup>3</sup>Department of Surgical, University of Turin, Turin, Italy

**Background and aims:** Amyotrophic lateral sclerosis (ALS) is a neuromuscular progressive disorder, characterised by limb and bulbar muscle wasting and weakness. 30% present a bulbar onset, while 70% a spinal one, although most of them develop bulbar impairment later, associated with poor prognosis. Due to the lack of early biomarker of bulbar involvement, we wanted to evaluate the role of stapedial reflex (SR) in predicting pre-clinical bulbar impairment in ALS.

**Methods:** We enrolled 36 ALS patients, 4 excluded for tympanometry alterations, and we assessed revised-ALS functional rating scales and SR, using Amplaid A728 impedance audiometer. Follow-up was performed every 3-4 months for a total of 4 visits. We evaluated presence of SR, ARLT and DECAY. Patients who hadn't developed bulbar signs at 4th visit continued follow-up for maximum 18 months. We analysed data using Mann-Whitney U test, Kruskal-Wallis test and Cox regression analysis.

**Results:** We observed that DECAY at 500 and 1000Hz is the first parameter of SR to get altered in all ALS before development of bulbar impairment (Fig. 1). 28 patients, developed bulbar impairment during the study. We highlighted a correlation between the progression rate (PR) of disease and both time of decay's alteration and time of bulbar impairment from disease onset (Fig. 2A-B). 4 patients who didn't develop bulbar impairment had a PR lower than the others (p<0.05, Fig. 3).

Patients	Sex	DECAY 500Hz V1	DECAY 500Hz V2	DECAY 500Hz V3	DECAY 500Hz V4	DECAY 1KHz V1	DECAY 1KHz V2	DECAY 1KHz V3	DECAY 1KHz V4	Age disease onset	Progression rate
1	F	Y	Y	Y	Y	Y	Y	Y	A	62,4	0,45
2	M	N	N	N	N	N	N	N	N	71,0	0,77
3	M	Y	Y	A	N	Y	Y	Y	N	62,1	1,24
4	M	Y	N	N	N	Y	N	N	N	78,1	0,26
5	F	Y	Y	A	N	Y	A	A	N	70,8	0,42
6	M	A	A	A	A	A	Y	A	A	69,3	0,34
7	F	Y	N	N	N	Y	N	N	N	70,6	0,82
8	M	N	N	N	N	N	N	N	N	73,2	0,63
9	M	Y	Y	A	N	Y	Y	Y	Y	52,6	0,60
10	M	Y	Y	A	N	Y	A	A	N	38,4	0,61
11	F	N	N	A	A	A	A	N	N	57,5	0,19
12	M	Y	N	N	N	Y	A	N	N	54,0	1,54
13	M	Y	Y	Y	A	Y	Y	Y	A	58,1	0,85
14	M	N	N	N	N	N	N	N	N	61,1	0,41
15	M	Y	Y	A	N	Y	A	A	A	67,6	0,54
16	F	N	N	N	N	N	N	N	N	49,1	0,77
17	M	N	A	A	A	A	A	A	A	75,1	1,02
18	F	N	N	N	N	N	N	N	N	73,0	0,38
19	M	A	A	A	N	A	A	A	A	73,7	0,72
20	F	A	A	A	A	A	A	A	A	66,6	0,34
21	M	A	A	A	A	A	A	A	A	41,3	0,27
22	M	Y	A	A	A	Y	A	A	A	57,0	0,82
23	F	A	A	A	A	Y	A	A	A	63,2	0,66
24	M	N	N	N	N	N	N	N	N	80,6	0,31
25	M	N	N	N	N	N	N	N	N	73,2	0,62
26	M	Y	A	A	A	Y	A	A	A	62,4	1,24
27	M	Y	Y	Y	A	Y	Y	Y	A	55,0	0,14
28	F	Y	Y	A	N	Y	Y	Y	N	64,4	0,16
29	M	Y	A	A	N	Y	Y	A	N	58,3	0,54
30	M	Y	Y	A	A	Y	A	A	A	62,3	0,18

Figure 1: DECAY is the 1st parameter of stapedial reflex (SR) to get altered before development of bulbar impairment. During the progression of disease we observed a gradual alteration and absence of SR at qualitative analysis. V1: first visit; V2: second visit; V3: third visit; V4: fourth visit. Y: SR normal; A: SR altered; N: SR absent.

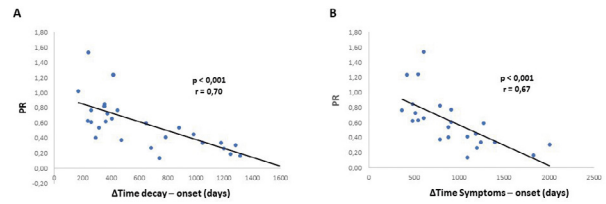


Figure 2: Progression rate inversely correlate with time passed from disease onset and both time of alteration/absence of decay (A) and time of development of bulbar signs (B).

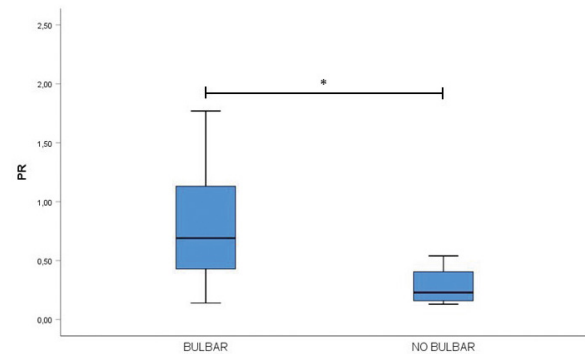


Figure 3: 4 patients who didn't develop bulbar signs before the end of the study present a progression rate to last visit significantly lower than other patients (U-Mann-Whitney; p=0.018).

**Conclusion:** This study shows that stapedial reflex could be a sensitive measure for detecting pre-symptomatic bulbar involvement in ALS and could represent a simple and useful biomarker of disease progression.

**Disclosure:** Nothing to disclose



## EPO1164

**Exosomal angiogenin as a possible biomarker in amyotrophic lateral sclerosis**

E. Chekanova<sup>1</sup>, M. Ivanova<sup>1</sup>, B. Belugin<sup>2</sup>, I. Dolzhikova<sup>2</sup>, I. Tutykhina<sup>2</sup>, I. Zakroychikova<sup>1</sup>, A. Abramova<sup>1</sup>, M. Zakharova<sup>1</sup>

<sup>1</sup>Research Center of Neurology, Moscow, Russian Federation, <sup>2</sup>N.F. Gamaleya National Research Center for Epidemiology and Microbiology, Moscow, Moscow, Russian Federation

**Background and aims:** It is believed that extracellular vesicles (EVs), particularly exosomes, carry biologically active molecules contributing to disease progression in ALS. Angiogenin (ANG) is suggested to be implicated in the pathogenesis of ALS. This study aimed to analyze the levels of ANG in plasma, CSF and their EV fractions in patients with ALS (PALS).

**Methods:** The study included 30 PALS and 26 healthy participants (HP). EV fractions were extracted from plasma and CSF with ExoEasy Maxi Kit (Qiagen). Exosomal markers (CD63, CD81, Flotillin1) were detected in obtained EV fractions by western blot. ANG levels were analyzed in plasma, CSF and EVs with ELISA.

**Results:** Exosomal markers were detected in all EV samples. Levels of ANG in PALS were significantly higher both in plasma (Me 6368.76pg/mg of protein) and CSF (Me 2365.19pg/mg) than in their EV fractions (Me 1869.22 and 223.50pg/mg, respectively) ( $p < 0.0002$ ). Levels of ANG were 1.2 times lower in plasma ( $p = 0.0153$ ) and 1.6 times in its EV fraction ( $p < 0.0001$ ) in PALS compared to HP, which could point to the protective role of ANG. No statistically significant correlations between ANG levels and clinical features were found in PALS. Although, there was a tendency to decreased levels of ANG in patients with lower ALS-FRS-R scores ( $p = 0.06$  for plasma EV fraction).

**Conclusion:** This study confirms previous data on the protective role of ANG in ALS. Data suggest that lowered ANG, especially exosomal, could be a biomarker of disease progression, which should be confirmed in a larger sample.

**Disclosure:** This study was supported by the Russian Foundation for Basic Research, project no. 18-015-00480 A.

## EPO1165

**Association between body weight and metabolic function in onset and progression in amyotrophic lateral sclerosis.**

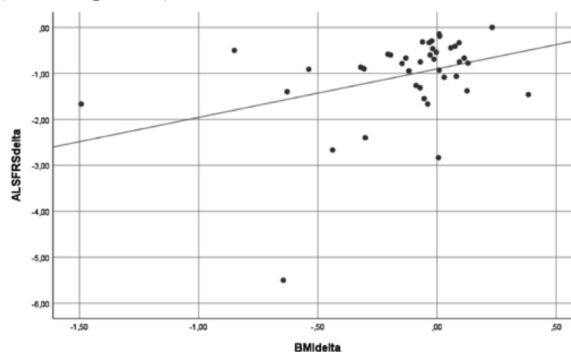
E. De Marchi<sup>1</sup>, M. Serioli<sup>2</sup>, E. Cazzaniga<sup>1</sup>, M.F. Sarnelli<sup>1</sup>, G.P. Biroli<sup>2</sup>, S. Riso<sup>2</sup>, R. Cantello<sup>3</sup>, L. Mazzini<sup>1</sup>

<sup>1</sup>CRESLA, Department of Neurology, Azienda Ospedaliero Universitaria Maggiore della Carità, Novara, Italy, <sup>2</sup>S.C. Dietetica e Nutrizione, Azienda Ospedaliero Universitaria Maggiore della Carità, Novara, Italy, <sup>3</sup>Institute of Neurology, University of Eastern Piedmont, Novara, Italy

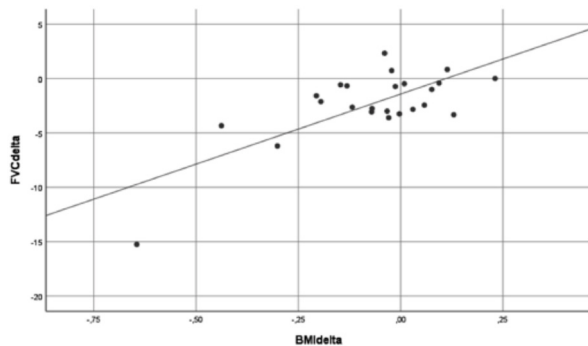
**Background and aims:** There is growing interest in the role of nutrition in pathogenesis and progression of amyotrophic lateral sclerosis. Indeed, poor prognosis and decreased survival time correlate with worse nutritional status of patients with ALS. Therefore, we sought to evaluate the associations between body weight, metabolic parameters and functional and respiratory markers at diagnosis and over disease course.

**Methods:** A retrospective/prospective single-center study was conducted between 01/16 and 12/19 at the Tertiary Regional Center for ALS in Novara, Italy. For each patient we collected demographics and clinical features, including metabolic parameters (e.g. weight, height, BMI, arm circumference, triceps skin fold, arm muscle area, type of diet). Patients were followed-up every 3 months after diagnosis, evaluating ALSFRS-R, FVC%, neuropsychological performances.

**Results:** 235 patients (131M, age at onset  $63.3 \pm 11.9$ ) were included. 59% had spinal onset, 41% had bulbar one. The mean BMI was  $25.57 (\pm 5.3)$ . There was a strong positive linear correlation between negative variation in BMI (most recent BMI - baseline BMI/time between measurement) and negative variation in ALSFRS-R ( $R = 0.33$ ,  $p = 0.04$ ). BMI negative variation strongly correlated with FVC% decline ( $R = 0.41$ ,  $p = 0.04$ ).



Correlation between BMI variation (delta BMI) and ALSFRS variation (delta ALSFRS-R)



Correlation between BMI variation (delta BMI) and FVC variation (delta FVC)

**Conclusion:** A worse metabolic status influence ALS disease course. Starting from these preliminary findings, we established to monitor the diet of ALS patients with a telecare and telemedicine approach, with the aim to prevent/treat malnutrition as soon as it develops. We believe that an early detection of significant changes in food and nutrient intake can be a prompt therapeutic nutritional intervention to improve disease course.

**Disclosure:** Nothing to disclose

## EPO1166

### Descriptive analysis of varying real-world treatment patterns and outcomes in patients with spinal muscular atrophy collected from the RESTORE registry

R.S. Finkel<sup>1</sup>, J.W. Day<sup>2</sup>, D.C. De Vivo<sup>3</sup>, J. Kirschner<sup>4</sup>, E. Mercuri<sup>5</sup>, F. Muntoni<sup>6</sup>, P.B. Shieh<sup>7</sup>, E. Tizzano<sup>8</sup>, I. Desguerre<sup>9</sup>, S. Quijano-Roy<sup>10</sup>, K. Saito<sup>11</sup>, M. Droege<sup>12</sup>, O. Dabbous<sup>12</sup>, A. Shah<sup>12</sup>, F. Khan<sup>12</sup>, F.A. Anderson<sup>13</sup>, L. Servais<sup>14</sup>

<sup>1</sup>Division of Neurology, Department of Pediatrics, Nemours Children's Hospital, Orlando, USA, <sup>2</sup>Department of Neurology, Stanford University Medical Center, Stanford, USA, <sup>3</sup>Departments of Neurology and Pediatrics, Columbia University Irving Medical Center, New York, USA, <sup>4</sup>Clinic for Neuropediatrics and Muscle Disease, University Medical Center Freiburg, Freiburg, Germany, <sup>5</sup>Department of Paediatric Neurology and Nemo Clinical Centre, Catholic University, Rome, Italy, <sup>6</sup>Department of Developmental Neuroscience, University College London, London, United Kingdom, <sup>7</sup>Department of Neurology, David Geffen School of Medicine at UCLA, Los Angeles, USA, <sup>8</sup>Department of Clinical and Molecular Genetics, Hospital Valle Hebrón, Barcelona, Spain, <sup>9</sup>Hôpital Necker Enfants Malades, APHP, Paris, France, <sup>10</sup>Garches Neuromuscular Reference Center (GNMH), APHP Raymond Poincaré University Hospital (UVSQ Paris Saclay), Garches, France, <sup>11</sup>Institute of Medical Genetics, Tokyo Women's Medical University, Tokyo, Japan, <sup>12</sup>AveXis, Inc., Bannockburn, USA, <sup>13</sup>Department of Surgery and Center for Outcomes Research, University of Massachusetts Medical School, Worcester, USA, <sup>14</sup>MDUK Oxford Neuromuscular Centre, University of Oxford, Oxford, United Kingdom

**Background and aims:** Spinal muscular atrophy (SMA) is a debilitating disease characterised by muscle weakness, respiratory failure, and early death. While recent advancements have dramatically improved prognosis, real-world data on treatment outcomes remain limited. The RESTORE registry is a comprehensive registry of patients with SMA specifically designed to overcome the recognised limitations of existing single-product registries.

**Methods:** RESTORE is an ongoing, prospective, multicentre, multinational, observational study, assessing outcomes in SMA patients, informing patients, caregivers, regulatory agencies, and researchers on the effectiveness and safety of approved and emerging treatments; and collecting information on healthcare resource utilisation and caregiver burden. The RESTORE database incorporates data from patients enrolled in partnering registries and the onasemnogene abeparvovec (formerly AVXS-101) managed access programme. Follow-up duration is 15 years from enrolment or until death.

**Results:** As of 3 January 2020, the RESTORE database comprises information from 64 patients and 25 active sites in the United States. This cohort permits descriptive analyses of patients with a range of baseline characteristics at time of dosing, including individuals who have switched

therapies, and who received treatment under managed/expanded access programmes at a variety of treatment centres. RESTORE is rapidly expanding globally, with 53 sites currently in start-up.

**Conclusion:** The RESTORE registry represents a pivotal resource for enhancing our understanding of SMA disease course under differing treatment regimens, and off therapy, in a diverse set of patients.

**Disclosure:** This study was sponsored by AveXis, Inc., a Novartis Company.

## EPO1167

### ALS plateaus: demographics, disease characteristics, treatments, and co-morbidities

Y. Fainmesser, A. Abraham, B. Vainer, B. Nefussy, V.E. Drory

*Neurology, Tel Aviv medical center, Tel Aviv, Israel*

**Objective:** To identify differences in demographics, disease characteristics, treatments, and comorbidities between patients with amyotrophic lateral sclerosis (ALS) who experience periods of stability without disease progression (“plateaus”) and patients with typical progression.

**Methods:** Our retrospective study used data of over 1200 patients followed up at the ALS clinic at Tel-Aviv Sourasky Medical Center during the years 1996-2018. From these ALS plateaus were determined (defined as patients with a drop of 2 points or less on the revised ALS Functional Rating Scale (ALSFRRS-R) within 12 months). Their demographic and clinical data were compared with a group of patients with a classical ALS progression (average 12 points drop in ALSFRS-R within 12 months).

**Results:** 78 cases and 131 controls were confirmed through chart review. Among the Plateaus, median duration of the plateau period was 18.5 months.

Comparisons between the demographics and disease characteristics of cases and controls did not show any significant differences in family history, past physical activity, occupation, or co-morbidities.

“Plateaus” were more frequently male, had a younger age at onset, lower prevalence of bulbar onset, and smoked more packyears.

The exposure to cannabis was greater for plateaus than for controls. The odds of exposure to Riluzole was significantly lower in plateau patients. The exposures to other medications were not significantly different between groups.

**Discussion:** Lower age at onset, male sex, smoking and use of cannabis were associated with periods of stability in patients with ALS. Better understanding of the processes leading to disease stability might suggest potential treatment strategies.

**Disclosure:** Nothing to disclose

## EPO1168

### Financial Impact of a formal Percutaneous Endoscopic Gastrostomy (PEG) pathway for patients with Motor Neurone Disease (MND) at the Leeds Regional MND Care Centre

S. Farid<sup>1</sup>, L. Tuttle<sup>2</sup>, J. Currell<sup>3</sup>, J. Selfridge<sup>3</sup>, A. Jung<sup>2</sup>  
<sup>1</sup>Multan, Pakistan, <sup>2</sup>Neurology, Leeds General Infirmary, Leeds, United Kingdom, <sup>3</sup>Leeds General Infirmary, Leeds, United Kingdom

**Background and aims:** Dysphagia is a major issue in patients with Motor Neuron Disease (MND) and assisted nutrition by percutaneous endoscopic gastrostomy (PEG) is modality of choice at Leeds Regional MND Care Centre. Following a patient death whilst waiting for a PEG in 2014, our centre developed a formal PEG pathway. We conducted this study to assess cost effectiveness of this PEG pathway which is operational since 2015.

**Methods:** Patients were selected from local MND registry and relevant clinical data was obtained through electronics records. Patient cohorts were defined as '2014' and '2018' (year of PEG insertion) and '2017' (patients died in this year). Financial information was extracted from PLICS (Patient Level Information Costing System).

**Results:** Average cost of the MND patient journey in the 2014 cohort was £298 while £348 in 2018 cohort. Comparing 2018 to 2014, average cost of the PEG procedure reduced to £2,650 from £4,747, average length of stay (LOS) reduced to 2.5 days from 3.1 days, average LOS for PEG episode has reduced to 5.1 days from 9.3 days. In 2017 cohort, average cost of PEG patient was £272 against £454 in non-PEG patient while average LOS for PEG patients was 2.2 days compared to 3.1 days for non-PEG patients. For the 2017 cohort, total and average costs were £275,652 and £329 respectively.

**Conclusion:** Formal PEG pathway has proven to be a significant positive impact financially on health care in patients with MND. We suggest that a multidisciplinary dedicated PEG pathway should be a standardised part of MND care.

**Disclosure:** Nothing to disclose

## EPO1169

### TDP-43 nucleo-cytoplasmic mislocalization can be rescued by antisense oligonucleotide treatment in ALS cell lines harboring C9Orf72 mutation

D. Gagliardi, M. Taiana, M. Nizzardo, S. Salani, A. Bordoni, I. Faravelli, N. Bresolin, G.P. Comi, S. Corti  
 Department of Pathophysiology and Transplantation (DEPT), Università degli studi di Milano, Milan, Italy

**Background and aims:** The cytoplasmic accumulation and aggregate formation of hyper-phosphorylated and ubiquitinated TDP-43 is the pathological signature of TDP-43 proteinopathies, including C9Orf72-related fronto-temporal lobe degeneration (FTLD). Impairment in nucleo-cytoplasmic (NC) transport and TDP-43 NC mislocalization have been extensively reported in Amyotrophic lateral sclerosis (ALS), including C9-ALS. We aimed to validate TDP-43 NC mislocalization in cell lines derived from C9-ALS patients, compared to controls, sporadic lines (sALS) and other familial lines (fALS) and to evaluate the therapeutic effect of antisense oligonucleotide (ASOs) administration. Moreover, we aimed to test the role of TDP-43 mitochondrial localization in causing neuronal toxicity in ALS.

**Methods:** We obtained fibroblasts from ALS patients and controls and we performed immunofluorescence and Western blot for nuclear, cytoplasmic and mitochondrial fractions of TDP-43. Then, we transfected C9 lines with 2 different ASOs with Morpholino chemistry, 1 binding to the expansion motif and the other 1 binding to the promoter and silencing the whole gene.

**Results:** fALS lines with mutations in TARDP43 and C9Orf72 showed TDP-43 NC mislocalization, compared to controls and other ALS lines. TDP-43 mitochondrial content seemed to be increased in C9-ALS and TDP-43-ALS, and mitochondrial impairment was observed. ASO treatment, particularly with Morpholino-B, was able to revert TDP-43 NC ratio in C9-ALS.

**Conclusion:** Our results confirm that TDP-43 NC mislocalization is a pathological hallmark in C9-ALS and suggest that ASO may be a promising therapeutic strategy in C9-ALS patients. Further investigations are needed to assess if mitochondrial TDP-43 localization may cause mitochondrial toxicity in C9-ALS, potentially providing new TDP-43-based therapeutical strategies.

**Disclosure:** Nothing to disclose

## EPO1170

### The tolerability of non-invasive ventilation in motor neurone disease patients

A. Gilchrist<sup>1</sup>, A. Chaouch<sup>2</sup>

<sup>1</sup>Salford, <sup>2</sup>Neurology, Salford Royal Hospital, Manchester, United Kingdom

**Background and aims:** Motor neurone disease (MND) is a devastating and fatal neurodegenerative disease. Non-invasive ventilation (NIV) is the gold standard used to treat the respiratory impairment that occurs and is shown to be the most beneficial treatment for increasing survival. Unfortunately, some patients cannot tolerate NIV.

This study aimed to examine MND patients in Manchester who had been referred for NIV to determine if there were factors which correlated with tolerability.

**Methods:** We retrospectively reviewed MND patients who had been referred for NIV at the University Hospital of South Manchester in 2017. Data was then collected by reviewing the Electronic Patient Record (EPR) at Salford Royal Hospital and the EPR and physical records at the University Hospital of South Manchester.

**Results:** Tolerability was defined as consistent use of NIV for at least 4 hours a day. Of the 24 patients included, 16 (67%) were tolerant. The only statistically significant result identified was the positive correlation between indoor mobility and tolerability ( $p=.004$ ). Tolerability was also likely correlated with the disease phenotype, psychosocial state, and certain respiratory parameters. See the results table attached.

Median (IQR) / Total frequency (%)	Total n = 24	Tolerant patients n = 16	Intolerant patients n = 8	Statistically significant (p value <0.05)
Age (y)	66.50 (13.25)	66.50 (14)	62.50 (17)	.312
Women	6 (25)	4 (25)	2 (25)	>.999
Deceased	18 (75)	11 (69)	7 (86)	.621
Survival (mo)	27.50 (27)	28.00 (16)	22.00 (37)	.856
Onset				.733
ALS bulbar	6 (25)	5 (31)	1 (13)	
ALS limb	11 (46)	7 (44)	4 (50)	
ALS resp.	1 (4)	1 (6)	0 (0)	
Other	6 (25)	3 (19)	3 (38)	
Cognitive impairment	1 (4)	1 (6)	0 (0)	>.999
Indoor mobility				.004
Independent	14 (58)	13 (81)	1 (13)	
Mobility aid	10 (42)	3 (19)	7 (88)	
Dysphagia				.301
Yes	13 (54)	7 (44)	6 (75)	
No	11 (46)	9 (56)	2 (25)	
Evidence of depression or anxiety	13 (54)	7 (44)	6 (75)	.211
Taking riluzole	18 (67)	12 (75)	6 (75)	>.999
Time (mo) from symptom onset to NIV referral	17.00 (30)	17.00 (21)	25.00 (52)	.602
Patients with respiratory symptoms	n = 23 19 (79)	n = 15 13 (87)	6 (75)	.589
Initiated due to acute decompensation	6 (25)	6 (38)	0 (0)	.066
Reported issues with NIV				.363
Yes	12 (50)	10 (42)	2 (25)	
No	12 (50)	6 (38)	6 (75)	

Results Table

**Conclusion:** There is a need for further prospective research to make definitive conclusions about what factors influence tolerability. With a better understanding of the impact of the modifiable factors, the rate of NIV tolerability could be improved to allow more patients to benefit from this vital treatment.

**Disclosure:** This project was done with the support of the University of Manchester, Salford Royal Hospital, and the University Hospital of South Manchester.

# EPO1171

## Factors affecting survival in patients with motor neuron disease

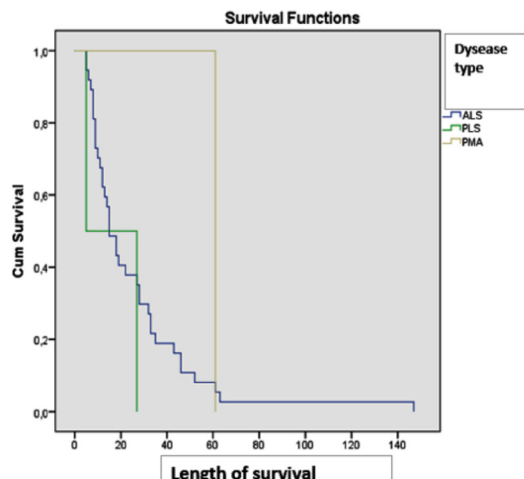
T. Gilman Kuric<sup>1</sup>, J. Tamse<sup>2</sup>, S. Misevic<sup>1</sup>,  
 L. Knezevic Poljak<sup>3</sup>, Z. Popovic<sup>1</sup>, S. Tomić<sup>1</sup>  
<sup>1</sup>Department of Neurology, University Hospital Center Osijek, Osijek, Croatia, <sup>2</sup>Faculty of Medicine, Josip Juraj Strossmayer University of Osijek, Maribor, Slovenia,  
<sup>3</sup>Department of Neurology, University Hospital Osijek, Osijek, Croatia

**Background and aims:** Motor neuron disease (MND) is a neurodegenerative disorder characterized with upper and lower moton neuron lesion and bulbar symptoms. Etiology is still unknown and prognosis is very poor with short survival period. There are different types of MND depending on involved neurological system (amiotrophic lateral sclerosis, primary lateral sclerosis, progressive bulbar palsy, progressive muscular atrophy) with different survival. The aim was to determine differences in survival depending on the MND type, involved neurological system on beginning, gender, age, duration of symptoms up to and from the beginning of treatment with riluzole.

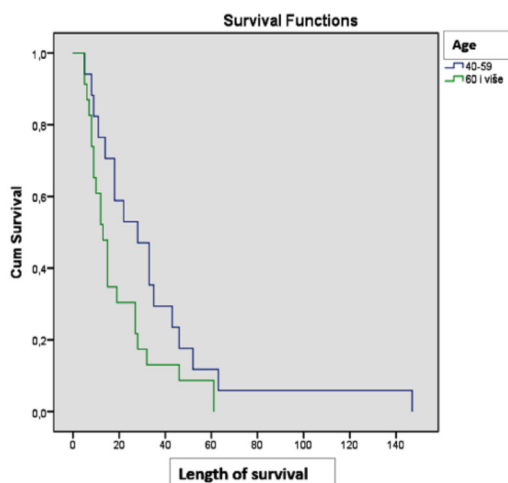
**Methods:** The study was designed as a retrospective cross sectional, with data extracted from patients medical history. All the patients from 2007 till the end of 2017 were analyzed.

**Results:** We've analysed 49 patients. Negative correlation was found between the patient's age at the disease onset and the survival ( $p < 0.027$ ) and positive correlation between the length of symptoms duration prior diagnose ( $p < 0.001$ ) and duration of medical treatment with riluzole ( $p < 0.020$ ) and survival. Patients treated more then 1 year with riluzole ( $p < 0.013$ ) and had symptoms more than 1 year before diagnose was made ( $p < 0.001$ ) had better survival. We haven't found difference in survival in respect to the gender, involved neurological system on the begining and type of MND.

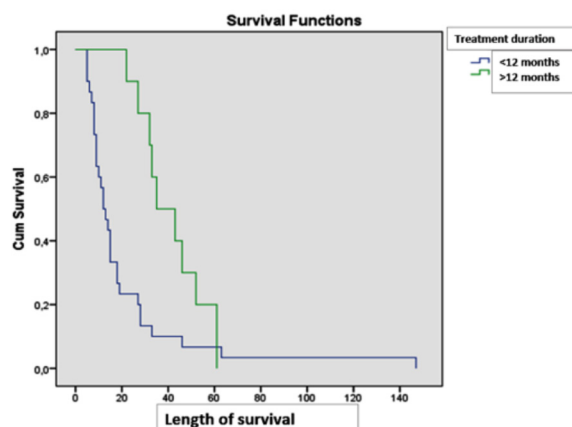
**Conclusion:** Younger patients, patients with symptoms lasting more than 1 year prior the diagnose and treated with riluzole more than 1 year had better survival. We haven't noticed influence of gender, disease type, neither involved neurological system on begining on survival.



Kaplan Meyer table-disease type



Kaplan Meyer table-age



Kaplan Meyer table-treatment duration

**Disclosure:** Nothing to disclose

## EPO1172

**Epidemiological data on ALS in Albania**

H. Gorica<sup>1</sup>, M. Shyti<sup>1</sup>, I. Alimehmeti<sup>2</sup>, K. Elpenoria<sup>1</sup>, G. Halili<sup>3</sup>, A. Kuqo<sup>4</sup>, J. Kruja<sup>3</sup>

<sup>1</sup>Neurology, Faculty of Medicine, University of Medicine, Tirana, Tirana, Albania, <sup>2</sup>Family and Occupational Health Department, Faculty of Medicine, UMT, Tirana, Albania,

<sup>3</sup>Neurology, Faculty of Medicine, UMT, Tirana, Albania,

<sup>4</sup>Neurology, UHC Mother Teresa, Tirana, Albania

**Background and aims:** The primary objective of this study was to evaluate the hospital incidence of ALS in Albania.

**Methods:** This is a prospective study. All the patients who were suspected to suffer from ALS from all over the Country were hospitalized at the Department of Neurology, UHC “Mother Teresa”. The diagnosis was made based in the clinical notes, electrophysiological and imaging investigations. All the patients that fulfilled the criteria for ALS were included in our database. The data was retrieved from the patient files database during January 2018 -December 2019. First admission was used to calculate incidences. Age distribution was reported by sex and age group. The study is part of NDAL (Neurodegenerative Diseases in Albania) in collaboration with Center for Neurodegenerative Diseases and the Aging Brain, University of Bari “Aldo Moro”.

**Results:** A total number of 40 ALS patients, 27 (63%) males and 13 (32%) females were included. The mean age at diagnosis was 56+11.9 years old (max 76, min 21). Males developed ALS more frequently than females on the 5th decade of life. The mean annual incidence of ALS in Albania resulted 0,73 per 100,000 in 2018 and 0,66 per 100,000 in 2019.

**Conclusion:** ALS affects more frequently males than females in Albanian population. The mean age of 56 years old is almost the same compared to Western countries. ALS incidence in Albania results distinctively low in comparison to other European countries (considering the population in Albania the annual incidence was expected to be approximately 55 cases).

**Disclosure:** Nothing to disclose

## EPO1173

**The effect and challenges of nusinersen treatment in adult spinal muscular atrophy patients – preliminary results**

B. Inan<sup>1</sup>, C.E. Bekircan-Kurt<sup>2</sup>, M. Kilinc<sup>3</sup>, S. Erdem-Özdamar<sup>2</sup>, E. Tan<sup>2</sup>

<sup>1</sup>Ankara, Turkey, <sup>2</sup>Neurology, Hacettepe University, Ankara, Turkey, <sup>3</sup>Physiotherapy and rehabilitation, Hacettepe University, Ankara, Turkey

**Background and aims:** Nusinersen has been approved for all types of SMA, although there are no data from clinical trials in adult SMA type 3 patients. Therefore real-life experiences are essential to show safety and efficacy. We shared our real-life experience in adult patients.

**Methods:** Nusinersen was administered intrathecally on days 1, 29, 85, and 274. Hammersmith Functional Motor Scale-Expanded (HFMSE) scores were evaluated before the 1st dose and during the follow-ups. The feasibility of lumbar puncture (LP) and side effects of nusinersen were reviewed.

**Results:** 36 out of 40 patients were SMA type 3, 4 were type 2. The mean age was 34.4 (range:19-60). The mean HFMSE score was 27 (range:0-65), and 42.5% were ambulatory. Conventional LP could not be performed in 6 patients because of scoliosis. After placement of intrathecal catheter, 1 patient completed 3 doses without complications. 1 patient had LP under fluoroscopy-guidance, and 4 have been waiting for surgery. 1 patient discontinued the treatment due to the difficulty of the procedure. So far, 3 patients completed 4 loading doses. Post-LP headache was reported in 2% of LPs. 7 patients developed proteinuria.

**Conclusion:** Intrathecal administration of nusinersen was generally well-tolerated. Scoliosis was the main challenge that can be overcome by spinal catheter or fluoroscopy-guidance. LP may be the reason for abandoning treatment. The most common side effect was proteinuria that did not cause any discontinuation of treatment. At the time this abstract was written, post-treatment evaluations of patients by HFMSE scores have still been continued and will be presented during the meeting.

**Disclosure:** Nothing to disclose

## EPO1174

### **Analysis of neuronal loss and pTDP-43 positive neuronal/glial inclusions between bulbar and lower-limb onset ALS phenotypes**

K. Inoue, R. Yamashita, M. Yamadera, K. Toyooka, C. Mori, H. Fujimura  
*Neurology, National Hospital Organization Toneyama National Hospital, Toyonaka, Japan*

**Background and aims:** We aimed to see pathological features of bulbar onset and lower-limb onset ALS phenotypes in relation to neuronal loss and pTDP-43 inclusions.

**Methods:** Brain tissues from 8 bulbar-type ALS patients and 7 classic-type ALS patients with lower limb onset were obtained at autopsy from Toneyama National Hospital. Neuronal loss and gliosis in routine sections were semiquantitatively evaluated. The number of pTDP-43 positive neuronal/glial inclusions were scored in each section using a semiquantitative grading system.

**Results:** The bulbar-type patients showed neuronal loss: 8/8 (1 mild, 2 moderate, 5 severe) in the hypoglossal nuclei in contrast to the lower-limb onset patients: 6/7 (3 mild, 2 moderate, 1 severe). In the anterior horn of lumbar cords, all patients showed neuronal loss (i.e. bulbar-type patients: 6 mild, 1 moderate, 1 severe; lower-limb onset: 1 mild, 4 moderate, 2 severe). There was a tendency for clinical symptom at onset to affect pathological severity in neuronal degeneration of motor neurons. pTDP-43 staging showed more inclusions in the bulbar-type, Brettschneider stage III and IV (each 4 patients respectively) than in lower-limb type, stage II (2), III (4) and IV (1). We could not find any feature of topographical distribution of inclusions in the supra-tentorial nuclei between bulbar and lower-limb types.

**Conclusion:** Phenotypes of ALS might affect severity of neuronal loss in motor nuclei. We could not find a clear tendency in pTDP-43 inclusions in either phenotype.

**Disclosure:** Nothing to disclose



# Movement disorders 1

## EPO1175

### Peripheral silent period in cervical and generalized dystonia

H. Abbaszade, M. Tütüncü, A. Gunduz, M. Kızıltan  
 Department of Neurology, Istanbul University Cerrahpaşa  
 Faculty of Medicine, Istanbul, Turkey

**Background and aims:** Dystonia is an involuntary movement disorder in which continuous or intermittent muscle contractions cause abnormal postures or repetitive movements. Abnormalities sensorimotor integration and inhibitory pathways are accused in pathophysiology of dystonia. The aim of this study was to investigate the state of inhibitory pathways in spinal cord in dystonia by recording silent period (SP).

**Methods:** We included 23 patients with dystonia (12 female, 11 male); 10 patients (44.0%) with cervical dystonia and 13 with generalized dystonia. We also recruited 19 healthy subjects (11 female, 8 male; p=0.711) as a control group. Age was similar between groups (41.4±12.1 vs 36.2±5.2 years, p=0.092). To record SP, surface electrodes were placed over belly of right abductor pollicis brevis (APB) muscle while subject was performing a moderate contraction. For cutaneous stimulation (CuSP), stimulus was 20 times sensory threshold in intensity and applied on right index finger. For mixed nerve stimulation (MnSP), stimulus at 3 times motor threshold was applied on median nerve at wrist.

**Results:** Regarding onset latency, duration and suppression index of CuSP, the onset and end latencies of MnSP as well as its duration there was no difference between patients with dystonia and healthy subjects. Comparisons of patients with segmental and generalized dystonia showed I2 suppression index was low in patients with generalized dystonia.

Group Statistics					
	grupikili	N	Mean	Std. Deviation	Std. Error Mean
I1onsetlatency	3,00	3	43,6667	3,21455	1,85592
	1,00	20	45,3400	8,18062	1,82924
I2onsetlatency	3,00	18	76,7444	21,87094	5,15503
	1,00	22	76,9364	12,74757	2,71779
LLRonsetlatency	3,00	3	59,6667	2,51661	1,45297
	1,00	18	56,1889	16,10692	3,79644
I2duration	3,00	3	75,6667	11,17915	6,45428
	1,00	21	68,5238	14,19570	3,09776
I121duration	3,00	17	38,2706	10,21419	2,47731
	1,00	20	38,4050	10,59426	2,36895
I2endlatency	3,00	17	119,4588	16,14385	3,91546
	1,00	21	117,2476	14,99452	3,27207
suppindex	3,00	17	98,7294	5,23877	1,27059
	1,00	21	93,6667	15,91645	3,47325

CUSP

Group Statistics					
	grupikili	N	Mean	Std. Deviation	Std. Error Mean
mnspon	3,00	18	25,1222	1,53568	,36196
	1,00	21	25,5667	1,68266	,36719
mnsppoff	3,00	18	110,6500	11,64304	2,74429
	1,00	21	113,2381	19,07036	4,16149
mnsppdur	3,00	18	85,5278	11,50712	2,71225
	1,00	20	87,8050	19,43010	4,34470

MNSP

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
I1onsetlatency	Between Groups	7,304	1	7,304	,119	,734
	Within Groups	1292,195	21	61,533		
	Total	1299,499	22			
I2onsetlatency	Between Groups	,365	1	,365	,001	,973
	Within Groups	11544,255	38	303,796		
	Total	11544,620	39			
LLRonsetlatency	Between Groups	31,101	1	31,101	,134	,719
	Within Groups	4423,024	19	232,791		
	Total	4454,126	20			
I1duration	Between Groups	133,929	1	133,929	,688	,416
	Within Groups	4280,305	22	194,559		
	Total	4414,233	23			
I2duration	Between Groups	,166	1	,166	,002	,969
	Within Groups	3801,805	35	108,623		
	Total	3801,971	36			
I2endlatency	Between Groups	45,935	1	45,935	,191	,665
	Within Groups	8666,694	36	240,741		
	Total	8712,628	37			
suppindex	Between Groups	240,800	1	240,800	1,574	,218
	Within Groups	5505,782	36	152,938		
	Total	5746,582	37			
mnspon	Between Groups	1,915	1	1,915	,732	,398
	Within Groups	96,718	37	2,614		
	Total	98,632	38			
mnsppoff	Between Groups	64,921	1	64,921	,251	,619
	Within Groups	9578,095	37	258,867		
	Total	9643,016	38			
mnsppdur	Between Groups	49,128	1	49,128	,188	,667
	Within Groups	9424,086	36	261,780		
	Total	9473,214	37			

ANOVA

**Conclusion:** We found no difference regarding spinal inhibitory circuits in patients with cervical or generalized dystonia. However, there was less suppression during CuSP in patients with generalized dystonia whereas it was similar to healthy subjects in patients with cervical dystonia.

**Disclosure:** Nothing to disclose

## EPO1176

### Role of increasing levels of the hormone cortisol in cognitive impairment in Parkinson's disease

D. Akramova<sup>1</sup>, G. Rakhimbaeva<sup>2</sup>

<sup>1</sup>Tashkent, Uzbekistan, <sup>2</sup>Neurology department, Tashkent Medical Academy, Tashkent, Uzbekistan

**Background and aims:** Elevated cortisol levels are found in many diseases.

**Methods:** We studied the level of morning plasma cortisol in Parkinson's disease (PD) in 68 patients who was hospitalized in Department 1 of TMA neurology in the period 2015 to the present. The results of the study were statistically analyzed. Cortisol was determined in all blood samples of patients of the Main and Control groups. The control group consisted of 47 volunteers. The concentration of cortisol was studied by enzyme immunoassay on an automatic analyzer EL808 Ultra Microplate Rider (BIO-TEC Instruments, Inc) using standard sets of reagents "Steroid IFA-cortisol-01" series No. 061P and "Non-extraction IGF-1 ELISA DSL-10-2800". The reference values of the norm of cortisol were 50-250 mg/ml. To assess cognitive status, we evaluated on the MMSE scale, MOCA test.

**Results:** 50-250mg/ml

250-500mg/ml

500-900mg/ml

Main group n=68

20 (29.4%)

3 (54.4%)

1116.1%)

Control group n=47

32 (68%)

9 (19.1%)

3 (6%)

Spearman's rank correlation coefficient. The relationship of cortisol levels and indicators of cognitive impairment.

Groups

**MMSE**

**MOCA test**

Main group

n=68

r=-0.45, p=0.03

r=-0.13, p>0.05

Control group

n=47, r=0.77, p=0.02

r=0.74, p=0.04

The relationship between the value of cortisol and the assessment of cognitive impairment was determined. In the main group, a statistically significant moderate inverse correlation was determined between plasma cortisol level and cognitive impairment in PD. When studying cortisol levels in PD, its significant increase is noted than in the control (p<0.05).

**Conclusion:** Increased levels of the hormone cortisol in Parkinson's disease play an important role in cognitive impairment and during the course of the disease and affect the effectiveness of PD therapy.

**Disclosure:** Nothing to disclose

## EPO1177

### Non-motor symptoms in a cohort of patients undergoing bilateral subthalamic stimulation

M.T. Alba Isasi, J. López Sánchez,

M. Morales de la Prida, J. Vazquez Lorenzo,

M. Cánovas Iniesta, L. Fuentes Rumí, E. García Molina,

G. Valero López, A.E. Báidez Guerrero, J. Jimenez Veiga,

O. Morsi Hassan

Neurology, Virgen de la Arrixaca University Hospital, Murcia, Spain

**Background and aims:** Deep brain stimulation (DBS) of the subthalamic nucleus is an effective therapy in the improvement of motor fluctuations in patients with advanced Parkinson's disease (APD). In recent years, the importance of the presence of non-motor symptoms (NMS) in reducing the quality of life of affected patients has been demonstrated

**Methods:** Retrospective study of a cohort of patients undergoing DBS in our center, in which the presence of NMS is studied.

**Results:** 32 patients were interviewed, obtaining a median of 86.5±78 in Parkinson's disease sleep scale, with 31.3% of patients with a score below 86 points, a median of 21±16 in MOCA (Montreal Cognitive Assessment), with 48.1% of patients below 14, and a median of 18.5±13.2 in Beck Depression inventory with 59% of patients within the category of "moderate-severe" depression. 93.7% of the patients presented both hyposmia and pain, and all of them, some dysautonomic symptom. Being a woman [0.072 95% CI (0.007-0.713), p=0.025], and a shorter illness time [0.834, 95% CI (0.692-0.999), p=0.05], protects against a worse quality of sleep. The worst results in MOCA were related with the time of illness [3,741 (95% CI 3.7-12.5), p=0.01], however, in the multivariate analysis the association was lost. The presence of premotor symptoms was associated in the univariate analysis with a worse score in Beck's inventory [OR: 4.81, 95% CI (1,001-25.65), p=0.05], without remaining in the multivariate.

**Conclusion:** Patients with APD submitted to DBS present significant amount of NMS.

**Disclosure:** Nothing to disclose

# EPO1178

## Features of sensory-motor integration between visual perception and the oculomotor system and their MRI correlates in Parkinson's disease

O.A. Alenikova<sup>1</sup>, S. Likhachev<sup>1</sup>, N. Alenikov<sup>2</sup>, L. Parkhach<sup>1</sup>

<sup>1</sup>Department of Neurology, Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus, <sup>2</sup>Health care agency "32nd city clinical health centre", Minsk, Belarus

**Background and aims:** The eye movements and visual functions are closely interconnected to percept the world properly. Optokinetic reflex (OKN) and saccades reflect visual-motor interaction during the image transferring from the peripheral retina to the fovea. Visual disturbances along with a brain structure degeneration in PD lead to action/perception dissociation. We investigated the relationship between the visual function state, oculomotor parameters and MRI morphometry

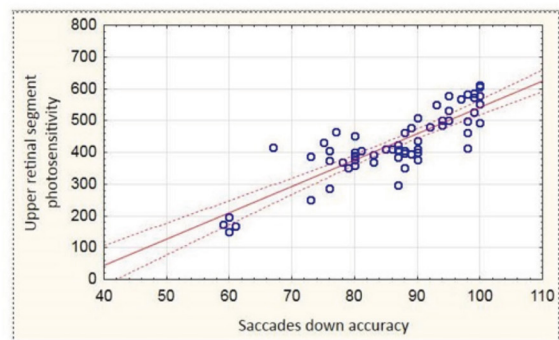
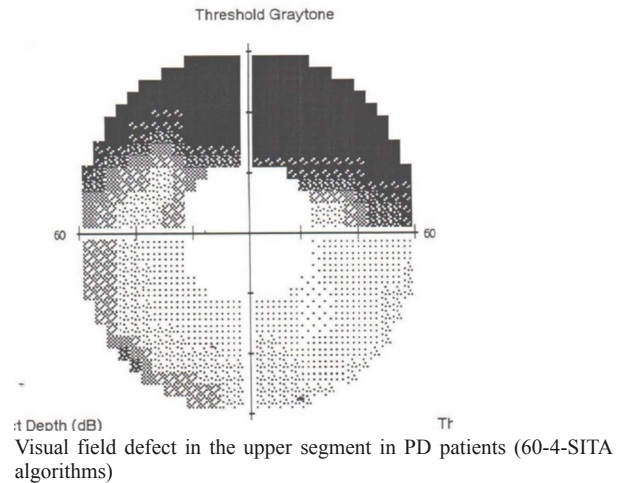
**Methods:** 42 PDpatients with 2–3 stages and 20 age-matched controls were examined. OKN and saccades were investigated by video-oculography. Threshold perimetry with photosensitivity determination in the central and peripheral retina assessed the visual function. MRI study was performed with voxel-based morphometry analysis.

**Results:** There was a significant decrease in the vertical saccades accuracy and velocity, vertical OKN velocity with relatively unchanged saccads and OKN in horizontal direction in PDpatients (table). The visual field defect predominately was located in the superior region of the peripheral retina, especially in PDpatients with postural instability. A decrease in the photosensitivity in this retinal region was correlated with a decrease in the downward saccade parametres, and vertical OKN velocity in both directions (figure 1 and 2). Positive correlation was established between reduced in the volume of inferior temporal gyrus, posterior parietal cortex, cuneus and velocity of vertical OKN and saccades, between retinal photosensitivity and volume in posterior parietal cortex and cuneus.

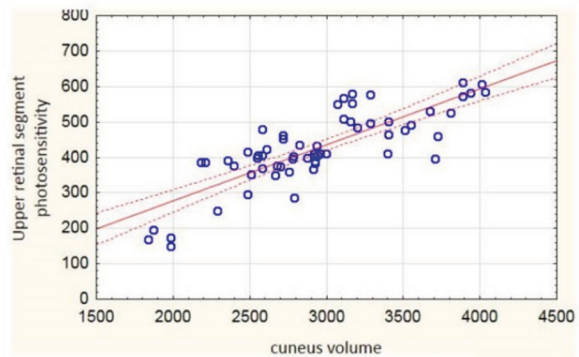
Movement direction	Groups	Saccadic test		OKN	
		Accuracy (%)	Velocity %/c	Stimulus velocity 20°/s	
				Velocity %/c	Gain (%)
Me (Q1, Q3)					
Left	control group	96 (88; 100)	465 (423; 503)	21,3 (20,7; 22,8)	107 (103; 114)
	PD patients	93 (87; 95)	443 (408; 500)	19,7 (17,9; 22,8)	98,8 (94,1; 113)
Right	control group	97 (86; 99)	462 (420; 500)	22 (19,5; 22,9)	110 (107; 115)
	PD patients	91 (85; 94)	443 (414; 484)	19,9 (18,5; 22,3)	99,5 (95,4; 109)
Up	control group	95 (88; 99)	456 (423; 496)	22 (20,7; 23,2)	101 (95; 110)
	PD patients	73 (66; 84)*	346 (266; 393)*	14,8 (10,6; 18,7)*	73 (55; 91)*
Down	control group	96 (87; 98)	450 (424; 502)	21 (20,1; 22,6)	99 (90; 113)
	PD patients	70 (61; 86)*	367 (299; 414)*	14,8 (11,3; 18,3)*	74 (53,1; 93)*

\* - Statistically significant difference (p < 0.05) between 1st and control groups (Mann-Whitney test);

Table. Comparative assessment of the saccadic and OKN parameters in PD patients and control group



A. Correlation: r = 0,795



B. Correlation: r = 0,757

An example of a positive correlation between retinal photosensitivity in the upper peripheral segment and saccades down accuracy (A); between retinal photosensitivity in the upper peripheral segment and volume in cuneus

**Conclusion:** The disturbance of inputs from the superior retina has a great influence on the disturbance of vertical oculomotor reflexes, and is associated with a decrease in the brain structures volume involved in visual perception in PD.

**Disclosure:** Nothing to disclose

## EPO1179

**May safinamide have a role in atypical parkinsonism? a retrospective study in clinical practice**

F. Rodríguez Jorge, P. Pérez Torre, I. Pareés,  
J.L. Lopez Sendon, E. Natera-Villalba, A. Gómez López,  
J.L. Chico, Á. Beltrán Corbellini, P. Parra Díaz,  
S. Fanjul Arbos, J.C. Martínez Castrillo,

A. Alonso Cánovas

*Neurology, Hospital Ramón y Cajal, Madrid, Spain*

**Background and aims:** Safinamide (50-100mg) has proved efficacy as an add-on treatment to levodopa in fluctuating Parkinson's disease (PD). Atypical parkinsonian syndromes (AP, progressive supranuclear palsy, PSP, Multiple System Atrophy, MSA, Corticobasal Syndrome, CBS) have a poor prognosis and lack specific treatment. Drugs approved for PD are commonly used off-label for symptomatic treatment in AP.

**Methods:** Retrospective study (2016-2020) of electronic records of our Movement Disorders Unit: patients with clinical diagnoses of AP with a safinamide prescription were registered. Clinical Global Impression of Improvement (CGI-I) was used for efficacy assessment.

**Results:** 26 patients, 10 (38%) male, mean 70±10 years, with diagnosis of MSA (14), PSP (11) and CBS (1), and disease duration 7±4 years were prescribed safinamide at 50mg (1), 100mg (21) or 200mg (4). 1 patient was lost to follow-up before reassessment, and the remaining 26 were followed a mean of 8±9 months afterwards. 8 patients (32%) experienced mild adverse events (drowsiness, confusion, feeling unwell, headache). 9 patients (32%) (6 MSA, 3 PSP, 1 CBS) followed 13±11 months improved with safinamide (CGI-I 1 in 1, 2 in 6, 3 in 3), mainly in mobility (6), falls (5), mood (2), pain (2), sleep (1), dyskinesia (1). 14 cases did not improve (11) or minimally worsened (3), leading to discontinuation after 4±4 months.

**Conclusion:** In our experience with AP, off-label safinamide treatment was overall well tolerated, and had a clinical benefit in a subset of patients. Clinical trials are warranted to establish efficacy and safety of safinamide in this clinical setting.

**Disclosure:** Nothing to disclose

## EPO1180

**Cerebral cavernomatosis as a chameleon of Parkinson's disease**

A. Andre, A. Félix, H. Machado, C. Basilio, C. Sanchez  
*Neurology, Centro Hospitalar do Algarve, Faro, Portugal*

**Background and aims:** Idiopathic Parkinson's Disease (IPD) is the commonest type of parkinsonian syndromes and has a good response to levodopa. Secondary causes account for 14–16% of the cases, and usually have a poor response to levodopa treatment.

**Methods:** Clinical case

**Results:** A 53-year-old-male patient with previous history of cavernomatosis multiple with secondary epilepsy and severe cervical and postural limb tremor, treated with zonisamide 100mg/day, propranolol 120mg/day and carbamazepine 400mg/day, presented with subacute worsening of the gait and tremor and appearance of nocturnal akinesia and slowness in daily activities. The neurological examination revealed a severe akinetic-rigid syndrome with exuberant rest tremor lateralized to the right side, hypomimia and incapacity of gait without pyramidal, autonomic, cerebellar signs or cognitive impairment. Brain MRI demonstrated countless cerebral cavernomas, involving the right pallidocapsular region. Analytic investigation was negative in blood and urine. The patient was started on levodopa trial with gradually increase doses to 300mg per day with improvement of tremor, gait and akinetic-rigid syndrome, being able to walk with a stroller after 2 weeks on treatment. Posterior Datascan revealed a loss of pre-synaptic nigrostriatal neurons in both caudate nucleus, more on the left side.

**Conclusion:** The uncommon location of pallidal cavernomas could explain the parkinsonian symptomatology, and the stepwise progression is more typical in vascular parkinsonism. However, the good response to levodopa should raise the possibility of IPD. This differentiation between IPD and secondary causes is important not only for the choice of treatment but also for the prognosis of patients.

**Disclosure:** Nothing to disclose

## EPO1181

**Peripheral neuropathy in patients with idiopathic Parkinson's disease**

A. Antia<sup>1</sup>, N. Khizanishvili<sup>2</sup>, E. Nebadze<sup>1</sup>, N. Beridze<sup>1</sup>, M. Beridze<sup>1</sup>, N. Kvirkvelia<sup>1</sup>

<sup>1</sup>Tbilisi, Georgia, <sup>2</sup>Tbilisi, Germany

**Background and aims:** Parkinson's disease (PD) is a neurodegenerative disorder that affects motor system. Peripheral nerves are frequently involved in patients with PD that negatively influences on their quality of life.

Our aim was to assess the frequency and type of peripheral neuropathy (PNP) in PD patients.

**Methods:** The study comprised 56 patients with PD (31 males, 25 females aged 64-82 years, disease duration was 2-10 years) and 46 age and gender matched controls. Nerve conduction studies were performed in median, ulnar, peroneal, tibial and sural nerves of both limbs. Statistics performed by SPSS -14.0.

**Results:** Electrophysiological abnormalities consistent with a diagnosis of PNP were found in 30 PD patients (53.6%), who were older (76.3±6.1 vs 70.5±6.3 years) and had a longer duration of PD, compared to 13 healthy controls (28.3%). The most common type of PNP in PD patients was motor demyelinating (30.4%) axonal motor and sensory PNP detected in 23.3%. The most common type of PNP in healthy controls was axonal motor and sensory PNP and in 17.4% and sensory PNP in 10.9% (p<0.01).

**Conclusion:** PNP is common in PD patients compared to healthy controls. The most common type is the motor demyelinated PNP. Polyneuropathy is rarely found. Our results suggest the correlation between the presence of motor neuropathy in PD and age of patients (p<0.5). No correlation was found between the presence of PNP and gender.

**Disclosure:** Nothing to disclose

## EPO1182

**Super-responders to opicapone adjunct treatment to levodopa in parkinson's disease patients with motor fluctuations: combined post-hoc analysis of BIPARK-I and II**

A. Antonini<sup>1</sup>, W. Poewe<sup>2</sup>, J.J. Ferreira<sup>3</sup>, G. Ebersbach<sup>4</sup>, H. Gama<sup>5</sup>, J.-F. Rocha<sup>6</sup>, D. Magalhães<sup>6</sup>, P. Soares-Da-Silva<sup>5</sup>

<sup>1</sup>Department of Neurosciences, University of Padova, Padua, Italy, <sup>2</sup>Department of Neurology, Medical University of Innsbruck, Innsbruck, Austria, <sup>3</sup>Laboratory of Clinical Pharmacology and Therapeutics, Faculty of Medicine, University of Lisbon, Lisbon, Portugal, <sup>4</sup>Movement Disorders Clinic, Beelitz Hospital, Beelitz, Germany, <sup>5</sup>Research and Development Department, BIAL - Portela & Ca S.A., Coronado, Portugal, <sup>6</sup>Global Parkinson's Disease Department, BIAL - Portela & Ca S.A., Coronado, Portugal

**Background and aims:** Opicapone (OPC), a once-daily catechol-O-methyltransferase inhibitor, proved to be effective in treating end-of-dose motor fluctuations in Parkinson's Disease (PD) patients [1,2].

**Methods:** OPC 50-mg data from BIPARK I and II [1,2] were combined to evaluate the efficacy and safety of patients who were considered 'super-responders' (≥2 hours of OFF-time reduction or ≥2 hours of ON-time increase from baseline to double-blind endpoint). Efficacy was assessed by applying Patient and Clinician-Global Impression of Change (PGI-C and CGI-C). Safety was assessed by incidence of at least possibly related treatment-emergent adverse-events (TEAEs).

**Results:** A total of 265 patients were treated with OPC 50-mg, of whom 100 were super-responders (Safety Set, Table 1). Super-responders had longer duration of daily OFF-time at baseline and were treated with a higher mean daily levodopa amount but had similar Hoehn and Yahr stage, disease duration and onset of motor fluctuations. The percentages of patients rated as showing improvement on both PGI-C and CGI-C were approximately 15% higher for super-responders than for total study population treated with OPC 50-mg (Figure 1). The incidence of at least possibly related TEAEs was similar, with higher dyskinesia rates in super-responders (most likely due to the higher mean daily levodopa at baseline) but low overall and dyskinesia-related discontinuations (Table 2).

**Table 1.** Baseline characteristics (Safety Set)

Characteristic	Total study population	Super-responders
	OPC 50 mg N=265	OPC 50 mg N=100
Male gender, n [%]	160 (60.4)	60 (60.0)
Age, mean (SD) years	64.5 (8.8)	64.7 (8.8)
Disease duration, mean (SD) years	7.6 (4.3)	7.5 (3.8)
Onset motor fluctuations (SD) years	2.7 (2.9)	2.4 (1.8)
Hoehn & Yahr staging at ON state	2.4 (0.5)	2.3 (0.5)
Daily OFF-time, mean (SD) hours	6.2 (2.0)	6.9 (2.1)
Levodopa dose, mean (SD) mg/day	698.1 (322.8)	751.3 (337.6)

OPC, opicapone; SD, standard deviation

Table 1

**Figure 1.** Proportions of patients who were rated as improved\* (assessed by PGI-C and CGI-C) in total study population (n=262) and super-responders (n=100) at study endpoint following treatment with OPC 50-mg (Full Analysis Set). \*Improvement was defined as being rated as 'very much improved', 'much improved' or 'minimally improved'. CGI-C, Clinical Global Impression of Change; OPC, opicapone; PGI-C, Patient Global Impression of Change

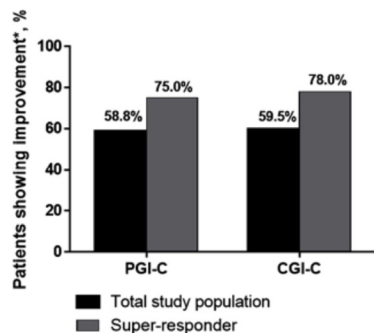


Figure 1

**Table 2.** Summary of TEAEs (Safety Set)

	Total study population	Super-responders
	OPC 50 mg N=265	OPC 50 mg N=100
At least possibly related <sup>a</sup> TEAEs, n (%)	113 (42.6)	46 (46.0)
Most frequently reported <sup>b</sup> at least possibly related <sup>a</sup> TEAEs, n (%)		
Dyskinesia	52 (19.6)	25 (25.0)
Constipation	10 (3.8)	4 (4.0)
Insomnia	8 (3.0)	3 (3.0)
Nausea	9 (2.6)	1 (1.0)
At least possibly related <sup>a</sup> TEAEs leading to discontinuation, <sup>b</sup> n (%)	20 (7.5)	3 (3.0)
Dyskinesia	8 (3.0)	1 (1.0)

<sup>a</sup>Relationship to study medication reported as 'possible', 'probable', 'definite' or missing; <sup>b</sup>≥2% of patients in total study population (n=265). OPC, opicapone; TEAE, treatment-emergent adverse event

Table 2

**Conclusion:** Super-responders to OPC 50-mg showed a high patient and clinician global impression of change and favourable tolerability.

1. Ferreira et al., *Lancet Neurol.* 2016;15(2):154-165.
2. Lees et al., *JAMA Neurol.* 2017;74(2):197-206.

**Disclosure:** Study supported by Bial - Portela & C<sup>a</sup>, S.A.

## EPO1183

**MiR-146 as a potential biomarker for Parkinson's disease**

N. Ardashirova, N. Abramycheva, E. Fedotova, S. Illarioshkin  
*Neurogenetics, Research Center of Neurology, Moscow, Russian Federation*

**Background and aims:** Parkinson's disease (PD) is the most common movement disorder worldwide. In some cases it develops due to genetic mutations, but in most cases it is multifactorial. In the last few years there is an increasing interest on epigenetic mechanisms in the development of PD. 1 of the most important epigenetic regulators is microRNA. Previously the difference in expression of microRNA in PD and control groups has been shown in various brain regions, blood, iPSC. The aim of this study is to analyze a role of microRNA as a potential biomarker of PD.

**Methods:** 20 patients with PD and 10 healthy volunteers were included in the study. Expression of miR-132, miR-7, miR-146 was explored. Total RNA was extracted from blood leukocytes using RNeasy Mini Kit (Qiagen), then specific reverse transcription for each microRNA was performed with a kit for reverse transcription with stem-loop primers, followed by real-time PCR with fluorescent probes. MiR-191 was used as a housekeeping gene. Expression has been measured using  $\Delta\text{Ct}$  method. Data analyses was performed with Statistica 10.0.

**Results:** There was significant overexpression of miR-146 in leucocytes of patients with PD compared to healthy controls ( $p=0.03$ , Mann-Witney U test). MiR-146 expression negatively correlated with UPDRS total score ( $R=-0.47$ ,  $p=0.025$ , Spearman's rank correlation).

**Conclusion:** MiR-146 should be considered as a potential biomarker for PD. Further investigation is needed to confirm the diagnostic role of this microRNA.

**Disclosure:** This work is supported with Russian Science foundation grant №17-75-20211

## EPO1184

**Effectiveness, tolerability and safety of opicapone in fluctuating Parkinson's disease**

G. Martí-Andrés, L. Armengou, I. Esparragosa, C. Toledano Illán, R. Valentí, R. Luquin  
*Neurology, Clínica Universidad de Navarra, Pamplona, Spain*

**Background and aims:** To evaluate the effectiveness, tolerability and safety of opicapone as an add-on to levodopa in fluctuating Parkinson's disease (PD) patients.

**Methods:** Observational, retrospective, cohort study that included fluctuating PD patients who started opicapone 50mg/day as add-on to levodopa. Demographic and clinical data were recollected. Clinical effectiveness was assessed by the Clinical Global Impression of Change (CGI-C) at the follow-up visit. The effect on dyskinesia and the presence of adverse events (AEs) were also reported.

**Results:** We included 35 fluctuating PD patients. The clinical characteristics of patients are shown in table 1. 18 patients showed non-troublesome dyskinesia at baseline (mostly mild). At the follow-up visit, 65.7% of patients showed a clinical improvement (CGI 1-3) and 17.2% a worsening (CGI 5-7) (Figure 1). 42.9% of patients referred at least one AE ( $n=12$  one AE/patient,  $n=3$  2 AEs/patient) of mild to moderate intensity. Dyskinesia was the most frequent AE reported. The frequency of AEs is described in Table 2. 7 patients withdrew prematurely from opicapone because of AEs and/or lack of benefit, 17 patients maintained the treatment, 6 patients reduced the Levodopa Equivalent Daily Dose (LEDD) mainly because of AEs and 5 increased the LEDD because of an insufficient benefit. There were no differences between LEDD in baseline and follow-up visit ( $p=0.3941$ ). We neither found predictive clinical variables associated with clinical improvement.

Table 2: Adverse Events at follow-up visit

<b>Dyskinesia (n (%))</b>	9 (25.7%)
Intensity:	
-Mild worsening	4
-Moderate worsening	5
History of dyskinesia at baseline visit:	
-Dyskinesia-naïve PD	4
-Dyskinesia history	5
<b>Hallucinations (n (%))</b>	2 (5.7%)
<b>Insomnia (n (%))</b>	2 (5.7%)
<b>Dizziness (n (%))</b>	2 (5.7%)
<b>Worsening of a pre-existing impulse control disorder (n (%))</b>	2 (5.7%)
<b>Constipation (n (%))</b>	1 (2.9%)

\*None of our patients developed nausea/vomiting, somnolence, dry mouth, cramps, muscle pain nor blood CPK increased

Table 2. Adverse Events at follow-up visit

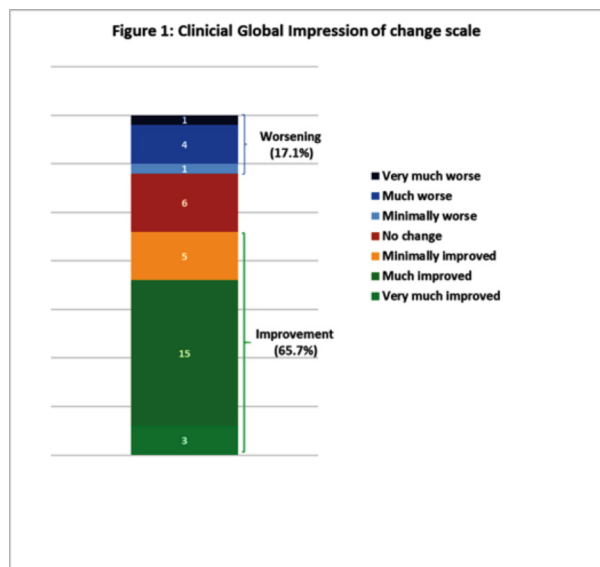


Figure 1. CGI-C scale

Table 1: Demographic and clinical data at baseline visit

Total PD patients (n)	35
Sex (female; n(%))	17 (48.6%)
Age (years)*	72.9 [62.1-77.1]
Disease duration (years)*	9.4 [6.3-13.5]
mH&Y score*	2.5 [2-3]
History of falls (n (%))	4 (11.4%)
Cognitive impairment (n (%)):	
-Mild Cognitive Impairment	3 (8.6%)
-Dementia	2 (5.7%)
History of Impulse Control Disorders (n (%))	7 (20%)
History of non-troublesome dyskinesia (n (%)):	
-Mild dyskinesia	17 (48.6%)
-Moderate dyskinesia	1 (2.9%)
LEDD (mg/day)*	880 [710-1230]
Follow-up visit (months after Baseline-visit)*	4.7 [3-7]

\*Median [Interquartile range], mH&Y= modified Hoehn &Yahr scale, LEDD = Levodopa Equivalent Daily Dose

Table 1. Demographic and clinical data at baseline visit

**Conclusion:** Our results indicate that opicapone provides a significant motor improvement in fluctuating PD. Dyskinesia is the most common complaint that might be ameliorated adjusting the concomitant dopaminergic treatment.

**Disclosure:** Nothing to disclose

## EPO1185

### Distinctive blood alpha-synuclein profile and lysosomal alterations in Parkinson's Disease patients bearing GBA1 mutations

M. Avenali<sup>1</sup>, S. Cerri<sup>2</sup>, G. Ongari<sup>2</sup>, C. Pacchetti<sup>3</sup>, C. Tassorelli<sup>1</sup>, E.M. Valente<sup>4</sup>, F. Blandini<sup>2</sup>

<sup>1</sup>Neurorehabilitation Unit; Department of Brain and Behavioural Sciences, University of Pavia, Pavia, Italy, IRCCS Mondino Foundation, Pavia, Italy, Pavia, Italy, <sup>2</sup>Laboratory of Cellular and Molecular Neurobiology, IRCCS Mondino Foundation, Pavia, Italy, Pavia, Italy, <sup>3</sup>Parkinson's Disease and Movement Disorders Unit, IRCCS Mondino Foundation, Pavia, Italy, Pavia, Italy, <sup>4</sup>Molecular Genetics and Cytogenetics; General Biology and Medical Genetics Unit, Department of Molecular Medicine, University of Pavia, Pavia, Italy, IRCCS Mondino Foundation, Pavia, Italy, Pavia, Italy

**Background and aims:** Mutations in the GBA1 gene, encoding the lysosomal enzyme glucocerebrosidase (GCase), are the most frequent risk factor for Parkinson's disease (PD). The aim of this study is to characterize the blood profile of alpha-synuclein and the main lysosomal proteins of PD subjects carrying GBA1 mutations (GBA-PD), as well as their clinical features.

**Methods:** In this study we recruited 14 GBA-PD, 25 PD subjects without GBA1 mutations (iPD) and 31 healthy subjects (HC). We evaluated alpha-synuclein levels in peripheral blood lymphocytes, plasma exosomes and whole plasma and lysosomal alterations in lymphocytes by analyzing the expression of the main GCase-related proteins (cathepsin D, LAMP1, LIMP2, Saposin C). Moreover, we assessed motor and non-motor signs in all subjects by means of clinical questionnaires and scales (MoCA, UPSIT, RBDSq, UPDRS-III, SCOPA-AUT and BDI).

**Results:** In GBA-PD, both the alpha-synuclein expression in lymphocytes and the total plasma alpha-synuclein levels were significantly increased than iPD and HC. Furthermore, a significantly higher concentration of alpha-synuclein was detected in the exosomal vesicles in iPD than GBA-PD. The GBA-PD group also displayed lower Saposin C levels and higher LIMP-2 levels compared to iPD. A prevalence of non-motor features were observed in GBA-PD group compared to iPD.

**Conclusion:** This study confirms the presence of distinctive lysosomal alterations related to GCase enzyme deficiency in GBA-PD group compared to iPD and highlights that differences also exist in the blood alpha-synuclein profile between patient's group.

**Disclosure:** Nothing to disclose



## EPO1186

**Coexistence of Klinefelter's syndrome and essential tremor: a case report**

C. Aydin Kaya, S.S. Özkaynak

*Neurology department, Akdeniz University Medical Faculty, Antalya, Turkey*

**Background and aims:** Klinefelter's syndrome is the most common sex chromosomal anomaly among males and the most common cause of male infertility. Typical clinical features are long stature and disproportionately long extremities, gynecomastia, small testes, azoospermia and infertility. It is also frequently associated with developmental delay, mood problems, and behavioral issues. There are also controlled and uncontrolled studies in the literature that patients with Klinefelter syndrome have a higher prevalence of essential tremor than the general population.

**Methods:** A 41-year-old male patient was admitted to our clinic with tremor in both hands. The patient whose complaints started in 2000 was followed in our clinic with the diagnosis of essential tremor for 19 years. In last 6 months right hand resting tremor was added to the clinical findings. The patient's last neurological examination revealed bilateral upper extremity postural and actional tremor with resting tremor in the right thumb, without rigidity and bradykinesia. As the patient was tall and he had gynecomastia, we studied a karyotype genome analysis. The analyse revealed that 47 XXY was consistent with Klinefelter syndrome.

**Results:** Our patient was resistant to medical treatment and some treatment options could not be used because of comorbid diseases of the patient and finally we planned to evaluate the patient for deep brain stimulation (DBS).

**Conclusion:** Our case will be discussed together with Klinefelter syndrome and essential tremor or essential tremor-like clinical cases reported in the literature.

**Disclosure:** Nothing to disclose

## EPO1187

**Long-term efficacy of botulinum toxin in facial movement disorders**

S. Badarny<sup>1</sup>, R. Ibrahim<sup>2</sup>, Z. Susel<sup>3</sup>, A. Zaina<sup>4</sup>, R. Nasar<sup>5</sup>, Y. Badarny<sup>6</sup>

*<sup>1</sup>Nahariya, Israel, <sup>2</sup>Haifa University, Haifa, Israel, <sup>3</sup>Neurology Zvulon, Haifa, Israel, <sup>4</sup>Endocrinology Zvulon, Haifa, Israel, <sup>5</sup>Technion Faculty Of Medicine Haifa, Haifa, Israel, <sup>6</sup>Neurosurgery, Rambam Medical Center, Haifa, Israel*

**Background:** Botulinum toxin type A injections is known as the best treatment for facial movement disorders. **Aim:** To examine the long-term effect of 2 botulinum toxin A products, Botox (Allergan) and Dysport (Madison) in patients with hemifacial spasm, facial synkinesis and benign essential blepharospasm

**Methods:** Registry analysis of 87 consecutive patients (51 women, 36 men) who had undergone treatment for  $\geq 6$  years. The long term effects, as well as side effects of Botox or Dysport local injection were evaluated.

**Results:** The mean treatment duration was 9.9 (range 6-11, SD 1.0) years. A total of 2441 treatments were given, 1162 with Botox and 1279 with Dysport. Good to full improvement was seen in 89% of treatments both with Botox and with Dysport. Treatment responses were consistent during the study with both drugs. Side effects were relatively few, mainly ptosis and lacrimation (6.1% in visits 1-3, and 3.9% in visits 4 thru study end).

**Conclusion:** A good long-term effect for local injection of botulinum toxin A (BTX-A) was observed in patients with hemifacial spasm, facial synkinesis and benign essential blepharospasm. Both BTX-A, Botox<sup>®</sup> (Allergan) and Dysport<sup>®</sup> (Madison) were effective. The two botulinum toxin A brands were interchanged as needed

**Disclosure:** Nothing to disclose

## EPO1188

**Wilson and Parkinson's disease: beyond copper metabolism**

B. Baena Alvarez<sup>1</sup>, R. Sainz Amo<sup>1</sup>, F. Rodríguez Jorge<sup>1</sup>, A. Celdrán de Castro García<sup>1</sup>, J. Masjuan<sup>1</sup>, J. Vaamonde Gamo<sup>2</sup>, J.P. Cabello de la Rosa<sup>2</sup>, D. Burgos Santamaria<sup>3</sup>, G. Sánchez Díaz<sup>1</sup>, G. García Ribas<sup>3</sup>, I. Pareés<sup>1</sup>, J.C. Martínez Castrillo<sup>1</sup>, A. Alonso Canovas<sup>1</sup>

<sup>1</sup>Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain, <sup>2</sup>Neurology, Hospital Universitario Ciudad Real, Ciudad Real, Spain, <sup>3</sup>Gastroenterology, Hospital Universitario Ramón y Cajal, Madrid, Spain

**Background and aims:** Parkinsonism is evident in approximately 40% of patients with Wilson's disease and responds favourably to metabolism control. Single photon emission computed tomography (SPECT) studies suggest both presynaptic and postsynaptic nigrostriatal dopaminergic damage, although not universally. Anecdotal case reports communicated favourable response to levodopa. Transcranial sonography (TCS) findings include mostly lenticular nucleus hyperechogenicity, while substantia nigra hyperechogenicity (SN+) is rare.

**Methods:** Case report.

**Results:** A 35 year-old woman was referred to our clinic 15 years after Wilson's disease diagnosis. Clinical onset was at the age of 20 with cognitive impairment, upper limb tremor and dystonia, all successfully controlled with D-penicillamine, zinc and trihexyphenidyl. 10 years after she presented bilateral feet dystonia and dysarthria, partially responsive to trientine and botulinum toxin injections. Treatment was suspended for 3 months without clinical changes, and zinc was restarted due to liver enzymes increase. 4 years later, she complained of slowness and gait problems leading to several falls, and bradykinesia and freezing of gait were evident on examination. A SPECT-DaTscan showed presynaptic damage and TCS hyperechogenic substantia nigra without abnormalities in lenticular nucleus. Levodopa 300mg daily improved symptoms, and a marked clinical worsening was noted after discontinuation.

**Conclusion:** We present a case of Wilson's disease with late onset parkinsonism unrelated to copper balance, with positive DaTscan and TCS similar to sporadic PD, as well as favourable response to levodopa. While a very unusual presentation of Wilson's disease is the most likely diagnosis, the possibility of an independent disorder such as a juvenile Parkinson's disease needs to be considered.

**Disclosure:** Nothing to disclose

## EPO1189

**Substantia nigra echogenicity as a predictor of drug withdrawal response in suspected drug-induced parkinsonism: a five year follow-up study**

B. Baena Alvarez, R. Sainz Amo, F. Rodríguez Jorge, J. Gómez Corral, F.J. Buisan Catevilla, N. García Barragán, I. Corral Corral, A. De Felipe Mimblera, C. Matute Lozano, J. Masjuan, J.C. Martínez Castrillo, J.L. Lopez Sendon, A. Alonso Canovas  
Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain

**Background and aims:** Differential diagnosis between drug-induced parkinsonism (DIP) and Parkinson's disease (PD) is challenging, as 15% of suspected DIP are actually PD unmasked by drug exposure. Substantia nigra hyperechogenicity (SN+) as detected with transcranial sonography (TCS) has proved useful for PD diagnosis. In a previous study (n=60), we assessed the role of TCS in suspected DIP, obtaining a positive predictive value (PPV) of SN+ of 49.9% for underlying PD. We hypothesized a longer follow-up could increase the PPV if more incidental PD cases were registered.

**Methods:** At the end of the previous study 16 patients had PD diagnosis, and 44 DIP (7 SN+, 37 SN-), being clinical resolution after drug withdrawal the diagnostic gold standard. 44 DIP patient's records were analysed 5 years after the completion of the study.

**Results:** After a mean follow up of 2.1 years (0-5), incidental PD diagnosis occurred in 2 SN+ patients (28.6%) and 1 (2.7%) SN-. 10 patients died (1 SN+, 9 SN-). Accuracy of SN+ to distinguish PD from DIP improved in terms of sensitivity 88% (82.4%), specificity 88% (previous 85.4%) and PPV 54.5% (49.9%); with similar negative predictive value 96.2% (96.5%), area-under-the-curve 0.83. The hazard ratio for final PD diagnosis in SN+ subjects with suspected DIP was 11.4 (95% confidence interval 3.7-34.8, p<0.0002).

**Conclusion:** This study strengthens the role of TCS in the assessment of suspected DIP, not only for differential diagnosis but also as a prognostic tool. In our study, PPV of SN+ improved by 5%, even if follow-up was potentially insufficient in some patients.

**Disclosure:** Nothing to disclose

## EPO1190

**The potential of asymmetric stimulation frequency in subthalamic stimulation for Parkinson's disease**

G. Baille<sup>1</sup>, A. Kreisler<sup>2</sup>, G. Touzet<sup>3</sup>, L. Defebvre<sup>4</sup>, D. Devos<sup>5</sup>, C. Moreau<sup>1</sup>

<sup>1</sup>Lille, France, <sup>2</sup>Department of Neurology, Expert Center for Parkinson's Disease, Lille University, INSERM UMRS\_1171, CHU of Lille, LICEND COEN center, University of Lille, Lille, France, <sup>3</sup>CH Lille, Lille, France, <sup>4</sup>Department of Movement Disorders, Lille Nord de France University, CHU Lille, Lille, France, <sup>5</sup>Department of Movement Disorders; INSERM U1171; Department of Movement Disorders, Lille Nord de France University, CHU Lille, Lille, France

**Background and aims:** Subthalamic deep brain stimulation (STN-DBS) is the best treatment for motor fluctuations in Parkinson's disease (PD). High-frequency stimulation (HFS) (i.e. from 130Hz) is classically the best choice to control the segmental PD symptoms. Higher frequencies (i.e. 130-180Hz) can further improve the tremor. However, HFS may also have slight differential effect on akinesia and tremor, but can also worsen some symptoms as gait. Cartesia-Boston<sup>®</sup> system for STN-DBS (Vercise Cartesia<sup>™</sup> Directional Lead, Boston Scientific, Valencia, CA, USA) allows configuring different frequency stimulation between left and right sides. As the motor symptoms of the PD are asymmetrical, we aimed to display if differentiated frequency can improve the tremor in patients with STN-DBS.

**Methods:** Postoperatively, after 1 year, 17 PD patients with STN-DBS were assessed in 4 conditions (stimulation on/medication off, stimulation off/medication off, stimulation off/medication on, stimulation on/medication on). 4 (age between 56 and 68 years old; H/F=3/1; disease duration between 12 and 25 years old) were not satisfied because of a persistent asymmetrical tremor. Differentiated frequency was proposed with higher frequency to control the tremor.

**Results:** Differentiated HFS (185Hz vs 140Hz for 3 patients, 174Hz vs 130Hz for the last 1) reduced the tremor subscore and clinical global impression for 3 patients in comparison with symmetrical HFS (130Hz bilaterally). No worsening of the total MDS-UPDRS III was highlighted.

**Conclusion:** Differentiated HFS is an option to reduce tremor in STN-DBS patients. More studies are needed to assess which profile of PD patients could benefit from it.

**Disclosure:** Nothing to disclose

## EPO1191

**Prevalence of depression in Parkinson's disease patients in Albania and the relationship with gender and stage of disease**

E. Basha<sup>1</sup>, V. Leka<sup>1</sup>, A. Agastra<sup>1</sup>, K. Elpenoria<sup>2</sup>, G. Halili<sup>2</sup>, D. Dobi<sup>1</sup>

<sup>1</sup>Neuroscience, UHC Mother Theresa, Tirana, Albania, <sup>2</sup>Neurology, Faculty of Medicine, University of Medicine, Tirana, Tirana, Albania

**Background and aims:** Depression is 1 of the most common non-motor symptoms in PD with a large negative impact on patient's quality of life. It is largely unrecognized by neurologists, emphasizing the need of an approach to psychiatric symptoms by non-psychiatrists in order to ensure an early diagnosis of depression in PD.

**Methods:** We include in this study 76 PD patients, range age 42-79 age range, diagnosed from neurologists in Department of Neurosciences in UHC "Mother Teresa", Tirana Albania. They were presented in out patient service in our department, from december 2018 to june 2019. All of them was underwent neurological examination with UPDRS test, MMSE, HAM-D.

**Results:** In this study are included 76 PD patients, range age 42-79 years, 77% of PD patients were presented with depression symptoms. 43% of patients were male and 57% female. 76% of patient with depression had a Hoehn&Yahr stage  $\geq 3$  ( $p=0.001$ ). There was no statistically significant difference in the prevalence of depression between man and women ( $p=0.279$ ). Later stages of PD patients had higher prevalence and gravity of depression ( $p<0.001$ ). Patients with depression that had long years with PD had higher scores in HAM-D ( $p<0.001$ )

**Conclusion:** High prevalence of depression in our PD patients with an important correlation with stage and years of disease. There wasn't any important difference between man and woman.

**Disclosure:** Nothing to disclose

## EPO1192

**Diplopia in Parkinson's disease, a possible role of dopaminergic treatment**

E. Belli, E. Del Prete, D. Frosini, U. Bonuccelli,  
R. Ceravolo

*Department of Clinical and Experimental Medicine,  
University of Pisa, Pisa, Italy*

**Background:** Diplopia could be present in 10-30% of Parkinson's Disease (PD) patients. Its pathophysiology is discussed; associations with dementia and visual hallucinations have been proposed. Diplopia is also reported as a non-common side effect of dopamine-agonist (DA).

**Objective:** Aim of our study was to explore the role of dopaminergic treatment in PD patients with diplopia.

**Method:** PD non-demented patients with diplopia were retrospectively recruited and matched with PD patients without diplopia for age and disease duration. Motor and cognitive assessment was evaluated at baseline (T0) and after 1 year (T1) from diplopia onset. In diplopic patients DA was reduced or withdrawn. For each patient we evaluated Daily Levo-Dopa Dose Equivalent Total (LEDD-T) and for DA (LEDD-DA). Presence of other side effects of DA was assessed.

**Results:** 40 PD were recruited, 20 with diplopia and 20 without (age  $58.8 \pm 12.4$  vs  $59.7 \pm 11.2$  years, disease duration  $13.25 \pm 8.3$  vs  $13.7 \pm 7.2$  years respectively), all patients were assuming DAs. LEDD-T and LEDD-DA were significantly higher in diplopic patients than in those without diplopia ( $p=0.044$ ,  $p=0.003$  respectively); mean disease time before diplopia onset was  $7.3 \pm 7.0$  years. At T1 ten patients reported reduction or disappearance of diplopia. At both T0 and T1 no significant differences were found in motor evaluation, cognitive assessment, presence of hallucinations, somnolence and impulsive control disorder between groups.

**Conclusion:** Dopaminergic treatment, in particular DA, seems to have a role in the pathogenesis of diplopia in non-demented PD patients; however longer follow up is needed to validate the PD psychosis spectrum hypothesis for this symptom.

**Disclosure:** Nothing to disclose

## Movement disorders 2

### EPO1193

#### Refractory cervical dystonia: is the infiltration of the obliquus capitis inferior muscle a game changer?

Á. Beltrán Corbellini, P. Parra Díaz, J.L. Chico García, F. Rodríguez Jorge, G. Sánchez Díaz, I. Parés Moreno, J.C. Martínez Castrillo, A. Alonso Canovas  
*Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain*

**Background and aims:** Cervical dystonia is occasionally refractory to botulinum toxin (BT) therapy. The obliquus capitis inferior (OCI) muscle contributes to head rotation and is active in most patients with torticollis, being its infiltration potentially useful. However, a specific training for ultrasound-guided injections is required.

**Methods:** Retrospective analysis of electronic records of patients with cervical dystonia of our movement disorders unit who underwent ultrasound-guided OCI infiltration.

**Results:** 11 patients (4 males) with an average duration of disease (DOD) of  $7.6 \pm 6.9$  years were included. All had torticollis and 7 had tremor. Most had undergone several cycles ( $8.8 \pm 5.9$ ) of BT infiltration with poor response. After  $2.6 \pm 1.5$  OCI infiltration cycles (5 patients with  $57 \pm 16$  U of onabotulinum toxin, 3 with  $71 \pm 19$  U of incobotulinum toxin and 3 with  $131 \pm 23$  U of abobotulinum toxin) and a follow-up of  $13.1 \pm 7.8$  months, 8 notably improved, while 3 did not (all males, with significantly longer DOD –  $p=0.02$ ). A non-significant trend to improvement was observed regarding pain, tremor, position and functional capacity (Clinical Global Impression-Improvement scale scores  $2.0 \pm 1.2$ ;  $2.2 \pm 1.3$ ;  $2.0 \pm 1.2$ ;  $2.1 \pm 1.4$  respectively), although women showed significant improvement in pain and position ( $p<0.05$ ). There were no differences concerning duration of BT effect (2.5-3 months) nor either adverse events.

**Conclusion:** The infiltration of OCI is safe and feasible with specific training and expertise, and may offer a clinical benefit to patients refractory to conventional patterns of infiltration.

**Disclosure:** Nothing to disclose

### EPO1194

#### Falls needing specialist care in the 10 years preceding the initial diagnosis of Parkinson's disease

D. Bereczki<sup>1</sup>, A. Ajtay<sup>1</sup>, A. Takats<sup>1</sup>, S. Szatmári<sup>1</sup>, M. Bálint<sup>2</sup>, F. Oberfrank<sup>3</sup>

<sup>1</sup>Department of Neurology, Semmelweis University, Budapest, Hungary, <sup>2</sup>Center for Economic and Regional Studies, Budapest, Hungary, <sup>3</sup>Institute of Experimental Medicine, Hungarian Academy of Sciences, Budapest, Hungary

**Background and aims:** The 1st motor symptoms of Parkinson's Disease (PD) become obvious after a significant (30-80%) cell-loss in the substantia nigra. Postural instability is considered a sign appearing in the late stage of PD. We assume that postural instability might occur earlier in the course of PD.

**Methods:** In the framework of the National Brain Research Program we used the database of the National Health Insurance Fund (NHIF) in Hungary, a country with a single-payer health insurance system. We evaluated falls as the cause of trauma (ICD-10 W00-W19) in the 10-year history preceding the 1st diagnosis of PD (ICD-10 G20) or cerebral infarction (CI, ICD-10 I63) in those who had the initial diagnosis of PD or CI in 2015 and 2016. Record linkage by the anonymized unique patient identifiers was used to identify falls needing specialist visits.

**Results:** In 2015-2016 there were 16403 and 93278 new cases of PD (mean age:  $74.3 \pm 10.1$  years) and CI (mean age:  $70.3 \pm 13.0$  years) in Hungary. Falls as the cause of trauma were recorded in 47% of PD and in 44% of cerebral infarctions in the 10 years history (chi-squared test,  $p<0.001$ ). Those with a history of falls were 2 years younger in both groups. In logistic regression age ( $p<0.001$ ) and diagnosis type (G20 or I63;  $p=0.007$ ) were independent predictors of falls in the 10-year history.

**Conclusion:** Based on these initial results we suggest that signs of postural instability – reflected by falls needing specialist care – may appear earlier in the course of PD than assumed previously.

**Disclosure:** Nothing to disclose

## EPO1195

### Characteristics and outcomes in a 12-month follow-up case series of advanced parkinson's disease patients on stable 24-hour/day levodopa-carbidopa intestinal gel from the DUOGLOBE study

M. Simu<sup>1</sup>, R. Iansek<sup>2</sup>, E. Cubo<sup>3</sup>, N. Kovacs<sup>4</sup>, L. Bergmann<sup>5</sup>, P. Kukreja<sup>5</sup>, L. Yu<sup>5</sup>, J. Aldred<sup>6</sup>

<sup>1</sup>Department of Neurology II, University of Medicine and Pharmacy "Victor Babes", Timisoara, Romania, <sup>2</sup>Kingston Centre, Monash Health, Melbourne, Australia, <sup>3</sup>Neurology, Hospital Universitario de Burgos, Burgos, Spain, <sup>4</sup>University of Pécs, Pécs, Hungary, <sup>5</sup>AbbVie Inc., North Chicago, USA, <sup>6</sup>Selkirk Neurology and Inland Northwest Research, Spokane, USA

**Background and aims:** Stable 24-hour/day levodopa-carbidopa intestinal gel (LCIG) has the potential to extend the benefit of Parkinson's disease (PD) symptomatic control through nighttime, compared to a 16-hour regimen. Here we present a case series summary on the effectiveness of stable 24-hour/day LCIG therapy on motor fluctuations and non-motor symptoms (NMS) including sleep during routine clinical practice.

**Methods:** In this interim case series analysis from the ongoing DUOGLOBE study, "Off" time, dyskinesia (UDysRS total score), NMS (NMSS total and sleep subdomain scores), and sleep symptoms (PDSS-2 and ESS) were assessed in patients on stable 24-hour/day LCIG infusion at baseline (BL) and month (M) 12. Serious Adverse Events (SAEs) were monitored.

**Results:** As of December 2018, 7 patients were on stable 24-hour/day LCIG; 5 patients had M12 follow-up. From BL to M12, improvements were observed in median values for "Off" time (5.0h/day to 0.0 h/day; range at M12: 0 to 3.5h/day; n/n=7/5) and median cores on the UDysRS (44.5 to 14.0; n/n=6/3), NMSS (84.0 to 22.0; n/n=7/4), NMSS sleep subdomain (27.0 to 6.0; n/n=7/4), PDSS-2 (42.0 to 14.0; n/n=7/5), and ESS (10.0 to 5.0; n/n=7/5). SAEs occurred in 42.9% of patients (n/n=3/7); 1 patient discontinued LCIG due to AEs (pulmonary embolism and acute psychosis) and another withdrew consent.

**Conclusion:** These limited case series summary data suggest that stable 24-hour/day LCIG may provide benefits in motor complications and NMS including sleep. In this small sample, the safety events were consistent with the established safety profile of LCIG but needs confirmation in larger studies.

**Disclosure:** AbbVie funded the research for this study design; study research; collection, analysis, and interpretation of data; and writing, reviewing, and approving this abstract for submission. All authors had access to the data; participated in the development, review, and approval of the abstract, and agreed to submit.

## EPO1196

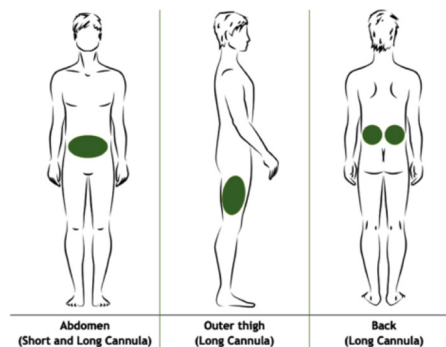
### Pharmacokinetics of ND0612 administered at different infusion sites and with different cannula lengths: an open-label, randomised, cross-over study in healthy volunteers

T. Birnberg, C. Durlach, T. Yardeni, S.F. Orenbach, S. Oren, L. Adar

NeuroDerm, Rehovot, Israel

**Background and aims:** This phase 1 study aimed to evaluate the impact of subcutaneous (SC) infusion site location and cannula length on levodopa and carbidopa pharmacokinetics administered as a single 16-hour infusion of ND0612 in healthy volunteers. ND0612 is a drug-device combination designed to deliver liquid levodopa/carbidopa (60/7.5mg/mL) via SC-infusion to reduce motor complications in patients with Parkinson's disease.

**Methods:** Single-centre, open-label, randomised, single-dose, 4-period, crossover study in 24 healthy subjects (16M/8F). Subjects were randomised 1:1:1:1 into one of four sequences. Each subject sequentially received ND0612 at three different infusion sites (32h washout time), with the abdomen infused twice, once with a long cannula (reference route of administration) and once with a short cannula. The outer thigh and back sites were assessed with long cannula [Figure].



Infusion approaches tested

**Results:** Mean plasma drug concentration-vs.-time profiles (for levodopa and carbidopa) were similar for ND0612 infused with long cannulas at the abdomen and the other infusion locations, or with short cannulas. The 90% confidence intervals for the C<sub>max</sub> and the AUC parameters were within the pre-defined limits of 80-125% among all tests and the reference, indicating bioequivalence. The most common adverse events were infusion-site reactions; none led to study discontinuation and none were classified as serious/severe.

**Conclusion:** There were no differences in the rate or extent of absorption of levodopa or carbidopa independent of infusion site location or cannula length. Furthermore, infusion to the back and outer thighs did not affect the safety of ND0612, offering patients alternative infusion locations for long-term ND0612 use.

**Disclosure:** Funded by NeuroDerm

## EPO1197

**The effect of medical xenon on affective disorders in patients with advanced stages of the Parkinson's disease**

R. Bogdanov<sup>1</sup>, E. Vasilchenko<sup>1</sup>, A. Dobrovolsky<sup>2</sup>, P. Ratmanova<sup>3</sup>, D. Napalkov<sup>3</sup>

<sup>1</sup>Neurology, Moscow Regional Scientific Research Clinical Institute n.a. M.F. Vladimirsky, Moscow, Russian Federation, <sup>2</sup>Psychiatry And Psychotherapy, Institute of Mental Health and Addictology, Moscow, Russian Federation, <sup>3</sup>Department Of Higher Nervous Activity, M.V. Lomonosov Moscow State University, Moscow, Russian Federation

**Background and aims:** Affective disorders of the anxiety-depressive spectrum are quite common in the advanced stages of Parkinson's disease (PD), significantly reducing the patient's quality of life. The purpose of this research was to evaluate the possibility of correction of affective disorders in patients with advanced stages of PD using medical xenon.

**Methods:** We examined 15 patients having complaints of affective disorders and suffering from PD, stage III according to Hoehn-Yahr (average age 63.0±2.9 years), as well taking stable dopaminergic therapy for at least 3 months and not receiving any psychotropic drugs. Evaluation of the severity of the affective disorders was carried out on HADS, MADRS, STAI and WAN scales. For the treatment of affective disorders was used a therapeutic course of inhalation of an oxygen-xenon mixture in a ratio with a mass fraction of xenon of 30%.

**Results:** After the course of therapy with the usage of medical xenon was noted a decrease in the severity of anxiety disorders (on the HADS-A scale -30%, on the STAI scale, the severity of situational anxiety decreased by 15%, personal anxiety by 6%), depressive disorders (on the HADS-D scale -20%, MADRS -35%), according to the WAN scales overall health improvement was noted by 34%, activity by 30%, mood by 24%.

**Conclusion:** According to the obtained pilot results, the use of medical xenon therapy in the complex treatment of advanced stages of PD reduces the severity of both anxiety and depressive disorders, which improves the overall quality of patients' life.

**Disclosure:** Nothing to disclose

## EPO1198

**Genetic characterization of Parkinson's disease in a selected population from North-eastern Italy**

G. Bonato<sup>1</sup>, M. Pilleri<sup>2</sup>, M. Mainardi<sup>1</sup>, L. Lerjefors<sup>3</sup>, S. Andretta<sup>4</sup>, F. Garri<sup>5</sup>, L. Salviati<sup>6</sup>, M. Carecchio<sup>7</sup>, A. Antonini<sup>1</sup>

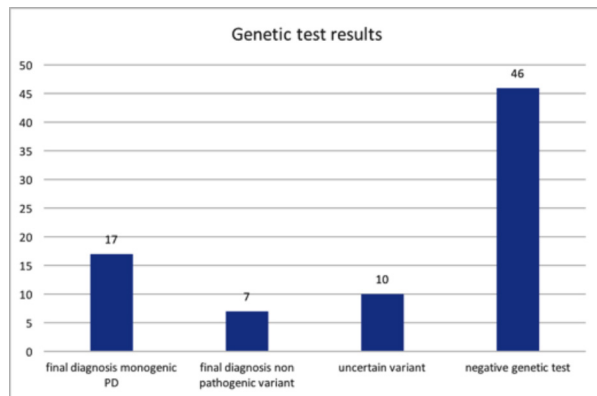
<sup>1</sup>Padua, Italy, <sup>2</sup>Vicenza, Italy, <sup>3</sup>University of Padua, Padua, Italy, <sup>4</sup>Neurology, Padova, Padua, Italy, <sup>5</sup>Department of Neurosciences, Neurology Clinic, Padua, Italy, <sup>6</sup>Medical Genetics, University of Padova, Padua, Italy, <sup>7</sup>Padua, Italy

**Background and aims:** Monogenic forms of PD account for 5-10% of all patients, being genetically heterogeneous and with potential additional genes still unknown. The use of Next-Generation Sequencing Techniques and patients' selection will increase our knowledge in this field. We assessed the prevalence of pathogenic variants in PD-related genes and clinical phenotype in a selected cohort of PD patients.

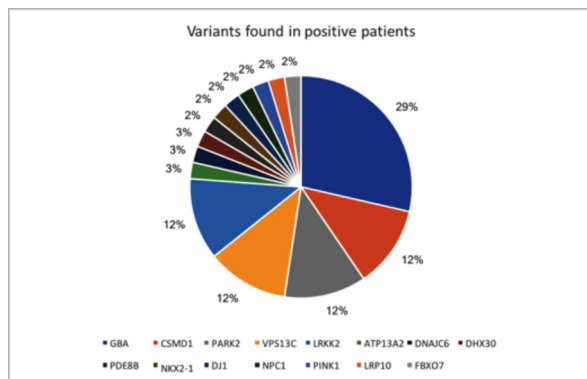
**Methods:** We selected 80 patients from 2 specialized centers (Padua and Vicenza) with onset under 50 years and/or positive family history and/or early cognitive decline. Genetic analysis by NGS with a customized gene panel including 80 genes related to movement disorders was carried out. Bioinformatic data-analysis, literature revision and database search were performed to determine pathogenicity. Clinical and neuropsychological assessment was performed.

**Results:** 34 out of 80 patients (42%) carried at least 1 variant in one PD-related gene, for a total of 42 different mutations in 14 genes (GBA, PARK2, LRRK2, CSMD1, VPS13C, ATP13A2, DNAJC6, NPC1, PDE8B, DHX30, NKX2-1, PINK1, DJ1, LRP10). 43% variants had evidence of pathogenicity, whereas 26% had an uncertain significance. A definite genetic diagnosis was formulated in 22% of patients. 12 patients carried a pathogenic variant in GBA gene and 6 of them underwent DBS.

**Conclusion:** Pathogenic variants in PD-related genes were common in our cohort and our screening criteria were useful predictors of an underlying genetic etiology. Testing patients with specific clinical manifestations allows better resource allocation and increases the probability of finding pathogenic variants. Clinical use of genetic panels broadens the spectrum of PD-related genes and may lead to targeted treatments.



genetic test results in entire cohort



gene variants in positive patients

**Disclosure:** Nothing to disclose

## EPO1199

### “Dozing off” in the car and Excessive Daytime Sleepiness (EDS) in Parkinson’s disease

C. Borley<sup>1</sup>, C. Sportelli<sup>1</sup>, K. Ray Chaudhuri<sup>2</sup>

<sup>1</sup>Neurosciences, King’s College Hospital, London, United Kingdom, <sup>2</sup>department of basic and clinical neurosciences, Institute of Psychiatry, Psychology, Psychiatry, Psychology & Neuroscience, King’s College London, London, United Kingdom

**Background and aims:** EDS is a key non-motor symptom (NMS) of Parkinson’s disease (PD), disease-related and iatrogenic. Phenotypic correlations of PD with EDS have been of recent interest in relation to personalised medicine and PD.1

**Objectives:** To explore the risk of dozing off and possibility of road traffic accidents in PD patients with EDS. Neuropsychiatric symptoms, quality of life and pattern of medication in PD patients will also be considered.

**Methods:** From the Non-motor International Longitudinal Study database of 630 patients assessed holistically for motor and NMS at baseline, a high EDS group was selected defined by scores  $\geq 10$  on the Epworth Sleepiness Scale (ESS).

**Results:** The high EDS group consisted of 125 patients (mean age at assessment=  $65 \pm 9.68$ , mean age of PD onset=  $58 \pm 10.79$ , mean disease duration=  $7 \pm 6.40$ ). 42.48% of high EDS patients reported a likelihood of dozing off in a car whilst in traffic, posing a risk for car accidents; 50% were taking Dopamine Agonists (DAs) including ropinirole (21.2%), pramipexole (1.9%) and rotigotine (25%). Ropinirole is a DA with high affinity to D3 receptors; D3 receptor agonists are known to induce sleepiness. Patients scored in the clinically significant range on the Hospital Anxiety and Depression Scale (81.6%) and on the PD Sleep Scale (64.8%). Patients scored on average  $11.42 \pm 6.63$  points on the PD Questionnaire-8.

**Conclusion:** ESS may predict a risk for work-related somnolence which may cause road traffic accidents. DAs are confirmed as a risk factor and depression and anxiety are commonly comorbid.

**Disclosure:** Nothing to disclose



## EPO1200

### Differences in performance on clock drawing tasks as predictive measurements for disease classification among patients with Parkinson's disease and essential tremor

A. Bougea<sup>1</sup>, E. Efthymiopoulou<sup>1</sup>, C. Gkoumas<sup>2</sup>, P. Giannaki<sup>3</sup>, K. Zikos<sup>4</sup>

<sup>1</sup>First department of Neurology, National and Kapodistrian University, Eginition Hospital, Athens, Greece, <sup>2</sup>Psychology, University of Cyprus, Nicosia, Cyprus, <sup>3</sup>Maison Sofos elderly care unit, Athens, Greece, <sup>4</sup>Neurology, Hellenic Air Force Hospital, Athens, Greece

**Background and aims:** Non motor symptoms are widely being recognized in both Parkinson's disease (PD) and Essential Tremor (ET). Although visuospatial dysfunction is common in PD, data on ET are lacking. Our aim was to examine whether clock-drawing test as a quick test could predict visuospatial deficits in patients with ET.

**Methods:** Visuospatial performance was assessed in 58 consecutive patients with ET and 75 with PD and 22 healthy controls (HC) who visited 2 specialized memory clinics of Athens in Greece. The clock-drawing (CD) and copy (CC) items of the Parkinson's Disease-Cognitive Rating Scale were used as a test of visuospatial function.

**Results:** Both CD and CC scores were lower for ET compared to PD patients and HC ( $p < 0.001$  for both comparisons). A binomial logistic regression showed that both CD and CC items predict if participants had ET or PD with high sensitivity 94.7% and specificity 87.9% and an area under the curve (AUC) 0.980 (95% confidence interval, 0.962- 0.997). The model explained 86.1% (Nagelkerke R<sup>2</sup>) of the variance in the disease variable (ET/PD) and correctly classified 91.7% of the cases.

**Conclusion:** Patients with ET have more visuospatial deficits compared to PD. Clock-drawing test is a robust predictor of ET after adjust for age and education. These findings suggest that the clock-drawing task may be an easy useful tool to track cognitive changes in nondemented patients with ET in clinical practice.

**Disclosure:** Nothing to disclose

## EPO1201

### Combining device-aided treatments in advanced Parkinson's disease patients: a 10 years experience from the Cretan PD cohort.

C. Spanaki<sup>1</sup>, I. Boura<sup>1</sup>, E.A. Giannopoulou<sup>1</sup>, M. Koulentaki<sup>2</sup>, N. Haliasos<sup>3</sup>, P. Mitsias<sup>1</sup>  
<sup>1</sup>Neurology, University Hospital of Heraklion, Crete, Heraklion, Crete, Greece, <sup>2</sup>Gastroenterology, University Hospital of Heraklion, Heraklion, Greece, <sup>3</sup>Functional Neurosurgery Unit, Queen's Hospital, Queen Mary University of London Medical School, London, United Kingdom

**Background:** Continuous delivery of levodopa-carbidopa intestinal gel (LCIG), deep brain stimulation (DBS) and apomorphine subcutaneous infusion (ASI) are device-aided therapies for motor complications of advanced Parkinson's disease (PD). Studies addressing the effect of combining such treatments are lacking. We present a series of patients from the Cretan PD cohort (CPDC) who required 2 device-aided treatments for optimal management of their disease.

**Methods:** The CPDC includes PD patients followed prospectively over the course of 10 years. We identified advanced PD patients who received a device-aided treatment and later experienced problems that required implementation of a 2nd interventional treatment. We present their clinical characteristics and the indications of combining treatments.

**Results:** 63 patients on device-aided treatments were followed prospectively from 2009 to 2019. 8 patients (13%) experienced problems that required implementation of a 2nd interventional treatment. 5 of them were treated with STN-DBS and later received LCIG, 1 STN-DBS patient received later ASI, and 2 patients on LCIG received later STN-DBS. The main reason for adding infusion therapies on DBS was the re-appearance of motor fluctuations. Adding DBS on LCIG treatment improved intractable drug-induced symptoms (i.e psychosis) by allowing reduction of levodopa dose.

**Conclusions:** Advanced PD patients treated with 1 device-aided treatment may experience additional benefit from a 2nd interventional therapy. While infusion therapies can optimize dopaminergic drug delivery in DBS treated patients, DBS added to LCIG can be levodopa sparing. In the era of precision medicine, combining interventional treatments can maximize their effectiveness and tailor therapy to match patient's needs.

**Disclosure:** Nothing to disclose

## EPO1202

**Effective long-term treatment with inco-botulinum toxin after immuno-resistance to abo- or ona-botulinum toxin in patients with cervical dystonia**

B. Uerer, R.N. Brauns, S. Samadzadeh, H. Hefter  
*Department of Neurology, University Hospital of Düsseldorf, Düsseldorf, Germany*

**Background and aims:** Botulinum toxin type A (BoNT/A) is a 150kDa large molecule, embedded in a fivefold larger protein complex. Antibody formation can hardly be avoided in BoNT/A therapy with different forms of injection. This cross-sectional study aimed to investigate the effectiveness of switching to inco-BoNT/A in partially resistant patients with cervical dystonia (CD) to abo- or ona-BoNT/A.

**Methods:** In 51 CD-patients with clinical signs of partial secondary treatment failure (PSTF) who had been switched to inco-BoNT/A, mouse hemidiaphragm assay (MHDA) was performed to detect the presence of neutralizing antibodies (NABs), and the TSUI-score and the dose per treatment session were extracted from their charts.

**Results:** NABs were detected in almost 28% of all patients (=14) (ABPOS-group), and MHDA was negative in 37 patients (ABNEG-group). In both ABPOS- and ABNEG-group clinically and statistically significant worsening ( $p < 0.05$ ) was found before switching to inco-BoNT/A. When the course of BoNT/A treatment was synchronized to the time of the switch to BoNT/A, significant response to inco-BoNT/A was found which was more pronounced in the ABNEG-group ( $p < 0.001$ ) than in the ABPOS-group ( $p < 0.05$ ). After several years of inco-BoNT/A treatment, the severity of CD in the ABPOS-group approached the level of improvement in the ABNEG-group.

**Conclusion:** In CD-patients with a PSTF after abo- or ona-BoNT/A therapy, switch to inco-BoNT/A can play a prominent role in the level of improvement and should have higher priority over deep brain stimulation in the treatment plan.

**Disclosure:** Nothing to disclose

## EPO1203

**First Belgian case of myoclonus-dystonia caused by a mutation in KCTD17**

A. Bruggeman<sup>1</sup>, N. Schuermans<sup>2</sup>, B. Dermaut<sup>2</sup>, P. Santens<sup>1</sup>

<sup>1</sup>*Department of Neurology, Ghent University Hospital, Ghent, Belgium,* <sup>2</sup>*Department of Medical Genetics, Ghent University Hospital, Ghent, Belgium*

**Background and aims:** Myoclonus-dystonia is a rare movement disorder, in which familial cases are most commonly caused by genetic mutations in SGCE. More recently, in 2015, Mencacci et al. reported a missense mutation in KCTD17 in a British family with a myoclonus-dystonia phenotype, and described a similar German family. Since then, the pathogenic role of KCTD17 mutations has been confirmed by 2 independent groups describing an Argentinian and Italian patient.

**Methods:** A 50-year-old man presented with problems of increasing dysarthria, clumsiness and fatigue. Since childhood there were mild involuntary jerky movements of the arms and hands. There was no response to alcohol or psychiatric comorbidities. At the time of presentation both parents were already deceased, however similar symptoms were reported in his father according to the family.

**Results:** Clinical examination revealed non-epileptic myoclonic jerks of the upper limbs combined with a cranio-cervical dystonia involving the right shoulder. In addition, the patient exhibited a general slowness, hypomimia, hypokinetic dysarthria and a mild unsteady gait. DaTscan and MRI scan of the brain revealed no clear abnormalities. Whole exome sequencing revealed an Arg145His mutation in the KCTD17 gene, which is the same variant as reported previously in literature.

**Conclusion:** The clinical presentation in our patient (5th reported family) is strikingly similar to the 1 reported in literature and further confirms the phenotype associated to KCTD17 related myoclonus-dystonia. Moreover, our patient exhibits bradykinesia which potentially broadens the clinical spectrum further.

**Disclosure:** Nothing to disclose

## EPO1204

### The influence of deep brain stimulation on sweet liking and taste preferences in Parkinson's disease

E. Bucior<sup>1</sup>, M. Sobstyl<sup>2</sup>, P. Bieńkowski<sup>3</sup>,  
H. Sienkiewicz-Jarosz<sup>1</sup>

<sup>1</sup>1st Department of Neurology, Institute of Psychiatry and Neurology, Warsaw, Poland, Warsaw, Poland, <sup>2</sup>Department of Neurosurgery, Institute of Psychiatry and Neurology, Warsaw, Poland, Warsaw, Poland, <sup>3</sup>Department of Psychiatry, Medical University of Warsaw, Warsaw, Poland, Warsaw, Poland

**Background and aims:** Weight gain is 1 of potential adverse effects of deep brain stimulation (DBS) in patients with Parkinson's disease (PD). It has been suggested, that DBS-induced weight changes has a multifactorial nature, with the role of impulsivity and reflects the complex functional organization of the STN. Aim. The present study aimed to investigate sweet liking and taste preferences in PD patients with a specific focus on the effects of DBS in the subthalamic nucleus.

**Methods:** Basic demographic and clinical data were collected from 12 patients (9 males and 3 females), mean age 61.25±7.69, with disease duration of 9.91±3.99 years. The study participants were free of severe neuropsychiatric disorders, including depression and dementia. Pleasantness ratings of sucrose solutions (1-30%, w/w) and sweet liking/disliking status were assessed as well as basic sensory aspects of gustation (intensity ratings, electrogustometric thresholds).

**Results:** 7 patients declared olfactory deficits and 6 patients reported subjective taste problems. Decrease and increase of about 2.2% and 4.4% of initial weight was noted in 3 and 9 patients, respectively. We did not observe significant changes in electrogustometric threshold and intensity and pleasantness ratings of sucrose solutions. However, 50% of patients declared increase in sugar craving.

**Conclusion:** The results of the present study may suggest that post-DBS weight alterations are not associated with significant changes in basic gustatory function, including taste reactivity to sweet stimuli.

**Disclosure:** Nothing to disclose

## EPO1205

### Neurophysiological evaluation of voluntary postural control in PD patients on selection for stereotactic treatment and during deep brain stimulation

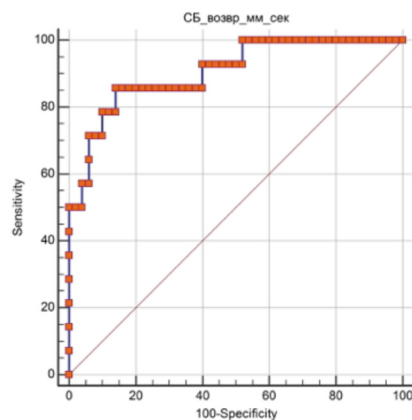
A. Buniak<sup>1</sup>, I. Maryenko<sup>1</sup>, S. Likchachev<sup>2</sup>

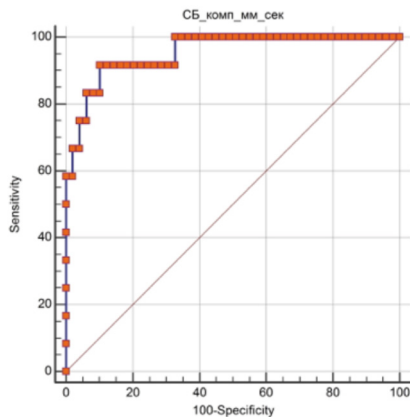
<sup>1</sup>Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus, Minsk, Belarus,  
<sup>2</sup>Neurological, National Research and Clinical Center Of Neurology and Neurosurgery, Minsk, Belarus

**Background and aims:** 1 of the contraindications for DBS in PD patients is a disturbance of voluntary postural control (VPC) does not respond to levodopa. Stabilometry with biofeedback is used to objectify of VPC at the selection stage and postural disturbances on DBS. The impairments of VPC in PD patients at the selection and on DBS using the speed characteristics of the statokinesiogram during voluntary movements will be evaluated.

**Methods:** We examined 106 PD patients on selection and 52 on DBS. 28 male and 24 female, mean age 55.98±7.04, 32 patients—II stage of H&Y, 20—III. 40 patient with DBS STN, 9 – DBS GPi, 3 – DBS Vim. We used computer stabiloanalizator with biofeedback. Test was carried out with a stepped exposure. Patients moved the pressure center forward (I stage), then returned (II stage). The speed of throw (ST), mm/s was evaluated at the I and II stage.

**Results:** The optimal ST at the I stage 13.72mm/s, AUC 0.86 (95% CI 0.73-0.95), p<.0001. The sensitivity 76.9 (95% CI 46.2-95.0), specificity 87.5 (95% CI 71.0-96.5). The optimal ST at the II stage 11.95mm/s, AUC 0.91 (95% CI 0.81-0.96), p<.0001. The sensitivity 85.7 (95% CI 57.2-98.2), specificity 86.0 (95% CI 73.3-94.2). Statistically significant difference by W-test of ST indicators revealed after 1m (p=0.0004), 1y (p=0.018), 2y of DBS (p=0.028).





**Conclusion:** The results revealed diagnostic markers of VPC in PD patients at the selection stage. Excess markers indicate the presence of postural disorders. The selected indicators help to evaluate changes of VPC in PD patients on DBS.

**Disclosure:** Nothing to disclose

## EPO1206

### CERS1 deficiency causes a rare progressive myoclonic epilepsy: two new familial cases

D. Campo-Caballero<sup>1</sup>, A. Spinazzola<sup>2</sup>, E. Bugiardini<sup>3</sup>, S. Efthymiou<sup>4</sup>, H. Houlden<sup>3</sup>, I.J. Holt<sup>5</sup>, J. Rodriguez-Antigüedad<sup>1</sup>, J. Equiza<sup>1</sup>, P. Iruzubieta<sup>1</sup>, J.F. Martí Massó<sup>1</sup>, J. Ondaro<sup>6</sup>, M. Zulaica<sup>6</sup>, A. López de Munain<sup>1</sup>

<sup>1</sup>Neurology, Donostia University Hospital, Donostia, Spain, <sup>2</sup>Clinical and Movement Neurosciences, UCL Queen Square Institute of Neurology, London, United Kingdom, <sup>3</sup>MRC Centre for Neuromuscular Diseases, UCL Institute of Neurology and National Hospital for Neurology and Neurosurgery, London, United Kingdom, <sup>4</sup>Molecular Neuroscience, UCL, London, United Kingdom, <sup>5</sup>Department of Clinical and Movement Neurosciences, UCL Queen Square Institute of Neurology, London, United Kingdom, <sup>6</sup>Neuroscience, Biodonostia Health Research Institute, Donostia, Spain

**Background and aims:** Progressive myoclonic epilepsy (PME) comprises a heterogeneous group of disorders characterized by myoclonus, tonic-clonic seizures, and progressive neurological dysfunction, including ataxia, neuropathy and myopathy. Despite the advent of genomic sequencing, the genetic cause is unknown in the majority of PME patients. Extremely rare mutations in CERS1, so far reported in one family and in an isolated single case, define PME type 8. CERS1 is the gene encoding ceramide synthase 1, precursor of sphingolipids, critical components for normal brain functions. We report 2 new cases with PME carrying mutations in CERS1.

**Methods:** Diagnostic work-up consisted in: Neuropsychological evaluation, MRIs, EEGs, ENoG, EMG, SSEP, plasma oxysterols, molecular testing (CSTB, EPM1, EPM2, MERRF), genetic panel (ADCK3, AFG3L2, APTX, CYP27A1, FXN, KCND3, NPC1, NPC2, PDYN, PEX7, PHYH, PNPLA6, POLG, PRAKCG, SACS, SETX, SLC52A2 and TTPa), skin biopsy and whole-exome sequencing.

**Results:** 2 brothers, aged 44 and 34, firstly presented generalized tonic-clonic seizures and myoclonus at the age of 11 and 12 respectively. They acquired slowly progressive ataxia and cognitive impairment, affecting the younger brother more severely. Neurological examination revealed truncal and limb ataxia, dysarthria and myoclonus. At neuropsychological evaluation the patients presented from mild to moderate cognitive impairment. EEG showed multifocal discharges. After an extensive metabolic and genetic diagnostic work-up, whole-exome sequencing revealed the H183Q homozygous mutation in the CERS1.

**Conclusion:** These 2 new cases strengthen the genotype-clinical phenotype association between mutant CERS1 and PME. However, while the clinical features are broadly similar to the previously reported cases, there is phenotypical variability and different grades of severity exist.

**Disclosure:** Nothing to disclose

## EPO1207

**Adult onset craniocervical dystonia with uncommon mutations: report of two cases**

M. Cánovas Iniesta<sup>1</sup>, M. Morales de la Prida<sup>2</sup>, M.T. Alba Isasi<sup>1</sup>, J. Vazquez Lorenzo<sup>3</sup>, M.O. Lozano Caballero<sup>4</sup>, V.M. Pérez Navarro<sup>4</sup>, J. López Sánchez<sup>1</sup>, J.M. Cabrera Maqueda<sup>1</sup>, L. Fuentes Rumí<sup>3</sup>, G. Valero López<sup>1</sup>, A.E. Báidez Guerrero<sup>4</sup>, B. Cuartero Pérez<sup>5</sup>, G.D. De Paco Tudela<sup>6</sup>

<sup>1</sup>Murcia, Spain, <sup>2</sup>Neurology, Hospital Virgen de la Arrixaca, Murcia, Spain, <sup>3</sup>Neurology, Virgen de la Arrixaca University Hospital, Murcia, Spain, <sup>4</sup>Neurology, Hospital Clínico Universitario Virgen de la Arrixaca, Murcia, Spain, <sup>5</sup>Hospital Clínico Universitario Virgen de la Arrixaca, Murcia, Spain, <sup>6</sup>Radiology, Hospital Clínico Universitario Virgen de la Arrixaca, Murcia, Spain

**Background and aims:** Adult onset primary dystonia commonly begins in the craniocervical region and tends to remain focal or spread to a segmental distribution (generalisation is rare). Most cases are sporadic, being the genetic cause less common.

**Methods:** We present 2 patients without family history of dystonia, diagnosed of adult craniocervical onset dystonia caused by uncommon mutations.

**Results:** 48-year-old female diagnosed of spasmodic dysphonia since she was 33 treated with botulinum toxin with mild response. At the age of 45 she developed right torticollis, blepharospasm and trunk stiffness. Genetic study showed an heterozygous mutation in the ANO3 gene, responsible for the autosomal dominant DYT24 dystonia. 52-year-old female, with a 14-year history of progressive craniocervical dystonia. Initially she developed a head shake that progressed to a severe right laterocollis and right upper limb dystonia. Symptoms were severe and refractory to medical treatment and botulinum neurotoxin, so she was treated with deep brain stimulation (DBS) targeting bilaterally globus pallidus interna (GPi), with clinical improvement. Years later she developed left hemidystonia. Genetic study was performed, revealing an heterozygous mutation in the GNAL gene, responsible for the autosomal dominant DYT25 dystonia. There is no previous report in literature of DYT25 dystonia treated with DBS.

**Conclusion:** Primary genetic dystonia is an uncommon disease, specially if the symptoms have an adult onset. In addition, the cases described above are caused by mutations rarely described in literature. DBS could be a treatment option in craniocervical dystonia refractory to conventional medical therapy.

**Disclosure:** Nothing to disclose

## EPO1208

**Phenotypic characterization of a cohort of patients affected by laryngeal dystonia: a monocentric study**

L. Carraro<sup>1</sup>, M. Carecchio<sup>2</sup>, A. Antonini<sup>3</sup>  
<sup>1</sup>Mirano (VE), Italy, <sup>2</sup>Padua, Italy, <sup>3</sup>Padua, Italy

**Background and aims:** Laryngeal dystonia (LD) is characterized by involuntary spasms of the vocal cords during phonation. Botulinum toxin (BTX) is considered the preferable treatment. Aims of this study were: describing a cohort of patients with LD; comparing findings with available literature; evaluating patients' quality of life and the effectiveness of BTX; investigating non-motor symptoms.

**Methods:** 43 patients (33 F, 10 M) affected by LD were consecutively recruited at the ENT Department of Padua University. Demographical and clinical data were collected by direct interview and a thorough neurological examination was performed. The following questionnaires were used to better characterize patients' phenomenology and comorbidities: VPQ, VHI-30, BDI and PSQI.

**Results:** 76.7% patients were females; mean age at examination was 58.4±11.4 years and mean age at onset was 50.3±12.3 years. Mean disease duration was 9 years. 19/40 (15 F, 4 M) patients presented extra-laryngeal dystonia/tremor on examination (Table 1). Difference between VHI-30 scores at the time of greatest benefit given by BTX (23.8±24.1) vs scores during BTX wearing-off (87.1±27) was statistically significant (p<0.01) (Table 2). Psychiatric comorbidities and sleep disorders were present in 10/43 and 6/43 patients respectively (Table 3). Considering preliminary data, BDI and PSQI scores did not differ significantly (Mann-Whitney U test) from healthy age- and sex-matched population.

Table 1. Demographical and clinical data			
N° and Sex of patients	43	F 33 (77%)	M 10 (23%)
Age at examination (y)	58.4	F 59.7	M 54.3
Age at onset (y)	49.5	F 50.3	M 47
Years of illness (y)	9.25		
Years of illness at diagnosis (y)	2.6		
Profession (at onset time)			
	Office worker/assistant	14/43 (32.6%)	
	Teacher/Professor/instructor	9/43 (18.6%)	
	Salesman/shop assistant	4/43 (9.3%)	
	Social and health worker	3/43 (7.0%)	
	Physician	2/43 (4.7%)	
	Lawyer	2/43 (4.7%)	
	Farmer	2/43 (4.7%)	
	Housewife	2/43 (4.7%)	
	Singer	2/43 (4.7%)	
	Baker	1/43 (2.3%)	
	Butcher	1/43 (2.3%)	
	Plumber	1/43 (2.3%)	
	Cashier	1/43 (2.3%)	
	Priest	1/43 (2.3%)	
	Chief police inspector	1/43 (2.3%)	
	University Researcher	1/43 (2.3%)	
Singers	Amateur	10/43 (23.3%)	
	TOT	12/43 (28.0%)	
Type of LD	Adductor (ADLD)	40/43 (93.0%)	30 F (75%) 10 M (25%)
	Abductor (ABLD)	0/43 (0.0%)	
	Mixed	1/43 (2.3%)	1 F (100%)
	Breathing (ALBD)	2/43 (4.7%)	2 F (100%)
Referred Trigger	Emotional Stress	23/43 (53.5%)	
	Airways infection	4/43 (9.3%)	
	Quit singing	1/43 (2.3%)	
	Rhinoplasty	1/43 (2.3%)	
	No trigger	13/43 (30.2%)	
	Unknown	2/43 (4.7%)	
Other dystonias/tremor	Upper limb tremor	15/43 (34.9%)	
	Head tremor	5/43 (11.6%)	
	Torticollis	3/43 (7.0%)	
	Oromandibular dystonia	3/43 (7.0%)	
	Blepharospasm	6/43 (14.0%)	
	TOT	19/43 (44.2%)	
Positive family history		11/43 (25.6%)	

Table1. Demographical and clinical data.

Table 2. Quality of Life (QoL)			
2A. BTX treatment and QoL scores			
Years treatment in our ENT clinic (y)	3.0		
N° of injections	7.3		
TOI years of treatment (y)	3.7		
Frequency of treatment	5.4 ± 2		
Complaints of aphonia/breathing voice	22/43		
Duration of aphonia (w)	3.0 ± 1.8		
Complaints of dysphagia	15/43		
Duration of dysphagia (d)	9.8 ± 5.7		
Efficacy duration (m)	3.7 ± 2.0		
VPQ	(33 ± 10)/60	F (34 ± 10.5)/60	M (28.5 ± 3)/60
VHI-30 OFF BTX	(87 ± 27)/120	F (88 ± 27.5)/120	M (97 ± 8)/120
VHI-30 ON BTX	(24 ± 24)/120	F (25 ± 25)/120	M (15 ± 13)/120
Δ VHI OFF-ON	(65 ± 27)/120	F (63 ± 27.5)/120	M (82 ± 14)/120
Personal efficacy (%)	(81.3 ± 15.5)	F (80.8 ± 17)	M (82.8 ± 12)
2B. Ameliorating and Worsening Situations or Gestures			
	Phone speaking	20	
	Stress/Negative emotivity	12	
	Reading out loud	7	
	Evening	6	
Worsening (n° of cases)	Morning	4	
	Crouded places/Noise	4	
	Talking a lot	3	
	Physical activity	2	
	Head/Neck Flexion	2	
	Shouting	11	

Table 3. Non-motor symptoms and scores			
Sleep disturbances (N° of cases)	6	6	0
On Medication (N° of cases)	4	4	0
Family history (N° of cases)	3		
PSQI score (Partial data)	(7 ± 5)/21	F (8.7 ± 9.0)/21	M (3.0 ± 1.7)/21
Depression (N° of cases)	5	5	0
On Medication (N° of cases)	5	5	0
Family history (N° of cases)	4		
BDI score (Partial data)	(7.8 ± 7.0)/63	F (12 ± 8)/21	M (2.3 ± 3.2)/21
Anxiety disorders (N° of cases)	7	6	1
On Medication (N° of cases)	7	6	1
Family history (N° of cases)	4		
Other psychiatric disturbances	1 (Stress eating)	1	0
Further Family History	1 (Bipolar disorder)		

Table3. Non-motor symptoms.

**Conclusion:** LD prevalence was higher in females and in some professional groups. Dystonic involvement of extra-laryngeal anatomic regions was frequent. We confirm the efficacy of treatment with BTX injections.

**Disclosure:** Nothing to disclose

## EPO1209

**Acute freezing of gait: a rare presentation of ischemic stroke**

V. Carvalho<sup>1</sup>, A. Ferreira<sup>2</sup>, P. Nascimento Alves<sup>3</sup>, A.I. Lopes<sup>4</sup>, P. Coelho<sup>1</sup>, S. França<sup>1</sup>

<sup>1</sup>Neurology, Hospital Pedro Hispano, Matosinhos, Portugal, <sup>2</sup>Neurology, Hospital Pedro Hispano, Matosinhos, Porto, Portugal, <sup>3</sup>Lisbon, Portugal, <sup>4</sup>Internal Medicine, Hospital Pedro Hispano, Matosinhos, Portugal

**Background and aims:** Freezing of gait (FOG) is defined as an aberrant pattern of brief episodes of inability to step or by short steps that typically occur on initiating/turning while walking.

**Methods:** Case report and literature review.

**Results:** A healthy 80-year-old woman was admitted to the emergency department due to sudden-onset gait impairment which had started 2 days prior. Her past medical and pharmacological histories were unremarkable. Her neurological examination was striking for FOG, sensitive to visual cues, when turning and initiating gait but otherwise normal. Brain CT revealed subacute right cortico-subcortical parietooccipital stroke. Brain MRI performed a week later showed hemorrhagic transformation. Stroke etiology workup was unremarkable. The patient was started on levodopa and referred to physical rehabilitation. Although she first noticed no improvement with medication, its suspension led to acute deterioration and hence medication was restored. While morphometric studies in PD patients and FOG show posterior parietal lobe atrophy, possibly implying this region in the generation of FOG, post-lesional FOG is seldom reported. Lesions are topographically heterogeneous, and, in functional connectivity maps, most lesions overlap the dorsal medial cerebellum network. Although the posterior parietal is extensively connected with the cerebellum, the structural disconnectome analysis showed only disconnection to the ventral striatum.

**Conclusion:** Lesion-induced FOG is seldom reported in the literature, and these cases can potentially shed some insight into the neuroanatomical substrate of this phenomenon, which in turn might have implications for identifying possible treatments. Our case highlights that other pathways or different lesions in the same patient might contribute to the genesis of FOG.

**Disclosure:** Nothing to disclose

## EPO1210

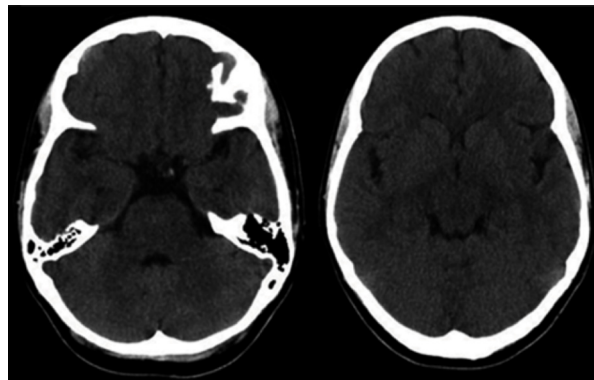
**Unusual cause of Chorea acquired secondary to Cannabinoids consuming**

G. Carvalho Monteiro<sup>1</sup>, D.E. Barbero Jiménez<sup>1</sup>, B. Povedano Margarit<sup>1</sup>, J.M. Celi Celi<sup>1</sup>, J. Hernandez Cristobal<sup>1</sup>, J.C. Martinez-Castrillo<sup>2</sup>, A. Yusta Izquierdo<sup>1</sup>

<sup>1</sup>Neurology, Guadalajara University Hospital, Spain, Guadalajara, Spain, <sup>2</sup>Neurology, Hospital Universitario Ramon y Cajal, Madrid, Spain

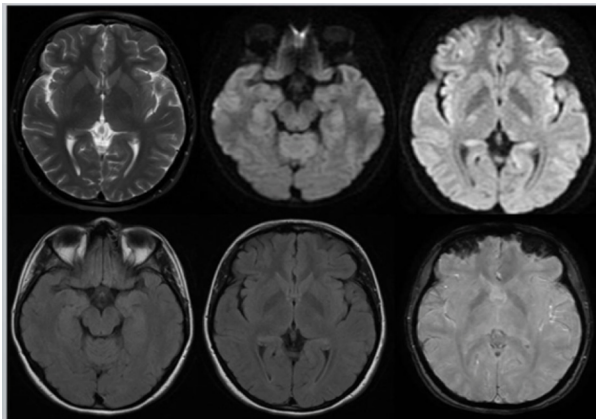
**Background and aims:** There is evidence that cannabinoids may play a role in the neurotransmission systems within the basal ganglia by increasing GABAergic transmission in internal Globus Pallidum, inhibiting the release of glutamate in the substantia nigra pars reticulata and affecting dopaminergic uptake which could induce chorea. Some drugs such as oral contraceptives may cause chorea as an acute phenomenon or as a result of long-term therapy but may require pre-existing basal ganglia dysfunction (neurodegenerative disease or Sydenham chorea). We present an unusual case of chorea secondary to toxic/drugs by combination of oral contraceptives and cannabis use.

**Methods:** Case report presentation



Cranial TC Chorea

**Results:** A 23-year-old woman was admitted to the emergency department because she abruptly presented an episode of involuntary hyperkinetic movements, brief and irregular, predominantly on the right hemibody, but flowed from 1 side to the other with mild involvement of the trunk and head, not inhibited with distraction maneuvers. These movements occurred after consuming cannabis use for the 1st time, resolved spontaneously in 2 hours. She was taking oral contraceptives for 4 years. There was no history of previous infections, Sydenham chorea, neurological or family history. Brain CT and MRI, biochemistry, blood count, autoimmunity, echocardiography, throat culture and ceruloplasmin were normal. There was a positive cannabinoid analysis in urine and ASLO was also positive.



Brain MRI

**Conclusion:** Cannabinoids consuming may produce chorea, in our case, oral contraceptives and ASLO might be susceptibility factors.

**Disclosure:** Nothing to disclose

## EPO1211

### Advanced Parkinson's disease treatment eligibility in France: the EpiPark cross-sectional study

I. Cazala Telinge<sup>1</sup>, L. Defebvre<sup>2</sup>, F. Canoui-Poitaine<sup>3</sup>, D. Maltete<sup>4</sup>, R. Decombe<sup>5</sup>, J.-D. Turc<sup>6</sup>, M.-S. Behier<sup>1</sup>  
<sup>1</sup>Medical department, AbbVie, Rungis, France, <sup>2</sup>Service de Neurologie A: Pôle Neurosciences et Appareil Locomoteur, Université de Lille, U1171, CHRU - Hôpital Roger Salengro, Lille, France, <sup>3</sup>Public Health Department, CHRU - Henri Mondor, Créteil, France, <sup>4</sup>Service de Neurologie, CHRU, Charles Nicolle, Rouen, France, <sup>5</sup>Troyes, France, <sup>6</sup>Les Iris, Cabinet de Neurologie, Martigues, France

**Background and aims:** Epidemiological data on French patients with advanced Parkinson's disease (aPD) are limited. We aimed to estimate the size of the French population of aPD patients, describe aPD patients' characteristics, and assess eligibility for deep brain stimulation (DBS), apomorphine pump (APO) and levodopa/carbidopa intestinal gel (LCIG).

**Methods:** The epidemiological, cross-sectional and observational EpiPark study, proposed to 2,841 neurologists (hospital, mixed or private), was conducted with 38 neurologists, representative of the territory and stratified according to their type of practice and geographic location. 2 complementary parts were simultaneously introduced: CENSUS part to count aPD patients seen consecutively in outpatient consultation over six months (N=688) and extrapolate to all aPD patients; CORE part to collect patients' characteristics and identify populations eligible for LCIG according to the Market Authorization and the National Authority for Health criteria, for DBS and APO. aPD criteria were: duration of levodopa-treatment  $\geq 3$  years, motor complications, and insufficient control by antiparkinsonian conventional treatment. An independent Expert Committee validated the patients' selection criteria.

**Results:** The 410 patients who entered the CORE analysis had aPD (Table 1). Eligibilities for LCIG, DBS and APO are shown in Table 2. After extrapolation to the total French population of PD patients, 55,258 were aPD patients, including 14,732 patients eligible for LCIG according to the Market Authorization, 2,767 to 14,801 for DBS, and 20,633 to 24,524 for APO.



**Disclosure:** This study was funded by AbbVie.

**Table 1. Demographic and clinical characteristics of patients in the CORE part of the study (N=410)**

Characteristics	All (N=410)
Gender, N (% male)	239 (58.3%)
Age <sup>a</sup> , years	71.05 ± 9.44
Time since initial Parkinson's disease diagnosis <sup>a</sup> , years	12.46 ± 5.86
Time since onset of motor complications <sup>a</sup> , years	5.85 ± 4.49
Time between initial diagnosis and onset of motor complications <sup>a</sup> , years	6.60 ± 3.59
<b>General health status</b>	
Excellent	63 (15.4%)
Good	226 (55.1%)
Medium	109 (26.6%)
Bad	12 (2.9%)
<b>Current motor fluctuations</b>	
Presence of troublesome 'off' phases for more than 25% of waking time	394 (96.1%)
<b>Current dyskinesia</b>	
Presence of dyskinesia for more than 25% of waking time	308 (75.1%)
Presence of severe dyskinesia during 'on' time response	188 (45.9%)
Impact at least minimal on functional activities	109 (26.5%)
	242 (59.0%)
<b>Dystonia</b>	
Severe dystonia during 'on' phase	121 (29.5%)
	35 (8.5%)
<b>At least one ongoing antiparkinsonian treatment, N (%)</b>	
History of levodopa per os, N (%)	408 (99.5%)
Levodopa treatment ongoing, N (%)	410 (100%)
Time since levodopa's treatment start date <sup>a</sup> , years	394 (96.1%)
Other antiparkinsonian treatments, N (%)	12.21 ± 9.67
	394 (96.1%)
<b>Levodopa challenge test, N (%)</b>	
Excellent response	56 (13.7%)
Good response	24 (5.9%)
Moderate response	24 (5.9%)
	8 (1.9%)

**Table 2: Individual endpoints for complete eligibility to LCIG according to the Transparency Committee's opinion (primary objective) and to its market authorization (first secondary objective) – analysis on raw datasets and on weighted population**

		Main analysis (Scenario 1) <sup>a</sup>	Complementary analysis (Scenario 2) <sup>b</sup>
<b>Overall analysis population</b>	N	410	410
<b>Endpoint 1:</b>	N (%)	117 (28.5%)	117 (28.5%)
Severe motor fluctuations and hyper/dyskinesia	[95% CI]	[24.38; 33.09]	[24.38; 33.09]
<b>Endpoint 2:</b>	N (%)	389 (94.9%)	389 (94.9%)
Levodopa-responsiveness	[95% CI]	[92.30; 96.63]	[92.30; 96.63]
<b>Endpoint 3:</b>	N (%)	402 (98.0%)	334 (81.5%)
Non-eligibility to DBS	[95% CI]	[96.20; 99.01]	[77.42; 84.93]
<b>Endpoint 4:</b>	N (%)	240 (58.5%)	217 (52.9%)
Contra-indication, intolerance or failure to APO	[95% CI]	[53.71; 63.20]	[48.09; 57.71]
<b>Endpoint 5:</b>	N (%)	369 (90.0%)	369 (90.0%)
No contra-indication to LCIG	[95% CI]	[86.71; 92.54]	[86.71; 92.54]
Eligibility to LCIG according to the French National Authority for Health (endpoints 1,2,3,4 and 5)	N (%)	71 (17.3%)	60 (14.6%)
	[95% CI]	[13.96; 21.28]	[11.54; 18.38]
Eligibility to LCIG according to its French market authorization (endpoints 1,2 and 5)	N (%)	98 (23.9%)	98 (23.9%)
	[95% CI]	[20.0; 28.3]	[16.2; 25.2]

<sup>a</sup> Scenario 1 (overestimation): Regarding the eligibility to DBS and the contra-indication, intolerance or failure to APO, the missing data handling planned in the first version of the statistical analysis plan were in favor of eligibility to LCIG rather than to DBS or APO.

**Conclusion:** EpiPark provides epidemiological data on French aPD patients in a real-life setting, describing their characteristics and quantifying populations eligible for DBS, APO and LCIG.

**Disclosure:** This study was funded by AbbVie.

## Movement disorders 3

### EPO1212

#### Biological markers of neurodegeneration in patients with Idiopathic Parkinson's Disease (IPD), Multiple System Atrophy (MSA) and Progressive Supranuclear Palsy (PSP)

M. Chudackova<sup>1</sup>, K. Bucilova<sup>2</sup>, M. Kaiserova<sup>1</sup>, K. Mensikova<sup>1</sup>, K. Langova<sup>3</sup>, K. Pekarova<sup>4</sup>, J. Mareš<sup>1</sup>, P. Kanovsky<sup>1</sup>

<sup>1</sup>Olomouc, Czech Republic, <sup>2</sup>Neurology Department, Faculty of Medicine and Dentistry, Palacky University and University Hospital, Olomouc, Czech Republic, Olomouc, Czech Republic, <sup>3</sup>Department of Biophysics, Palacky University olomouc, Olomouc, Czech Republic, <sup>4</sup>Department of Neurology, Faculty of Medicine and Dentistry, Palacky University and University Hospital, Olomouc, Czech Republic, Olomouc, Czech Republic

**Background and aims:** Parkinsonian syndromes can be classified according to the predominant type of protein in cell inclusions to intracellular synucleinopathy (IPD), extracellular synucleinopathy (MSA) and tauopathy (progressive supranuclear paralysis-PSP). Our study aimed to find a panel of CSF and serum biomarkers to differentiate patients with MSA and PSP from IPD.

**Methods:** CSF and blood samples were obtained from patients with clinical diagnoses of IPD (n=28), PSP (n=19), MSA (n=21) and from healthy patients as a control group without neurodegenerative disease. Levels of chromogranin-A, phosphorylated neurofilament heavy chain, phosphorylated  $\tau$  protein, total  $\tau$  protein,  $\beta$ -amyloid 42, tau/ $\beta$  ratio,  $\alpha$ -synuclein, cystatin C were measured in CSF.

**Results:** We found a statistically significant difference in the levels of pNF-H,  $\beta$ -amyloid 42, tau/ $\beta$  ratio, serum  $\alpha$ -synuclein and the difference in serum and CSF  $\alpha$ -synuclein concentrations. The tau/ $\beta$  ratio is significantly different between IPD and MSA (p=0.023). Serum  $\alpha$ -synuclein concentration in IPD or MSA was significantly higher than in PSP (p=0.001). In patients with IPD was significantly higher compared to control (p=0.032) and PSP (p=0.002), in patients with MSA was marginally higher compared to PSP (p=0.07)

Tab. 1 Statistical values of monitored markers in individual ND groups

	IPD (n = 28)			PSP (n = 19)			MSA (n = 21)			Control group (n = 9)			P
	Median	Min	Max	Median	Min	Max	Median	Min	Max	Median	Min	Max	
chromogranin A [ $\mu$ g/l]	90.55	30	433.21	110.4	302	339.82	113.34	303	500	114.5	52.71	228.99	0.72
pNF-H [ng/l]	293	3.19	1102	342	185	2444	511	120	739	585	185	2595	0.04
phosphorylated $\tau$ [ng/l]	36.85	15.6	75.7	29.7	19.2	58.5	37.45	15.6	86.1	37.55	33.7	76.5	0.343
total $\tau$ [ng/l]	237	62	647	215	48	644	273	145	758	290	197	574	0.005
$\beta$ -amyloid 42 [ng/l]	837.72	253.8	1305.44	867	558.07	1179.4	622.11	408.75	1340	1176.5	1030	1327	0.001
tau/ $\beta$ ratio	0.25	0.07	2.38	0.25	0.12	0.68	0.44	0.2	1.39	0.23	0.16	0.51	0.019
$\alpha$ -syn CSF [ng/l]	165.95	25.6	872.6	185.8	131	566.4	149.9	25.6	786.6	268.35	161.9	604.5	0.339
$\alpha$ -syn S [ng/l]	1126.05	362.4	1833.8	510.4	340.5	1628.8	1216.4	240.9	1631.1	583.75	376.2	1069.2	0.001
cyst C [mg/l]	3.45	1.91	6.97	3.81	1.7	5.6	4.05	1.79	6.25	4.25	3.25	5.89	0.444
total $\alpha$ -syn CSF $\alpha$ -syn S	892.8	-257	1716.1	325.8	-200.4	1179.1	740.8	138.8	1303.3	328.3	183.7	484.6	0.004

Tab. 2 Statistical values of serum  $\alpha$ -synuclein in synucleinopathies and PSP

	IPD & MSA (n = 49)			PSP (n = 19)			P				
	Median	Percentile 25	Percentile 75	Min	Max	Median		Percentile 25	Percentile 75	Min	Max
$\alpha$ -syn S [ng/l]	1150.1	804	1392.1	240.9	1833.8	510.4	398.4	835.7	340.5	1620.8	0.001

Statistical values of monitored markers in individual ND groups

**Conclusion:** The tau/ $\beta$  ratio could serve to differentiate intracellular and extracellular synucleinopathies, i.e. IPD and MSA. Serum  $\alpha$ -synuclein, or the difference between serum and CSF  $\alpha$ -synuclein concentrations, could be used to differentiate synucleinopathies and tauopathies. Thus, the determination of  $\alpha$ -synuclein concentrations and the resulting differential diagnosis of synucleinopathies and tauopathies could be limited to biochemical blood testing.

**Disclosure:** Supported by the European Regional Development Fund - Project ENOCH (No. CZ.02.1.01/0.0/0.0/16\_019/0000868)

## EPO1213

**Assessment of motor and non-motor symptoms in patients with Parkinson's disease in the early post-transplant period**

V. Chyzyk, V.V. Ponomarev, A. Boika, N. Aleinikava  
*Belarusian Medical Academy of Postgraduate Education,  
 Minsk, Belarus*

**Background and aims:** Treatment of patients with Parkinson's disease (PD) using autologous mesenchymal stem cells (MSCs) is a perspective method to influence on the pathogenesis of the disease. At the same time, this is a complex and still insufficiently explored process. On January 17, 2019, in the 5th Minsk City Clinical Hospital, the 1st implantation of MSCs in the Republic of Belarus was performed to a patient with PD. Currently, the number of patients in the post-transplant period has increased to 12.

**Objective:** To evaluate the immediate results of the effectiveness of the introduction of MSCs on motor and non-motor symptoms in patients with PD.

**Methods:** The therapy of MSCs in patients with PD was performed using 2 methods developed by us: systemic (intravenous) administration method and method of tandem (intranasal + intravenous) administration

Effectiveness of the therapy was evaluated before the transplantation (Day 0) and after the introduction of MSCs (Month 1 and Month 3) according to the dynamics of non-motor symptoms when scoring the following scales: The Montreal Cognitive Assessment, Hamilton Depression Rating Scale, The Pittsburgh Sleep Quality Index, The Epworth Sleepiness Scale, Non-Motor Symptoms Scale. The severity of motor symptoms of PD was evaluated on the basis of Section III of the Unified Parkinson's Disease Rating Scale (MDS-UPDRS).

**Results:** A decrease of the severity of motor and non-motor symptoms in the post-transplant period was revealed.

**Conclusion:** Positive results allow us to consider the usage of MSCs in PD as a therapy modifying the course of the disease.

**Disclosure:** The research was carried out from the task "Development and implement a Parkinson disease therapy method using cellular technologies" (the subprogram "Transplantation of cells, organs and tissues" of the State scientific-technical program "New methods of medical care" (state registration number 20171292))

## EPO1214

**Application of the AT(N) biomarker classification system in corticobasal syndrome**

V. Constantinides, G. Paraskevas, F. Boufidou,  
 M. Bourbouli, L. Stefanis, E. Kapaki  
*1<sup>st</sup> Department of Neurology, National and Kapodistrian  
 University of Athens, Athens, Greece*

**Background and aims:** Corticobasal syndrome (CBS) is a rare clinical phenotype comprising symptoms and signs of higher cortical as well as basal ganglionic dysfunction. Diverse pathologies may underlie CBS, including corticobasal degeneration (CBD) and Alzheimer's disease (AD). A decrease in cerebrospinal fluid (CSF) beta-amyloid (A $\beta$ 42), with an increase of total tau ( $\tau$ T) and phosphorylated tau at threonine 181 ( $\tau$ P-181) are established biomarkers of an underlying AD pathology. The AT(N) classification system groups biomarkers into those indicative of  $\beta$  amyloid deposition (A), pathologic tau (T) and neurodegeneration (N). This results in 5 biomarker groups: a) normal AD biomarkers; b) AD pathologic change; c) AD; d) AD and concomitant suspected non-AD pathologic change; e) non-AD pathologic change. The aim of this study was to classify CBS patients according to the AT(N) system.

**Methods:** All patients with a diagnosis of probable or possible CBS and available classical CSF biomarker data, which were examined at our clinic from 2011 to 2019, were included. All CSF analyses were performed by commercially available enzyme-linked immunosorbent assay kits (ELISAs).

**Results:** A total of 27 patients with CBS were included. 12 patients (44.4%) had an AD CSF profile and 3 patients an "Alzheimer's pathologic change" profile (11.1%). 7 patients (25.9%) had normal CSF biomarkers and 5 patients (18.5%) had a "non-AD pathologic change" CSF profile.

**Conclusion:** About 40% of CBS patients had an AD-CSF profile. More than 50% of CBS patients had decreased CSF A $\beta$ 42 levels. The AT(N) system can be helpful in investigating the underlying pathology in CBS.

**Disclosure:** Nothing to disclose

## EPO1215

**STW5 (Iberogast®) for constipation in Parkinson's disease**

M. Roy<sup>1</sup>, M. Pere<sup>2</sup>, P.G. Damier<sup>1</sup>,  
S. Bruley Des Varannes<sup>1</sup>, P. Derkinderen<sup>1</sup>, T. Rouaud<sup>1</sup>  
<sup>1</sup>CIC 0004, CHU, INSERM, Nantes, France, <sup>2</sup>Plateforme de  
Méthodologie et Biostatistique, DRCI, CHU, Nantes, France

**Background and aims:** Chronic constipation is a frequent non-motor symptoms in Parkinson's disease (PD), and impairs patients' quality of life.

The aim of this pilot study was to assess the efficacy and tolerability of STW5, a phytotherapeutic agent composed of nine extract plants, for the treatment of constipation in PD patients.

**Methods:** We carried out an open-label monocentric study of STW5 for treating constipation in PD patients. 44 PD patients with a mean age of 66.4±7.3 years (range, 35-78), a mean disease duration of 12.6±5.4 years (range, 3-27) and with constipation defined by Rome III criteria for functional constipation were included. Following a 2 weeks laxative-free baseline period, all the patients were treated with 20 drops STW5 t.i.d for 28 days, after a 7 days titration period. Treatment efficacy was defined as a marked improvement of the stool frequency with an increase of 3 exonerations on the last week of treatment when compared to the week before treatment initiation. The treatment would be considered to be of clinical interest if a success response rate was obtained at least in 29/45 patients.

**Results:** An increase of stool frequency  $\geq 3$  eliminations/week was observed in 4 out of 44 patients (9,0%) at the end of the study. The only significant difference observed before and after treatment was a decrease of stool consistency ( $p=0.0272$ ).

**Conclusion:** Our results suggest that STW5 is safe but is not effective as a phytotherapeutic agent to treat constipation in PD.

**Disclosure:** The research was supported by a researcher grant from C.H.U. Nantes.

## EPO1216

**Enteric LRRK2 as potential link between Parkinson's and Crohn's diseases**

A. De Guilhem de Lataillade<sup>1</sup>, T. Oullier<sup>2</sup>, M. Neunlist<sup>2</sup>,  
P. Derkinderen<sup>3</sup>  
<sup>1</sup>Nantes, France, <sup>2</sup>Inserm, Nantes, France, <sup>3</sup>Department of  
Neurology, Hôpital Laennec, Nantes, France

**Background and aims:** An accumulating body of literature has emerged over recent years to show that Parkinson's disease (PD) is not only disorder of the brain but also of the gut-brain axis. Recent reports have shown that, aside from enteric synuclein neuropathology and gastrointestinal dysfunction, PD patients also exhibit some degree of gastrointestinal inflammation. The possible link between gastrointestinal inflammation and PD is further reinforced by genetic observations showing that the Leucine-rich repeat kinase 2 (LRRK2) gene, which has emerged as the gene most commonly associated with both familial and sporadic PD, is also a major susceptibility gene for Crohn's disease (CD).

This suggests that LRRK2 could be a link between gastrointestinal inflammation, PD and CD and therefore we set out to examine the expression levels of LRRK2 in the gastrointestinal tract of sporadic PD and CD patients.

**Methods:** Colonic biopsies of 14 controls, 6 CD and 9 PD subjects were analyzed by Western Blot and qPCR.

**Results:** We found that the expression levels of LRRK2 were increased in the colonic samples of CD patients when compared to controls. By contrast, no changes in the expression levels of LRRK2 were observed in colonic biopsies of sporadic PD patients.

**Conclusion:** Our results show that, despite the genetic and molecular links between the 2 disorders, the gastrointestinal inflammation in PD and CD follows different molecular mechanisms. Further research is nevertheless needed to determine if the expression levels of LRRK2 is increased in PD patients with a short disease duration or with LRRK2 mutations.

**Disclosure:** Nothing to disclose

## EPO1217

### A novel CCM2 mutation associated with choreoathetosis in family with Cerebral Cavernous Malformations

F.J.P. De Almeida<sup>1</sup>, J. Pinto Basto<sup>2</sup>, A.F. Geraldo<sup>1</sup>, A.H.C. Jorge<sup>1</sup>, G. Sousa<sup>1</sup>

<sup>1</sup>Neurology, Centro Hospitalar Vila Nova de Gaia/Espinho, Vila Nova de Gaia, Portugal, <sup>2</sup>Lab Diagnóstico Molecular e Genómica Clínica-CGC Genetics (Centro Genética Clínica), Porto, Portugal

**Background and aims:** Cerebral Cavernous Malformations (CCM) are vascular malformations occurring in the central nervous system. These abnormalities can present incidentally or manifest as hemorrhagic stroke, seizures and focal neurological deficits. CCMs are present in both sporadic and familial forms. The pathologic mutations of KRIT1/CCM1, MGC4607/CCM2 and PDCD10/CCM3 are responsible for familial cases of CCMs, inherited in an autosomal dominant manner. We report 2 family members presenting both with choreoathetosis, with a novel CCM2 mutation.

**Methods:** Case report.

**Results:** A 52-year-old woman, without personal or familiar history of stroke or epilepsy, was diagnosed with CCM at age 28. 10 years ago, she presented choreoathetoid movements of the right hand which evolved progressively until functional limitation. The proband's 23-year-old son reported since his 16 years old a tremor in both hands, with a right predominance. At the neurological evaluation he presented also choreoathetoid movements of the right hand. Subsequent MRI evaluation of both patients revealed multiple CCMs, with the largest lesion located in the left thalamic region. Genetic testing was performed and identified a c.514G>T p.(Glu172\*) heterozygous mutation in the MGC4607/CCM2 gene, consisted in a premature terminated codon. To our knowledge, this mutation was not yet reported in the literature or population databases.

**Conclusion:** The anatomic location of the CCM is directly associated with the patient's symptoms. Choreoathetosis is an uncommon manifestation of CCM and in this family is most probably related with the thalamic lesion. Since both patients had a similar presentation, their mutation might be correlated with this specific phenotypic variation.

**Disclosure:** Nothing to disclose

## EPO1218

### Cardiac Innervation in Huntington's disease

A. De Rosa<sup>1</sup>, R. Assante<sup>2</sup>, E. Salvatore<sup>1</sup>, C. Nappi<sup>2</sup>, G. De Simini<sup>2</sup>, S. Peluso<sup>1</sup>, A. Roca<sup>1</sup>, S. Pappatà<sup>3</sup>, A. Cuocolo<sup>2</sup>, G. De Michele<sup>4</sup>

<sup>1</sup>Department of Neurosciences and Reproductive and Odontostomatological Sciences, Federico II University, Naples, Italy, <sup>2</sup>Department of Advanced Biomedical Sciences, Federico II University, Naples, Italy, <sup>3</sup>Institute of Biostructure and Bioimaging, National Council of Research, Federico II University, Naples, Italy, <sup>4</sup>Department of Neurosciences, Reproductive Sciences and Odontostomatology, University Federico II of Naples, Italy., University of Naples "Federico II", Naples, Italy

**Background and aims:** Huntington's disease (HD) patients often present abnormal modulation of blood pressure and heart rate. Arrhythmias and sudden cardiac death occur more frequently in HD subjects than in controls. We aimed to investigate whether cardiac autonomic innervation assessed by 123I- metaiodobenzylguanidine (MIBG) imaging is impaired in HD patients, in comparison with controls (Ctrl).

**Methods:** 14 patients (6 F and 8 M) were assessed by the Unified HD Rating Scale (UHDRS) and the Total Function Capacity (TFC). All patients and x Ctrl (5 F and 5 M) subjects underwent 123I-MIBG imaging. From planar images, the early and late heart-to-mediastinum (H/M) ratios were computed. Moreover, myocardial washout rates (WR) were also calculated.

**Results:** Demographic and clinical data are shown in Table 1, MIBG scintigraphy results in Table 2. We did not find a significant difference in early and late H/M ratios and WR between HD patients and Ctrl. There were no significant correlations between 123I-MIBG imaging data, clinical features and CAG expansion.

	Early H/M*	Late H/M*	Wash Out rate (%)*
Cases	2.03±0.28	2.06±0.36	14.6±17.9
Ctrl**	2.2±0.12	2.1±0.20	19.9±9.6

Table 2: MIBG scintigraphy results. Values below or above 2SD the mean of Ctrl were considered abnormal.

\*: mean±SD; \*\* Ctrl: control subjects

Table 2: MIBG scintigraphy results. Values below or above 2SD the mean of Ctrl were considered abnormal. \*: mean±SD; \*\* Ctrl: control subjects

Subjects	Gender	Age	DD*	UHDRS <sup>§</sup>	TFC <sup>^</sup>
1	F	50	10	20	13
2	M	51	1	27	11
3	M	65	3	25	11
4	F	68	5	33	9
5	M	47	5	34	10
6	F	64	8	35	11
7	F	41	4	15	10
8	F	39	3	11	13
9	M	46	2	4	13
10	M	66	11	42	7
11	F	74	3	11	13
12	M	35	1	8	13
13	M	47	6	12	12
14	M	42	7	45	8

Table 1: demographic and clinical data

\*DD: disease duration; <sup>§</sup>UHDRS: section III of Unified Huntington's Disease Rating Scale; <sup>^</sup>TFC: Total Functional Capacity

Table 1: demographic and clinical data \*DD: disease duration; <sup>§</sup>UHDRS: section III of Unified Huntington's Disease Rating Scale; <sup>^</sup>TFC: Total Functional Capacity

**Conclusion:** Our study results suggest that myocardial postganglionic sympathetic innervation is preserved in HD and the cardiovascular dysfunction may due to the impairment of brain areas, as the prefrontal cortex, the bilateral insular cortex, the anterior cingulate gyrus, the amygdala and the hypothalamus, associated with the regulation and modulation of the heart function and shown to be altered in HD. Furthermore, decreased levels of brain-derived neurotrophic factor, known to play a role in the neuro-mediated regulation of the heart rate and blood pressure, are reported in HD.

**Disclosure:** Nothing to disclose

## EPO1219

### Dopamine transporter imaging in Progressive Supranuclear Palsy subtypes

E. Del Prete<sup>1</sup>, N. Campese<sup>2</sup>, G. Palermo<sup>2</sup>, S. Mazzucchi<sup>3</sup>, D. Frosini<sup>3</sup>, U. Bonuccelli<sup>2</sup>, R. Ceravolo<sup>2</sup>

<sup>1</sup>Pisa, Italy, <sup>2</sup>Department of Clinical and Experimental Medicine, University of Pisa, Pisa, Italy, <sup>3</sup>Department of Medical Specialties, Neurology Unit, AOUP, Pisa, Italy

**Background:** Recently new criteria for Progressive Supranuclear Palsy (PSP), which includes different phenotypes, have been proposed. In PSP patients a reduced tracer uptake in 123FP-CIT dopamine transporter single photon emission computed tomography (SPECT-DAT) is present. Nowadays there is an increasing interest in identifying neuroimaging biomarkers to support differential diagnosis among different PSP phenotypes.

**Aim:** The aim of our study was to investigate the role of SPECT-DAT imaging in differentiating between PSP-Richardson (PSP-RS) and PSP non-RS phenotypes.

**Methods:** Patients with diagnosis of PSP were included in the study. Patients performed SPECT-DAT imaging at disease onset; caudate and putamen binding specific indices and caudate to putamen ratio were evaluated for each side. Clinical features including motor assessment, performed using Progressive Supranuclear Palsy Rating Scale (PSPrs), were considered.

**Results:** 29 PSP patients were enrolled in the study, 22 PSP-RS and 7 PSP non-RS. No significant differences were found in caudate, putamen indices or caudate to putamen ratio for each side between PSP-RS and nonRS in SPECT-DAT imaging. SPECT imaging shows low sensitivity and specificity in differentiating PSP-RS and non-RS. No significant differences were found in age, disease duration or PSPrs between groups.

**Conclusion:** SPECT-DAT imaging does not show an adequate diagnostic accuracy to differentiate PSP-RS and PSP non-RS phenotypes in our samples, however such data need to be confirmed in larger samples of patients.

**Disclosure:** Nothing to disclose

## EPO1220

### Quantitative EEG analysis and neuropsychological testing in de novo PD patients

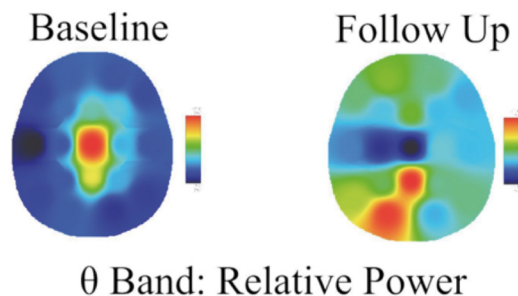
A. D'elia<sup>1</sup>, C. Liguori<sup>1</sup>, T. Schirinzi<sup>1</sup>, F. Placidi<sup>1</sup>, F. Izzi<sup>1</sup>, C. Mancini<sup>2</sup>, S. Scalise<sup>1</sup>, G. Di Lazzaro<sup>1</sup>, N.B. Mercuri<sup>3</sup>, A. Pisani<sup>1</sup>

<sup>1</sup>Department of Systems Medicine, University Hospital of Rome Tor Vergata, Rome, Italy, <sup>2</sup>University Hospital of Rome Tor Vergata, Rome, Italy, <sup>3</sup>Department of Systems Medicine, Università Hospital of Rome Tor Vergata, Rome, Italy

**Background and aims:** Search for disease biomarkers is essential to improve our knowledge on pathophysiology and treatment for Parkinson's Disease (PD). Quantitative EEG analysis may reflect the cognitive status of patients affected by PD. The aim of our study was to evaluate quantitative EEG (qEEG) and neuropsychological testing in patients with PD.

**Methods:** 16 de novo cognitive preserved PD patients underwent motor symptoms examination (UPDRS-III), neuropsychological assessment and qEEG during the diagnostic work-up and after 18 months. EEG was performed at rest. As reference parameter of spectral analysis, relative power of EEG bands (delta, theta, alpha and beta) was considered. In the neuropsychological evaluation we used a validated multi-domain neuropsychological battery for PD.

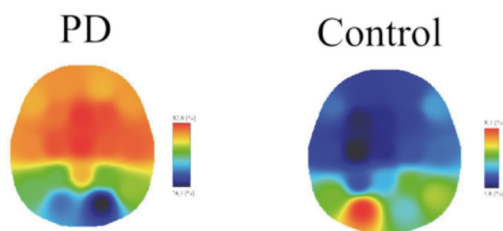
**Results:** We noticed a greater representation of slow rhythms in PD de novo patients compared to healthy controls, already at the baseline. Conversely, at follow-up the slowdown of the scalp activity was not homogeneous in all the derivations considered. We also observed a decrease in the UPDRS-III scores and an increase (that is, an improvement of performance) in RAVLT, Recognition, MFTC, Stroop test. Finally, the greater was the representation of the theta rhythms, the lower was the improvement in motor performances obtained after therapy (L-dopa, dopamine agonists, iMAO-B).



Spectral maps. Modifications of theta band in PD patient between t0 and t1.

**Conclusion:** qEEG analysis may represent an useful neurophysiological approach in patients with de novo Parkinson's disease to observe cognitive performance and disease progression. Longer follow-up and more patients are needed to confirm this preliminary impression. Finally, is to be elucidated if it was the disease itself or therapy that influenced the qEEG parameters among time.

**Disclosure:** Nothing to disclose



$\theta$  Band: Relative Power

Spectral maps. Representation of theta band in PD vs controls.

## EPO1221

**Perampanel and Essential Tremor**

L. Díaz Feliz<sup>1</sup>, M. Ruiz-Lopez<sup>1</sup>, C. Feliz-Feliz<sup>1</sup>,  
J. Lopez Del Val<sup>1</sup>, P. Garcia-Ruiz<sup>2</sup>

<sup>1</sup>*Movement Disorders Unit, Fundacion Jimenez Diaz Hospital, Madrid, Spain*, <sup>2</sup>*Neurology, Fundación Jimenez Diaz, Madrid, Spain*

**Objectives:** To assess the safety of Perampanel in patient with essential tremor and to clarify the efficacy of the aforementioned medication in this population.

**Background:** Essential Tremor (ET) is the most frequent movement disorders. Medical treatment for ET is often unsatisfactory with 1<sup>st</sup>-line drugs only achieving 50-60% improvement. Over the last year, distribution problems of primidone led to rapid change of treatment for some ET patients in Spain. Since perampanel has been suggested to be effective for ET we have tried perampanel in those ET patients previously treated with primidone

**Methods:** We have evaluated patients from our movement disorders clinic with the diagnosis of ET, who were refractory to 1<sup>st</sup>-line drug (primidone and propranolol). Assessments were done in base line condition (without any other medication for ET) and after 1 month of 4mg perampanel a day. Details about tolerance and effectiveness were collected. Clinical evaluation included Tolosa scale (paired non-parametric test). Specially in those patients to not tolerated perampanel.

**Results:** We have found positive results in some, not all patients. We will report our final results of our patients treated with perampanel.

**Conclusion:** Our preliminary study suggests that perampanel may be an option for ET patients.

**Disclosure:** Nothing to disclose

## EPO1222

**Skin biopsy may help to distinguish Multiple System Atrophy-parkinsonism type from Parkinson's disease with orthostatic hypotension**

V. Donadio<sup>1</sup>, A. Incensi<sup>2</sup>, G. Rizzo<sup>1</sup>, R. De Micco<sup>3</sup>,  
P.A. Tessitore<sup>4</sup>, G. Devigili<sup>5</sup>, F. Del Sorbo<sup>6</sup>, S. Bonvegna<sup>7</sup>,  
M. Magnani<sup>8</sup>, L. Vignatelli<sup>1</sup>, C. Zenesini<sup>8</sup>, R. Cilia<sup>7</sup>,  
R. Eleopra<sup>9</sup>, G. Tedeschi<sup>10</sup>, R. Liguori<sup>11</sup>

<sup>1</sup>*Bologna, Italy*, <sup>2</sup>*UOC Clinica Neurologica, IRCCS Istituto Scienze Neurologiche Bologna, Bologna, Italy*, <sup>3</sup>*Department of Medical, Surgical, Neurological, Metabolic and Aging Sciences, University of Campania "Luigi Vanvitelli", Naples, Italy*, <sup>4</sup>*Department of Medical, Surgical, Neurological, Metabolic and Aging Sciences, MRI Research Center SUN-FISM, University of Campania "Luigi Vanvitelli", Naples, Italy*, <sup>5</sup>*UO Neurologia I, Fondazione IRCCS Istituto Neurologico "Carlo Besta", Milan, Italy*, <sup>6</sup>*Fondazione IRCCS Istituto Neurologico Carlo Besta, Milano, Italia, Milan, Italy*, <sup>7</sup>*Parkinson Institute ASST Gaetano Pini-CTO, Milano, Milan, Italy*, <sup>8</sup>*IRCCS ISTITUTO SCIENZE NEUROLOGICHE DI BOLOGNA, Bologna, Italy*, <sup>9</sup>*Istituto Carlo Besta, Milan, Italy*, <sup>10</sup>*Naples, Italy*, <sup>11</sup>*Department of Biomedical and Neuromotor Sciences, Alma Mater Studiorum, University of Bologna, Bologna, Italy, Bologna, Italy*

**Background and aims:** Multiple System Atrophy parkinsonism type (MSA-P) shows a similar clinical but a different prognosis compared to Parkinson disease with orthostatic hypotension (PD+OH). No established diagnostic test is available to help the differential diagnosis of these 2 conditions. This study aimed to distinguish MSA-P from PD+OH by means of the search of phosphorylated  $\alpha$ -synuclein (p-syn) in skin nerves.

**Methods:** 20 patients fulfilling clinical diagnostic criteria for MSA-P and 20 patients with clinical diagnostic criteria for PD+OH with similar disease duration were recruited for this study. Clinical diagnosis was supported by brain MR typical findings in all patients with MSA-P and abnormal cardiac MIBG in the majority of patients with PD+OH. Patients underwent skin biopsy from cervical, thigh and leg to search for p-syn deposits in skin nerves

**Results:** All PD+OH patients were positive for p-syn in autonomic skin fibers; scarce somatic fibers were positive for p-syn in 2 patients. The intraneural p-syn positivity was found in 75% of MSA-P patients, mainly in distal skin sites. Importantly, p-syn deposits differ from PD+OH since they were mainly found in somatic fibers of subepidermal plexuses and in scant sympathetic fibers of 2 patients.

**Conclusion:** The main conclusions of our study are: 1) skin biopsy allows to differentiate PD+OH from MSA-P since p-syn deposits are mainly found in different skin nerve fibers which may help the clinical differentiation of these 2 disorders; 2) the site of autonomic failure is likely different mainly affecting postganglionic sympathetic fibers in PD+OH and pre-ganglionic fibers in MSA-P.

**Disclosure:** This work was supported by Ricerca Finalizzata Ministero della Salute Grant RF-2016-02362047



## EPO1223

**A case of dystonia gravidarum**

E. Donlon, P. Moloney, L. Williams, E. McGovern, S. Smyth  
Neurology department, Mater Misericordiae Hospital, Dublin, Ireland

**Background and aims:** We describe a case of cervical dystonia in a 36 year-old, secundigravid, Caucasian woman at 8 weeks gestation, which responded to treatment with procyclidine and clonazepam with reduction in severity of dystonia, but not complete resolution of symptoms. Pregnancy is known to cause extrapyramidal syndromes, including chorea, ballismus and restless leg syndrome. The mechanism is poorly understood, but oestrogen likely plays a role in modulating nigrostriatal dopaminergic activity. Drug induced dystonic reactions are common in pregnancy, but there has only been 4 cases of new onset dystonia of pregnancy reported in the literature.

**Methods:** Patient clinical notes were reviewed along with results of ancillary investigations.

**Results:** Investigations were unremarkable for secondary causes of dystonia, including wilson's disease, autoimmune disease and thyrotoxicosis.

**Conclusion:** Pregnancy is known to both exacerbate existing movement disorders and precipitate de novo movement disorders. Based on a small number of case studies, dystonia gravidarum is an emerging clinical entity with a distinct clinical phenotype. Low dose benzodiazepines and anticholinergics can provide symptomatic relief, but symptoms appear to resolved spontaneously in the 3rd trimester or soon after delivery with or without treatment.

**Disclosure:** Nothing to disclose

## EPO1224

**Efficacy and safety of opicapone in Parkinson's disease patients according to duration of motor fluctuations: post-hoc analysis of BIPARK-I and II**

G. Ebersbach<sup>1</sup>, O. Rascol<sup>2</sup>, J.J. Ferreira<sup>3</sup>, R. Costa<sup>4</sup>, J.-F. Rocha<sup>5</sup>, D. Magalhães<sup>5</sup>, P. Soares-Da-Silva<sup>4</sup>  
<sup>1</sup>Movement Disorders Clinic, Beelitz Hospital, Beelitz, Germany, <sup>2</sup>Department of Neurosciences and Clinical Pharmacology, University of Toulouse, Toulouse, France, <sup>3</sup>Laboratory of Clinical Pharmacology and Therapeutics, Faculty of Medicine, University of Lisbon, Lisbon, Portugal, <sup>4</sup>Research and Development Department, BIAL - Portela & Ca S.A., Coronado, Portugal, <sup>5</sup>Global Parkinson's Disease Department, BIAL - Portela & Ca S.A., Coronado, Portugal

**Background and aims:** Opicapone (OPC), a once-daily catechol-O-methyltransferase inhibitor, proved effective in the treatment of end-of-dose motor fluctuations in Parkinson's disease (PD) patients in 2 large multinational trials (BIPARK-I and II) [1,2]. This exploratory post-hoc analysis evaluated the efficacy and safety of OPC in levodopa-treated PD patients with duration of motor fluctuations of up to 1 year ('early motor fluctuators' [EMF]) or more than 1 year ('long-standing MF' [LMF]).

**Methods:** Patient-level data from matching treatment arms in BIPARK-I and II were combined in placebo (PLC) and OPC 50mg groups. Studies had similar designs and eligibility criteria [1,2]. Outcomes were compared for PLC versus OPC for EMF and LMF. Statistical analysis of efficacy was performed using analysis of covariance.

**Results:** Overall, 71 PLC and 85 OPC patients were EMF whereas 174 PLC and 162 OPC patients were LMF (Safety Set; Table 1). Changes from baseline in absolute OFF- and ON-time were significantly greater for OPC versus PLC in both EMF and LMF (Table 2). Dyskinesia was the most frequently reported at least possibly related treatment-emergent adverse event, with approximately 2-fold increase in incidence in LMF versus EMF in the OPC groups (23.5% vs. 11.8%), which might be due to longer disease duration and higher daily levodopa dose.

**Table 1.** Baseline characteristics (Safety Set)

Characteristic	EMF (<=1 year)		LMF (>1 year)	
	PLC N=71	OPC 50 mg N=85	PLC N=174	OPC 50 mg N=162
Age, mean (SD) years	63.9 (9.4)	63.7 (9.4)	62.3 (9.1)	65.1 (8.6)
Disease duration, mean (SD) years	5.8 (2.6)	5.9 (2.8)	8.5 (4.1)	8.6 (4.7)
Daily OFF-time, mean (SD) hours	5.8 (1.8)	6.0 (1.7)	6.3 (2.2)	6.4 (2.1)
Levodopa dose, mean mg/day	585.4 (274.6)	616.6 (301.5)	742.3 (324.6)	739.3 (323.3)

EMF, early motor fluctuators; LMF, long-standing motor fluctuators; OPC, opicapone; PLC, placebo; SD, standard deviation

Table 1

**Table 2.** Changes from baseline in absolute OFF- and ON-time (Full Analysis Set)

Characteristic	EMF (</=1 year)		LMF (>1 year)	
	PLC N=71	OPC 50 mg N=85	PLC N=172	OPC 50 mg N=161
<b>Absolute OFF-time</b>				
LS mean (SE; 95% CI)	-74.4 (19.2);	-139.6 (18.1);	-51.9 (13.5);	-112.4 (13.2);
change from baseline, min	-112.1, -36.7)	-175.1, -104.1)	-78.3, -25.5)	-138.3, -86.5)
LS mean (SE; 95% CI)	-65.2 (26.3; -116.9, -13.5)		-60.5 (18.9; -97.5, -23.5)	
absolute difference, min	0.0135		0.0014	
<b>Absolute ON-time</b>				
LS mean (SE; 95% CI)	52.9 (19.1);	140.4 (18.0);	48.2 (13.4);	115.3 (13.2);
change from baseline, min	15.4, 90.4)	105.1; 175.7)	21.9, 74.6)	89.5, 141.1)
LS mean (SE; 95% CI)	87.5 (26.3; 35.9, 139.0)		67.1 (18.8; 30.2, 104.0)	
absolute difference, min	0.0009		0.0004	

CI, confidence interval; EMF, early motor fluctuations; LMF, long-standing motor fluctuations; LS, least squares; OPC, opicapone; PLC, placebo; SE, standard error

Table 2

**Conclusion:** OPC 50mg demonstrated efficacy in both EMF and LMF, with a lower incidence of dyskinesia in EMF. This reinforces the usage of OPC regardless of duration of motor fluctuations.

1. Ferreira et al., *Lancet Neurol.* 2016;15(2):154-165.
2. Lees et al., *JAMA Neurol.* 2017;74(2):197-206.

**Disclosure:** Study supported by Bial - Portela & C<sup>a</sup>, S.A.

## EPO1225

### Subacute parkinsonism due to bilateral subdural hematoma

J. Eguizábal<sup>1</sup>, P. Gil Armada<sup>2</sup>, J. Berrio<sup>3</sup>, L. Caballero<sup>3</sup>,  
D. Cerdan<sup>1</sup>, F. Rodriguez<sup>3</sup>, J. Duarte Garcia Luis<sup>1</sup>

<sup>1</sup>Segovia, Spain, <sup>2</sup>General Hospital Segovia, Segovia, Spain,  
<sup>3</sup>Hospital General Segovia, Segovia, Spain

**Background and aims:** To illustrate a non-common presentation of subacute parkinsonism.

**Methods:** A 92-year-old male patient with non relevant neurological background.

**Results:** The patient suffered a traffic accident 4 months before the start of the symptoms. The clinic begins one month before the entry to hospital with progressive deterioration that intensified in the two previous weeks in which his family saw him more standing, with slower walking and slow activity. More inexpressive and depressed mood as well as unexpected falls. In neurological examination stood out hypophonia, bilateral bradykinesia of right predominance with stiffness of the 4 limbs and the gait with short passage, anterocoli and decrease in bracing stood out. Cranial CT is performed showing bilateral subdural hematoma, being evacuated the day after with great improvement of bradykinesia and gait.

**Conclusion:** We present an unusual cause of subacute parkinsonism in order to emphasize the relevance that can take this form of presentation in order to raise a correct management.

**Disclosure:** Nothing to disclose

## EPO1226

**Olfactory dysfunction in restless legs syndrome**

Y. Erdal, O. Akdogan, U. Emre  
*Department of Neurology, Istanbul Training and Research Hospital, Istanbul, Turkey*

**Background and aims:** Dopaminergic dysfunction has been implicated in the pathogenesis of restless legs syndrome as in Parkinson's disease (PD). Because PD is associated with a loss of olfactory function, we aimed to investigate olfactory functions in patients with restless leg syndrome (RLS).

**Methods:** 54 with RLS and 50 healthy controls were included in the study. Olfaction was tested using the Connecticut Chemosensory Clinical Research Center (CCCRC) olfactory test.

**Results:** The mean age ( $50.9 \pm 8.5$  vs  $50.7 \pm 8.7$  years,  $p=0.893$ ) and gender distribution (female/male, 37/17 vs 31/19,  $p=0.485$ ) were similar between patient and control groups. In the patient group, the olfactory threshold, discrimination and total scores were significantly higher than the control group ( $p<0.01$ ). There was a significant negative correlation between age ( $p=0.16/r=-0.196$ ) and olfactory domains in contrast to disease duration, drug use duration and RLS severity scale.

**Conclusion:** Our results confirm that decreased olfaction in patients with RLS. This supports the similarity of pathogenesis of PD and RLS.

**Disclosure:** Nothing to disclose

## EPO1227

**Efficacy of continuous subcutaneous infusion of ABBV-951 on early morning symptoms in advanced Parkinson's disease patients from a phase 1b study**

W. Robieson, H. Zheng, C. Locke, M. Rosebraugh,  
M. Facheris  
*AbbVie Inc., North Chicago, USA*

**Background and aims:** ABBV-951 (foslevodopa/foscarbidopa) is a new soluble formulation of carbidopa and levodopa prodrugs designed for 24h/day delivery via continuous subcutaneous infusion (CSCI). Early morning symptoms (e.g. akinesia, delayed-on) are a significant burden for Parkinson's disease (PD) patients. The 24h/day CSCI of foslevodopa/foscarbidopa may improve early morning symptoms.

**Methods:** Individually optimized therapeutic doses of foslevodopa/foscarbidopa were delivered as CSCI for 28 days in advanced PD patients (Study M15-739, NCT03374917). Differences in daily hours of "Off" and "On" time, with or without dyskinesia, and changes in the 1st symptom reported upon awakening after  $\geq 2$ h of continuous sleep (from midnight to noon), were assessed via PD diaries from baseline (BL, before switching from oral levodopa to foslevodopa) through study end (D28). Safety endpoints were monitored.

**Results:** 21 patients (62% male, mean age 61.6, 43%  $\geq 10$  years PD duration) were included in this analysis. The overall mean (SD) change from BL to D28 in normalized daily "Off" time was significantly reduced ( $-4.6$  [2.5],  $p<0.001$ ). Comparing BL to D28, the percentage of patients reporting "Off" time as the first symptom upon awakening decreased from 86.7% to 10.8%, "On" without dyskinesia increased from 10.0% to 84.2%, "On" with non-troublesome dyskinesia increased from 0% to 4.9%, and "On" with troublesome dyskinesia decreased from 3.3% to 0%. 19 patients (90.5%) experienced at least one adverse event, with most rated mild to moderate in severity.

**Conclusion:** In advanced PD patients, tested doses of foslevodopa/foscarbidopa were generally well-tolerated when delivered 24h/day via CSCI, reduced overall daily "Off" time and improved early morning symptoms.

**Disclosure:** AbbVie funded the research for this study and participated in the study design; study research; collection, analysis, and interpretation of data; and writing, reviewing, and approving this abstract for submission. All authors had access to the data; participated in the development, review, and approval of the abstract, and agreed to submit this abstract.

## EPO1228

### Foslevodopa/foscarbidopa maintains stable levodopa and carbidopa exposure following subcutaneous infusion in Parkinson's disease patients

M. Rosebraugh, W. Liu, M. Facheris  
AbbVie, North Chicago, USA

**Background and aims:** As Parkinson's disease (PD) progresses, symptoms can no longer be well controlled by oral medication presumably due to large fluctuations in levodopa concentrations and a narrow therapeutic window. Foslevodopa/foscarbidopa, also known as ABBV-951, is a new investigational drug being developed for the treatment of PD that provides continuous therapeutic levels of levodopa (LD) and carbidopa (CD). The current work characterizes the LD and CD pharmacokinetics (PK) in PD patients following subcutaneous (SC) infusions of foslevodopa/foscarbidopa delivered at 4 different rates.

**Methods:** Foslevodopa/foscarbidopa was administered via abdominal SC infusion of PD patients over 72 hours. Patients were stratified in 4 dose groups and received a fixed dose of ABBV-951 based on their oral daily LD intake. Serial plasma PK samples were collected to assay for LD and CD concentrations. Safety and tolerability were assessed throughout the study.

**Results:** Preliminary results from 14 subjects who completed the study showed that following foslevodopa/foscarbidopa SC infusion, LD and CD exposure quickly reached a steady state and remained stable with minimal fluctuations. In this study, LD exposure from foslevodopa/foscarbidopa was consistent with that from oral LD medications, covering the broad range expected to control motor symptoms in PD patients. 4 subjects reported adverse events that were considered possibly related to treatment. The only adverse event which occurred in more than 1 subject was infusion site pain which occurred in 2 subjects.

**Conclusion:** Foslevodopa/foscarbidopa was able to deliver stable LD and CD exposures in PD patients.

**Disclosure:** This study was funded by AbbVie and AbbVie contributed to the study design, research and interpretation of data, writing, reviewing and approving the publication, all authors are AbbVie employees and may hold AbbVie stocks or options.

## EPO1229

### Improvements in motor symptoms in patients with advanced Parkinson's disease on long-term LCIG monotherapy or combination therapy: an analysis of the COSMOS observational study

A. Fasano<sup>1</sup>, J.C. Parra<sup>2</sup>, T. Gurevich<sup>3</sup>, R. Jech<sup>4</sup>, N. Kovacs<sup>5</sup>, P. Svenningsson<sup>6</sup>, J. Szász<sup>7</sup>, L. Bergmann<sup>2</sup>, O. Sanchez-Solino<sup>2</sup>, L. Vela-Desojo<sup>8</sup>

<sup>1</sup>Morton and Gloria Shulman Movement Disorders Clinic and the Edmond J. Safra Program in Parkinson's Disease, Toronto Western Hospital and Division of Neurology, UHN, Division of Neurology, University of Toronto, Toronto, Canada, <sup>2</sup>AbbVie Inc., North Chicago, USA, <sup>3</sup>Movement Disorders Unit, Neurological Institute, Tel Aviv Sourasky Medical Center, Tel Aviv, Israel, <sup>4</sup>Department of Neurology and Center of Clinical Neurosciences, <sup>1</sup>st Faculty of Medicine, Charles University in Prague and General University Hospital in Prague, Prague, Czech Republic, <sup>5</sup>University of Pécs, Pécs, Hungary, <sup>6</sup>Stockholm, Sweden, <sup>7</sup>University of Medicine and Pharmacy Tirgu Mures, Emergency Clinical County Hospital Mures, Tirgu Mures, Romania, <sup>8</sup>Department of Neurology, Hospital Universitario Fundación Alcorcón, Madrid, Spain

**Background and aims:** Advanced Parkinson's disease (PD) patients may experience insufficient symptom control with oral medication over time and may be candidates for device-aided therapies such as levodopa-carbidopa intestinal gel (LCIG) delivered continuously via percutaneous endoscopy gastrostomy with a jejunal extension tube. The COSMOS study is the 1<sup>st</sup> assessment of real-world usability of LCIG as monotherapy or in combination with add-on PD medications.

**Methods:** In this multicountry, retrospective and cross-sectional, post-marketing observational study (NCT03362879), advanced PD patients treated with LCIG for  $\geq 12$  months were stratified into 3 groups: LCIG monotherapy, LCIG monotherapy with oral or transdermal PD medication at nighttime only (ie, LCIG daytime monotherapy), and LCIG plus add-on PD medications. Assessments included motor symptom frequency/severity, and evaluation of "Off" time and "On" time with dyskinesia before starting LCIG and at study visit.

**Results:** Of 378 patients, 120 (32%) were treated with LCIG monotherapy at the 12-month visit, 94 (25%) received LCIG daytime monotherapy with adjunctive nighttime oral/transdermal PD medication, and 164 (43%) received LCIG plus add-on PD medication. Patient characteristics were similar between groups (Table). Patients treated with LCIG monotherapy tended to have slightly lower baseline "Off" time and dyskinesia duration than other treatment groups. All treatment groups experienced significant ( $p < 0.0001$ ) reductions from baseline in "Off" time and dyskinesia duration, with no significant between-group differences (Figure). Most motor symptoms showed improvements in frequency and severity after LCIG initiation.

Table 1. Patient Demographics and Characteristics at Patient Visit

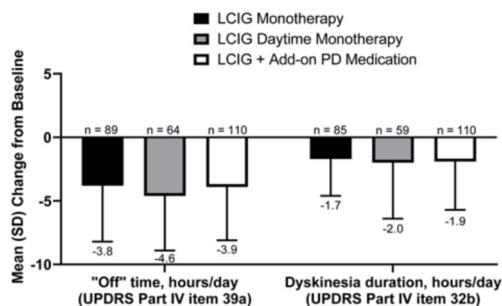
Characteristic	LCIG Monotherapy (n = 120)	LCIG Daytime Monotherapy (n = 94)	LCIG + Add-on PD Medication (n = 164)
Male, n (%)	75 (62.5)	66 (70.2)	104 (63.4)
Age, y	69.6 (8.1)	70.4 (7.1)	68.8 (7.9)
Time since PD diagnosis, y	15.2 (5.5)	15.3 (5.5)	16.3 (6.3)
Time from PD diagnosis to Motor fluctuation onset, y	7.3 (3.4)	7.1 (3.6)	7.5 (4.1)
LCIG initiation, y	12.0 (5.1)	12.7 (4.8)	13.5 (6.8) <sup>a</sup>
LCIG treatment duration, months	39.3 (25.6) <sup>b</sup>	31.8 (22.3) <sup>c</sup>	35.7 (21.9)
"Off" time before LCIG initiation, hours	5.7 (3.3)	6.7 (4.4)	6.1 (3.3)
Dyskinesia duration, hours/day	3.3 (2.9)	4.6 (3.5) <sup>d</sup>	3.8 (3.4)
	(n = 85)	(n = 59)	(n = 110)

<sup>a</sup>P = 0.0211 compared with LCIG monotherapy group.<sup>b</sup>n = 118.<sup>c</sup>P = 0.0328 compared with LCIG monotherapy group.<sup>d</sup>P = 0.0337 compared with LCIG monotherapy group.

Data are presented as mean (SD), unless otherwise noted.

LCIG, levodopa-carbidopa intestinal gel; PD, Parkinson's disease; SD, standard deviation.

Figure. Change from Baseline in "Off" Time and Duration of Dyskinesia After 12 Months of LCIG Treatment



LCIG, levodopa-carbidopa intestinal gel; PD, Parkinson's disease; SD, standard deviation; UPDRS, Unified Parkinson's Disease Rating Scale.

**Conclusion:** Patients with advanced PD treated with LCIG monotherapy or combination therapy experienced similar reductions in "Off" time and duration of dyskinesia.

**Disclosure:** AbbVie funded the research for this study and provided writing support for this abstract. Medical writing assistance, funded by AbbVie, was provided by Kelly M Cameron, PhD, CMPP<sup>TM</sup>, of JB Ashtin.

## EPO1230

### Characterizing intercountry differences in patients with Parkinson's disease controlled vs uncontrolled with current treatment: a subgroup analysis of the OBSERVE-PD observational study

A. Fasano<sup>1</sup>, L. Bergmann<sup>2</sup>, V.S. Fung<sup>3</sup>, Y. Jalundhwala<sup>2</sup>, K. Onuk<sup>2</sup>, K. Seppi<sup>4</sup>, Z. Pirtosek<sup>5</sup>

<sup>1</sup>Morton and Gloria Shulman Movement Disorders Clinic and the Edmond J. Safra Program in Parkinson's Disease, Toronto Western Hospital and Division of Neurology, UHN, Division of Neurology, University of Toronto, Toronto, Canada, <sup>2</sup>AbbVie Inc., North Chicago, USA, <sup>3</sup>Westmead Hospital and Sydney Medical School, Sydney, Australia, <sup>4</sup>Medical University of Innsbruck, Innsbruck, Austria, <sup>5</sup>University Medical Center Ljubljana, Ljubljana, Slovenia

**Background and aims:** As Parkinson's disease (PD) progresses, oral levodopa often becomes insufficient for symptom control. Classification of advanced PD (APD) is not distinct, making it challenging to determine the need for advanced therapies. This analysis focused on characterization of PD patients with/without controlled PD symptoms and intercountry differences.

**Methods:** OBSERVE-PD is a multicountry, cross-sectional, observational study conducted in 2615 PD patients across 128 movement disorder centers in 18 countries. This post hoc analysis stratified patients into 4 groups: APD or non-APD with controlled or uncontrolled symptoms. Patients were diagnosed as APD vs non-APD by investigator judgment. Whether patients were controlled on current therapy was determined by specific Delphi criteria (any of the following: taking oral levodopa  $\geq$  5 times/day, having  $\geq$  2 hours/day "Off" time, unpredictable fluctuations of motor symptoms, troublesome dyskinesias, or limitations in  $\geq$  1 activity of daily living). Intercountry differences were analyzed with descriptive statistics.

**Results:** Based on the Delphi criteria, 78% of patients were uncontrolled on their current therapy, although the intercountry range was varied (4% to 96%). More APD vs non-APD patients had uncontrolled symptoms (Table). The mean age range across countries was similar. APD patients generally had a longer time since PD diagnosis than did non-APD patients, with some intercountry variability, regardless of patients' symptom control.

Table. Patient Baseline Characteristics

Characteristic	Mean (SD)				
	Overall population (N = 2615) <sup>a</sup> (n = 2610)	Intercountry Range		Non-APD (n = 679)	
		APD			
	Controlled (n = 47)	Uncontrolled (n = 1353)	Controlled (n = 618)	Uncontrolled (n = 679)	
Age, years	67.0 (6.9) (n = 2610)	54.3 (6.35) – 70.0 (0.00)	63.9 (8.92) – 71.3 (10.39)	59.5 (6.19) – 77.5 (2.12)	47.3 (7.63) – 71.5 (9.72)
Time since PD diagnosis, years	7.7 (5.9) (n = 2553)	5.0 (3.57) – 30.5 (N/A) <sup>b</sup>	7.8 (4.61) – 14.0 (6.06)	1.8 (1.70) – 7.2 (1.77)	2.8 (2.82) – 7.5 (4.16)
Duration of motor fluctuations, years	4.4 (3.7) (n = 1423)	2.0 (N/A) <sup>b</sup> – 15.0 (N/A) <sup>b</sup>	3.3 (2.14) – 8.6 (5.73)	1.0 (N/A) <sup>b</sup> – 2.0 (N/A) <sup>b</sup>	1.0 (0.00) – 4.5 (0.71)
Time since referral, years	3.5 (4.2) (n = 1902)	0.1 (N/A) <sup>b</sup> – 10.4 (N/A) <sup>b</sup>	0.5 (1.28) – 7.3 (4.83)	0.3 (0.22) – 3.8 (5.09)	0.9 (N/A) <sup>b</sup> – 5.8 (4.85)

<sup>a</sup>Only available data are presented.

<sup>b</sup>Only 1 patient was in the specified group with available data, so the standard deviation could not be calculated.  
APD, advanced Parkinson's disease; SD, standard deviation.

**Conclusion:** Most patients with APD were uncontrolled on current therapy and >50% of non-APD patients did not have controlled PD symptoms, although this was varied between countries. Criteria-based assessment of sufficient symptom control may help inform the need for further treatment optimization.

**Disclosure:** AbbVie funded the research for this study and provided writing support for this abstract. Medical writing assistance, funded by AbbVie, was provided by Kelly M Cameron, PhD, CMPP™, of JB Ashtin.

## MS and related disorders 1

EPO1231

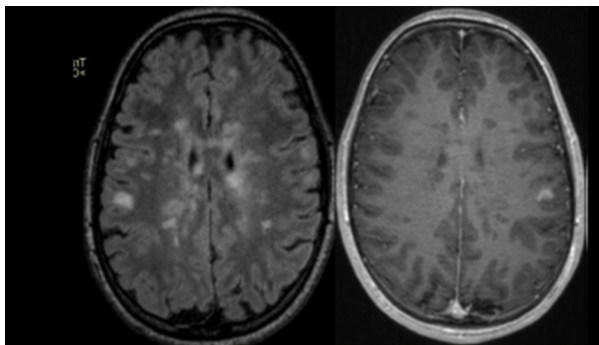
**MOG-IgG positivity in pediatric-onset multiple sclerosis: a diagnostic and therapeutic challenge**

R. Abi-Nahed, G. Macaron

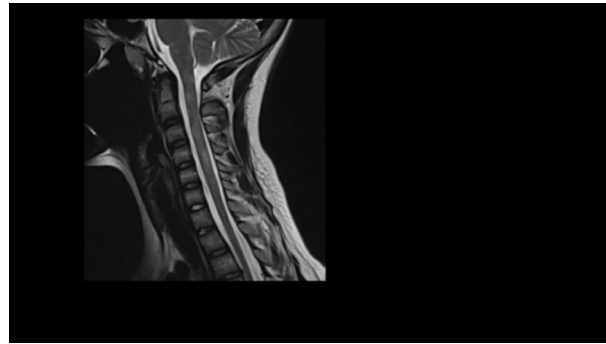
*Department of Neurology, Hôtel Dieu de France Hospital, Université Saint Joseph de Beyrouth, Faculty of Medicine, Beirut, Lebanon*

**Background and aims:** Myelin oligodendrocytes glycoprotein (MOG)-IgG are found in children with acquired demyelinating syndromes with a distinct phenotype from multiple sclerosis (MS). Interpretation of positive MOG-IgG in pediatric-onset MS and treatment implication are unclear. We present the case of a typical MS patient with positive MOG-IgG and discuss our treatment approach.

**Methods:** A 15-year-old girl with congenital aortic stenosis developed subacute right hand tingling, weakness, and gait instability. Physical examination showed right-sided proprioceptive ataxia and brisk deep tendon reflexes in the lower extremities (per-attack EDSS of 1.5). Brain MRI showed numerous juxtacortical, periventricular, and infratentorial lesions, with at least 8 enhancing lesions. Cervical and thoracic cord MRI showed multiple short-segment contiguous lesions extending along the cervical cord, with 2 enhancing lesions, and 2 non-enhancing short-segment lesions in the mid-thoracic cord. CSF studies showed positive oligoclonal bands. Aquaporin4-IgG were negative. Anti-MOG-IgG were positive (titer 1:20). She received high-dose intravenous methylprednisolone for 5 days followed by an oral prednisolone taper with near-complete resolution of symptoms. She was started on intravenous Rituximab 1000mg.



Brain MRI (left: axial T2 FLAIR, right: axial T1 with gadolinium) showing multiple lesions typical of multiple sclerosis, with some but not all lesions with contrast enhancement.



Cervical cord MRI (sagittal T2 sequence) showing numerous short-segment contiguous lesions, suggestive of multiple sclerosis.

**Results:** This patient has a clinical and radiological presentation consistent with pediatric-onset MS rather than acute demyelinating encephalomyelitis (ADEM), which is known to be associated with MOG-IgG in children. Transient MOG-IgG positivity is described in monophasic ADEM but not clearly reported in MS relapses. We elected to treat her with Rituximab as a highly-effective disease modifying therapy for MS and for its efficacy in MOG-related disorder.

**Conclusion:** MOG-IgG positivity in typical pediatric-onset MS poses a diagnostic and therapeutic challenge and should be further investigated.

**Disclosure:** Nothing to disclose

## EPO1232

**Disability, cognition and double inversion recovery magnetic resonance imaging brain sequence in a sample of Egyptian patients with multiple sclerosis**

S. Ali<sup>1</sup>, S. El-Jaafary<sup>1</sup>, R. Edward<sup>2</sup>, M. Abd Elnaseer<sup>1</sup>  
<sup>1</sup>Neurology Department, Cairo University, Cairo, Egypt,  
<sup>2</sup>Radiology, Cairo university, Cairo, Egypt

**Background and aims:** In Multiple Sclerosis (MS) cortical pathology recently returned to the spotlight of research as a result of specialized magnetic resonance imaging (MRI) sequences, double inversion recovery (DIR) which allows better detection of cortical lesions (CLs). Cognitive impairment occurs in 40-65% of MS patients, typically involving complex attention, information processing speed, episodic memory and executive functions. The aim of this study is to investigate the association between the presence of CLs, the clinical disability and psychological features of MS.

**Methods:** 30 Egyptian patients of RRMS underwent MRI for the assessment presence of cortical lesions using DIR sequences on 1.5 tesla. Disability was assessed using the Expanded Disability Status Scale (EDSS). Cognitive functions were assessed using the Brief International Cognitive Assessment for Multiple Sclerosis patients (BICAMS) Arabic version

**Results:** 27 out of 30 patients had cortical lesions detected by DIR and not detected by FLAIR. Patients were cognitively impaired mainly in Visual processing speed detected by Symbol Digit Modality Test (SDMT) which is highly sensitive in the assessment of cognitive impairment, and verbal memory detected by California verbal fluency test, with significant negative correlation with disability ( $r=-0.381$ ,  $p=0.038$ ,  $r=-0.548$ ,  $p=0.002$ ) respectively. There was a significant negative correlation between numbers of cortical lesions and verbal memory especially in right hemisphere lesions ( $r=-0.431$ ,  $p=0.018$ ), but not with the disability

**Conclusion:** Cortical lesions are better to be assessed with the DIR sequence compared to FLAIR. Cortical lesions correlated with verbal memory but not with disability in MS patients

**Disclosure:** Nothing to disclose

## EPO1233

**The effect of pelvic floor exercise program on incontinence and sexual dysfunction in multiple sclerosis patients**

B. Altunan<sup>1</sup>, A. Aksoy Gündoğdu<sup>1</sup>,  
 T.I. Kurtoğlu Özçağlayan<sup>2</sup>, A. Unal<sup>1</sup>, N. Turgut<sup>1</sup>  
<sup>1</sup>Department of Neurology, Tekirdağ Namık Kemal  
 University, Tekirdağ, Turkey, <sup>2</sup>Department of Radiology,  
 Tekirdağ Namık Kemal University, Tekirdağ, Turkey

**Background and aims:** Patients with multiple sclerosis (MS) may present with urological symptoms and sexual dysfunction or may develop such symptoms at any time. Besides, incontinence and sexual dysfunction may persist in the remission phase after the attack. Therefore, patients may experience a significant decrease in their quality of life. This study aimed to investigate the effect of pelvic floor exercise program on incontinence and sexual dysfunction in MS patients.

**Methods:** Patients with RRMS admitted to the outpatient clinic between January 2018 and September 2018 were included in the study. Pre-exercise bladder and post-void residual volumes (PVR) of the patients were measured by ultrasonography. Patients completed Incontinence Questionnaire Short Form (ICIQ-SF), Beck Depression Inventory (BDI), Multiple Sclerosis Quality of Life-54 (MSQOL-54), Female Sexual Function Index (FSFI), Sexual Health Inventory for Men (SHIM). In the control examination of the patients who completed the program regularly for 3 months, questionnaires and measurements with ultrasound were repeated. Data from 26 patients were analyzed.

**Results:** There was a statistically significant increase in bladder volume when pre- and post-exercise measurements were compared, but there was no difference in PVR ( $p=0.004$ ,  $p=0.4$ , respectively). There was a significant reduction in post-exercise values of ICIQ-SF ( $p=0.026$ ). There was no difference in depression scales, quality of lives, and sexual functions in the pre- and post-pelvic floor examinations.

**Conclusion:** According to this study, while pelvic floor exercise had no effect on sexual dysfunction in MS patients, it can be thought that incontinence may decrease by causing increased bladder volume.

**Disclosure:** Nothing to disclose



## EPO1234

## Presence of brainstem lesions is associated with diffuse spinal cord abnormalities in patients with early multiple sclerosis

M. Andelova<sup>1</sup>, J. Krasensky<sup>2</sup>, K. Vodehnalova<sup>1</sup>, E. Kusova<sup>2</sup>, M. Fartaria<sup>3</sup>, L. Friedova<sup>1</sup>, J. Motyl<sup>1</sup>, B. Benova<sup>1</sup>, I. Menkyova<sup>4</sup>, T. Uher<sup>1</sup>, E. Kubala Havrdova<sup>1</sup>, D. Horakova<sup>1</sup>, M. Vaneckova<sup>2</sup>

<sup>1</sup>Department of Neurology and Center of Clinical Neuroscience, First Faculty of Medicine, Charles University and General University Hospital, Prague, Czech Republic,

<sup>2</sup>Department of Radiology, <sup>1st</sup> Faculty of Medicine, Charles University in Prague, Czech Republic, Prague, Czech Republic, <sup>3</sup>Department of Radiology, Lausanne University Hospital (CHUV), and University of Lausanne (UNIL), Lausanne, Switzerland, Lausanne, Switzerland, <sup>4</sup>2<sup>nd</sup>

Department of Neurology, Faculty of Medicine, Comenius University University Hospital Bratislava – Derer's Hospital, Bratislava, Slovakia

**Background and aims:** The presence of early spinal cord (SC) and infratentorial lesions has been associated with higher risk of long-term disability in multiple sclerosis (MS). Little is known about significance of early diffuse SC abnormalities. We aimed to examine the association of intracranial lesion distribution and SC pathology in patients with early-stage MS (PweMS; disease duration  $\leq 5$  years).

with ScanView. Diffuse SC pathology was estimated by 2 raters on T2WFS/PDW images. Volume and lesion parameters of PweMS with- and without diffuse SC abnormalities were compared by (non)parametric tests. Risk of having diffuse SC abnormalities was determined by logistic regression.

**Results:** Table 1 summarizes the results. PweMS with diffuse SC abnormalities had higher brainstem and cerebellar LV than PweMS without ( $p=0.007$  and  $p=0.024$ ), whereas they did not differ in total intracranial LV ( $p=0.249$ ), brain- and SC-volume ( $p=0.975$ ,  $p=0.716$ ). Early brainstem lesions showed a 6-fold increased risk of diffuse SC abnormalities (OR 6.04, 95% CI 1.56–23.39,  $p=0.009$ ).

**Conclusion:** Early brainstem lesions are associated with higher risk of SC diffuse abnormalities, that are not associated with relative SC volume loss. Early diffuse SC abnormalities might therefore i.) precede spinal cord atrophy and ii.) present a link between infratentorial lesions and risk of long-term disability.

**Disclosure:** The Project was Supported by: RVO-VFN64165, AZV grant NV18-04-00168. Michaela Andelova received financial support for conference travel from Novartis, Genzyme, Merck Serono, Biogen Idec and Roche. The complete disclosures from my coauthors exceed the limit of 100 words and if they are required for the abstract submission, I can send them in a separate email. Thank you in advance for letting me know.

Table 1. Demographic and MRI data of early MS patients with- and without diffuse spinal cord abnormalities.

	diffuse SC abnormalities absent	diffuse SC abnormalities present	p value
n	38	21	
Age	33.0 $\pm$ 8.2	30.1 $\pm$ 6.3	0.165
Disease duration	0.73 $\pm$ 1.04	1.1 $\pm$ 1.4	0.276
Brain tissue	1133.89 $\pm$ 125.1	1132.94 $\pm$ 135.8	0.975
Corpus callosum	4.90 $\pm$ 0.64	5.08 $\pm$ 0.99	0.407
MUCCA	89.25 $\pm$ 8.0	88.36 $\pm$ 10.28	0.716
Lesion volume	6.06 $\pm$ 7.74	8.94 $\pm$ 11.0	0.249
Frontal lesions	1.01 $\pm$ 1.61	1.85 $\pm$ 3.0	0.387
Temporal lesions	0.53 $\pm$ 1.07	0.89 $\pm$ 1.58	0.423
Parietal lesions	1.11 $\pm$ 1.91	2.09 $\pm$ 3.70	0.369
Occipital lesions	0.43 $\pm$ 0.41	0.62 $\pm$ 0.72	0.414
Deep hemispheric les.	2.94 $\pm$ 3.44	3.31 $\pm$ 2.18	0.177
Cerebellar lesions	0.01 $\pm$ 1.61	0.07 $\pm$ 0.01	0.024
Brainstem lesions	0.02 $\pm$ 0.04	0.11 $\pm$ 0.18	0.007
EDSS	1.5 (0 – 4.0)	2.0 (0 – 4.0)	0.086

Data are displayed as means  $\pm$  standard deviations except EDSS for that median (min. – max.) is shown; age and disease duration are measured in years; volumetric data are shown in millilitres except of the area of corpus callosum and MUCCA which are measured in mm<sup>2</sup>. Normalized data are not shown.

EDSS = expanded disability status scale, MUCCA = mean upper cervical cord area, TIV = total intracranial volume.

Table 1. Demographic and MRI data of early MS patients with- and without diffuse spinal cord abnormalities.

**Methods:** Brain volumes were assessed in 59 PweMS on T1-w images using the MorphoBox prototype. Intracranial lesion volumes (LV) and location (frontal, temporal, parietal, occipital, deep hemispheric, cerebellar, brainstem) were automatically assessed using T1-w and FLAIR images using the LeManPV-prototype. SC volume was measured

## EPO1235

### Influence of some non-HLA SNPs on the severity of disability in multiple sclerosis during the interferon-beta and glatiramer acetate therapy

E. Arbuzova, N. Selyanina  
Perm, Russian Federation

**Background and aims:** It is known that lots of non-HLA single nucleotide polymorphisms (SNPs) contribute to the multiple sclerosis (MS) risk. The aim was to evaluate the influence of some non-HLA SNPs on MS severity and progression.

**Methods:** The study included 151 MS patients (46 male/105 female). The median age was 39 [32;48] years. The level of disability (EDSS median=4,0 [3.0;5.5]) and progression rate (0.42 [0.28;0.67]) were moderate. All patient received disease modifying therapy at least 6 months (76.8%-interferon-beta (IFN-beta), 23.2%-glatiramer acetate (GA). The genetic analysis of rs10492972 (KIF1B), rs11787532 (ZFHX4), rs9527281 (STARD13), rs7308076 (CIT), rs733254 (ZFAT) SNPs was conducted with real-time PCR using TaqMan probes. Multiple analysis of the alleles frequency was done by SNPstats software (Institut Català d'Oncologia, Spain).

**Results:** The allele combination TGTCa (alleles are arranged in order of SNPs mention) was associated with the high rate of MS progression in patients taking IFN-beta (OR=1.07, 95% CI 0.62-1.52, p=0.004). In the same group the TGGTC combination was significantly associated with a higher EDSS score (OR=1.53, 95% CI 0.28-2.79, p=0.046) and TGTCC with a lower one (OR=-2.12, 95% CI -4.0-0.23, p=0.046). In the group of GA the EDSS score was depended on TGGCA (OR=3.14, 95% CI 0.81-5.47, p=0.046) and CGTCA (OR=4.01, 95% CI 1.79-6.23, p=0.046) combinations.

**Conclusion:** The results might be used as additional criteria for disease modifying therapy selection (Priority of the invention №2019108392, 03.22.19).

**Disclosure:** The research was supported by the regional grant U.M.N.I.K. №13195GU/2018 (FSBI «Innovation promotion fund», Russia).

## EPO1236

### Clinical and neuroradiological characterization of a MS-plus population with low frequency of perivenular lesions identified with central vein sign: is there an underlying disease other from MS?

E. Azzolini<sup>1</sup>, B. Forci<sup>2</sup>, A. Barilaro<sup>2</sup>, L. Massacesi<sup>1</sup>  
<sup>1</sup>University of Florence, Florence, Italy, <sup>2</sup>Department of Neuroscience, Careggi Hospital, Florence, Italy

**Background and aims:** Central vein sign (CVS) is a multiple sclerosis (MS) specific MRI-biomarker defined as a perivenular white matter lesions frequency (PVL-f)>50% ("50%-rule"). CVS distinguishes MS from its mimics, in which PVL-f is steadily<50%. Thus far CVS has never been evaluated in MS-plus (MS-patients with red flags of better explanation of disease). Aim of this study are to 1) identify with CVS a proportion of MS-plus patient with PVL<50% 2) characterize MS-plus subgroups in terms of clinical, laboratory and MRI features.

**Methods:** Definite relapsing-remitting (RR)MS and RRMS patients with MRI, laboratory or clinical red-flags of better explanation (MS-plus), were included. Patients underwent one brain-MRI scan including FLAIR and T2\*sequences, and were stratified according to the 50%-rule. Clinical-demographic, laboratory and additional MRI features were collected and analyzed.

**Results:** 50%-rule was fulfilled by 28/28 (100%) MS-patients (median PVL-f 90.5%, range 68-100%) and by 32/60 (53%) MS-plus patients (median PVL-f 70.5%, range 55-100%), whereas 28/60 (47%) MS-plus patients showed PVL<50% (median PVL-f 23.5% range 10-48%), identifying a separate subset of patients (Fig. 1).

MS-plus with PVL<50% compared to the PVL>50% subgroup showed a higher proportion (p<0.001) of cardiovascular risk factors, MRI red flags (p=0.02), small (<3mm) white matter lesions (p=0.005), subcortical lesions (p<10<sup>-7</sup>). Moreover, while receiveing less disease-modifying-therapy (p<0.001) they didn't exhibit higher annualized relapse rate nor worse disability progression (further details:tables 1-2).

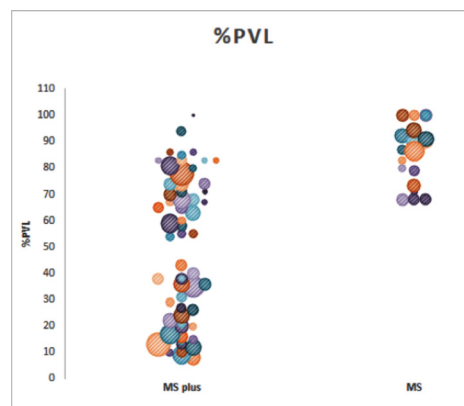


Figure 1. Frequency of perivenular (PVL) lesions in MS and MS plus

patients. The size of each circle is proportional to the total number of white matter lesions considered for central vein sign analysis. The MS plus population shows a bimodal distribution with two subgroups according to the 50%-rule: 47% of patients do not fulfill the rule.

Lesion Characteristics	MS	Patient group		Statistics (Mann Whitney U test)		
		MS plus >50% PVL	MS plus <50%PVL	MS plus <50%PVL vs >50%PVL	MS plus <50%PVL vs MS	MS plus >50%PVL vs MS
Total lesion load (mm <sup>3</sup> )	4619 (1118-19892)	2432 (539-26781)	1926 (486-8667)	p=0,20510	p=0,0022	p=0,0463
Median (range)	6785 (1089)	4700(1025)	2812(405)			
Mean (SE)	301,5(124-873)	131 (54-477)	70 (20-160)	p<10 <sup>-7</sup>	p<10 <sup>-7</sup>	p=0,0000
lesion size (mm <sup>3</sup> )	317(32)	164(19)	70(5)			
% Juxtacortical lesions	30 (11-60)	43 (1-100)	14(0-50)	p<10 <sup>-7</sup>	p=0,0000	p=0,030
% Subcortical/deep white matter lesions	38(0-75)	44 (0-80)	81 (16-100)	p<10 <sup>-7</sup>	p<10 <sup>-7</sup>	p=0,64
% Juxtacortical/Leukocortical lesions	16 (0-61)	0 (0-48)	0 (0-65)	p=0,43152	p=0000	p=0,0000
% Infratentorial lesions	0 (0-30)	4 (0-100)	0 (0-11)	p=0,0002	p=0,0261	p=0,813
%Juxtacortical, juxtacortical and infratentorial lesions	63 (25-100)	60 (20-100)	20(0-84)	p<10 <sup>-7</sup>	p<10 <sup>-7</sup>	p=0,573
Total lesion count (No.)	605	882	1107	-	-	-
Lesion/patient, n. median (range)	22 (15)	28 (22)	40 (29)	p=0,056*	p=0,0053*	p=0,382*
Perivascular lesion/patient, n. median (range)	19(13)	16(16)	7(6)	p=0,0002*	p=0,0000*	p=0,215*

Table 2: Characteristics of brain white matter lesions in MS patients, in MS plus patients and in MS plus subgroups stratified according to the 50% rule).

	MS+ PVL<50% n=28	MS+ PVL>50% n=32	test	
<b>Clinical-demographic</b>				
Female	n (%)	26 (93%)	25 (78%)	p=0,15*
Age at MRI <sup>1</sup> , years	median (range) mean (ES)	48,5 (34-62)	43,5 (20-65)	p=0,07*
Age at disease onset, years	median,(range) mean (ES)	37,8 (23,6-58)	38,2(14,9-62,4)	p=0,23**
Patients with onset age >50 years	n(%)	5 (18%)	5(16%)	p=1,00*
Patients aged > 50y at MRI scan,	n(%)	13 (46%)	10 (31%)	p=0,29*
Disease duration at MRI, years	median (range)	7,4 (0,4-2 8,4)	3,75 (0,2-24,8)	p=0,18*
EDSS <sup>2</sup> score at onset	median (range)	0 (0-2,5)	1(0-1,5)	p=0,43*
Time to EDSS worsening, years	median (range)	4,05 (0-20,8)	2,55 (0-20,8)	p=0,31*
Time to DMFT <sup>3</sup> start, years	median (range)	1,64(0-28,4)	0,3 (0-24,8)	p=0,0006*
Time to First Relapse, years	median (range)	2,05 (0,5-18,1)	1,55 (0,5-20,8)	p=0,3204**
AAR <sup>4</sup> over 10 ys <sub>...</sub>	median (range)	0,1 (0-0,5)	0,1(0-0,4)	p=0,8328**
<b>Red flags</b>				
Red flags/patient,	median (range)	2 (1-3)	1,5 (1-3)	p=0,54*
Patients with clinical red flags	n(%)	14 (50%)	18 (56%)	p=0,79*
Patients with serological red flags	n(%)	9 (31%)	14 (44%)	p=0,43*
Patients with CSF <sup>5</sup> red flags	n(%)	9 (32%)	10 (31%)	p=1,00*
Patients with MRI red flags	n(%)	19(68%)	12 (36%)	p=0,02*
<b>Cardiovascular risk factors</b>				
All CVRF <sup>6</sup> n(%)	14 (50%)	6 (19%)	p=0,01*	
History of Arterial Hypertension n(%)	8(29%)	1(3%)	p=0,009*	
Other* n(%)	11(39%)	6(19%)	p=0,09*	

\* Fisher exact  $\chi^2$  test; \*\* Mann-Whitney U test;  
**1** MRI Magnetic Resonance Imaging **2** EDSS expanded disability status scale **3** DMFT disease modifying therapy **4** AAR annualized relapse rate; **5** CSF cerebrospinal fluid **6** CVRF cardiovascular risk factors \* Diabetes, dyslipidemia, hypertension, hypercholesterolemia, polymorphism of coagulation factors, smoking, patent foramen ova

Table 1: Demographic, clinical, laboratory and MRI characteristics in MS plus subgroups, identified according to the 50% rule.

**Conclusion:** CVS identified a proportion of MS-plus patients with PVL<50%. In these patients, distinctive MRI and clinical features suggest a possible alternative pathogenic mechanism and therefore an alternative diagnosis to MS that should be investigated.

**Disclosure:** Nothing to disclose

## EPO1237

### Fulminant Marburg’s variant of multiple sclerosis: six months follow-up after high dose cyclophosphamide treatment.

A. Baltasar Corral<sup>1</sup>, A. Fernández Revuelta<sup>1</sup>, M. Fernández García<sup>1</sup>, M. Hernández Holgado<sup>1</sup>, F. Durán Boitia<sup>2</sup>, A. Subhi-Issa<sup>2</sup>, M. Polidura Arruga<sup>3</sup>, A. Marcos Dolado<sup>1</sup>, R. Ginestal<sup>1</sup>, E. Lopez Valdes<sup>1</sup>, C. Oreja-Guevara<sup>1</sup>

<sup>1</sup>Neurology, Hospital Clínico San Carlos, Madrid, Spain, <sup>2</sup>Pathology, Hospital Clínico San Carlos, Madrid, Spain, <sup>3</sup>Neuroradiology, Hospital Clínico San Carlos, Madrid, Spain

**Background and aims:** Marburg’s variant of multiple sclerosis (MS) is considered fulminant, leading to deterioration or death within weeks even with treatment. We present a 6 month follow-up of a patient diagnosed of Marburg disease, with favorable evolution after treatment with high dose cyclophosphamide (HiCy).

**Methods:** A 21-year-old male, with no prior illnesses or relevant epidemiological background, showed rapidly progressive gait impairment over the course of a week, with right-side hemiparesis, impaired bilateral proprioception, marked hyperreflexia, dysarthria and moderate cognitive decline (EDSS:6.5) on examination. MRI showed coalescent T2-hyperintense supratentorial, subependymal, splenial and anterior pontine plaques, some with gadolinium enhancement in open-ring pattern (Figures 1, 2). Lumbar puncture revealed slight leukocytosis and negative IgG oligoclonal bands. Five 1g intravenous methylprednisolone pulses (IVMP) were administered without improvement. As the clinical situation worsened (EDSS:8.0), a new MRI was obtained, and brain biopsy was performed to rule out other diagnoses in order to intensify immunosuppression.

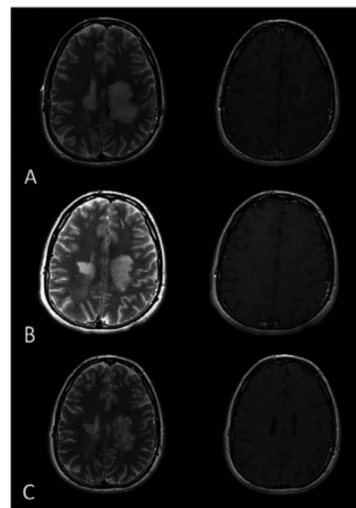
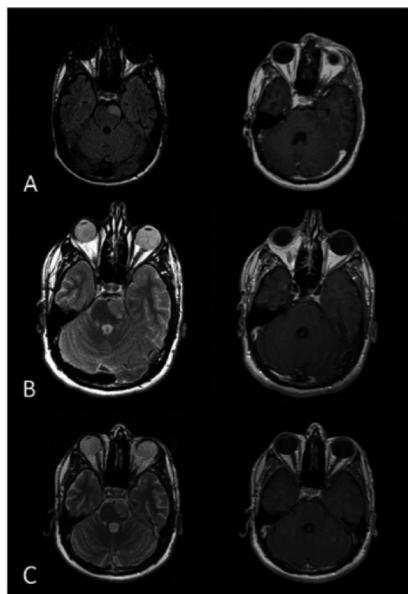


Figure 1. Supratentorial evolution of lesions, hyperintense in T2 with open-ring enhancement (T1-Gd) in July (A), October (B) and December (C).

Figure 1. MRI, supratentorial evolution.



**Figure 2.** Evolution of the anterior pontine lesion, hyperintense in FLAIR/T2, with no clear enhancement in July (A), October (B) and December (C).

Figure 2. MRI, pontine evolution.

**Results:** The brain biopsy confirmed the diagnosis of Marburg's MS displaying intense demyelination with numerous macrophages. He had received 2 cycles of IVMP and 10 plasma exchange sessions with insignificant response. Monthly HiCy was started.

After 5 doses of HiCy the patient has had a remarkable clinical and radiological improvement. 6 months after diagnosis the patient walks with one aid and has milder cognitive impairment.

**Conclusion:** Marburg's disease is considered fatal, but with aggressive and combined immunosuppressive treatment it is possible to prolong survival and ameliorate disability. Our findings suggest that HiCy may be a therapeutic alternative to induce clinical and radiological improvement.

**Disclosure:** Nothing to disclose

## EPO1238

### Bereitschaftspotential and event related desynchronization – A glimpse at motor preparation in multiple sclerosis

B. Bardel<sup>1</sup>, M.A. Chalah<sup>1</sup>, A. Créange<sup>2</sup>, J.-P. Lefaucheur<sup>1</sup>, S.S. Ayache<sup>1</sup>

<sup>1</sup>Department of Physiology, CHU Hôpital Henri Mondor, Créteil, France, <sup>2</sup>CHU Hôpital Henri Mondor, Department of Neurology, Créteil, France

**Background and aims:** Multiple sclerosis (MS) is 1 of the most common diseases of the central nervous system. A triad of demyelination, neurodegeneration and inflammation characterizes its pathophysiology. MS related lesions would alter several cognitive, motor and sensory functions. Motor preparation - a cognitive ability of utmost importance for an appropriate execution of daily tasks - has been rarely studied in this population. The aim of this work was to assess this ability in MS patients through the exploration of Bereitschaftspotential (BP) and event related desynchronization (ERD).

**Methods:** 12 MS patients and 10 healthy subjects were recruited for this purpose. Patients sociodemographic and clinical data were collected. All participants were asked to perform series of 30 finger extension movements. EEG signals were collected from 18 central electrodes, and an offline analysis was done to assess BP (early and late BP (i.e., BP1 and BP2)) and alpha/mu ERD.

**Results:** BP and alpha/mu ERD had longer latency (i.e., earlier onset) in MS patients compared to their healthy counterparts. BP amplitude and percentage of desynchronization of ERD did not significantly differ between groups. In addition, a direct correlation was found between BP latency and disability scores.

**Conclusion:** These findings reflect a prolonged motor preparation process, thus an altered premotor scheme in MS patients. Based on the cognitive reserve theory, activity of preexisting circuits seems to be strengthened and alternative networks appear to be recruited in order to ensure a proper, yet longer, motor preparation process.

**Disclosure:** Nothing to disclose

## EPO1239

**Alemtuzumab in the treatment of active relapsing-remitting multiple sclerosis: Croatian multicenter, observational study**

M. Habek<sup>1</sup>, V. Basic Kes<sup>2</sup>, I. Lazibat<sup>3</sup>, S. Kidemet Piskac<sup>4</sup>, M. Ratkovic<sup>5</sup>, M. Komso<sup>6</sup>, A. Bogoje Raspopovic<sup>7</sup>, **B. Barun**<sup>1</sup>, M. Krbot Skoric<sup>8</sup>  
<sup>1</sup>University of Zagreb, School of Medicine, Zagreb, Croatia, <sup>2</sup>University Hospital Center Sestre milosrdnice, Zagreb, Croatia, <sup>3</sup>University Hospital Dubrava, Zagreb, Croatia, <sup>4</sup>General Hospital Varaždin, Varaždin, Croatia, <sup>5</sup>General Hospital Slavonski Brod, Slavonski Brod, Croatia, <sup>6</sup>General Hospital Zadar, Zadar, Croatia, <sup>7</sup>Dubrovnik, Croatia, <sup>8</sup>Zagreb, Croatia

**Background and aims:** We aimed to analyse the efficacy and safety of alemtuzumab in a multi-centre cohort of people with relapsing-remitting multiple sclerosis (pwRRMS).

**Methods:** Data on all pwRRMS who received 2 cycles of alemtuzumab in 7 neurological departments across Croatia were retrospectively analysed. Annualized relapse rate (ARR) and ARR reduction were calculated.

**Results:** 49 pwRRMS (mean age 33.2 years, 36 females) were identified. Number of relapses in the previous year was 2 (0-6) with an ARR for the group 1.86. ARR in the 1st 2nd and 3rd year after treatment was 0.08 (ARR reduction 95.6%), 0.07 (ARR reduction 96.2%), and 0.24 (ARR reduction 86.9%), respectively. There was statistically significant reduction in total number of relapses in the first year, the 2nd year and the 3rd year, all in comparison with the year previous to treatment (all  $p < 0.001$ ). In a multivariable regression model including age, sex, and EDSS, EDSS at the time of treatment initiation was identified as an independent predictor of a relapse (OR 2.203, 95%CI 1.067-4.549,  $p = 0.033$ ). Sustained NEDA was achieved in 18 (52.9%) patients who had completed 3-year follow-up. Confirmed disability progression was identified in 7 (14.3%) pwRRMS. Six patients received 3rd cycle of alemtuzumab and one was switched to ocrelizumab. Seven (14.2%) patients developed hypothyreosis and 2 (4.1%) hyperthyreosis. 1 case of pulmonary embolism was observed during the 3rd cycle.

**Conclusion:** This study confirmed clinical and MRI efficacy of alemtuzumab in a real life setting.

**Disclosure:** Nothing to disclose

## EPO1240

**A Real World Data of Ocrelizumab in Multiple Sclerosis**

Y. Beckmann, C. Uzunköprü  
 Izmir, Turkey

**Background and aims:** Ocrelizumab has been recently approved for the treatment of relapsing remitting MS (RRMS) and primary progressive MS (PPMS). This study aims to describe the effectiveness, safety outcomes, treatment satisfaction and quality of life of MS patients on ocrelizumab.

**Methods:** This is an observational, prospective, single-center study of 102 patients with MS treated with ocrelizumab for minimum 12 months. Demographics, clinical and neuroimaging characteristics, including annualized relapse rate (ARR), Expanded Disability Status Score, previous treatment, adverse events, and MS related quality of life (MSQoL) were analyzed.

**Results:** A total of 102 patients were included: 52% female, 48% male; mean age 43 years (18-75); mean disease duration 10 years (1-26); mean ocrelizumab use 18 months. Patients were classified as RRMS (52%), SPMS (30%), or PPMS (17%). In this study 38% of patients received prior 1st-line disease-modifying therapies (26% enjectables or 12% oral), 48% of patients were previously treated with second-line disease-modifying therapies (43% fingolimod or 5% natalizumab), and 14% were treatment naive. The annualised relapse rate decreased by 92.3 % for the total population at the end of the 1st year of treatment and all patients were free from EDSS progression. All patients had no radiological activity. Only 10% of patients had mild infusion reactions during the initial dose of ocrelizumab and none discontinued treatment. At the end of 12 months with ocrelizumab, health-related quality of life and fatigue scores improved significantly in 88% of patients.

**Conclusion:** In this real-world data, ocrelizumab appeared to be significantly effective, safe and well tolerated.

**Disclosure:** Nothing to disclose

## EPO1241

**Oxidative Stress in Highly Active Multiple Sclerosis**

N. Beridze, E. Devidze, O. Samushia, G.G. Chakhava,  
N. Kvirkvelia, M. Beridze  
*Tbilisi, Georgia*

**Background and aims:** investigation of free toxic radicals and antioxidative enzymes in HAMS and their relation with Cognitive status of patients.

**Methods:** Totally 52 patients aged 21- 52 years, 18- with HAMS, 34 -with RRMS investigated. Control comprised age matched 15 healthy volunteers. Disease onset age, duration, number of relapses, EDSS scores collected. Cognition screened by Symbol Digit Modalities Test (SDMT). MRI (1.5-T) Gadolinium enhanced lesions calculated. Blood free toxic radicals and antioxidant enzymes detected by Electron Paramagnetic Resonance Method (EPR). Statistics performed by SPSS-20.

**Results:** Blood EPR specters of Lypoperoxiradical (LOO-) and superoxide anion (O<sub>2</sub>-) increased in HAMS compared to RRMS and control (12.4±0.4 versus 7.6 ±0.5 versus 2.4 ±0.4; p<0.05) respectively (9.4±0.4 versus 4.4±0.5 versus 1.7±0.2; p<0.05). Blood EPR specters of Superoxidismutase (SOD), Catalase (CAT) found elevated in RRMS and control against HAMS, while between RRMS and Control the significant differences were not found(p<0.5). Positive correlation established between LOO- and O<sub>2</sub>- with EDSS (r=+0.27 and r=+0.18 respectively, p<0.05). Negative correlation found between SOD, CAT and SDMT standardized scores (r=-0.32 and r=-0.24 respectively, p<0.01). Multivariate logistic regression showed the significance of HAMS duration in conjunction of SOD levels for cognitive status of patients (p<0.01).

**Conclusion:** Present study showed that antioxidation defensive system is relatively weak in HAMS and plays the pivotal role in detrimental consequences of the disease.

**Disclosure:** it was not granted.

## EPO1242

**A new perspective on sex-related differences in multiple sclerosis: the impact of fetal-maternal microchimerism on clinical and imaging features in women with multiple sclerosis**

A. Bianchi<sup>1</sup>, P. Ragonese<sup>1</sup>, M. Marrale<sup>2</sup>, E. Portera<sup>1</sup>, S. Alessi<sup>1</sup>, S. Realmuto<sup>1</sup>, G. Vazzoler<sup>1</sup>, I. Gattuso<sup>3</sup>, G. La Tona<sup>3</sup>, M. Midiri<sup>3</sup>, C. Gagliardo<sup>3</sup>, G. Salemi<sup>1</sup>  
<sup>1</sup>Department of Biomedicine, Neuroscience & Advanced Diagnostic, University of Palermo, Palermo, Italy, <sup>2</sup>Department of Physics and Chemistry, University of Palermo, Palermo, Italy, <sup>3</sup>Department of Biopathology and Medical Biotechnology, University of Palermo, Palermo, Italy

**Background and aims:** Multiple Sclerosis (MS) is a chronic autoimmune disorder characterised by inflammation and neurodegeneration. It has been hypothesized that persisting fetal microchimeric cells could contribute to autoimmune diseases pathogenesis. The aim of the study is to investigate the impact of microchimerism on the clinical, radiological, and laboratory features of MS.

**Methods:** We recruited 51 MS patients: 25 patients were nulliparous (mean age: 35.6±8.8 years, median EDSS: 2.0), 19 patients had at least one male son (mean age: 41.2±8.1 years, median EDSS: 2.0), and 8 patients had only daughters (mean age: 44.6±12.5 years, median EDSS: 3.75). Demographic, clinical, radiological, and paraclinical data at baseline and follow-up were collected. MRI protocol included 3D-T2w FLAIR FatSat and 3D-T1w FSPGR.

**Results:** Patients with at least a male son had a significantly lower age at onset (p=0.0002, p=0.0308) and a not-significant lower number of relapses over the 1<sup>st</sup> 3 years (2.60±2.22 vs 5.34±2.52 in women with daughters and 3.31±2.21 in nulliparous; p>0.05). The same group had a not-significant lower time-gap onset-EDSS4 (98.9±75.5 vs 192.2±154.1 and 159.0±155.3; p>0.05) and onset-EDSS6 (66.0±75.2 vs 66.0±75.2 and 235.0±193.3; p>0.05). Finally, this group showed a lower lesion volume (17.53±10.11 vs 18.25±9.25 and 18.82±10.45; p>0.05) and a more severe atrophy of the chiasma (p=0.0234, p=0.0185).

**Conclusion:** Our data suggest that, in a multifactorial background, the microchimeric XY fetal cells could modulate the inflammatory and neurodegenerative mechanisms underlying the MS, influencing the disease features.

**Disclosure:** Nothing to disclose

## EPO1243

### Prevalence of bowel and bladder dysfunctions in multiple sclerosis: an italian multicenter study

A. Bisecco<sup>1</sup>, A. Fornasiero<sup>2</sup>, A. Bianco<sup>3</sup>, A. Cortese<sup>4</sup>, E. D'amico<sup>5</sup>, G. Mataluni<sup>6</sup>, E. Ferraro<sup>7</sup>, L. Sinisi<sup>8</sup>, D.L.A. Spitaleri<sup>9</sup>, M.C. Buscarinu<sup>2</sup>, M. Mirabella<sup>3</sup>, S. Crisafulli<sup>4</sup>, C.G. Nicoletti<sup>6</sup>, A. Zanghi<sup>10</sup>, M. Ruggeri<sup>11</sup>, A.R. Cicalese<sup>9</sup>, R. Docimo<sup>12</sup>, G. Tedeschi<sup>1</sup>, A. Gallo<sup>1</sup>

<sup>1</sup>Department of Advanced Medical and Surgical Sciences, University of Campania Luigi Vanvitelli, Naples, Italy,

<sup>2</sup>Nesmos, Faculty of Medicine and Psychology, Sapienza University of Rome, Rome, Italy, <sup>3</sup>University Cattolica del Sacro Cuore, Rome, Italy, <sup>4</sup>Policlinico Umberto I, Rome, Italy, <sup>5</sup>Department G.F. Ingrassia, section of Neuroscience, University of Catania, Catania, Italy, Catania, Italy,

<sup>6</sup>University degli Studi di Roma Tor Vergata, Rome, Italy,

<sup>7</sup>Ospedale San Filippo Neri, Rome, Italy, <sup>8</sup>Multiple Sclerosis Center, San Paolo Hospital, Naples, Italy, <sup>9</sup>Azienda

Ospedaliera San Giuseppe Moscati, Avellino, Italy, <sup>10</sup>GF

Ingrassia, section of neurosciences, University of Catania, Catania, Italy, <sup>11</sup>Azienda Ospedaliero-Universitaria

Sant'Andrea, Rome, Italy, <sup>12</sup>Ospedale San Giuseppe Moscati, Aversa, Italy

**Background and aims:** Bladder and bowel dysfunctions are reported as common and disabling symptoms in multiple sclerosis (MS) patients, affecting severely their quality of life. To date, no studies have explored the prevalence of these symptoms in a multicenter setting. Aims of the present study are to assess: i) the prevalence of bladder and bowel symptoms in a large multicenter italian MS population and ii) the correlation between the severity of these symptoms and clinico-demographic variables.

**Methods:** Each participating center screened prospectively MS patients: 1100 patients were enrolled. All subjects completed the following questionnaires exploring bowel and bladder dysfunction: the Neurogenic Bowel Dysfunction (NBD) score and the International Prostatic Symptoms Score (IPSS). Multivariate linear regression models were used to study the association between a dependent outcome variable (NBD, IPSS) and several independent variables. All the analyses were Bonferroni corrected.

**Results:** 14 per cent of MS patients showed bowel symptoms of moderate/severe entity (NBD>10), whereas 47 per cent of MS patients showed bladder symptoms of moderate/severe entity (IPSS>8). Bowel and Bladder dysfunctions are more frequent in progressive phenotypes of MS and in MS patients with: higher disability, older age, longer disease duration. NBD is associated to female sex, ambulation impairment and bladder symptoms. Bladder symptoms are associated to bowel symptoms and disability.

**Conclusion:** This study confirms the high prevalence of moderate/severe bladder and bowel dysfunction in a large, unselected, multicenter, MS population. Bowel and bladder symptoms are closely related each other and strictly associated with disability level in MS.

**Disclosure:** Nothing to disclose

## EPO1244

### The brief international cognitive assessment for multiple sclerosis (BICAMS) in georgian population

N. Botchorishvili<sup>1</sup>, A. Dzagnidze<sup>1</sup>, N. Mikava<sup>2</sup>, N. Mikeladze<sup>2</sup>, M. Janelidze<sup>1</sup>

<sup>1</sup>Department of Clinical Neurology, Tbilisi State Medical University, Tbilisi, Georgia, <sup>2</sup>Neurology, S. Khechinashvili university hospital, Tbilisi, Georgia

**Background and aims:** Cognitive impairment is a common symptom of Multiple Sclerosis (MS). It has an unfavorable impact on a patient's quality of life and employment status. Early detection of cognitive impairment is important for adequate management. In 2011 the Brief International Cognitive Assessment for MS (BICAMS) was introduced by an international expert committee as a fast and effective tool for the assessment of cognitive status in patients with MS. We aimed to validate the Georgian version of BICAMS and to provide normative data for the battery.

**Methods:** 108 Healthy subjects were recruited from western and eastern regions of Georgia. Initially, the BICAMS was translated in accordance with ITC guidelines for translating and adapting tests. The battery was administered by a neurologist and a trained psychologist.

**Results:** The main characteristics of the study population are outlined in Table 1. The mean age of study population was 39±12.2. The mean SDMT score was 44±12.2, the mean CVLT II score was 56.4±9.0 and the mean BVM-T-R score was 24.5±7.5. Table 2 shows differences in mean scores between different age groups. Test scores tend to decline with increasing age.

Overall number	108
Age mean ± DS	39 ± 12.2 (20-65)
Gender	
Female	71 (66%)
male	37 (34%)
Employment status	
Employed	85 (79%)
Unemployed	23 (21%)
Education	
=11 years	24 (22%)
12-14 years	16 (15%)
=15 years	68 (63%)
Residence	
Urban	96 (90%)
Rural	12 (10%)
BICAMS mean raw scores ± SD	
SDMT	44 ± 12.2
CVLE II	56.4 ± 9.0
BVMT-R	24.5 ± 7.5

Table 1. Basic characteristics of study population

	N	Female/Male	Raw Scores $\pm$ SD		
			SDMT	CVLT II	BVMT-R
20-29	33	16/7	51 $\pm$ 13.8	60 $\pm$ 14.0	27.5 $\pm$ 7.0
39-40	25	16/9	46 $\pm$ 10.2	59. $\pm$ 29.0	25.2 $\pm$ 7.9
41-49	24	18/6	40 $\pm$ 9.6	54.2 $\pm$ 10.0	24.7 $\pm$ 8.0
50-59	21	17/4	38 $\pm$ 8.5	50.7 $\pm$ 7.6	19.6 $\pm$ 6.2
>60	5	4/1	34 $\pm$ 8.9	55.6 $\pm$ 7.0	22.6 $\pm$ 6.3

Table 2. Mean differences between age groups

**Conclusion:** In conclusion, our study provides normative means for the Georgian version of BICAMS. The mean SDMT score in the Georgian population is somewhat lower than demonstrated by other validation studies.

**Disclosure:** Nothing to disclose

## EPO1245

### Montreal Cognitive Assessment (MoCA) test in evaluating cognitive dysfunction in patients with Relapsing Remitting Multiple Sclerosis (RRMS) and Secondary Progressive Multiple Sclerosis (SPMS)

N.G. Bülbül<sup>1</sup>, S. Demir<sup>2</sup>, M.M. Atmaca<sup>3</sup>, R.E. Toğrol<sup>4</sup>  
<sup>1</sup>ISTANBUL, Turkey, <sup>2</sup>Neurology, GATA Haydarpaşa Medical Military Training Hospital, Istanbul, Turkey, <sup>3</sup>Istanbul University, Istanbul Faculty of Medicine, Istanbul, Turkey, <sup>4</sup>Istanbul, Turkey

**Background and aims:** MoCA is a scale that allows us to evaluate many cognitive functions such as, short-term memory, executive functions, viziyoşpasyal skills, language, attention, concentration, working memory and orientation. In this study, we have aimed to evaluate the availability of MoCA test to demonstrate cognitive dysfunction in RRMS and SPMS patients by comparing SDMT (Symbol-Digit-modality-Test) and 9-hole-PEG test results.

**Methods:** The study included 95 RRMS and 33 SPMS MS diagnosed patients with similar demographic features. Through the evaluation in which RRMS and SPMS patients were evaluated in terms of their age, gender, educational status and EDSS, SDMT positive and negative scores and SDMT duration and 9-hole-PEG test right and left hands duration were recorded with MoCA test results .

**Results:** As the level of education increased, MOCA total score increased ( $p < 0.001$ ). EDSS was significantly higher in patients with MoCA test result  $< 21$  compared with  $> 21$  ( $p = 0.01$ ) and the 9-hole-PEG test showed increased left hand duration ( $p = 0.017$ ) and SDMT duration was found to be extended ( $p < 0.02$ ). When the content of the MoCA test was evaluated, a greater impact on planning and organization, attention and phonemic fluency were observed on SPSM patients when compared to RRMS patients.

**Conclusion:** MoCA test can help us to plan more specific and comprehensive review of the affected area. MoCA, an internationally recognized and valid test that can be easily administered without any specialized equipment, can be used as an appropriate screening test to show cognitive effect on MS.

**Disclosure:** Nothing to disclose



# EPO1246

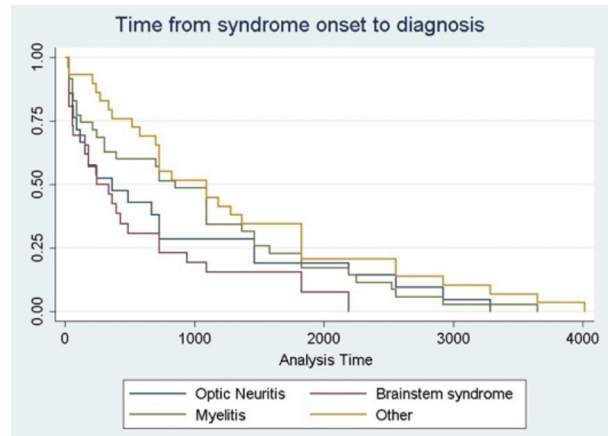
## Brainstem syndrome can led to an early MS diagnosis in Peru: a national referral center cohort

C. Caparó-Zamalloa, S. Castro-Suarez, J. Cortez-Escalante, E. Guevara-Silva, W. Aguirre-Quispe, M. Meza-Vega  
 Instituto Nacional de Ciencias Neurológicas, Lima, Peru

**Background and aims:** Multiple Sclerosis epidemiological data in Peru is scarce. In Lima, there is an estimated prevalence of 7.69 per 100000. We aim to describe the clinical and epidemiological characteristics of patients with MS in a national referral center in Lima-Peru.

**Methods:** We performed a retrospective study of MS patients diagnosed at the Instituto Nacional de Ciencias Neurológicas (INCN) between January 2010 and December 2018. A descriptive analysis was carried out. 4 different syndromes were selected for analysis as a 1st manifestation (Optic Neuritis, Brainstem syndrome, Myelitis and Other)

**Results:** We identified 268 medical records with the diagnosis of MS, 125 fulfilled the study criteria. We found misdiagnosis in 97 records (36.2%). The majority of patients belong to Lima (49.6%). As seen in Figure 1 distribution of patients in the study is related to population density of Peru. The main epidemiological and clinical characteristics are shown in table 1. The mean EDSS score was 2.85. Optic Neuritis is 2.87 (1.13-7.93) times the probability of being the initial symptom in SPMS compared to other syndromes (p=0.0145). Brainstem syndrome was associated with an early time to diagnosis compared to other syndromes (p=0.0261, Figure 2).



**Conclusion:** This study provides information about the main characteristics of MS patients at INCN. Optic neuritis was more frequent as the 1st presentation in SPMS compared with other syndromes. Brainstem syndrome at symptom onset was related to an early time to diagnosis. Our results will help us create a structure evaluation for our patients in order to make a better and faster diagnosis.

**Disclosure:** Nothing to disclose

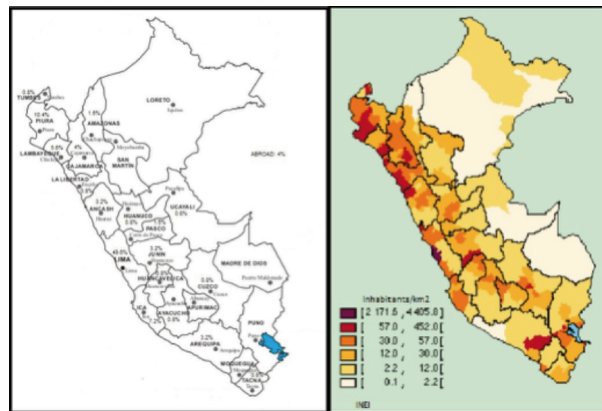


Table 1. Epidemiological and clinical characteristics

Characteristics	Phenotype	CIS		RRMS		SPMS		PPMS		TOTAL	
		n	%	n	%	n	%	n	%	n	%
Gender	Female	11	91.67%	37	50%	9	60%	15	62.50%	72	57.60%
	Male	1	8.33%	37	50%	6	40%	9	37.50%	53	42.40%
Age at diagnosis	mean (SD)	32.17	14.12	28.18	9.14	37.67	14.56	39.04	9.95	31.78	11.46
Relapses at diagnosis	mean (SD)	1	0	2.32	1.31	2.27	1.33	0.13	0.34	1.77	1.43
Time to diagnosis (months)	mean (SD)	19.19	35.20	33.89	70.74	82.79	76.20	41.43	46.80	39.80	66.36
Relapses during follow up	mean (SD)	1	0	3.04	1.68	2.53	1.68	0.13	0.34	2.22	1.85
Syndrome onset	Optic Neuritis	6	50%	16	21.62%	3	20%	2	8.33%	27	21.60%
	Brainstem Syndrome	4	33.33%	21	28.38%	2	13.33%	4	16.67%	31	24.80%
	Myelitis	0	0%	27	36.49%	4	26.67%	9	37.50%	40	32.00%
	Other	2	16.67%	15	20.27%	6	40%	11	45.83%	34	27.20%
Gad enhancement		3	25.00%	48	64.86%	8	53.33%	16	66.67%	75	61.98%
Treatment		0	0.00%	47	63.51%	5	33.33%	6	25.00%	58	46.40%

### EPO1247

#### Antiaquaporin-4 retroconversion in NMO patients treated with Rituximab

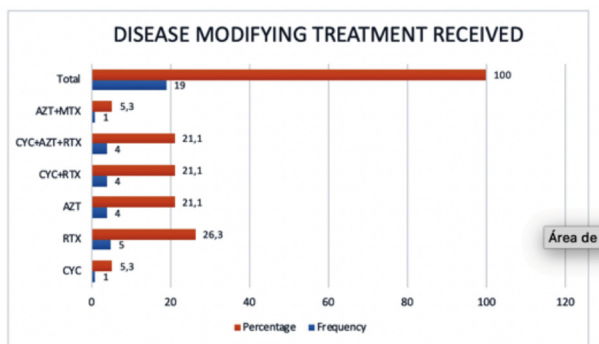
I.A. Zabala Angeles, A. Casallas Vanegas, E. Gomez Figueroa, C A. García Estrada, J.D.J. Flores Rivera, V. Rivas Alonso  
 CDMX, Instituto Nacional de Neurología y Neurocirugía Manuel Velasco Suárez, CIUDAD DE MEXICO, Mexico

**Background and aims:** NMO is an autoimmune “aquaporinopathy” of the central nervous system that causes inflammatory demyelinating lesions predominantly in the spinal cord and optic nerve. Rituximab (RTX) is a chimeric monoclonal antibody directed against CD20 epitope expressed on pre-B and mature B cells, used to treat antibody-mediated autoimmune diseases.

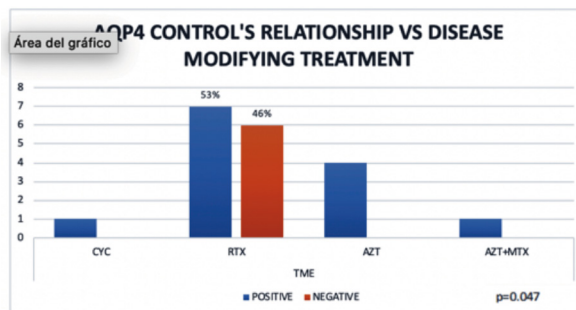
**Objectives:** To establish a relationship between seroconversion, different treatments and clinical outcomes in the follow-up of AQP4+ NMO patients.

**Methods:** A prospective and longitudinal descriptive study was carried out in patients of the National Institute of Neurology and Neurosurgery in Mexico City who met the inclusion criteria: diagnosed by Wingerchuk 2015 criteria, positive serostatus of AQP4-IgG and a subsequent AQP4-IgG serostatus at any given time.

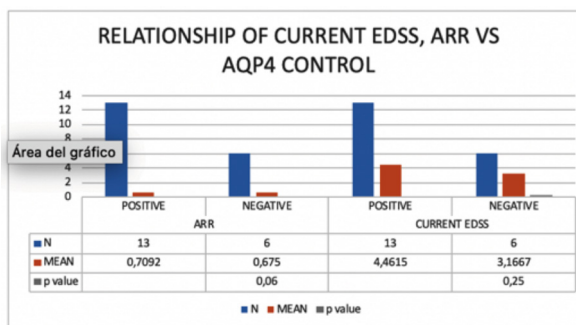
**Results:** 17 (89.5%) were women and 2 (10.5%) men. The mean age was 47.84 years. Mean EDSS at clinical onset was 3.8 and ARR was 0.81. Disease modifying treatment included rituximab (RTX) (26.3%), cyclophosphamide (CYC) (5.3%), azathioprine (AZT) (21.1%), CYC+RTX (21.1%), CYC+AZT+RTX (21.1%), AZT+ MTX (methotrexate) (5.3%). Seronegative conversion was documented in 6 patients in the RTX group (p=0.047). A lower ARR and an improvement in the EDSS was observed in those patients with negative AQP4 after RTX treatment (mean ARR 0.6, mean EDSS 3.1), unlike those who remained positive had higher ARR and EDSS (mean ARR 0.7, mean EDSS 4.4).



Number of patients treated with DMT (Disease Modifying treatment) is shown in orange and the percentage in blue. As can be evidenced, most patients were treated with Rituximab, either at baseline or as an escalation therapy. \* AZT (Azathioprine), MTX (Methotrexate), CYC (Cyclophosphamide), RTX (Rituximab).



AZT (Azathioprine), MTX (methotrexate), CYC (Cyclophosphamide), RTX (Rituximab).



Comparison between AQP4 control (positive and negative) and the clinical evolution measured by the EDSS and ARR. There was a better clinical evolution in those who converted to negative AQP4, who presented a decrease in EDSS and ARR. \*AQP4 (Aquaporine 4), EDSS (Expanded Disability Score Status), ARR (Annualized Relapse Rate).

**Conclusion:** Treatment with Rituximab in Mexican patients with NMO AQP4 seropositive can lead to retroconversion, and improvement ARR and EDSS.

**Disclosure:** Nothing to disclose

## EPO1248

### Rituximab is effective regardless of initial and maintenance doses in Neuromyelitis Optica Spectrum Disorders (NMOSDs). experience from a national health institute in Mexico.

A. Casallas Vanegas, E. Gomez Figueroa, I.A. Zabala Angeles, C.A. García Estrada, V. Rivas Alonso, J.D.J. Flores Rivera  
 CDMX, Instituto Nacional de Neurología y Neurocirugía Manuel Velasco Suárez, CIUDAD DE MEXICO, Mexico

**Background and aims:** NMOsd is an inflammatory condition of the central nervous system which preferentially affects optic nerves and spinal cord. Classic neuromyelitis optica is characterized by concurrent episodes of optic neuritis (ON) and transverse myelitis (TM). Rituximab is a monoclonal antibody directed against CD20 epitope expressed on pre-B and mature B cells and is used to treat antibody-mediated autoimmune diseases.

**Objectives:** To demonstrate rituximab clinical efficacy regardless doses administered in NMOsd patients.

**Methods:** In a retrospective and longitudinal observational study starting from January 1, 2010 to August 1, 2019 66 NMOsd patients under different RTX doses were identified. Univariate, multivariate and post hoc analysis of variables was performed.

**Results:** 12 patients (18.2%) were male, 54 (81.1%) female. 66.7% were AQP4 antibody positive. The most frequent RTX induction regimen was 2000mg 15 day apart (51.5%), followed by 1000mg (40.9%) each 6 months. Single 500mg of RTX each 6 months in 5 patients (7.5%). ARR reduced from 1.15±1.18 to 0.46 with RTX ( $p \leq 0.0001$ ). In patients with relapses, ARR dropped from 1.66 to 1.22 relapses per year, 73.49% relative risk relapse decrease. Previous to RTX ARR in 500mg subgroup was 1.36, with RTX 0.4. For 1000mg initial and maintenance doses ARR was 0.7 and follow-up 0.4

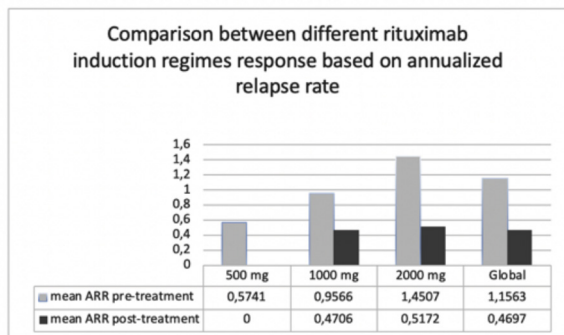


Figure 1. Comparison in response different rituximab induction regimes response based on annualized relapse rate

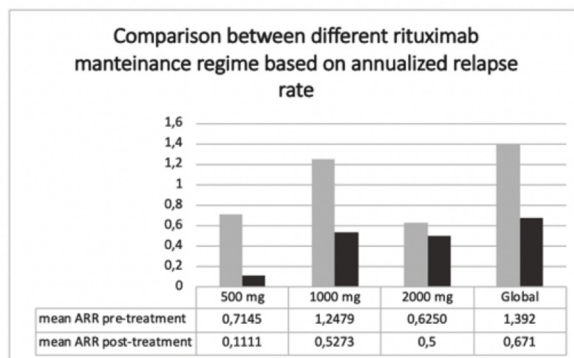


Figure 2. Comparison in response in different rituximab maintenance regime

**Conclusion:** The treatment of NMOSDs with rituximab in Mexican patients demonstrate marked and sustained ARR reduction regardless initial and maintenance regimen

**Disclosure:** Nothing to disclose

## MS and related disorders 2

### EPO1249

#### How understanding of MS patient experiences, with respect to conversations about disease progression, differs among healthcare professions

E. Celius<sup>1</sup>, P. Vermersch<sup>2</sup>, D. Yeandle<sup>3</sup>, A. Laroni<sup>4</sup>, N. Alexandri<sup>5</sup>

<sup>1</sup>Oslo University Hospitals and University of Oslo, Oslo, Norway, <sup>2</sup>University of Lille, Lille, France, <sup>3</sup>MS in the 21<sup>st</sup> Century, Southampton, United Kingdom, <sup>4</sup>University of Genoa and IRCCS Ospedale Policlinico San Martino, Genoa, Italy, <sup>5</sup>Global Medical Affairs, Neurology & Immunology, Merck KGaA, Darmstadt, Germany

**Background and aims:** The MS in the 21<sup>st</sup> Century initiative is led by a Steering Group of international multiple sclerosis (MS) healthcare professionals (HCPs) and people with MS (PwMS) committed to improving communication between HCPs and PwMS, currently focussing on understanding factors that influence outcomes of conversations about disease progression.

**Methods:** A 6 question electronic survey on the topic was conducted at international congress and online.

**Results:** Responses were received from 130 PwMS, 74 neurologists, 55 nurses and 43 other HCPs (GPs, physical therapists, psychologists). 13rd (32.7%) of PwMS reported that their HCP had never discussed disease progression with them; however, 98.0% of neurologists reported discussing the topic with their patients. Respondents from all groups reported the reason discussions take place is because it is important to be open about MS, with neurologists (52.0%) and PwMS (41.6%) stating this most consistently. Neurologists reported that discussions improve treatment adherence (54.0%) with nurses (23.8%) the next most likely group to state this. Both neurologists and PwMS reported patients' 1<sup>st</sup> reactions to discussions about progression as "worried", "overwhelmed" or "frightened". Nurses also included "upset" in their top 3, while other HCPs were the only group to report PwMS as "hopeful" in these conversations. None of the HCP groups included inevitability of decline as a major concern of PwMS despite 46.9% of PwMS reporting that this concerns them.

**Conclusion:** These data highlight the sometimes contradictory perspectives of HCPs and PwMS on disease progression. Greater collaboration between multidisciplinary teams could help HCPs to align perspectives and provide more effective care.

**Disclosure:** The MS in the 21<sup>st</sup> Century initiative is financially supported by Merck KGaA, Darmstadt, Germany with secretariat support, editorial input, and medical writing assistance provided by Cello Health Communications, Farnham, UK.

### EPO1250

#### Association of sarcoidosis and multiple sclerosis: an important lesson in neuroimmunology

A. Chaudhuri, A. Radunovic, M. Mattoscio  
Neurology, Queen's Hospital, Greater London, United Kingdom

**Background and aims:** Sarcoidosis is a rare association of multiple sclerosis (MS); in a large retrospective study, only 10 cases were identified in an MS population of over 15,000.

**Methods:** We reviewed our own database and literature regarding the association of sarcoidosis and MS.

**Results:** We identified 1 patient of sarcoidosis in our database of over 1000 patents with MS. This was a female patient in her 50s with a previously confirmed diagnosis of pulmonary sarcoidosis and presented with a subacute onset of progressive left leg weakness and foot drop. MRI of her brain and cervical spinal cord showed disseminated demyelinating lesions. CSF was positive for oligoclonal bands; serum was weakly positive with fewer and less intense bands. The course of her MS remained benign; over next 10 years, she experienced no new relapse or disability progression. Her pulmonary sarcoidosis was quiescent on Prednisolone 5mg once daily. She had a persistent mild lymphopenia and was not treated with disease modifying therapy.

**Conclusion:** We present an index case of sarcoidosis with MS followed up for over 10 years with a clinically benign course. We postulate that the state of mild immunosuppression, lymphopenia and normal or increased levels of 1,25 OH-vitamin D3 in sarcoidosis is protective against disease activity in MS. This is supported by the low incidence of MS in patients with sarcoidosis, and development of acute sarcoidosis reported in patients with MS following treatment with beta-interferon, alemtuzumab and daclizumab, probably from a shift of immune response and macrophage activity.

**Disclosure:** Nothing to disclose

## EPO1251

### Preliminary results of high-dose immunosuppressive therapy with autologous hematopoietic stem cell transplantation in progressive and relapsing-remitting multiple sclerosis

G. Bisaga, G. Moskalyuk, M. Topuzova, T. Alekseeva, A. Chaykovskaya

*Department of Neurology and Psychiatry, Federal State Budgetary Institution «Almazov National Medical Research Centre» of the Ministry of Health of the Russian Federation, Saint-Petersburg, Russian Federation*

**Background and aims:** To evaluate the efficacy of high-dose immunosuppressive therapy with autologous hematopoietic stem cell transplantation (HDIT + AHSCT) in patients with progressive (PMS) and relapsing-remitting (RRMS) multiple sclerosis (MS).

**Methods:** The study involved 5 patients with PMS and 1 patient with RRMS (mean age was  $40.8 \pm 9.9$  years, disease duration -  $6.0 \pm 4.3$  years) diagnosed according to McDonald criteria (2017). Inclusion criteria: an increase of the Expanded Disability Status Scale (EDSS) score during the last year; an increase of the lesion number and/or the Gd+ lesion number on magnetic resonance imaging (MRI) of the brain; the inefficacy of the I or II line of disease modified therapy. Monitoring was conducted by EDSS and MRI assessment before, just after (only for EDSS) and 6-8 months later the treatment.

**Results:** The average EDSS before treatment was  $5.6 \pm 0.7$ , immediately after treatment  $-5.5 \pm 0.8$ , 6-8 months later  $-5.0 \pm 1.0$ . In all patients on the brain MRI before treatment there were revealed multiple Gd+ lesions. 6-8 months after HDIT + AHSCT no new lesions and no other signs of lesion activity were fixed on MRI.

**Conclusion:** The neuroimage and EDSS monitoring indicate the absence of exacerbations and disease progression because of continuous suppression of immune system 6 months after HDIT + AHSCT in all patients with RRMS and PMS.

**Disclosure:** Nothing to disclose

## EPO1252

### A heterogeneity of relationships between sleep/wake parameters and physical functioning, mental health and cognitions in multiple sclerosis

M.Y. Chernenko, I.M. Nikishkova, D.O. Kutikov, O.Y. Kutikov

*Institute of Neurology, Psychiatry and Narcology of the NAMS of Ukraine, Kharkiv, Ukraine*

**Background and aims:** Sleep/wake disorders are common for multiple sclerosis (MS). There is a certain association of them with fatigue, anxiety, depression, and cognitive impairments. The aim was to investigate connections of sleep/wake components with psychometric and neurocognitive parameters in patients with MS.

**Methods:** Sleep/wake assessments with the Epworth Sleepiness Scale (ESS) and Pittsburgh Sleep Quality Index (PSQI) and psychometric and neurocognitive examinations were performed in 20 patients with MS (Figure 1).

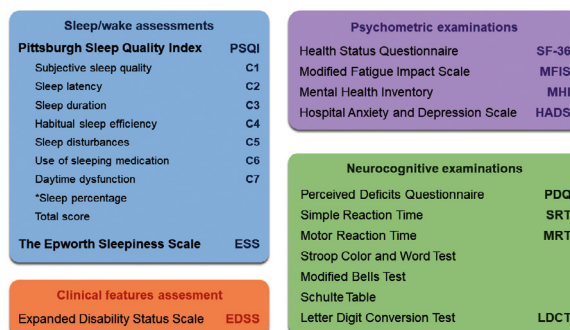


Figure 1. Methods of assessment

**Results:** The daytime sleepiness (ESS score) was significantly associated with fatigue ( $k=0.75$ ), depression ( $k=0.75$  for HADS and  $k=-0.68$  for MHI), perceived cognition deficits ( $k=0.82$ ), emotional conditions ( $k=-0.55$ ) and mental health ( $k=-0.75$ ) for SF-36. The daily sleepiness had no connections with physical functioning ( $k=-0.02$  for SF-36) and a simple ( $k=0.12$ ) and motor ( $k=0.23$ ) reaction time. The PSQI total score less correlated with fatigue ( $k=0.64$ ), scores of PDQ ( $k=0.47$ ), HADS ( $k=0.43$ ), emotional conditions ( $k=-0.43$ ) and mental health ( $k=-0.50$ ) for SF-36, than the ESS, but the PSQI was more connected with physical functioning ( $k=-0.66$  for SF-36) and a motor reaction time ( $k=0.48$ ). The PSQI components had relationships of different power with the parameters examined (Figure 2). Cognitive conditions, particularly speed of the test performing, were more connected with sleep efficiency, latency, and percentage; whereas psychometric parameters were connected stronger with sleep disturbances, duration, and efficiency.

	Scale or Test	Sleep latency	Sleep duration	Sleep percentage	Sleep disturbances	Sleep efficiency
<b>Clinical features</b>	EDSS	0,73	-0,09	-0,49	0,01	0,38
<b>Fatigue</b>	MFIS	-0,11	0,49	-0,29	0,61	0,45
<b>Physical functioning</b>	SF-36 (PCS)	-0,58	-0,28	0,63	-0,2	-0,69
	SF-36 (MCS)	0,34	-0,50	0,11	-0,58	-0,22
<b>Mental health</b>	MHI	0,21	-0,52	0,35	-0,59	-0,46
	MHI (MHD)	0,26	-0,44	0,38	-0,54	-0,49
<b>Depression</b>	HADS D	0,00	0,65	-0,41	0,45	0,39
	MHI (MHA)	0,17	-0,19	0,13	-0,44	-0,28
<b>Anxiety</b>	HADS A	-0,28	0,72	-0,29	0,52	0,34
<b>Cognitions</b>	PDQ	-0,18	0,19	-0,27	0,38	0,43
<b>Simple reaction time</b>	SRT	-0,03	0,02	-0,16	0,04	0,12
<b>Motor reaction time</b>	MRT	0,00	-0,38	-0,27	0,25	0,26
<b>Cognitive tiredness</b>	Schulte Tables, Stroop Test, Modified Bells Test, LDCT	0,45	-0,08	-0,48	-0,08	0,43
	Schulte Tables	0,53 to 0,68	-0,10	-0,48	0,05	0,45
	Stroop Test	0,58	-0,16	-0,36 to -0,42	0,16	0,42
<b>Time of performing</b>	Modified Bells Test	0,65	-0,23 to -0,33	-0,24 to -0,32	0,07	0,28
	LDCT	0,58 to 0,62	0,07	-0,56	-0,05	0,47 to 0,51

EDSS – Expanded Disability Status Scale; MFIS – Modified Fatigue Impact Scale; SF-36 – Health Status Questionnaire; SF-36 (PCS) – Physical Components Summary Scale; SF-36 (MCS) – Mental Component Summary Scale; MHI – Mental Health Inventory; MHI (MHD) – Mental Health Inventory Depression Subscale; MHI (MHA) – Mental Health Inventory Anxiety Subscale; HADS – Hospital Anxiety and Depression Scale; PDQ – Perceived Deficits Questionnaire; LDCT – Letter Digit Conversion Test

Figure 2. Heatmap of relationships between sleep/wake parameters and physical functioning, mental health and cognitions in multiple sclerosis

**Conclusion:** In MS, ESS total score was connected stronger with psychoemotional conditions, whereas PSQI total score had stronger connections with physical functioning and cognitions. Along with this, PSQI certain components also were connected significantly with psychoemotional conditions.

**Disclosure:** Nothing to disclose

## EPO1253

### Central nervous system inflammatory disease: between grey matter lesions and white matter vanishing hyperintensities

C. Coclitu<sup>1</sup>, O. Lacatus<sup>2</sup>, O.M. Mihalcea<sup>2</sup>, C. Tiu<sup>2</sup>, O. Bajenaru<sup>2</sup>

<sup>1</sup>Neurology, Chu Grenoble Alpes, Grenoble, France,

<sup>2</sup>Bucharest, Romania

**Background and aims:** Inflammatory diseases of the central nervous system (CNS) are heterogenous as we identify more antibodies and their targets in the pathological immune background. While the traditional theory of multiple sclerosis’ (MS) physiopathology refers to a white matter disease, the grey matter lesions are considered by some a signature of MS. White matter changes are common in a wide spectrum of inflammatory diseases of the CNS, nevertheless disappearing T2/FLAIR MRI white matter hyperintensities are uncommon.

**Methods:** We present the case of a 52-year-old woman with a long history of fluctuating neurological deficits. In 1997 she was diagnosed with left optic neuritis. In 2006 she underwent a brain MRI showing one T2/FLAIR white matter hyperintensity of her left parietal lobe. From 2010 she starts having recurrent paresthesias in her left leg, face, then both hands; a new brain MRI reveals multiple hyperintense T2/FLAIR lesions in both cerebral hemispheres and under the tentorium.

**Results:** Glucocorticoids are administered several times with good recovery. In 2016, the brain MRI performed shows no trace of white matter lesions but moderate atrophy and few grey matter T2/FLAIR hyperintensities. She was addressed to our department with progressive gait disturbance. Brain MRI proved to be unchanged, but a C2-C4 T2/FLAIR hyperintensity was identified on her spinal MRI.

**Conclusion:** The complete antibody workup we performed proved to be negative, but we initially considered a seronegative CNS inflammatory disease. However, the presence of oligoclonal bands, the radiological features and the evolution made the most likely diagnosis that of an atypical presentation of MS.

**Disclosure:** Nothing to disclose

## EPO1254

**Safety of Alemtuzumab Over 9 Years in Patients With Non-MS Autoimmunity**

A.J. Coles<sup>1</sup>, A.D. Bass<sup>2</sup>, G. Comi<sup>3</sup>, Ó. Fernández<sup>4</sup>, G. Giovannoni<sup>5</sup>, J. Jones<sup>1</sup>, L. Kappos<sup>6</sup>, E. Kubala Havrdova<sup>7</sup>, C. Laganke<sup>8</sup>, X. Montalban<sup>9</sup>, F. Piehl<sup>10</sup>, A. Traboulsee<sup>11</sup>, P. Vermersch<sup>12</sup>, T. Ziemssen<sup>13</sup>, E. Poole<sup>14</sup>, H. Wiendl<sup>15</sup>

<sup>1</sup>University of Cambridge School of Medicine, Cambridge, United Kingdom, <sup>2</sup>Neurology Center of San Antonio, San Antonio, USA, <sup>3</sup>Vita-Salute San Raffaele University, Milan, Italy, <sup>4</sup>Fundacion IMABIS, Hospital Universitario Carlos Haya, Málaga, Spain, <sup>5</sup>Queen Mary University of London, Barts and The London School of Medicine, London, United Kingdom, <sup>6</sup>Neurologic Clinic and Policlinic, University Hospital and University of Basel, Basel, Switzerland, <sup>7</sup>First Medical Faculty, Charles University, Prague, Czech Republic, <sup>8</sup>North Central Neurology Associates, Cullman, USA, <sup>9</sup>Division of Neurology, St Michael's Hospital, University of Toronto, Toronto, Canada, <sup>10</sup>Neuroimmunology Unit, Department of Clinical Neuroscience, Karolinska Institutet, Stockholm, Sweden, <sup>11</sup>University of British Columbia, Vancouver, Canada, <sup>12</sup>University of Lille, INSERM U995, CHU Lille, Lille, France, <sup>13</sup>Center of Clinical Neuroscience, Carl Gustav Carus University Hospital, Dresden, Germany, <sup>14</sup>Sanofi, Cambridge, USA, <sup>15</sup>University of Münster, Münster, Germany

**Background and aims:** In the CAMMS223 (NCT00050778) and CARE-MS trials (NCT00530348, NCT00548405), alemtuzumab significantly improved efficacy outcomes versus subcutaneous interferon beta-1a in RRMS patients. Efficacy was maintained in 2 consecutive extension studies (NCT00930553, NCT02255656). Here, we investigate the relationship of preexisting non-MS autoimmunity with subsequent onset of new autoimmune adverse events (AIAEs) after alemtuzumab.

**Methods:** In clinical trials, safety monitoring included monthly complete blood counts, serum creatinine, urinalysis with microscopy, and quarterly thyroid function tests. All patient- and investigator-reported AEs were recorded. AIAEs were counted at baseline if occurring before first alemtuzumab dose or if collected in the medical history database.

**Results:** A total of 1216 patients from the alemtuzumab clinical development program who received alemtuzumab 12 mg were included in the analysis. 96 had baseline non-MS autoimmunity. Up to 9 years after alemtuzumab initiation, AIAE incidences were similar in patients with baseline non-MS autoimmunity ( $\geq 1$  postbaseline AIAE, 35.4%;  $\geq 2$  postbaseline AIAEs, 5.2%) or without baseline autoimmunity (35.3%, 8.2%). Most patients with thyroid disorders at baseline did not experience AIAEs after alemtuzumab initiation; postbaseline AIAE incidence in patients with baseline hypothyroidism, hyperthyroidism, and autoimmune thyroiditis was 13.5%, 14.3%, and 16.7%, respectively. Thyroid AE incidence after a 3rd alemtuzumab course remained consistent between patients who had thyroid AEs before Course 3 (1.7%) and those who did not

(2.0%). Postmarketing data indicate thyroid AEs that developed post alemtuzumab were not associated with other treatment-emergent AIAEs.

**Conclusion:** Preexisting non-MS autoimmunity was not associated with subsequent new AIAE occurrence up to 9 years after alemtuzumab initiation.

**Disclosure:** STUDY SUPPORT: Sanofi and Bayer HealthCare Pharmaceuticals.

## EPO1255

### Autoimmune neurological adverse events related to biological drugs: a case series

R. Cortese<sup>1</sup>, L. Prosperini<sup>2</sup>, A. Stasolla<sup>3</sup>, S. Haggiag<sup>2</sup>, V. Villani<sup>2</sup>, C. Gasperini<sup>2</sup>, C. Tortorella<sup>2</sup>

<sup>1</sup>Dept. of Medicine, Surgery and Neurosciences, University Siena, Siena, Italy, <sup>2</sup>Department of Neurosciences, S. Camillo-Forlanini Hospital, Rome, Italy, <sup>3</sup>Neuroradiology, AOS San Camillo Forlanini, Rome, Italy

**Background and aims:** Biologic drugs (biologics) are an established therapeutic option for autoimmune diseases and malignancies targeting specific pathways of the immune system or cellular processes. Despite their selective mechanisms of action, biologics may have a variety of adverse events, including neurological complications that should be promptly recognized and treated.

**Methods:** We describe a case series of patients who developed complications affecting the central nervous system (CNS) while on treatment with biologics for autoimmune diseases or malignancies.

**Results:** Anti-tumor necrosis factor alpha (anti-TNF $\alpha$ ) (Infliximab, Etanercept, Adalimumab or Golimumab) were prescribed to 9 patients (6M, 3W) for psoriatic arthritis (n=4), ankylosing spondylitis (n=3), seronegative spondyloarthritis (n=1) and Crohn disease (n=1). During treatment, 4 patients developed an isolated CNS demyelinating syndrome; 1 was diagnosed with multiple sclerosis (MS); 1 experienced worsening of preexisting MS, 1 had isolated optic neuritis and 1 isolated pontine demyelination. All these 8 patients had MRI scans suggestive for MS-like demyelination. Complete or partial resolution of symptoms occurred after anti-TNF $\alpha$  therapy discontinuation and steroids. A 55-year-old patient developed opsoclonus myoclonus syndrome associated with anti-Glu3 antibodies, with no recovery after anti-TNF $\alpha$  therapy discontinuation, steroids, intravenous immunoglobulins and plasma exchange. The last patient was a 50-year old female who developed a fatal acute diffuse leukoencephalopathy while on an anti-cytotoxic T-lymphocyte associated antigen-4 monoclonal antibody (Ipilimumab) for advanced melanoma.

**Conclusion:** Our observation supports a possible association between biologics and unexpected neurological complications. Therefore, in clinical practice an active surveillance is mandatory for an early detection of neurological adverse events, which may require a prompt discontinuation of the drugs.

**Disclosure:** Nothing to disclose

Case	Gender, Age	Disease	Name of Biologics	Treatment duration	CNS complication	Outcome (follow-up)
1	M, 48 years	Psoriatic arthritis	Etanercept	2 months	Isolated optic neuritis	CIS (17 months)
2	M, 31 years	Psoriatic arthritis	Infliximab	3 months	CIS	CIS (20 months)
3	W, 37 years	Crohn disease	Infliximab	3 months	CIS	CIS (16 months)
4	W, 54 years	Psoriatic arthritis	Adalimumab	6 months	CIS	RRMS (13 months)
5	M, 50 years	Ankylosing spondylitis and RRMS (EDSS:2)	Adalimumab	11 months	Worsening of preexisting symptoms	SPMS (EDSS 7.5)
6	M, 27 years	Psoriatic arthritis	Etanercept	6 months	RRMS	RRMS stable (18 months)
7	M, 64 years	Ankylosing spondylitis	Etanercept	8 months	Autoimmune Encephalitis (Anti Glu3 antibodies positive)	Improved. Mild cognitive impairment (22 months)
8	F, 28 years	seronegative spondyloarthritis	Infliximab	3 months	CIS	RRMS (12 months)
9	M, 40 years	Ankylosing spondylitis	Golimumab	Unknown	Isolated pontine demyelination	Complete resolution (12 months)
10	F, 52 years	Metastatic melanoma	Ipilimumab	6 months after ipilimumab discontinuation	Acute diffuse leukoencephalopathy	Exitus

Footnotes: CIS = clinically isolated syndrome, RRMS= relapsing remitting multiple sclerosis, EDSS= expanded disability status scale

Table 1: Demographic and clinical characteristics of the cases.



## EPO1256

**Clinical features and treatment efficacy in Neuromyelitis Optica Spectrum Disorder**

G. Coşku Yılmaz, C. Uzunköprü, Y. Beckmann  
*Neurology, İzmir Katip Çelebi University, Izmir, Turkey*

**Background and aims:** Neuromyelitis Optica Spectrum Disorder (NMOSD) is an autoimmune disease characterized by optic neuritis and longitudinally extensive transverse myelitis. The progression of disability is mostly related to the severity of the attacks. Therefore, appropriate therapy should be started immediately. The aim of this study is to evaluate the clinical features of NMOSD and the efficacy of treatments.

**Methods:** Patients were recruited to this study who were fulfilling the 2015 International Diagnostic Criteria for NMOSD. The study design was retrospective, cross-sectional, and observational. The inclusion criteria were being older than 18 years, receiving any treatment longer than 12 months, having a clinical follow-up for more than 1 year, and having annual magnetic resonance imaging (MRI). The exclusion criteria were the presence of a co-morbid disease, which may cause neurological disability.

**Results:** We included 20 patients (15 females - 75%) in the study. The mean age was 38.5±20.4 years, and the mean disease duration was 74.5±30.7 months. The first symptoms in the onset of the disease were motor weakness (50%), brainstem involvement (10%), visual loss (55%), sensory loss (55%), and bowel-bladder involvement (30%). All therapies used for the treatment were oral steroid (80%), azathioprine (40%), Rituximab (75%), and Cyclophosphamide (10%). The annual relapse rate was 0.54 and showed a marked decrease to 0.16 (p<0.001). MRI was stable in 90% of the patients after 12 months.

**Conclusion:** NMOSD may present with different clinical findings. The appropriate treatments may prevent the progression of disability, the presence of attacks, and new lesions in MRI.

**Disclosure:** Nothing to disclose

## EPO1257

**Immunoglobulin free light chains in Multiple Sclerosis: Is a parallel increase of kappa and lambda associated with higher neuronal damage?**

I. Crespi<sup>1</sup>, R. Serino<sup>2</sup>, E. Saliva<sup>3</sup>, M. Lamonaca<sup>4</sup>, M.G. Sulas<sup>5</sup>, D. Vecchio<sup>1</sup>, E. Virgilio<sup>1</sup>, C. Comi<sup>1</sup>, R. Cantello<sup>6</sup>, G. Bellomo<sup>1</sup>, U. Dianzani<sup>7</sup>

<sup>1</sup>Novara, Italy, <sup>2</sup>Clinical Chemistry Laboratory, Azienda Ospedaliera-Universitaria Maggiore della Carità Novara, Novara, Italy, <sup>3</sup>Clinical Chemistry Laboratory, Azienda Ospedaliera-Universitaria Maggiore della Carità Novara, Novara, Italy, <sup>4</sup>Clinical Chemistry Laboratory, A.U.O. Maggiore della Carità di Novara, NOVARA, Italy, <sup>5</sup>Clinical Chemistry Laboratory, University of Eastern Piedmont, Novara, Italy, <sup>6</sup>NOVARA, Italy, <sup>7</sup>Interdisciplinary Research Center of Autoimmune Diseases, University of Piemonte Orientale, Novara, Italy

**Background and aims:** Increased levels of cerebrospinal fluid (CSF) immunoglobulin free light chains (FLC) are typical hallmark of multiple sclerosis (MS). Research has focused on the kappa FLC because most of the patients exhibits a CSF kappa to lambda ratio higher than that in serum. Moreover, kappa FLC (KFLC) index is currently employed in the diagnostic work-up of MS. Little is known, however, about role played by lambda FLC (LFLC).

**Methods:** Patients with MS with detectable intrathecal synthesis (kappa index >5) enrolled in the study were divided in 2 groups: KFLC index >10 and LFLC index <10 (group 1; n=20) and KFLC index >10 and LFLC index >10 (group 2; n=25). Kappa and lambda FLC and IgG were measured in serum and CSF by nephelometry. Oligoclonal bands (OCB) were detected by isoelectrofocusing (IEF). Tau, p-tau, b-amyloid and neurofilament light chain (NF-lc) were measured by ELISA.

**Results:** Comparison of the biochemical features of the two groups is detailed in the following Table

	Group 1	Group 2	p
CSF IgG mg/dL	5,79±2,63	5,04±3,89	0,218
CSF LFLC/IgG ratio	6,11±3,65	47,18±29,79	<0,0001
LFLC quotient (*1000)	18,72±10,60	136,32 ± 106,15	<0,0001
LFLC index	4,10±1,99	29,74±16,84	<0,0001
KFLC index/LFLC index	49,94±63,88	1,74±1,15	<0,0001
Tau (pg/ml)	119,79±89,61	126,47 ± 51,28	0,397
β-amyloid (pg/ml)	514,65±152,99	570,94 ± 210,60	0,184
p-Tau(pg/ml)	31,48±15,47	29,56±9,35	0,349
NF-lc (pg/ml)	831±558	1638±1161	0,002

Comparison of the biochemical features of the two groups

**Conclusion:** These results suggest that, in MS, a contemporary increase of KFLC and LFLC absolute concentrations and indexes is associated with increased neuronal damage, as revealed by increased levels of NF-lc.

**Disclosure:** Nothing to disclose

## EPO1258

### Cortical thickness and serum neurofilament light chain levels predict subtle neuropsychological impairment at early stages of Multiple Sclerosis

Á.J. Cruz Gómez<sup>1</sup>, L. Forero<sup>2</sup>, E. Lozano-Soto<sup>3</sup>, F. Sanmartino<sup>3</sup>, F. Cano Cano<sup>3</sup>, J. Paz-Expósito<sup>4</sup>, R. Espinosa-Rosso<sup>2</sup>, J.J. Gonzalez-Rosa<sup>3</sup>

<sup>1</sup>Institute of Biomedical Research Cadiz (INIBICA), Cadiz, Spain, <sup>2</sup>Neurology Department, Puerta del Mar, Cádiz, Spain, <sup>3</sup>Psychology, University of Cadiz, Cádiz, Spain, <sup>4</sup>Radiology Department, Hospital Puerta del Mar, Cadiz, Spain

**Background and aims:** The aim of this research was to examine the biomarkers related to ongoing neuroaxonal degeneration, radiological measures of cortical and subcortical gray matter damage, and clinical parameters to explore its association with subtle neuropsychological impairment in early-diagnosed multiple sclerosis (MS) patients.

**Methods:** 35 Relapsing-Remitting MS patients and 21 Healthy Controls (HC) matched in gender and age were enrolled in our study. All participants underwent magnetic resonance imaging (MRI) examination and neuropsychological and clinical assessments. In addition, regional brain GM volumes and Cortical Thickness (CT) were calculated and neurofilament light chain (NfL) blood levels were obtained from all participants.

**Results:** Compared to HC, MS patients showed statically poorer performance in information speed processing and verbal memory subtests as well as bilateral thalamic atrophy and cortical thinning in temporal-parietal areas. Moreover, stepwise multiple regression analyses revealed that state-anxiety scores, NfL levels, and global CT explained and predicted neuropsychological impairment (NI) in MS patients. Specifically, CT of right supramarginal gyrus (rSMG) accounted for the greater NI variance.

**Conclusion:** State anxiety, serum NfL levels as the biomarker of axonal injury, and global CT were the most significant variables explaining neuropsychological performance in patients recently diagnosed with MS. Precisely, CT of rSMG was the strongest regional measure predicting neuropsychological status in our MS sample. rSMG is a key brain area within fronto-parietal network involved in cognitive and attentional control, thus, rSMG thinning could represent an early radiological surrogate of MS-related cognitive decline at disease onset stage.

**Disclosure:** Nothing to disclose

## EPO1259

### Withdrawn

## EPO1260

### The incidence of infusion associated reactions in Ocrelizumab-treated Relapsing-Remitting Multiple Sclerosis patients.

C. Bewick, E. Das, J. Collins, C. Nash, L. Fisniku  
<sup>1</sup>Neuroscience, BSUH, Brighton, United Kingdom

**Background and aims:** Ocrelizumab is a disease modifying therapy (DMT) licensed for treatment of active relapsing-remitting Multiple Sclerosis (RRMS). Infusion-associated-reactions (IARs) are a common side effect (SE) of Ocrelizumab especially during the initial infusions. Tolerability is an important factor patients take into account when selecting a DMT; the local MS centre experience with a DMT could also influence such decision. We sought to assess the frequency of such IARs in our cohort of Ocrelizumab-treated RRMS-patients at Brighton & Sussex University Hospitals MS Centre.

**Methods:** All Ocrelizumab-treated RRMS-patients data from February 2019 to January 2020 was reviewed. IARs classified as mild, moderate, severe and life-threatening based on the Ocrelizumab-proforma, during and 1 hour post infusion were recorded. Patients were advised to contact the infusion nurses if they experienced further symptoms in the next 24 hours post infusion.

**Results:** 28 patients received Ocrelizumab: 20 (71%) females; mean age 41.7 years old (range 25-58); median EDSS 2 (range 0-6). 12 (42.8%) patients had received no prior DMTs. 23 (82.1) patients reported either nil or mild IARs; 7 (25%) patients had mild IAR. 2 (7.1%) patients had moderate IAR; 2 (7.1%) patients had severe IAR, 1 (3.6%) patient experiencing throat pain, swelling, rhinorrhoea and dyspnoea. 1 (3.6%) patient experienced significant raised liver enzymes; 1 (3.6%) patient had acute respiratory distress syndrome requiring treatment discontinuation.

**Conclusion:** Our data suggest that Ocrelizumab is generally well tolerated, however caution should be exercised and patient should be monitored closely especially in the initial infusion. Real world data provides useful information to share with patients when they are consented.

**Disclosure:** Nothing to disclose

## EPO1261

**Spectrum of Neuromyelitis optica spectrum disorders**

F.M. Khan, D. Dave, P. Rao, S. Nirhale, S. Rohatgi, P. Naphade

*Neurology, DR. D. Y. Patil Medical College, Hospital & Research Centre, Pune, India*

**Background and aims:** Neuromyelitis optica spectrum disorders (NMOSD, previously known as Devic disease or neuromyelitis optica [NMO]) are inflammatory disorders of the central nervous system characterized by severe, immune-mediated demyelination and axonal damage predominantly targeting optic nerves and spinal cord. The aim was to study the clinical, radiological, immunological profile and treatment outcomes of neuromyelitis optica spectrum disorder (NMOSD).

**Methods:** The study was carried out at a tertiary care multi-specialty hospital in Western Maharashtra. The study protocol was approved by the institutional ethics committee. The study design was a prospective, observational study with patients recruited over a period of 1 year from December 2018 to November 2019. The 2015 International consensus diagnostic criteria were used for the diagnosis of NMOSD. 30 patients of NMOSD were studied with detailed history, clinical evaluation, radiology, and serological workup.

**Results:** Female preponderance with 60% was seen. Aquaporin 4 antibody was positive in 60% of patients, the remaining 40% had positive myelin oligodendrocyte glycoprotein antibody. The mean age of presentation was 28 years. Isolated optic neuritis was the most common presentation. Recovery was directly related to the time of onset of therapy in the acute stage. Plasma exchange showed clinically significant only if it started up to 2 weeks of the acute event. Rituximab was most effective in the prevention of relapse as compared to other options.

**Conclusion:** NMOSD is the most common cause of vision loss in young patients. The spectrum of NMOSD is expanding. MOG antibody should be tested in all Aquaporin 4 antibody-negative NMOSD

**Disclosure:** Nothing to disclose

## EPO1262

**A 2-year Study to Evaluate the Onset of Action of Cladribine Tablets in Subjects with Highly Active Relapsing Multiple Sclerosis: Results from MAGNIFY-MS Baseline Analysis**

N. De Stefano<sup>1</sup>, A. Achiron<sup>2</sup>, F. Barkhof<sup>3</sup>, A. Chan<sup>4</sup>, T. Derfuss<sup>5</sup>, S. Hodgkinson<sup>6</sup>, L. Leocani<sup>7</sup>, X. Montalban<sup>8</sup>, A. Prat<sup>9</sup>, K. Schmierer<sup>10</sup>, F. Sellebjerg<sup>11</sup>, P. Vermersch<sup>12</sup>, H. Wiendl<sup>13</sup>, B. Keller<sup>14</sup>, S. Roy<sup>15</sup>

<sup>1</sup>Department of Neurological and Behavioural Sciences, University of Siena, Siena, Italy, <sup>2</sup>Multiple Sclerosis Center, Sheba Academic Medical Center, Ramat Gan, Israel,

<sup>3</sup>Department of Radiology, VU University Medical Center, Amsterdam, Netherlands, <sup>4</sup>University Hospital of Berne, University of Berne, Berne, Switzerland, <sup>5</sup>Department of Neurology, University Hospital Basel, Basel, Switzerland,

<sup>6</sup>Ingham Institute for Applied Medical Research, University of New South Wales Medicine, Sydney, Australia, <sup>7</sup>Experimental Neurophysiology Unit, Vita-Salute San Raffaele University, Milan, Italy, <sup>8</sup>St. Michael's Hospital, University of Toronto, Toronto, Ontario, Canada,

<sup>9</sup>Department of Neurosciences, University of Montréal, Montreal, Canada, <sup>10</sup>The Blizzard Institute (Neuroscience), Barts and The London School of Medicine and Dentistry, Queen Mary University of London, London, United Kingdom, <sup>11</sup>Danish MS Center, University of Copenhagen, Rigshospitalet, Copenhagen, Denmark, <sup>12</sup>Univ. Lille, INSERM U1172, CHU Lille, FHU Imminent, Lille, France,

<sup>13</sup>Department of Neurology, Institute of Translational Neurology, University of Münster, Münster, Germany, <sup>14</sup>Merck KGaA, Darmstadt, Germany, <sup>15</sup>Merck, Aubonne, Switzerland

**Background and aims:** Better characterisation of how the effects of cladribine tablets on lymphocytes translate into clinical benefits, and the time-course of clinical benefits, is the subject of the ongoing MAGNIFY-MS study. The baseline characteristics of eligible patients in MAGNIFY-MS are reported.

**Methods:** MAGNIFY-MS is a prospective phase IV, open-label, single-arm, multi-centre, multi-country, 2-year study to determine the onset of magnetic resonance imaging (MRI)-detectable disease control following treatment with cladribine tablets 1 mg (3.5mg/kg cumulative dose over 2 years). Eligible patients are  $\geq 18$ -years-old, with highly active RMS and Expanded Disability Status Scale score  $\leq 5.0$ . The primary endpoint is change in the number of combined unique active MRI lesions during the first 6 months versus baseline. Secondary endpoint is characterisation of immune cell subsets at pre-defined intervals versus baseline.

**Results:** A total of 313 patients have been enrolled. In total, 260 patients have been assigned to active treatment (cut-off for baseline analysis, June 2019). Baseline demographics and clinical characteristics are shown in Table 1.

Table 1. Baseline demographics and clinical characteristics of patients enrolled in MAGNIFY-MS (ITT population, June 2019 cut-off)	
Parameter	Cladribine tablets 3.5 mg/kg (n=260)
Female, n (%)	172 (66.2%)
Race, n (%)	
White	217 (83.5)
Black/African-American	1 (0.4)
Asian	2 (0.8)
Other	11 (4.2)
Not collected	29 (11.2)
Age, years, mean±SD	37.7±9.7
Age categories, n (%)	
≤40 years	146 (56.2)
>40-65 years	114 (43.8)
EDSS at baseline, median (range)	2.5 (0-5)
Time since MS onset, months, mean±SD	83.4±83.9
Time since first relapse, months, mean±SD	53.0±71.2
Relapses within 12 months of baseline, n (%)	
0	8 (3.1)
1	112 (43.1)
2	114 (43.8)
>2	26 (10.0)
≥1 T1 Gd+ lesion, n (%)	97 (37.3)
≥1 new or enlarging T2 lesion, n (%)	30 (11.5)
≥1 T1 Gd+ or new or enlarging T2 lesion, n (%)	127 (48.8)
EDSS, Expanded Disability Status Scale; Gd+, gadolinium-enhancing; ITT, intent-to-treat; MS, multiple sclerosis; SD, standard deviation.	

Table 1

**Conclusion:** Baseline characteristics of those recruited reflect the anticipated patient population as specified in the protocol. MAGNIFY-MS will provide key information on changes in early immune phenotype and the onset of treatment effect, marked by MRI-detectable disease activity following treatment with cladribine tablets.

**Disclosure:** This study was sponsored by Merck KGaA, Darmstadt, Germany.

## EPO1263

### Key Factors for Patient Persistence in Dimethyl Fumarate Patient Support Programs

N. Dell<sup>1</sup>, A. Jenkins<sup>2</sup>, S. Kenny<sup>2</sup>

<sup>1</sup>Biogen, Stockholm, Sweden, <sup>2</sup>Biogen, Cambridge, USA

**Background and aims:** Patient Support Programs (PSP) for patients with multiple sclerosis (MS) provide critical support services and address patient needs through personalization. The impact of PSP participation was examined using persistence on delayed-release dimethyl fumarate (DMF), an oral MS therapy.

**Methods:** De-identified data from Australia, Canada, Germany, and the UK for all PSP participants starting DMF before October 2017 (≥12 months [M] of data) were analyzed. Persistence rate survival curves evaluated support call type, frequency, and financial assistance. Hazard ratio analyses assessed association of patient characteristics with persistence.

**Results:** Persistence in Australia was influenced by total number of support calls; moderate (10-20) call volume was most consistently correlated with short- and long-term sustained persistence. In Australia, calls during weeks 2–3 post-initiation positively influenced persistence up to 12M, with similar persistence at 12M regardless of early outbound check-up calls (Fig1). Similarly in Canada, check-up calls during 0–6M resulted in higher short-term persistence (up to 12M) for moderate (5-15) and high (15+) call groups (Fig2); however after 6M, persistence for the high (15+) call group fell below the low (0-5) call group at 12M. Financial assistance increased persistence for up to 3 years post-initiation in Canada. In Germany, temporal associations with persistence remained after stratification of PSP participants by adherence risk.

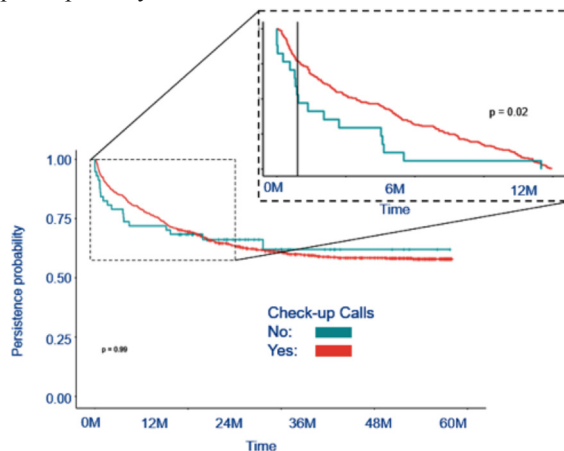


Figure 1. Persistence probability based on frequency of Australian outbound calls during weeks 2-3

Figure 1. Persistence probability based on frequency of Australian outbound calls during weeks 2-3

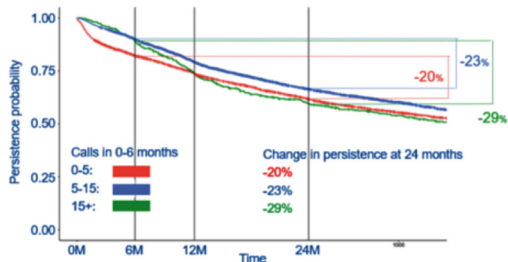


Figure 2. Persistence probability according to frequency of Canadian PSP check-up calls

**Conclusion:** Support calls in DMF PSPs are positively associated with persistence, demonstrating the value of PSPs. Additional analyses segmenting by patient phenotype and risk factors are required to provide definitive PSP design recommendations to further improve persistence. Support: Biogen

**Disclosure:** Supported by Biogen; the authors are full-time employees of and hold stock/stock options in Biogen.

## EPO1264

### Retinal nerve fiber layer and disease course. Is this a relationship despite disability?

J. Díaz-Díaz<sup>1</sup>, L. Estefania Hidalgo<sup>1</sup>, M.T. Merino Díez<sup>1</sup>, A. Valls Carbó<sup>1</sup>, I. Gómez Estévez<sup>1</sup>, S. Noval Martín<sup>2</sup>, M. Capote Díez<sup>2</sup>, R. Sanchez Jean<sup>3</sup>, C. Oreja-Guevara<sup>1</sup>  
<sup>1</sup>Neurology, Hospital Universitario Clínico San Carlos, Madrid, Spain, <sup>2</sup>Ophthalmology, Hospital Universitario La Paz, Madrid, Spain, <sup>3</sup>Ophthalmology, Hospital Universitario Clínico San Carlos, Madrid, Spain

**Background and aims:** Optical coherence tomography (OCT) measures thickness of the retinal nerve fiber layer (RNFL), commonly associated with disability. We studied the relationship of previous disease course with RNFL thickness despite disability.

**Methods:** We retrospectively analyzed RNFL thickness and demographic features, optic neuritis and annualize relapse rate (ARR) at year 1, 2 and 5 from diagnosis, of remitting-relapsing MS(RRMS) patients.

**Results:** We analyzed 24 patients with a mean age of onset of 31y (15-48y), 75% women and a medium follow-up of 10y from diagnosis to OCT. Eleven patients had at least 1 optic neuritis (ON).

RNFL thickness was  $\leq 90\mu\text{m}$  in both eyes in 71% (17/24), 10 of them with previous ON.

RNFL thickness was normal in 7 patients, only 1 with previous ON.

Differences in RNFL thickness in patient with or without previous ON are shown in table 1. Presence or absence of ON is the event most related to RNFL thickness.

In our cohort time from onset to OCT independently influence RNFL thickness, showing that patients with longer course presented more decrease (table 2).

No differences were found in RNFL thickness respecting ARR at year 1, 2 and 5, age at onset (table 3) or sex.

Table 1. RNFL thickness and optic neuritis, age of onset and disease course.

	RNFL AO	RNFL OD	RNFL OS	Age at onset	Time at OCT	TAB 1	TAB 2	TAB 5
All patients (n=24)	85,0 ± 9,6	86,5 ± 10,2	83,5 ± 11,6	31y	10y	1,57	1,91	2,96
With ON (n=11)	81,0 ± 11,1	82,6 ± 12,7	79,4 ± 11,1	31y	10y	1,82	2,18	3,55
With 1 ON (n=4)	83,3 ± 18,4	79,3 ± 20,0	87,3 ± 18,0	30y	12y	2,75	2,75	3,75
With 2 ON (n=6)	78,8 ± 5,5	84,5 ± 8,2	73 ± 8,8	35y	7,6y	1,5	1,67	2,83
Without ON (n=13)	88,4 ± 6,9	89,7 ± 6,5	87,1 ± 8,4	30y	10,6y	1,33	1,67	2,42

AO: Both eyes; OD: Right eye; OS: Left eye

Table 3. RNFL related to age at diagnosis

Age at diagnosis	RNFL AO	RNFL patients with ON	RNFL patients without ON
Less 18y (n=1)	76	76	
18-28y (n=5+5)	83,95 ± 8,7	77,4 ± 7,3	90,5 ± 4,0
28-38y (n=2+6)	87,68 ± 11,7	94,3 ± 20,9	85,5 ± 9,1
38-48y (n=3+2)	84,6 ± 8,8	79,3 ± 8,3	91,8 ± 1,8

**Conclusion:** RNFL thickness in patients with MS seem to be decrease, despite ON. In our cohort, 71% of patients present RNFL thickness  $\leq 90\mu\text{m}$  in both eyes, 41% without ON. Progressive degeneration of RNFL in RRMS is not only associated with disability but also with disease duration. ARR, age at onset or sex do not seem to influence RNFL.

**Disclosure:** Nothing to disclose

## EPO1265

### Cognitive-motor interaction: Its role in Multiple Sclerosis patient's quality of life.

M.B. Eizaguirre<sup>1</sup>, N. Ciuffia<sup>1</sup>, A. Marinangeli<sup>1</sup>, R. Alonso<sup>1</sup>, B.A. Silva<sup>1</sup>, C. Pita<sup>1</sup>, O. Garcea<sup>1</sup>, S. Vanotti<sup>2</sup>  
<sup>1</sup>Multiple sclerosis clinic. University Center of Neurology ., J. M. Ramos Mejía Hospital, Buenos Aires, Argentina,  
<sup>2</sup>Research Institute of Psychology - Faculty of Psychology, Buenos Aires University, Buenos Aires, Argentina

**Background and aims:** Recent evidence suggests that patients with Multiple Sclerosis (PwMS) present deficits when performed simultaneously cognitive and motor tasks (Cognitive-Motor Interaction, CMI). The impact of this deficits in patient's quality of life has been sparsely studied.

**Objectives:** 1) To compare performance in CMI between PwMS and healthy controls. 2) To examine the impact of CMI in health-related quality of life (HRQoL).

**Methods:** 91 patients with relapsing remitting MS and 20 healthy controls were included. Age: 38.58±11.37, 34.00±14.25; Education: 13.26±3.82, 14.50±2.65 respectively; EDSS: 2.20±1.30; Evolution: 9.70±9.01. Outcome measures: Clinical variables: EDSS; Fatigue Severity Scale; Beck's Depression Inventory II. HRQoL: MS International QoL Questionnaire (MusiQoL); Cognitive variables: BICAMS Battery; Dual tasks: Two CMI tasks (walking while performing verbal fluency/counting). Difference between subject performance in simple and dual task was obtained. It was quantified: time, steps and cognitive performance. Parametric and nonparametric statistics were performed, p value <0.05 was accepted.

**Results:** patients and controls were similar in age and education (p=0.124, p=0.104). Significant differences were found between groups in CMI, in time and steps of counting task (p=0.015, p<0.05), and in the performance of both cognitive tasks (fluency p=0.028, counting p<0.01). Significant associations were found between CMI and disease evolution (p=0.027), EDSS (p=0.031), SDMT (p=0.018). Significant negative correlations were found between CMI and HRQoL dimensions (rS=0.297 to 0.564). Adjusting by clinical variables, CMI was established as a predictor of HRQoL (R<sup>2</sup>=0.36, p<0.05).

**Conclusion:** PwMS show alterations in CMI. This performance has a significant impact in HRQoL that should be considered in patient's treatment.

**Disclosure:** Nothing to disclose

## Muscle and neuromuscular junction disease 1

### EPO1266

#### Vestibular impairment in Guillain-Barré syndrome

R. Ala<sup>1</sup>, K. Koçoğlu<sup>2</sup>, T. Tanrıverdizade<sup>2</sup>, P. Özçelik<sup>2</sup>, I. Şengün<sup>1</sup>, G. Akdal<sup>1</sup>

<sup>1</sup>Department of Neurology, Dokuz Eylül University Faculty of Medicine, Izmir, Turkey, <sup>2</sup>Department of Neuroscience, Institute of Health Sciences, Dokuz Eylül University Medical School, Izmir, Turkey

**Background and aims:** The Guillain-Barré syndrome (GBS) is a common, treatable, acute peripheral neuropathy that can produce imbalance. We evaluated the vestibular function in GBS patients order to find out if vestibular impairment could contribute to the imbalance.

**Methods:** We measured postural stability with a battery comprising the modified Clinical Test of Sensory Integration and Balance, the Berg Balance Scale, the Dynamic Gait Index, the Fall Efficiency Scale, and the International Cooperative Ataxia Rating Scale and semicircular canal (SCC) vestibular function in 11 GBS patients (7M/4F) by the video Head Impulse.

**Results:** Of the 11 patients, 8 had vestibular impairment, ranging from mild-affecting just a single SCC to severe - affecting all 6 canals. Although the severity of the vestibular impairment did not correlate either with the severity of the postural imbalance or of the peripheral neuropathy, our data show that vestibular impairment be an additional challenge to balance it some GBS patients.

**Conclusion:** Measuring SCC in GBS patients is easy with the video Head Impulse Test and can yield useful information for patient management.

**Disclosure:** Nothing to disclose

### EPO1267

#### Multifocal Motor Neuropathy secondary to infection by Rickettsia conorii.

G. Alvarez Bravo<sup>1</sup>, M. Puig Casadevall<sup>1</sup>, L. Sánchez Cirera<sup>1</sup>, D. López Domínguez<sup>1</sup>, A. Boix Lago<sup>1</sup>, M. Angerri Nadal<sup>2</sup>

<sup>1</sup>Neurology, Hospital Josep Trueta, Gerona, Spain, <sup>2</sup>Internal Medicine, University Hospital Josep Trueta, Gerona, Spain

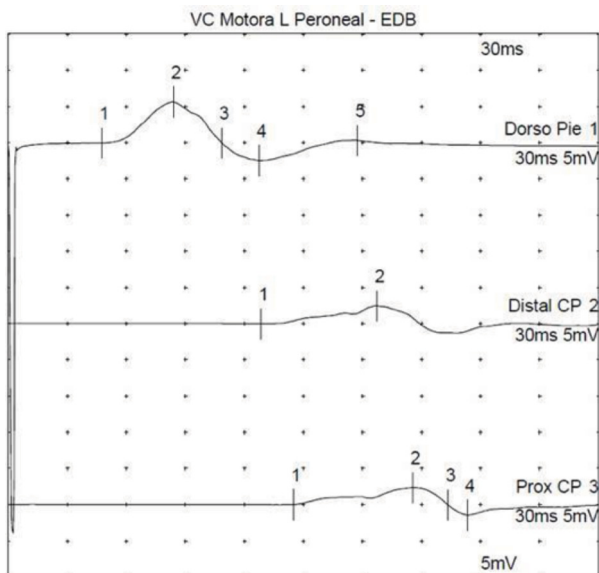
**Background and aims:** Mediterranean spotted fever caused by Rickettsia conorii (RC) is endemic in the Mediterranean countries. Typical clinical features include fever, myalgia, cervical lymphadenopathy, headache, generalized maculopapular rash and an inoculation eschar at the site of the tick bite. RC diagnosis is supported by positive IgM and fourfold increase of IgG. Neurological manifestations, mostly manifested as meningoencephalitis, have been reported in up to 28% of patients. Involvement of peripheral nervous system is considered extremely rare.

We are reporting a patient who developed tetraparesis secondary to a multifocal motor neuropathy secondary to infection by RC.

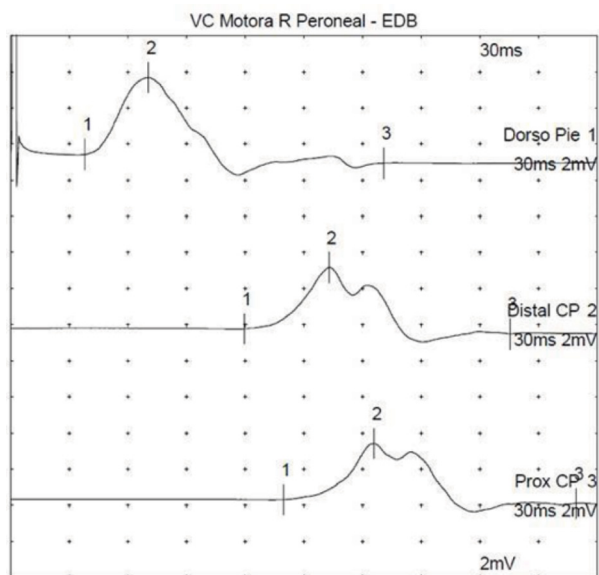
**Methods:** A 46-year-old man who came at our outpatient clinic due to generalized weakness accompanied by dysesthesias and progressive deterioration in walking in the last 5 days. 3 weeks earlier, the patient was bitten by a tick. The neurological examination showed asymmetrical distal quadriparesis with motor weakness of the feet and to a lesser degree in hands, arreflexia in lower limbs and hyporreflexia in upper limbs without sensory involvement. A eschar at the site of the bite was also observed.

Investigations included routine serological testing which was normal. Nerve conduction studies showed Multifocal Motor Neuropathy (MMN) with conduction blocks and IgM positive for RC was also obtained.

**Results:** Thanks to these findings, MMN secondary to infection by RC was diagnosed and doxycycline 200mg daily for 10 days was started. Over the next few weeks, the patient had a marked improvement in clinical and neurophysiological parameters.



Conduction blocks on peroneal nerve.



Improvement of motor nerve conduction on peroneal nerve after antibiotic treatment.

VC Sensitiva

Nervio / Lugares	Reg.	Latencia ms	Ampl. µV	Distancia mm	VC ms
L Median - vs Ulnar					
Dedo II	Med	3.20	16.5	170	63.1
Dedo V	Cub	2.90	8.1	140	48.3
R Radial					
Ant	Tab ana	2.20	26.1	110	50.0
L Sural - Mal Exter	Mal Lat	3.00	16.0	150	50.8
Sura	Mal Lat	2.15	14.3	130	60.5
R Superficial peroneal	Dorso pie	2.85	7.1	120	42.1
L Superficial peroneal	Dorso pie	2.50	10.8	125	49.0

VC Motora

Nervio / Lugares	Latencia ms	Ampl. mV	Dur. ms	Dist. cm	VC ms	Reg
R Median - Apb	4.45	6.7	7.70			APB
Muñeca	9.75	2.1	6.80	290	54.7	
Codo	13.10	2.1		240	71.6	
Ep	14.90	1.9	7.20			
L Median - Apb	4.00	7.3	8.65			APB
Muñeca	8.90	3.7	6.95	270	55.1	
Codo	12.50	3.5	6.50	240	69.7	
Ep	14.35	3.1				
R Ulnar - Adm	4.25	4.9	10.50			ADM
Muñeca	8.95	1.0	9.00	210	44.7	
Codo	10.80	0.8	8.30	180	72.7	
Ep	16.10	0.3	10.35			
L Ulnar - Adm	4.90	3.8	8.65			ADM
Muñeca	7.80	0.5	11.55			
Codo	8.80	0.4	12.75			
Ep	13.05	0.3	15.95			
Ep	16.55	0.2	17.85			
L Peroneal - EDB						EDB
Dorso Pie	4.75	6.7	6.10			
Distal CP	12.85	2.5		380	46.9	
Prox CP	14.50	2.4	7.85	190	60.9	
L Tibial						AH
Mal Int	8.20	1.2	10.65			
Hueso Popl	20.10	0.4	4.70	430	36.1	
R Tibial						AH
Mal Int	9.00	2.9	11.70			
Hueso Popl	20.85	0.3	11.65	430	38.3	

PRE TREATMENT

VC Sensitiva

Nervio / Lugares	Reg.	Latencia ms	Ampl. µV	Distancia cm	VC ms
R Medial - y Ulnar Dedos					
Dedo I	Mal	3.20	12.9	180	55.4
Dedo V	Mal	2.70	6.4	130	50.0
L Medial - y Ulnar Dedos					
Dedo I	Mal	3.10	14.3	180	51.4
Dedo V	Mal	2.65	5.4	140	52.8
R Radial					
Ant	Tab ana	2.30	36.7	120	52.2
L Radial					
Ant	Tab ana	2.30	33.9	120	52.2
L Sural - Mal Exter	Mal Lat	2.85	17.0	130	47.4
Sura	Mal Lat	2.35	16.5	120	53.3
R Superficial peroneal	Dorso pie	2.70	8.5	120	45.5
L Superficial peroneal	Dorso pie	2.70	7.9	130	48.1

VC Motora

Nervio / Lugares	Latencia ms	Ampl. mV	Dur. ms	Dist. cm	VC ms	Reg
R Medial - Apb	3.45	8.3	6.45			APB
Muñeca	8.90	3.8	11.90	280	50.6	
Codo	13.15	1.9	14.85	250	80.2	
Ep	15.65	2.0	15.85			
L Medial - Apb	3.65	11.4	10.45			APB
Muñeca	8.50	5.3	20.40	380	61.8	
Codo	13.05	4.4	20.85	250	54.0	
Ep	15.25	4.3	21.00			
R Ulnar - Adm	3.20	5.6	11.35			ADM
Muñeca	7.80	2.5	15.90	230	51.1	
Codo	10.35	2.5	14.20	120	47.1	
Ep	15.10	2.2	16.20	240	50.9	
Ep	17.65	2.0	14.30			
L Ulnar - Adm	3.15	6.0	20.90			ADM
Muñeca	7.40	2.3	24.10	220	51.8	
Codo	9.70	2.5	23.05	130	56.5	
Ep	13.90	2.1	28.95	220	52.4	
Ep	16.25	1.9	28.85			
R Peroneal - EDB						EDB
Dorso Pie	3.80	4.3	15.30			
Distal CP	11.95	3.4	13.90	390	47.9	
Prox CP	13.95	3.1	15.00	190	50.2	
L Peroneal - EDB						EDB
Dorso Pie	4.25	4.8	8.45			
Distal CP	11.75	3.8	9.80	370	49.3	

POST TREATMENT

Comparison table of motor conduction velocities.

**Conclusion:** MMN peripheral involvement, although rare, can occur as a complication of infection by *R. conorii*.

**Disclosure:** Nothing to disclose



## EPO1268

**Camptocormia as a presenting symptom of Myotonic Dystrophy Type 2: an overlooked cause of axial myopathy**

E. Angelopoulou, E.-S. Pyrgelis, G. Karadima, T. Zambelis, G. Koutsis, M. Rentzos, V. Zouvelou  
Neurology, Eginition University Hospital, Athens, Greece

**Background and aims:** Myotonic dystrophy type 2 (DM2) is an autosomal dominant multisystemic disorder most commonly presenting with proximal leg muscle weakness and myotonia between the 4-6th decade of life. Axial involvement and camptocormia are rare and misdiagnosis often occurs especially in the elderly.

**Methods:** Case-report

**Results:** A 83-year old man was admitted to the neurology department due to predominant progressive camptocormia, difficulty climbing stairs and arising from a chair over the last 10 years. His past medical history involved early-onset cataract, Wolff-Parkinson-White syndrome with atrial fibrillation, and arterial hypertension. His family history was negative regarding any neurological disorder. Physical and neurological examination revealed frontal balding, mild atrophy of temporalis muscles, camptocormia exacerbated upon walking, muscle weakness of neck flexors (4+/5 MRC), neck extensors (4/5 MRC) and hip flexors (4/5 MRC). Myotonic phenomenon was also elicited on the calf muscles. Biochemical analysis revealed mildly elevated creatine kinase levels without any other significant abnormalities. Nerve conduction studies showed mild sensorimotor axonal polyneuropathy, whereas electromyography demonstrated small amplitude, brief, polyphasic action potentials in biceps brachialis, deltoid, quadriceps, paraspinal and rectus abdomini muscles, with rare mild myotonic discharges in biceps brachialis and trapezius muscle. Clinical suspicion of DM2 was set based on clinical and electrophysiological findings. Genetic testing revealed a CCTG repeat expansion of the CNBP gene, confirming the clinical diagnosis.

**Conclusion:** We present an unusual elderly-onset DM2 case with prominent camptocormia, expanding the clinical spectrum and differential diagnosis of axial myopathies. Detailed electrophysiological testing is essential for the detection of myotonic disorders, while the appropriate genetic testing confirms the diagnosis.

**Disclosure:** Nothing to disclose

Table 2. RNFL and time from onset of MS

Years of disease	RNFL patients with ON	RNFL patients without ON	RNFL AO
<5 years (n=2+3)	91,83 ± 15,9	82,5 ± 14,8	88,1 ± 14,4
5-10 years (n=3+4)	77,5 ± 1,5	91,5 ± 3,9	85,5 ± 8,0
>10 years (n=7+5)	76,6 ± 7,6	88,3 ± 5,8	83,4 ± 8,7

## EPO1269

**Expanding the phenotype of p.R1460W mutation in SCN4A gene: a family report**

S. Cotti Piccinelli<sup>1</sup>, B. Risi<sup>2</sup>, E. Baldelli<sup>3</sup>, N. Necchini<sup>4</sup>, A. Galvagni<sup>5</sup>, A. Padovani<sup>6</sup>, M. Filosto<sup>7</sup>

<sup>1</sup>Darfo Boario Terme, Italy, <sup>2</sup>Department of Medicine and Surgery, University of Parma, PARMA, Italy, <sup>3</sup>Neurology, University Hospital Essen, Essen, Germany, <sup>4</sup>Neurology, ASST spedali civili of brescia, Brescia, Italy, <sup>5</sup>Unit of Neurology, University of Brescia, Brescia, Italy, <sup>6</sup>Clinical Neurology, Section for Neuromuscular Diseases and Neuropathies, Brescia, Italy, <sup>7</sup>BRESCIA, Italy

**Background and aims:** SCN4A gene encodes the  $\alpha$  subunit of the voltage-gated sodium channel. The homozygote LOF p.R1460W mutation has been described in a patient affected with myasthenic congenital myopathy at birth. Both heterozygote parents were asymptomatic, suggesting a recessive transmission.

**Methods:** We report a family complaining about muscle cramps and stiffness after physical activity. The brothers experienced episodes of periodic paralysis improved after potassium administration. Genetic analysis showed the heterozygote p.R1460W SCN4A mutation in all the siblings. Their asymptomatic mother showed no mutation, while the father was not tested because he died early. EMG study showed in the younger brother myopathic abnormalities and was normal in the other subjects. Muscle biopsy performed on the younger brother showed only mild non specific findings (fiber diameter variability and scattered atrophic fibers). The role of others genes involved in muscle channelopathies, such as CLCN1 and CACN, was excluded by performing NGS study.

**Results:** To our knowledge, this is the second family harbouring the p.R1460W variant in SCN4A reported in literature. However in our family this mutation appears to be inheritend in an autosomal dominant manner and associated with a new “hypoPP, muscle pain and cramps” phenotype. No signs of myasthenia were detected.

**Conclusion:** Our findings expand the phenotypical spectrum associated with the p.R1460W mutation in SCN4A, by reporting a novel phenotype and a novel inheritance pattern. Further investigation on related genes and epigenetic factors are mandatory in order to better define and understand the mechanisms underlying the variable clinical expression.

**Disclosure:** Nothing to disclose

## EPO1270

**Inclusion body myositis: presentation with asymptomatic hyperCKemia**

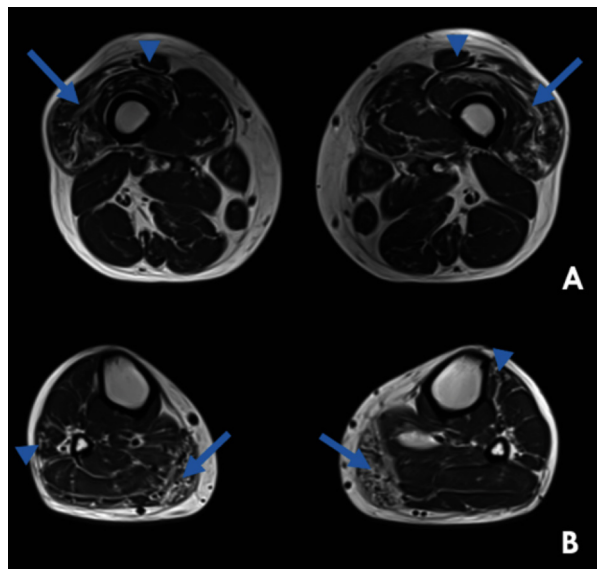
S. Delgado<sup>1</sup>, J. Peres<sup>1</sup>, R.V.F.R. Roque<sup>2</sup>, L. Santos<sup>3</sup>, P. Alves<sup>4</sup>, A. Valverde<sup>1</sup>, S. Cruz<sup>1</sup>

<sup>1</sup>Neurology Department, Hospital Prof. Doutor Fernando Fonseca, Amadora, Portugal, <sup>2</sup>Neuropathology Unit, Centro Hospitalar e Universitário de Lisboa Norte, Lisbon, Portugal, <sup>3</sup>Neuromuscular Disorders Clinic, Centro Hospitalar de Lisboa Ocidental, Lisbon, Portugal, <sup>4</sup>Radiology Department, Centro Hospitalar e Universitário de Lisboa Central, Lisbon, Portugal

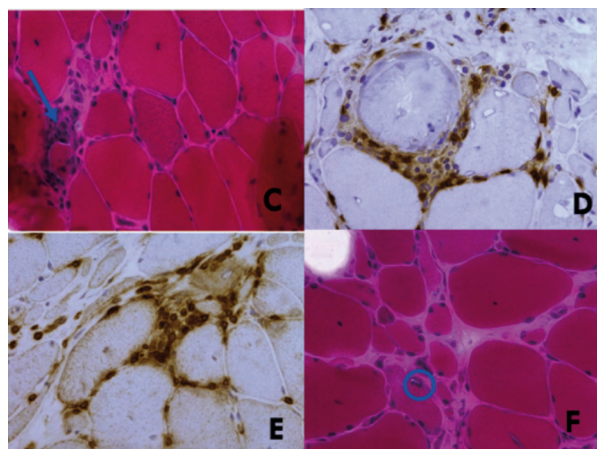
**Background and aims:** Sporadic Inclusion body myositis (sIBM) is a myopathy that usually presents with progressive muscle weakness in a characteristic anatomical distribution and is typically accompanied by normal or only slightly increased serum creatine kinase (CK).

**Methods:** Case report.

**Results:** Male of African descent with persistent asymptomatic CK elevation (maximum 1300IU/L) incidentally detected after an Acute Myocardial Infarction by the age of 63. At the time, neurological examination was unremarkable, and both EMG and deltoid biopsy were normal. Two years later he began experiencing mild muscle discomfort and, by the age of 71, weakness finally became apparent, with selective involvement of long finger flexors. Over the next 2 years, hand weakness progressed and leg weakness (plantar flexion and especially foot dorsiflexion) emerged. A 2<sup>nd</sup> EMG was performed, then showing myopathic changes in finger flexors and leg muscles, with abundant fibrillations. Lower limb MRI showed moderate fatty infiltration in vastus lateralis and medial gastrocnemius, and mild infiltration in tibialis anterior and peroneal muscles, with relative sparing of rectus femoris and posterior thigh. Accordingly, vastus lateralis was selected for a 2<sup>nd</sup> muscle biopsy and endomysial inflammatory infiltrates (predominantly CD8<sup>+</sup>) coexisting with rimmed vacuoles were found. Serum anti-cN1A antibody was positive, further supporting the diagnosis of sIBM.



Lower limb MRI: moderate fatty infiltration in vastus lateralis (A, arrow), and relative sparing of rectus femoris (A, arrowhead) and posterior thigh; moderate fatty infiltration of the medial gastrocnemius (B, arrow) and mild infiltration in tibialis anterior and peroneal muscles (B, arrowhead).



Vastus lateralis biopsy: endomysial inflammatory infiltrates (C, arrow), predominantly CD8<sup>+</sup> (D) T lymphocytes (E) and presence of rimmed vacuoles (F, circle).

**Conclusion:** We herein describe a case of sIBM presenting with asymptomatic hyperCKemia preceding in 8 years the onset of muscle weakness. This feature is probably very unusual but suggests that sIBM should be included among the differential diagnoses of asymptomatic hyperCKemia above the age of 50 years.

**Disclosure:** Nothing to disclose

EPO1271

## Anti-NXP2-Antibody Positive Late Onset Pompe Disease Misdiagnosed as Polymyositis

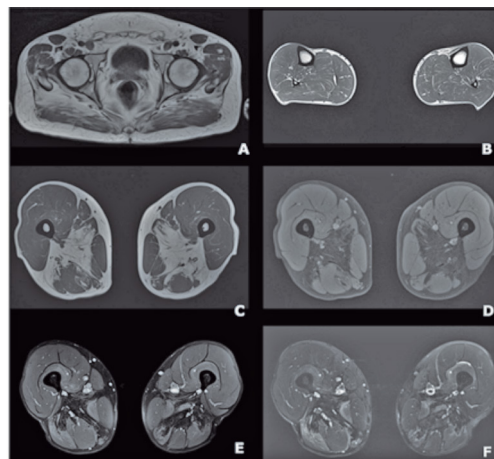
A. Farina<sup>1</sup>, S. Casagrande<sup>1</sup>, G. Ricci<sup>2</sup>, G. Comi<sup>3</sup>, G. Siciliano<sup>4</sup>, L. Massacesi<sup>5</sup>, A. Barilaro<sup>6</sup>

<sup>1</sup>Florence, Italy, <sup>2</sup>Department of Clinical and Experimental Medicine, University of Pisa, Pisa, Italy, <sup>3</sup>Milan, Italy, <sup>4</sup>Department of Clinical and Experimental Medicine, University of Pisa, Pisa, Italy, <sup>5</sup>University of Florence, Florence, Italy, <sup>6</sup>Department of Neuroscience, Careggi Hospital, Florence, Italy

**Background and aims:** Pompe Disease (PD) is caused by lysosomal acid-alfa glucosidase (AAG) deficiency. A partial reduction of enzyme activity results in a late-onset form of the disease mainly consisting of proximal myopathy and elevated creatine kinase (CK) levels, which it may be confused with inflammatory myopathies.

**Methods:** Male, 54-year-old, with a previous diagnosis of polymyositis supported by progressive proximal limb weakness, elevated CK and serum anti-nuclear matrix protein 2 (antiNXP2) antibodies. Despite of treatments with steroids, azathioprine, intravenous immunoglobulin and rituximab, he had continued to suffer from muscle pain and limb weakness.

**Results:** From the clinical history some red flags for a diagnosis of polymyositis emerged: asymptomatic hyper-CK-emia since the age of 30, the absence of spontaneous activity or insertion irritability at electromyography, atrophy and fatty infiltration without no major inflammatory changes of bilateral glutei, adductors and biceps femoris at muscle MRI (fig. 1). Neurological examination showed bilateral weakness of biceps femoris (MRC 4/5) and iliopsoas (MRC 4+/5) without atrophy, fasciculations or myotonia. Laboratory test confirmed elevated serum CK levels (650Iu/L) and high titer of antiNXP2 antibodies. Diagnosis was reconsidered and additional tests were planned. EMG showed myopathic abnormalities, particularly in biceps femoris and paraspinal muscles. Enzymatic tests showed reduction of AAG activity and the diagnosis was confirmed by genetic test. The patient started AAG replacement therapy with reduction of muscle pain and CK levels normalization.



**Fig. 1. Muscle MRI: Spin Echo T1 (A, B, C); T1 with fat sat after contrast enhancement (D); T1 with fat sat after contrast enhancement (E); STIR (F). Fatty infiltration can be seen in glutei (A), adductor muscles and biceps femoris (C,D). Mild-moderate STIR hyperintensity (F) without contrast enhancement (E) can be seen in both biceps femoris (right>left) and right adductors. Muscles of legs (B) appeared to be spared.**

**Conclusion:** PD screening for AAG deficiency should be recommended in cases of inflammatory myopathies refractory to immune therapies, particularly when some red flags of better explanation are present.

**Disclosure:** Nothing to disclose

## EPO1272

### How do patients with cervical dystonia (CD) experience their Botulinum Neurotoxin Type A (BoNT-A) treatment cycle: results from an international online survey

J.J. Ferreira<sup>1</sup>, C. Comella<sup>2</sup>, M. Azoulay<sup>3</sup>, E. Pain<sup>3</sup>, S. Om<sup>4</sup>  
<sup>1</sup>Instituto de Medicina Molecular, Faculdade de Medicina, Universidade de Lisboa, Lisbon, Portugal, <sup>2</sup>Department of Neurology, Rush University Medical Center, Chicago, IL, USA, <sup>3</sup>Carenity, Paris, France, <sup>4</sup>Medical Affairs, Ipsen Pharma, Boulogne-Billancourt, France

**Background and aims:** BoNT-A is established as CD gold standard treatment. However, BoNT-A injection effects last around 3-4 months and CD symptoms usually recur at the end of a treatment cycle. The aim of this study is to better understand patients' experience of the waning of BoNT-A effects.

**Methods:** An Internet-based survey was conducted through Carenity, an online patient community, from May to September 2019 in France, Germany, Italy, UK and USA. Adult patients with CD who had received ≥2 previous BoNT-A injections and were currently treated with BoNT-A or had stopped in the last 12 months were eligible.

**Results:** 209 respondents (80.9% women, mean age 49.7 years) answered the questionnaire. Motor/non-motor symptoms and conditions related to CD experienced by those patients in the past 12 months are listed in Table 1. 87.6% experienced the reappearance of CD-related symptoms between 2 BoNT-A injections. Pain (84.2%) was the most reported recurring symptom. Waning of BoNT-A effect started on average 73.6 days after BoNT-A injection. The intensity of CD-related symptoms was rated between 2.6-3.1/10 at maximum BoNT-A effect (0=no symptom; 10=very strong symptom), 5.4-5.8/10 when effects started to wear off, and 7.1-8.0/10 at 1 day before next injection (Table 2). The impact of CD on patients' Quality of Life (QoL) evolved similarly (Table 3). Many patients reported that recurring symptoms affected their comfort (66.4%) and efficiency (65.6%) at work.

Motor/non-motor symptoms and CD-related conditions most experienced*	Overall (N=209)
<b>Motor symptoms; n (%)</b>	
Neck pain or other related pain	179 (85.7)
Muscle spasms	149 (71.3)
Abnormal positioning of the head/neck	145 (69.4)
Involuntary movement of head or shoulder	133 (63.6)
Loss of head range of motion	120 (57.4)
<b>Non-motor symptoms and CD-related conditions; n (%)</b>	
Difficulty at work	113 (54.1)
Fatigue	111 (53.1)
Mood disorders	108 (51.7)
Sleep disorders	106 (50.7)

\*symptoms and conditions with frequencies >50%.

Table 1: Motor/non-motor symptoms and conditions most experienced by patients in the past 12 months\*

	Intensity of the symptoms reappearing between two sessions of BoNT-A injections (N=183)		
	At peak treatment effect	When pre-existing symptoms start reappearing	1 day before next BoNT-A injection
Neck pain or other related pain (n=154)	2.6	5.4	7.8
Involuntary movement of head or shoulder (n=126)	2.8	5.6	7.9
Muscle spasms (n=120)	2.8	5.6	8.0
Abnormal positioning of the head/neck (n=118)	2.9	5.6	7.8
Loss of head range of motion (n=108)	3.1	5.8	7.9
Tremors (n=84)	2.9	5.6	7.5
Shoulder elevation (n=80)	2.9	5.4	7.1

\*mean scores out of 10: 0=no symptom, 10=very strong symptom.

Table 2: Patients' perception of the intensity of the symptoms reappearing between two sessions of BoNT-A injections\*

	Impact of the symptoms reappearing between two sessions of BoNT-A injections (N=183)		
	At peak treatment effect	When pre-existing symptoms start reappearing	1 day before next BoNT-A injection
Ability to work	2.7	5.1	7.0
Ability to have social interactions	2.5	5.0	6.8
Ability to drive	2.5	4.6	6.3
Sleep disturbance	2.2	4.4	6.3
Ability to perform daily tasks	2.1	4.4	6.3

\*mean scores out of 10: 0=no symptom, 10=very strong symptom.

Table 3: Patients' perception of the impact of the symptoms reappearing between two sessions of BoNT-A injections on QoL\*

**Conclusion:** The waning of BoNT-A effects between treatment cycles has a negative impact on patients' CD related symptoms and on overall QoL and professional life.  
**Disclosure:** Ipsen Pharma funded the study

## EPO1273

**Exome sequencing: mutilating sensory neuropathy with spastic paraplegia due a mutation in the FAM134B gene**S. Wakil<sup>1</sup>, J. Finsterer<sup>2</sup><sup>1</sup> Department of Genetics, King Faisal Specialist Hospital and Research Centre, Riyadh, Riadh, Saudi Arabia, <sup>2</sup>Vienna, Austria

**Background and aims:** Hereditary sensory and autonomic neuropathies (HSANs) are a clinically and genetically heterogeneous group of disorders involving various sensory and autonomic dysfunctions. The most common symptoms of HSANs include loss of sensations of pain and temperature that frequently lead to chronic ulcerations in the feet and hands of the patient.

**Methods:** Case report

**Results:** In this case study, we present the clinical features and genetic characteristics of 2 affected individuals from 2 unrelated Saudi families presenting mutilating sensory loss and spastic paraplegia. We employed homozygosity mapping and exome sequencing which is an efficient strategy to characterize the recessive genes, thus obtaining a rapid molecular diagnosis for genetically heterogeneous disorders like HSAN. Subsequently, a nonsense mutation (c.926 C>G; p.S309\*) in FAM134B was identified. In addition, we confirmed that the mutant FAM134B transcripts were reduced in these patients presumably disrupting the receptors of the degradative endoplasmic reticulum pathways that facilitate the autophagy processes

**Conclusion:** We describe the second family with HSAN-II associated with HSP due to the mutation p.S309X in the FAM134A gene. However the pathogenetic role of FAM134A in sensory neuropathy with spastic paraplegia remains largely unknown and this study expands the phenotypic heterogeneity caused due to variants in FAM134A.

**Disclosure:** Nothing to disclose

## EPO1274

**Suboptimal Control of Generalized Myasthenia revealed by implementation of systematic follow-up in a French-Canadian Community neurology practice**

A. Gagnon

Gatineau Quebec, Canada

**Background and aims:** Little is published on actual management of generalized myasthenia in community practice. According to a recently published American registry, 7% of myasthenic patients are refractory and experiencing worse scores on MG-15-item Quality of Life (MG-QOL-15).

**Methods:** From 19-10-24 to 19-12-20, 16 consecutive patients from Western Quebec coming for regular follow-up with the author, were asked to complete both a MG-Activities of Daily Living (MG-ADL) and MG-QOL-15 instrument. The author, his nurse, and his EMG technician completed Quantitative Myasthenia Gravis score (QMG), Myasthenia Gravis Foundation of America Clinical Classification (MGFA), spirometry and dynamometry.

**Results:** Almost all scales were successively completed. Eleven patients were AARA positive on a standard essay (69%). 14 were using 2nd line treatment of therapy and 12 (75%) were on continuous IVIg, plasmapheresis or rituximab. 2 are MGFA=4. The mean MG-ADL is 5.5 (7 equal or more than 6), MG-QOL-15 is 11.1 (6 equal or more than 15), QMG is 7.3 (7 equal or more than 10). 5 (31.3%) correspond to the definition of refractory generalized myasthenia and would be eligible for the phase-3 REGAIN study on eculizumab. Another is currently seronegative and less than 12 months of duration. Qol-15 and QMG are worse in refractory patients.

**Conclusion:** Implementation of a systematic follow-up is feasible in an out-of-hospital community neurology practice. Many of the author's patients remain negatively impacted despite following current clinical care guidelines. According to American Registry definition, about one third of patients are refractory, and would fulfill criteria for the REGAIN Study.

**Disclosure:** Nothing to disclose

## EPO1275

### A benchmarking audit of the pre-diagnosis pathway in patients with Duchenne muscular dystrophy

V. Gowda<sup>1</sup>, M. Prasad<sup>2</sup>, A.-M. Childs<sup>3</sup>, I. Hughes<sup>4</sup>, S. Tirupathi<sup>5</sup>, C. Degoede<sup>6</sup>, D. O’rourke<sup>7</sup>, D. Parasuraman<sup>8</sup>, T. Willis<sup>9</sup>, S. Saberian<sup>10</sup>, I. Davidson<sup>11</sup>

<sup>1</sup>Evelina Children’s Hospital, London, United Kingdom,

<sup>2</sup>Queens Medical Centre, Nottingham, United Kingdom,

<sup>3</sup>Leeds Teaching Hospitals, Leeds, United Kingdom, <sup>4</sup>Royal

Manchester Children’s Hospital, Manchester, United

Kingdom, <sup>5</sup>Belfast, Ireland, <sup>6</sup>Royal Preston Hospital,

Preston, United Kingdom, <sup>7</sup>Temple Street Children’s

University Hospital, Dublin, Dublin, United Kingdom,

<sup>8</sup>University Hospitals Birmingham NHS Foundation Trust,

Birmingham, United Kingdom, <sup>9</sup>The Robert Jones and Agnes

Hunt Orthopaedic Hospital NHS Foundation Trust,

Oswestry, United Kingdom, <sup>10</sup>OPEN VIE, London, United

Kingdom, <sup>11</sup>PTC Therapeutics, Guildford, United Kingdom

**Background and aims:** Duchenne muscular dystrophy (DMD) is a genetic disorder causing progressive muscle weakness, cardio-respiratory impairment and early death. Early diagnosis is key to proactive treatment. This audit aimed to understand the patient pathway to diagnosis and identify opportunities for timeline improvement.

**Methods:** A multi-centre audit of 9 centres in the United Kingdom & Ireland. Eligible patients were those with a definitive diagnosis of DMD (based on molecular genetics /muscle biopsy) ≤3 years prior to December 2018. Retrospective data were collected from patients’ medical records.

**Results:** A total of 122 eligible patients were included (1 antenatal diagnosis). A family history of DMD was recorded in 21% (26/122) of patients. The mean age (months) at; a) symptom onset (observed by parents) was 36.4 (n=66, standard deviation [SD] 26.8); b) 1st healthcare professional (HCP) engagement for DMD symptoms was 49.9 (SD=28.9, n=106); c) 1st serum creatine kinase test was 53.8 (SD=30.1, n=97); and d) definitive diagnosis was 53.9 (SD=29.7, n=120). The mean time (months) from 1st symptom onset to first HCP engagement was 19.0 (SD=22.7, n=62); and 4.4 (SD=8.1, n=106) from 1st HCP engagement to definitive diagnosis.

Table 1 shows the distribution of documented motor (n=106) and non-motor (n=57) symptoms.

Table 1. Distribution of symptoms recorded in patient notes<sup>1</sup>

Motor Symptoms	n	% (n=106) <sup>2</sup>
Gross motor delay	58	55%
Gowers’ sign on rising from floor	54	51%
Calf pseudohypertrophy	52	49%
Difficulty climbing stairs	50	47%
Difficulty running or climbing	44	42%
Abnormal gait	40	38%
Frequent falling or clumsiness	38	36%
Inability to keep up with peers	36	34%
Decreased endurance	26	25%
Inability to jump	22	21%
Muscle pain or cramping	22	21%
Toe walking	19	18%
Hypotonia	14	13%
Flat feet	6	6%
Decreased head control when pulled to sit	3	3%
Loss of motor skills	3	3%
Other	17	16%
Non-Motor Symptoms	n	% (n=57) <sup>3</sup>
Speech delay or articulation difficulties	42	74%
Learning and attentional issues	27	47%
Cognitive Delay	19	33%
Behavioural issues	14	25%
Failure to thrive/Poor weight gain	3	5%
Other	8	14%

<sup>1</sup> Not mutually exclusive as may have presented with more than one symptom

<sup>2</sup> Percentages have been derived from number of patients who had at least one motor symptom recorded

<sup>3</sup> Percentages have been derived from number of patients who had at least one non-motor symptom recorded

Table 1- Distribution of symptoms recorded in patient notes

**Conclusion:** Whilst the time from first HCP engagement to definitive diagnosis appeared shorter compared to a previously published audit, there may still be delays from onset of symptoms to 1st engagement with HCP and subsequent diagnosis, which need to be further explored.

**Disclosure:** Financial support for the series of service evaluations reported in this project was provided by PTC Therapeutics.

## EPO1276

**Diagnostic yield of muscle biopsies in pediatric population**

S. Grenho Rodrigues<sup>1</sup>, D. Silva<sup>2</sup>, M. Machado<sup>3</sup>, R. Roque<sup>2</sup>

<sup>1</sup>Neurology, Hospital da Luz de Lisboa, Lisbon, Portugal, <sup>2</sup>Neurolog Department, CHLN, Lisbon, Portugal, <sup>3</sup>Neurology, Centro Hospitalar Universitário Lisboa Central, Lisbon, Portugal

**Background and aims:** Despite the advances in neuromuscular pathologies diagnosis, muscle biopsy remains a valuable tool for the evaluation of these patients. Nevertheless, data regarding diagnostic yield can be disappointing, with a minority of procedures providing a definite diagnosis. We aimed to analyze the diagnostic yield in a tertiary center in Lisbon, in the pediatric population.

**Methods:** We performed a retrospective analysis from the muscle biopsy database of a neuropathology laboratory to identify patients (<18 years old), submitted to muscle biopsy between January 2015 and August 2019. Demographics, clinical suspicion, biopsy reports, and follow-up were evaluated.

**Results:** We included 106 patients, 52.8% (n=56) were male. Median age at biopsy was 8 years (IQI 3, 14). The clinical suspicions were mitochondrial (n=31), congenital (n=9), inflammatory (n=8) and metabolic myopathies (n=4), muscular dystrophies (n=6), hyperCKemia (n=7), weakness/other neuromuscular symptoms (n=29) and multiple suspicions (n=12). Muscle biopsies showed alterations in 52.9% patients (n=56), 48.2% (n=27) of which providing specific diagnostic features, and the remaining showing unspecific myopathic alterations. In 47.2% (n=50), biopsies were normal. Concerning the cases with specific diagnostic features, 88.9% (n=24) provided a definite diagnosis, 18.5% (n=5) patients had a change in diagnosis and 4 patients had a change on treatment. Median follow-up was 1 year (IQI 0.3).

**Conclusion:** In this cohort, muscle biopsy provided a definite diagnosis in 22.6%. Although this number is low, biopsies presented alterations in 52.9% and still helped narrowing differential diagnosis, confirming myopathic alterations or lead to a therapeutic change.

**Disclosure:** Nothing to disclose

## EPO1277

**The safety of enzyme replacement therapy during pregnancy and lactation in Pompe disease- a longitudinal follow up**

Z. Grosz<sup>1</sup>, L. Javor<sup>2</sup>, J.M. Molnár<sup>3</sup>

<sup>1</sup>Semmelweis University, Institute of Genomic Medicine and Rare Disorders, Budapest, Hungary, <sup>2</sup>Neurology, Petz Aladár Egyetemi Oktatókórház, Győr, Hungary, <sup>3</sup>Institute of Genomic Medicine and Rare Disorders, Semmelweis University, Budapest, Hungary

**Background and aims:** It is a generally accepted practice in the medical society throughout the world to avoid any medication during pregnancy unless it is necessary for the protection of fetus. Although, when it comes to the headline what impact different kind of medication may have on the development of fetus or child post partum, we face a little amount of knowledge. In these cases most of the time only animal and in vitro studies are available we can rely on. Pompe disease is a rare genetically determined lysosomal storage disease treatable with enzyme replacement therapy (ERT) since 2006. Though, until recent time only one case report is known on the safety of ERT in Pompe disease during pregnancy. Our aim was to contribute additional information on the safety of ERT during pregnancy.

**Methods:** We have performed a longitudinal follow up of 2 pregnancies where mothers have received ERT to Pompe disease. Regular check-ups including effect and safety of ERT treatment was evaluated before, during and afterward of pregnancies both for mothers and children.

**Results:** Both ERT treated mothers featured a stable disease course throughout the pregnancy. The development of fetus and children after delivery was normal during the follow up. 2 children received breastfeeding for 22 months combined while receiving ERT.

**Conclusion:** The continuation of alglucosidase alfa for the treatment of Pompe disease was safe during pregnancy and lactation. Neither mother nor fetus have shown any side effects. The limited data available suggest that treatment of alglucosidase alfa can be continued during pregnancy and lactation.

**Disclosure:** Nothing to disclose

## EPO1278

**Diaphragm ultrasound in neuromuscular disease (NMD) patients**

V. Haliyeuskaya<sup>1</sup>, M.Y. Chernenko<sup>2</sup>, S.A. Likhachev<sup>1</sup>, Y. Rushkevich<sup>1</sup>

<sup>1</sup>Minsk, Belarus, <sup>2</sup>Ultrasound diagnostics Department, Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus

**Background and aims:** Respiratory failure is 1 of the main causes of death in NMD. Detection of the diaphragm dysfunction using ultrasound may be a diagnostic possibility of reveal respiratory failure at the early stages. To examine the diaphragm function in NMD patients using ultrasound

**Methods:** Ultrasound was performed on 34 subjects (16 patients with NMD—the main group, 18 healthy volunteers – the control); 13(38%) men, 21(62%) women; age Me49[34;60]years. NMD-9 myasthenia gravis patients and 7 motor neuron disease patients without signs respiratory failure. Research was carried on the HD11XE(Philips) device using sensors of linear and convexy formats with a frequency 5-12 and 2-5MHz along the midclavicular line symmetrically from 2sides in the patient's supine position.

**Results:** In NMD the diaphragm dysfunction was detected. Decrease of the diaphragm movement amplitude during quiet breathing in NMD was revealed: on the right NMD/control Me0.86 [0.75;1.14]cm/1.24 [1.03;1.58]cm (U, p=0.011), on the left Me0.985 [0.685;1.26]cm/1.225 [1.08;1.82]cm (U, p=0.017). The decrease of the diaphragm movement amplitude during deep breathing in NMD: on the right Me3.305 [1.91;5.04]cm/4.885 [3.98;6.37]cm (U, p=0.015), on the left Me3.82 [2.995;4.635]cm/4.69 [4.11;5.81]cm (U, p=0.011). When studying the thickness of the diaphragm during quiet breathing and the thickening ratio difference was not found: U, p=0.772 and U, p=0.088 accordingly.

**Conclusion:** Statistically significant decrease in the diaphragm movement amplitude during quiet and deep breathing was revealed in the main group while ultrasound, that indicates significant diaphragm dysfunction in NMD

**Disclosure:** Nothing to disclose

## EPO1279

**Nocturnal sleep in myasthenia gravis (MG) patients**

V. Haliyeuskaya<sup>1</sup>, N. Chechik<sup>2</sup>, T. Hvishch<sup>1</sup>, N. Viarenich<sup>1</sup>, S.A. Likhachev<sup>1</sup>, Y. Rushkevich<sup>1</sup>

<sup>1</sup>Minsk, Belarus, <sup>2</sup>Presidents Hospital, Minsk, Belarus

**Background and aims:** Sleep related disorders are more common among MG patients than in general population that leads not only to a decrease in the quality of sleep and life, but also worsen the course of the disease. Identification of these violations allows planning the care for MG patients. Aim. To examine the features of nocturnal sleep in MG patients using polysomnography (PSG).

**Methods:** PSG was performed on 56 subjects (35 MG patients - the main group, 21 healthy volunteers - the control group). MG: 8 patients with ocular form, 27 with generalized (12 with bulbar dysfunction, 15 without it). The groups corresponded by gender ( $\chi^2$ , p=0.120), age—Me57[44;66] years/43 [41;57] years (U, p=0.051), BMI—Me26.2 [23;29.7]/24.2 [22.9;27.1] (U, p=0.156). Research was carried on the SOMNOlabV2.19 system (Weinmann, Germany).

**Results:** We revealed specific features of nocturnal sleep in MG. Reducing the total cycle time at MG: MG/control Me0.18[0.15;0.21]h/ 0.22[0.18;0.24]h (U, p=0.035). Reduced sleep efficiency at MG: Me83.1 [73.8; 88.3]%/89.4 [81.7;91.5]% (U, p=0.009). Increased arousals at MG: Me16.9 [11.7;25.7]%/ 10.2 [8.5;18.2]% (U, p=0.009). Reduced REM stage at MG: Me14.5 [9.8;20.8]%/ 19.5 [17.5;24.3]% (U, p=0.011). When studying S1-S4 stages difference was not found (U, p>0.05).

**Conclusion:** Statistically significant decrease in the total cycle time and sleep efficiency, reduction of the REM, increase of arousals was revealed in the main group. The results indicate fragmentation of sleep, violation of its structure, decrease in the quality of sleep in MG.

**Disclosure:** Nothing to disclose



## Neuroimaging 1

### EPO1280

#### Superficial siderosis of central nervous system associated with parkinsonism: a case report

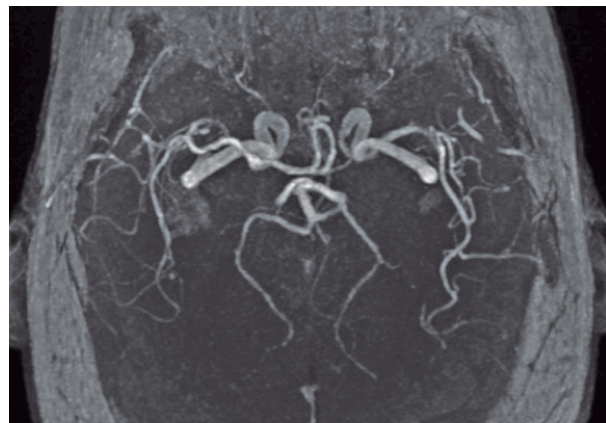
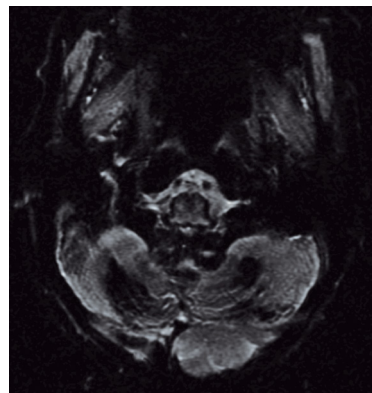
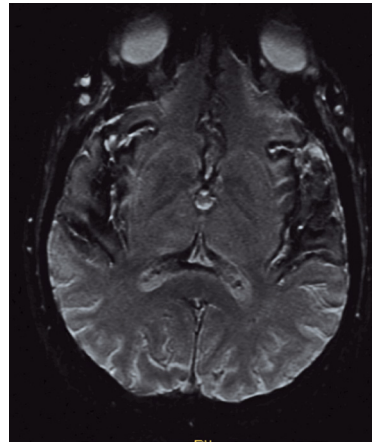
J.I. Albornoz Mena<sup>1</sup>, F.A. Santajuliana Rebechi<sup>2</sup>,  
L. Tschopp<sup>3</sup>, S. Fariña<sup>1</sup>, W. Toledo<sup>4</sup>, G. Povedano<sup>2</sup>,  
A. Maggi Larentis<sup>5</sup>

<sup>1</sup>Buenos Aires, Argentina, <sup>2</sup>Neurology, Churruca Hospital, Buenos Aires, Argentina, <sup>3</sup>Hospital Churruca-Visca, Buenos Aires, Argentina, <sup>4</sup>Caba, Argentina, <sup>5</sup>Radiology, Churruca Hospital, Buenos Aires, Argentina

**Background and aims:** Superficial siderosis of central nervous system (SS-CNS) is a rare disease that results from toxic accumulation of hemosiderin on the surface of the brain and spinal cord. The most common causes of SS-CNS are aneurysm, trauma, tumor, and arteriovenous malformation. Although in most cases, there is no obvious source of bleeding. We present an atypical case of SS-CNS associated to parkinsonism.

**Methods:** A 79-year-old woman with a 5-year history of hypothyroidism, cognitive impairment and progressive hypoacusia. On the physical examination she presented a cephalic horizontal tremor, oromandibular dyskinesia, rigidity and bradykinesia in both upper and lower limbs, mild axial rigidity. She began treatment with levodopa/carbidopa with partial response. The patient died 3 months later due to sepsis.

**Results:** Brain MRI showed hypointense images in gradient-echo sequence in subarachnoid spaces, predominantly localized on both temporal lobes, affecting the emergency of both VIII cranial nerves, cerebellar vermis and cerebellar folia. The appearance of the substantia nigra was normal. Intracranial MRI angiography showed no significant findings. Spinal cord MRI showed hemosiderin deposits, predominantly on cervical segments. There were no signs of hepatic or cardiac iron deposits.



**Conclusion:** SS-CNS is an infrequent entity. Cognitive deterioration must be suspected in patients with neurosensorial hypoacusia and cerebellar ataxia. We suggest that in our case that SS-CNS with generalized injuries of the central nervous system might be associated with parkinsonism. The patient presented some improvement after dopaminergic therapy. This association has only been shown once in the literature.

**Disclosure:** Nothing to disclose

## EPO1281

**The role of magnetic resonance imaging in positive and etiological diagnosis in laminar cortical necrosis**

F. Aziouaz, M. Yassine

*Neurology, CHU Mohammed VI oujda, Oujda, Morocco*

**Background and aims:** Laminar cortical necrosis is neuronal ischemia associated with glial reaction. It occurs following cerebral hypoxia. Cerebral magnetic resonance imaging (MRI) is the key examination: establishes the diagnosis, focuses on the etiology and assesses the evolution of the lesions thereafter. The objective of our study is to analyze the clinical profile of our patients, to clarify the role of cerebral MRI in the positive diagnosis and lesional assessment of laminar cortical necrosis and to describe the main etiological forms.

**Methods:** This is a retrospective study on the medical file of 18 patients, collected in the neurology department of the Mohammed VI CHU of Oujda, during a period from January 2015 to december 2019.

**Results:** The average age of our patients was 29 years old with a sex ratio (M/F) of 2. The reasons for admission were various, dominated by disorders of consciousness (44%), status epilepticus 33% and neurological deficit 16%. Encephalic MRI allowed positive diagnosis of all patients. Etiological reasoning was based on a bundle of clinical, radiological, biological and evolutionary arguments. MRI data were highly suggestive of etiological diagnosis in 66% of patients. The etiologies were polymorphic, with the predominance of herpetic meningo-encephalitis which accounted for 27% followed by status epilepticus in 22%. Other causes were: hypoglycemia, Gayet Wernicke encephalopathy, toxic origin, hypoxic encephalopathy and ischemic strokes.

**Conclusion:** Laminar cortical necrosis can complicate any situation of cerebral hypoxia. Their etiological diagnosis remains difficult. The clinical context and the brain MRI are the 2 keys in the diagnostic approach of this pathology.

**Disclosure:** Nothing to disclose

## EPO1282

**Cerebral hemosiderosis is a rare cause of cerebellar ataxia**M. Ben Hmidene<sup>1</sup>, I. Bedoui<sup>1</sup>, M. Messelmani<sup>2</sup>, M. Mansour<sup>1</sup>, A. Riahi<sup>3</sup>, H. Derbali<sup>1</sup>, B. Ines<sup>1</sup>, J. Zaouali<sup>1</sup>, R. Mrissa<sup>4</sup>*<sup>1</sup>Neurology department, Military Hospital of Tunis, Tunis, Tunisia, <sup>2</sup>Department of neurology, Military Hospital, Tunis, Tunisia, <sup>3</sup>Tunis, Tunisia, <sup>4</sup>Neurology, Military Hospital, Tunis, Tunisia*

**Background and aims:** Cerebral hemosiderosis is a rare cause of cerebellar ataxia. We report a case of CH presenting with instability.

**Methods:** cas report of cerebellar ataxia secondary to Cerebral hemosiderosis i

**Results:** A 53-year-old male, with a past history of subarachnoid hemorrhage presented rapidly progressive hearing and vision loss for 2 years, who was admitted with gait disturbances progressing over the previous 15 months. Neurological examination showed cerebellar and ataxia associated with deafness and reduced visual acuity. Cerebral MRI revealed T2\* hyposignal edging extending to the surface of the brain stem, cerebellar and cerebral parenchyma in relation to hemosiderin deposits. The patient was undergone fer chelator and intravenous corticosteroids, stability was obtained.

**Conclusion:** Cerebral hemosiderosis should be considered in patient with Cerebellar ataxia specially if there is a past history of subarachnoid hemorrhage

**Disclosure:** Nothing to disclose

## EPO1283

**3-D High Resolutional MR-Protocol in pharmacoresistant epilepsy patients.**

O. Bronov<sup>1</sup>, A. Marinets<sup>1</sup>, O. Karpov<sup>1</sup>, A. Zuev<sup>1</sup>, Y. Filippov<sup>1</sup>, M. Bronova<sup>2</sup>, N. Pedyash<sup>1</sup>, N. Utyashev<sup>1</sup>  
<sup>1</sup>Radiology, Pirogov's National Medical-Surgical Center, Moscow, Russian Federation, <sup>2</sup>Svt. Luka Institute of Child Neurology and Epilepsy, Moscow, Russian Federation

**Background and aims:** According to the recommendations of ILAE, MRI is obligate in most of epilepsy patients. For more detailed imaging, high-resolution MR sequences have been developed, but even using the recommended dedicated protocols (ex. HARNESS-MRI) comprehensive assessment of brain changes can be challenging due to the loss of the quality when multiplanar reconstructions used. Loss of the quality of examination during movement of the patient is another reason.

**Aim:** To show the advantages of high-resolution 3D MR-protocol in patients with pharmacoresistant epilepsy using general anesthesia.

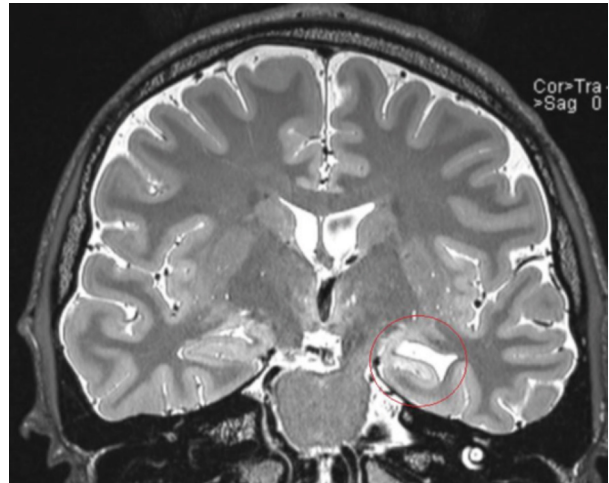
**Methods:** All patients have been examined using 3T MR scanner (Siemens Magnetom Skyra) with T2 3D sequence (isotropic voxel 0.6x0.6x0.6mm), T1 3D sequence (0.8x0.8x0.8mm), T2 Flair (1.0x1.0x1.0mm). Additional 2D/3D sequences (PD, SWI, T1-IR, ASL) were made.

All examinations were performed using general anesthesia.

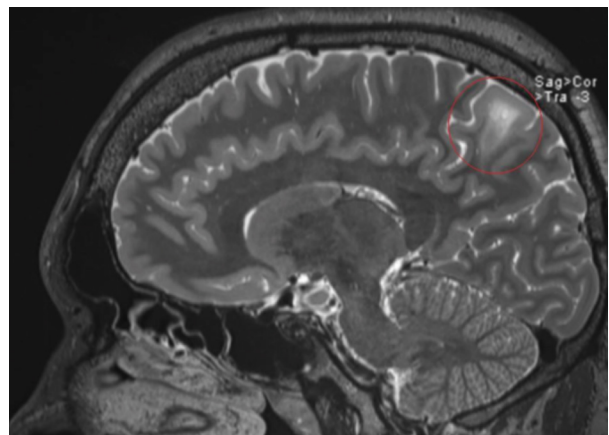
**Results:** Total number of 235 patients were included in the study. FCDs were detected in 28% (66 patients), heterotopy of the grey matter in 6% (14), mesial temporal sclerosis in 29% (68). DNET and other tumors 8% (19). Posttraumatic or postischemic changes - 25% (59), encephalocele - 4% (9).



T2 WI. Ganglioglioma (axial plane reconstruction)



T2-WI. Mesial Temporal Sclerosis (coronal plane reconstruction)



T2-WI. DNET (sagittal plane reconstruction)

**Conclusion:** Detection rate of epileptogenic foci using high-resolution 3D sequences increased in comparison with 2D MR-protocol. Analysis of highly detailed images and possibility of multiplanar reconstructions allows to determine the possible cause of epilepsy in a more precise way. Use of general anesthesia almost completely excludes motion artifacts, as well as virtually eliminates the development of an epileptic seizure during the examination.

**Disclosure:** Nothing to disclose

## EPO1284

### Idiopathic ventral spinal cord herniation: a cause of invisible myelopathy on magnetic resonance

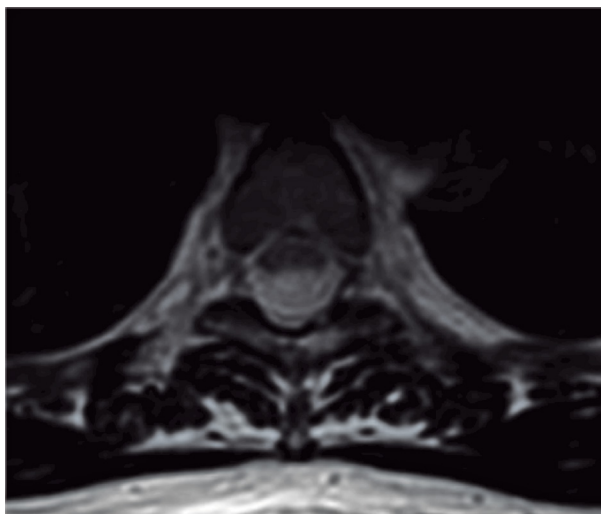
A. Celdrán de Castro García<sup>1</sup>, F. Rodríguez Jorge<sup>1</sup>,  
J. Gómez Corral<sup>1</sup>, R. Sainz Amo<sup>1</sup>, B. Baena Álvarez<sup>1</sup>,  
N. García Barragán<sup>2</sup>, F.J. Buisan Catevilla<sup>1</sup>

<sup>1</sup>Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain, <sup>2</sup>Neurology, Hospital Ramón y Cajal, Madrid, Spain

**Background and aims:** Idiopathic spinal cord herniation (ISCH) is an exceptional entity, possibly related with embryonic development and potential cause of myelopathy. In the literature there are barely 200 cases described. Brown-Sequard Syndrome or progressive paraparesis with or without sphincter dysfunction, are the main presentations. It seems to constantly affect thoracic segments between D4 and D8. There is a preponderance of female sex, with an average duration of symptoms up to diagnosis from 2 months to years.

**Methods:** Case study

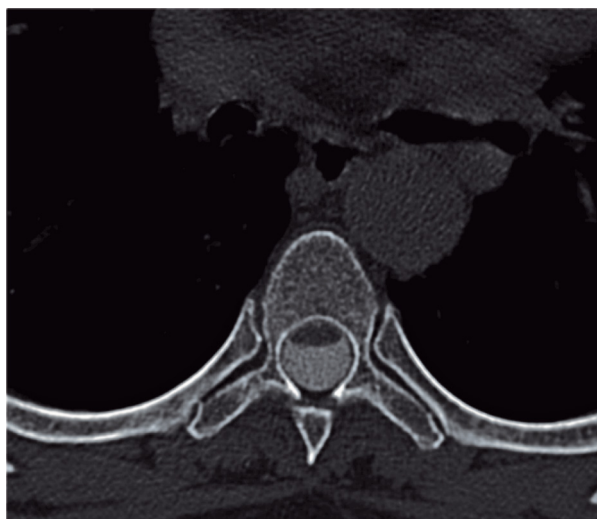
**Results:** 67-year-old woman with a history of goiter and urinary incontinence, goes to neurology consultation due 6 month duration left submammary pain, without other symptoms (including zoster clinic). The examination highlighted a left hemihypoesthesia with a D4-D5 sensory level and generalized hyperreflexia. A thoracic MRI showed an anterior displacement of the spinal cord at the level of D4-D5. To perform the differential diagnosis between posterior arachnoid cyst or an anterior dural defect, a myeloTC was performed, confirming the 2nd option and establishing the diagnosis of ISCH. Conservative management was decided in consensus with Neurosurgery.



Initial magnetic resonance



ISCH in sagittal section



ISCH in axial section

**Conclusion:** Although uncommon, ISCH is an entity to consider in the differential diagnosis of myelopathy. Its diagnostic difficulty by MRI makes necessary to perform myeloTC when the index of suspicion is high. Our case was atypical because of the indolent clinical presentation. Concerning treatment, it is not established, there is a potential risk of spinal injury despite the apparent benignity.  
**Disclosure:** Nothing to disclose

## EPO1285

**High value (2000s/mm<sup>2</sup>) DWI MRI findings in TGA: a prospective study**

S. Chatzikonstantinou<sup>1</sup>, M.E. Karantali<sup>1</sup>, T. Geroukis<sup>2</sup>, A. Kalfountzou<sup>1</sup>, G. Konstantinidis<sup>1</sup>, A. Prevezianou<sup>3</sup>, A.P.O. Argiropoulou-Raka<sup>1</sup>, A.P.D. Kazis<sup>1</sup>

<sup>1</sup>3<sup>rd</sup> Neurology Department, Aristotle University of Thessaloniki (AUTH), Thessaloniki, Greece, <sup>2</sup>Radiology Department, General Hospital "G.Papanikolaou", Thessaloniki, Greece, <sup>3</sup>3<sup>rd</sup> Neurological Department, Aristotle University of Thessaloniki, Thessaloniki, Greece

**Background and aims:** Transient global amnesia (TGA) is a clinical syndrome characterized by the sudden onset of anterograde amnesia, lasting up to 24 hours, without compromise of other neurologic functions. Vascular, epileptic and migrainous events have been proposed as responsible pathophysiologic mechanisms. Early brain MRI (48-72h from onset) may reveal focal diffusion-weighted imaging (DWI) hippocampal hyperintensities, which may be reversible.

**Methods:** To assess the efficacy of high value DWI MRI in the early phase of TGA, and compare these findings with follow-up brain imaging.

**Results:** 15 patients were included (male/females:4/11). The mean age was 65 years [SD±4.4]. Diagnostic work-up included brain MRI, EEG, clinical and neurocognitive examination. Mean time from TGA onset to MRI was 3 days [SD±2.5]. A follow-up MRI was conducted 34 days after baseline MRI[IQR:28,55]. High value DWI MRI was normal in 2 patients, and in 2 revealed hippocampal sulcus remnant cysts. Bilateral high 2000-DWI hyperintense hippocampal lesions were noted in 2 patients. A unilateral left hippocampal lesion was depicted in 5, and a right in 4. 1000-DWI MRI revealed hyperintense hippocampal lesions only in 4/13 patients, while in 1/4 additional lesions were revealed in the 2000-DWI MRI. In all cases, the follow-up 2000-DWI MRI revealed no findings. No follow-up brain imaging was conducted in the patients where hippocampal remnant cysts were found.

**Conclusion:** The majority of our patients revealed high signal lesions in high value DWI MRI conducted in the early phase of TGA, which disappeared in the follow-up neuroimaging. Our study further supports the theory of transient vascular disturbance.

**Disclosure:** Nothing to disclose

## EPO1286

**Imaging the human brain at the nanoscale level with STochastic Optical Reconstruction Microscopy (STORM)**

P. Codron<sup>1</sup>, J. Cassereau<sup>2</sup>, A. Chevrollier<sup>3</sup>

<sup>1</sup>ANGERS, France, <sup>2</sup>Service des Explorations fonctionnelles de Neurologie, CHU d'Angers, ANGERS, France, <sup>3</sup>Laboratoire Mitolab, Inserm u1083, CNRS umr6015, Institut de Biologie en Santé, Angers, Angers, France

**Background and aims:** For many years, the diffraction barrier (~250nm) remained a resolution limit for conventional light microscopes, hindering the precise characterization of subcellular brain structures. Recently, a microscopy technique named STochastic Optical Reconstruction Microscopy (STORM) overcame this limit, increasing resolution towards the nanometre scale (~20-50nm). However, to date, STORM has mainly been used to image cultured cells, while no experiment on human cortex has been performed so far. In this work, we combined super resolution microscopy and neuropathological techniques to perform STORM on human brain samples from control subjects and patients with neurodegenerative disorders.

**Methods:** Cryopreserved post-mortem brain samples were immunostained and placed on the stage of an inverted microscope Eclipse Ti-E (Nikon Instruments) equipped with a CFI SR APO TIRF 100X ON1.49 objective, a total internal reflection fluorescence ILas2 module (Roper Scientific) and a single-photon sensitive Evolve 128TM EMCCD camera (Photometrics). Acquisition of images were proceeded using Metamorph 7.7 software (Molecular Devices). More than 300 STORM images have been acquired and analysed.

**Results:** Physiological brain structures such as axons, myelin sheaths and synapses were imaged in control samples with a nanometre-scale precision. Aβ, Tau, α-synuclein and TDP-43 pathological aggregates were also imaged with unprecedented details in brain sections from patients affected with neurodegenerative disorders.

**Conclusion:** These very 1st super-resolution STORM images of physiological and pathological brain structures open further gates to a more comprehensive understanding of the human brain organization and revelations about the underlying mechanisms responsible for common neurological diseases.

**Disclosure:** This work was supported by the University Hospital of Angers (Grant N° 2019-264 900\_036), the French National Institute for Health and Medical Research (INSERM Research Fellow 2017–2019), and the European Regional Development Fund (ERDF).

## EPO1287

### Dopamine transporter imaging in corticobasal syndrome patients with or without underlying Alzheimer's disease pathology.

V. Constantinides, E. Kapaki, F. Boufidou, M. Bourbouli, L. Stefanis, G. Paraskevas  
<sup>1</sup>st Department of Neurology, National and Kapodistrian University of Athens, Athens, Greece

**Background and aims:** Corticobasal syndrome (CBS) is characterized by primarily asymmetrical parkinsonism, myoclonus, dystonia, apraxia and alien limb phenomena. Alzheimer's disease (AD) can underlie CBS. The aim of this study was to investigate dopamine transporter imaging status in CBS patients with or without AD underlying pathology (CBS-AD vs. CBS-non-AD).

**Methods:** All patients included were examined at our Clinic from 2011 to 2019. All patients fulfilled clinical diagnostic criteria for possible or probable CBS. Dopamine transporter imaging (DaT-scan) and classical CSF biomarker data were available in all patients. CSF beta-amyloid (A $\beta$ 42), total tau ( $\tau$ T) and phosphorylated tau at threonine 181 ( $\tau$ P-181) were used to establish an in vivo AD diagnosis. All CSF analyses were performed by commercially available enzyme-linked immunosorbent assay kits (ELISAs). Patients were characterized as CBS-AD according to the AT(N) classification system. DaT-scans were characterized as normal or abnormal according to qualitative image analysis and semi-quantitative binding specific indices (BSIs) of basal ganglia.

**Results:** A total of 18 CBS patients had CSF-biomarker and DaT-scan data available. 7 patients (39%) had a CSF-AD profile and 11 patients (61%) had a CSF-non-AD profile. 5 of the 11 CBS-non-AD patients (45.5%) had a normal DaT-scan. 1 of the 7 CBS-AD patients (14.3%) had an abnormal DaT-scan.

**Conclusion:** Pathological dopamine transporter imaging is indicative of non-AD pathology in CBS patients. A pathological DaT-scan was highly specific (86%) but lacked sensitivity (55%) for a non-AD diagnosis in CBS.

**Disclosure:** Nothing to disclose

## EPO1288

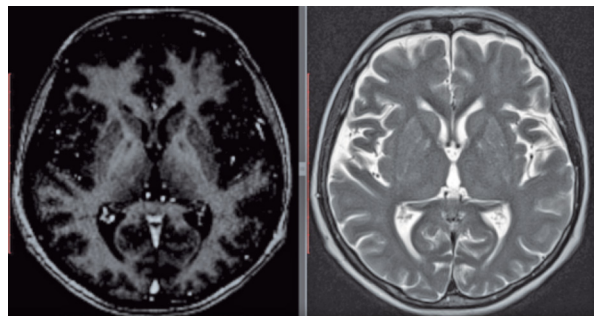
### T1 reverse eye-of-the-tiger in chronic acquired hepatocerebral degeneration

L. Cozma<sup>1</sup>, N. Dima<sup>2</sup>, D. Tulbă<sup>1</sup>, A. Lefter<sup>2</sup>, I. Olaru<sup>1</sup>, A. Danau<sup>2</sup>, B.O. Popescu<sup>3</sup>

<sup>1</sup>Department of Clinical Neurosciences, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania, <sup>2</sup>Department of Neurology, Colentina Clinical Hospital, Bucharest, Romania, <sup>3</sup>Laboratory of Ultrastructural Pathology, "Victor Babeş" National Institute of Pathology, Bucharest, Romania

**Background and aims:** Chronic acquired hepatocerebral degeneration (CHAD) is a rare complication of liver cirrhosis responsible for a complex movement disorder with particular MRI lesions.

**Methods:** A 59-year-old female with a history of cirrhosis secondary to chronic hepatitis B and C and multiple episodes of hepatic encephalopathy presented to our clinic for upper limb tremor, imbalance and slowness of movements gradually developed in the last year. Clinical examination revealed bilateral symmetrical parkinsonian syndrome, trunk and limb ataxia, action tremor, slight chorea and dystonic posturing of the hands with isolated myoclonic jerks. She also presented striking synkinesis of the contralateral hand and jaw, brisk tendon reflexes and cognitive impairment. Brain MRI revealed increased T1 signal bilaterally in the globus pallidus with central T1-hypointense/T2-hyperintense lesions suggesting central gliosis. There was also marked increase in T2/FLAIR signal of the pyramidal tract in the internal capsule. Workup for Wilson's disease was negative whereas serum manganese levels were highly increased.



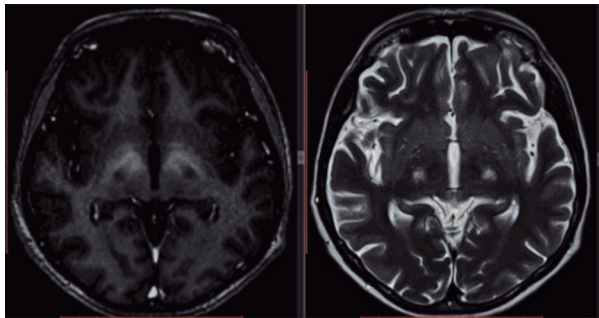
Brain MRI. Left - axial T1W-imaging showing increased signal bilaterally in the globus pallidus with central hypointensity. Right - axial T2W-imaging showing small T2 hyperintensity in the globus pallidus bilaterally.

Brain MRI. Left - axial T1W-imaging showing increased signal in the cerebral peduncles with hypointensity of the pyramidal tracts. Right - axial T2W-imaging showing increased signal of the pyramidal tracts.

**Results:** The complex clinical picture in the presence of cirrhosis with T1-hyperintensity of the globus pallidus and high serum manganese indicate CHAD. T1-hyperintensity of the globus pallidus is highly characteristic for CHAD, but MRI lesions suggestive of central gliosis have not been reported. This particular feature is similar to the eye-of-the-tiger sign commonly described on T2W-imaging in neurodegeneration with brain iron accumulation, but in this case the sign is seen on T1W-imaging with a reversed signal intensity.

**Conclusion:** We describe lesions of the basal ganglia in a patient with CHAD with a particular MRI pattern of a T1 reverse eye-of-the-tiger.

**Disclosure:** Nothing to disclose



## EPO1289

### Carotid Distensibility evaluation on a cohort of hypertensive patients.

R. Dias<sup>1</sup>, A. Monteiro<sup>2</sup>, C. Ferreira<sup>1</sup>, G. Pereira<sup>1</sup>, P. Castro<sup>1</sup>, J. Polonia<sup>3</sup>, E. Azevedo<sup>1</sup>

<sup>1</sup>Department of Neurology, Hospital de São João - Porto, Porto, Portugal, <sup>2</sup>Neurology, Hospital Pedro Hispano EPE, Matosinhos, Portugal, <sup>3</sup>HTA and Cardiovascular Risk Unit, Hospital Pedro Hispano EPE, Matosinhos, Portugal

**Background and aims:** Cerebrovascular risk factors are associated with progressive stiffness and reduction of arterial wall distensibility in the pre-symptomatic phase. These can be noninvasively assessed through carotid ultrasound. We evaluated the intima-media thickness (IMT) and distensibility indexes, namely Carotid Arterial Strain (CAS), Arterial Compliance (AC), arterial distensibility (AD), Stiffness Index (SI), Pressure-strain modulus (PSM) and Young Elastic Modulus (YEM), in a cohort of chronic hypertensive patients.

**Methods:** Supine B-mode carotid ultrasound IMT was recorded in the right common carotid artery, according to Mannheim criteria. Videos of the same arterial section were obtained for at least 5 complete cardiac cycles. Supine blood pressure was measured. We analysed the correlation between distensibility, IMT and clinical-demographic variables.

**Results:** We evaluated 46 patients, aged 63±11 years old. IMT did not significantly correlate with distensibility indexes except the SI (Rho Spearman (rs)=0.341, p=0.020), but showed a positive correlation with age (rs=0.425, p=0.003). On the other hand, most distensibility parameters (AC, YEM and PSM) did not correlate with age but rather with systolic blood pressure (AC: rs=-0.435, p=0.003; YEM: rs=0.373, p=0.011; PSM: rs=0.412, p=0.004). AD, in turn, correlated with both systolic blood pressure (rs=-0.338, p=0.021) and age (rs=-0.453, p=0.002).

**Conclusion:** IMT is significantly influenced by age. However, distensibility indexes appear to correlate with systolic blood pressure, regardless of normal vascular aging. Distensibility parameters obtained by carotid ultrasound seem promising for studying different pathophysiological aspects of early vascular disease.

**Disclosure:** Nothing to disclose

## EPO1290

**Peak width of skeletonized mean diffusivity (PSMD) is linked to cognition in relapsing-remitting MS**

A. Giorgio<sup>1</sup>, C. Vinciguerra<sup>2</sup>, J. Zhang<sup>3</sup>,  
R. Tappa Brocci<sup>1</sup>, V. Nardone<sup>4</sup>, L. Pasto<sup>5</sup>, C. Niccolai<sup>5</sup>,  
M.L. Stromillo<sup>1</sup>,

M. Mortilla<sup>6</sup>, M.P. Amato<sup>7</sup>, N. De Stefano<sup>2</sup>

<sup>1</sup>University of Siena, Siena, Italy, <sup>2</sup>Siena, Italy,

<sup>3</sup>Department of Medicine, Surgery and Neuroscience,  
University of Siena, Siena, Italy, <sup>4</sup>Ospedale del Mare,  
Naples, Italy, <sup>5</sup>University of Florence, Florence, Italy,

<sup>6</sup>Anna Meyer Children's University Hospital, Florence, Italy,

<sup>7</sup>Florence, Italy

**Background and aims:** Peak width of skeletonized mean diffusivity (PSMD) is a novel MRI biomarker of altered white matter (WM) microstructure, which has showed in cerebral small vessels diseases a significant association with reduced information processing speed.

We aimed here to investigate, in a group of relapsing-remitting multiple sclerosis (RR MS) patients, the relationship between PSMD and cognitive performances, in comparison with other MRI measures

**Methods:** RR MS patients (n=60, age: 42.5±10 years, 76.7% female, median EDSS: 1 [range 1-3], cognitive impairment in 36.7%) and age-matched normal controls (NC, n=15, age: 42±10 years, 46.7% female) underwent a 3T MRI examination. WM lesion volume and brain volumes (brain, grey matter [GM] and WM) were computed. PSMD was obtained through "skeletonization" of WM tracts and diffusion histograms. Cognition was assessed in MS with Rao's Brief Repeatable Battery (BRB).

**Results:** As expected, all MRI measures of MS were different from NC (p<0.001), including PSMD (4.2±1.3 in MS vs 2.9±0.6 x 10<sup>-4</sup> mm<sup>2</sup>/s in NC, p<0.001). In RRMS, in general MRI measures variably correlated with BRB cognitive tests, with the closest correlation found between higher PSMD and lower symbol digit modalities test (SDMT, r=-0.70, p<0.001). On multiple regression analysis, PSMD contributed to the SDMT variance more than other MRI measures (R<sup>2</sup>= 0.54, p<0.001).

**Conclusion:** In RR MS, PSMD explained the SDMT performance better than other MRI measures, confirming the great relevance of this novel MRI biomarker in predicting information processing speed dysfunction in MS.

**Disclosure:** Nothing to disclose

## EPO1291

**Patients' understanding of incidental findings and brain magnetic resonance imaging: a mixed-methods study involving people with cognitive symptoms**

S. Glasmacher<sup>1</sup>, F. Brown<sup>1</sup>, L. Stirland<sup>2</sup>, T. Wilkinson<sup>3</sup>,  
G. Holloway<sup>4</sup>, S. Pal<sup>1</sup>

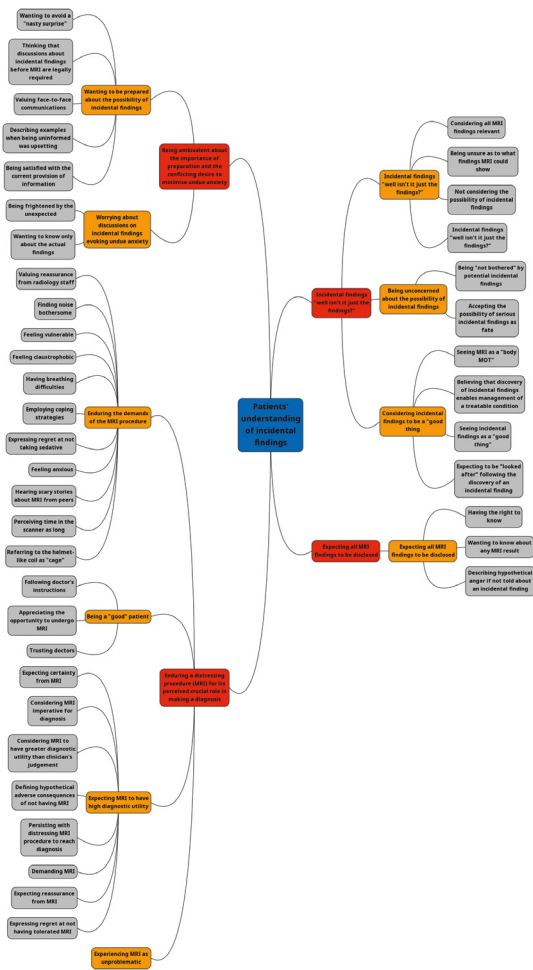
<sup>1</sup>Anne Rowling Regenerative Neurology Clinic, University of Edinburgh, Edinburgh, United Kingdom, <sup>2</sup>Division of Psychiatry, University of Edinburgh, Edinburgh, United Kingdom, <sup>3</sup>Edinburgh, , <sup>4</sup>Psychiatry, University of Edinburgh, Edinburgh, United Kingdom

**Background and aims:** Incidental findings are common in neuroimaging for investigation of cognitive symptoms, particularly brain magnetic resonance imaging (MRI). Understanding of incidental findings among people with cognitive symptoms has not been explored in the literature. Our objective was to examine patients' understanding of incidental findings and the role of brain MRI in diagnosing a cognitive disorder, their preferences regarding the disclosure of incidental findings and their views regarding discussions on the risk of incidental findings prior to imaging.

**Methods:** We conducted in-depth semi-structured interviews with purposefully selected patients attending a cognitive disorders clinic. Questionnaires comprising Likert-style and multiple-choice questions were also administered. Patients with a significant incidental finding were excluded. Analysis was based on constructivist grounded theory.

**Results:** 15 patients were interviewed of whom 7 had a diagnosis of dementia. 7 participants were awaiting brain MRI and 8 had undergone brain MRI prior to interview. 4 theoretical codes emerged from the analysis: incidental findings "well isn't it just the findings", being ambivalent about the importance of preparation and the conflicting desire to minimise undue anxiety, expecting all MRI findings to be disclosed, and enduring a distressing procedure (MRI) for its perceived crucial role in making a diagnosis.





Mindmap of coding structures. Theoretical codes are coloured in red, focussed codes in yellow and initial codes in grey.

Question	Question type and scoring	Result
How well informed did you feel about the process of undergoing a brain scan before your scan?	Likert: 1-10 where 10 indicates "very well informed"	Median: 9 (IQR 7-9)
How important do you feel a brain scan is in securing a diagnosis?	Likert: 1-10 where 10 indicates "very important"	Median: 10 (IQR 9-10)
How should future patients attending the clinic be informed about brain scans and incidental findings?	Multiple choice: (Participants can choose more than one option) Discussion with healthcare staff Information leaflet Information video Interactive website Smartphone app There is no need to inform future patients about MRI and incidental findings Other (please state)	Discussion (n=12) Information leaflet (n=8) Information video (n=3) Interactive website (n=1) Smartphone app (n=1)
How would you rate the amount of detail you received about incidental findings during the consultation? <sup>1</sup>	Multiple choice: Just right Not enough detail Too much detail	Just right (n=7) Not enough detail (n=0) Too much detail (n=0)
Your brain scan did not identify an incidental finding - this is a hypothetical question: If your brain scan had identified an incidental finding, would you have wanted this information disclosed to you? A) A harmless incidental finding that does not require follow-up or treatment B) An incidental finding that is unlikely to cause problems but for which regular clinic appointments for observation are recommended C) An incidental finding that could have an impact on life expectancy and/or quality of life but is treatable D) An incidental finding that has an impact on life expectancy and/or quality of life but that is NOT treatable.	Multiple choice: I would want to know I am not sure if I would want to know I would NOT want to know	A-D: I would want to know (n=6) I am not sure: I would want to know (n=0) I would NOT want to know (n=0)

Table 2. IQR: interquartile range. <sup>1</sup> Only participants with whom the risk of incidental findings was discussed during the consultation were asked this question (n=7). <sup>2</sup> Only participants who had successfully undergone brain MRI were asked this question (n=7), one participant did not complete the questionnaire but participated in the interview.

Table 1. Participants' answers to quantitative questions.

**Conclusion:** It is helpful to define the term incidental finding and to outline the role of brain MRI alongside clinical history and cognitive testing. Our findings could facilitate discussions between clinicians and patients with cognitive symptoms regarding the risk of incidental findings and the role of brain MRI in diagnosing a cognitive disorder.

**Disclosure:** Nothing to disclose

# EPO1292

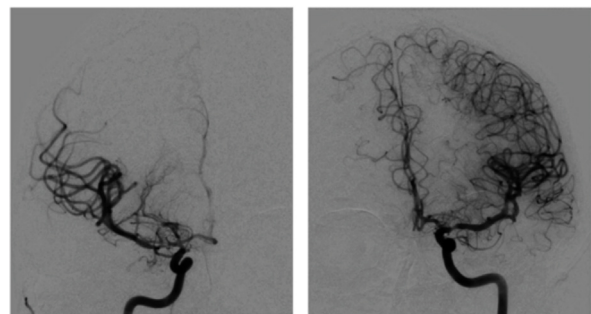
## Transient ischemic attack in a 29-year-old male might be a smoke ball

E. Gómez López<sup>1</sup>, B. Palazon Cabanes<sup>2</sup>, A.M. García Medina<sup>1</sup>, I. Pellicer Espinosa<sup>1</sup>, E. Marin Conesa<sup>1</sup>, M. Martínez Zarco<sup>1</sup>, N. García Lax<sup>3</sup>, M. Morales de la Prida<sup>2</sup>, B. García-Villalba Navaridas<sup>2</sup>, A. Ocete Ocete<sup>2</sup>, F.J. Pareja Herrero<sup>4</sup>, J. Marin Marin<sup>1</sup>, J.M. Rodríguez García<sup>1</sup>, J.A. Iniesta Valera<sup>1</sup>

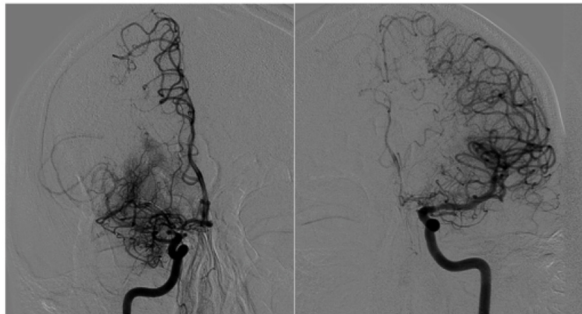
<sup>1</sup>Neurology, Hospital General Universitario Reina Sofia, Murcia, Spain, <sup>2</sup>Hospital Clínico Universitario Virgen de la Arrixaca, Murcia, Spain, <sup>3</sup>Murcia, Spain, <sup>4</sup>Neurology, Hospital Universitario de Gran Canaria Doctor Negrin, Las Palmas de Gran Canaria, Spain

**Background and aims:** Moyamoya disease (MMD) is a chronic progressive cerebrovascular disease characterized by bilateral stenosis with prominent arterial collateral circulation. It can cause ischemic and hemorrhagic strokes. **Methods:** 29-year-old male patient with DM and consumer of THC. This patient had an abrupt and self-limited episode of loss of strength in the upper right limb with further disorientation and confusion. A CT scan was performed in which multiple lesions were observed in the right MCA territory.

**Results:** MRI multiple hyperintense lesions in cortical and subcortical T2 made us think as differential diagnosis ischemic vs demyelinating. Cerebrospinal fluid analysis: growth of Streptococcus alactolyticus in bacterial culture. In CT brain angiography, a decretase in size of the M1 segment of right MCA and ACA was observed. We performed an arteriography that informed us of stenotic-occlusive non-atheromatous vasculopathy in intracranial segments of both ICA compatible with MMD. After a year of this dx we made a new arteriography and see a progression in intracranial stenosis and now we are arguing different options with neurosurgery for this young man.



Significant stenosis of both intracranial ICA: segment M1 and A1 of the right side and a very significant slowdown of hemispheric filling. Moderate stenosis of the origin of the M1 segment of the left MCA. Significant stenosis of the origin of segment A1 of the left ACA on which the filling of both ACAs depends.



Progression of the terminal RICA stenosis, showing occlusion of the M1 with the formation of a Moya-Moya arteriolar-arteriolar type. Progression of the stenosis at the origin of the left A1 that presents a filiform flow and compensation from a Moya-Moya arteriolar-arteriolar network from lenticulostriates arteries of the left MCA.

**Conclusion:** This case leads us to make a broad differential diagnosis of TIA. We must take into account diseases such as vasculitis and MMD of the CNS when we see ischemic lesions in a young patient. In a review of the literature, articles with MMD secondary to pneumococcal meningitis have been found, so we cannot be sure if the Streptococcus found in the CSF culture has a triggering role in our case. However, MMD treatment is unfortunate in most cases.

**Disclosure:** Nothing to disclose

## EPO1293

### Volumetric study of subcortical structures in motor neuron disease and dystonia

I. Goursky<sup>1</sup>, S. Likhachev<sup>1</sup>, Y. Rushkevich<sup>1</sup>,  
T. Charnukha<sup>2</sup>, S. Fursa<sup>3</sup>

<sup>1</sup>Department of Neurology, Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus, <sup>2</sup>Neurological department №3, Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus, <sup>3</sup>Department of Neuroradiology, Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus

**Background and aims:** Recent studies indicate a widespread involvement of different CNS structures in MND and dystonia. In our previous works on volumetric studies, we have found that in dystonia the volumes of right thalamus and right cerebellar cortex were significantly lower compared to controls; in MND we demonstrated decrease in the volume of thalami.

**Aim:** to study volumes of subcortical structures in patients with MND and dystonia.

**Methods:** We studied volume of subcortical structures in a group of 29 MND patients, 55[51;64] years old (Me [25%; 75%]), 2 with PLS, 8 with bulbar onset ALS, 19 with spinal onset ALS; in 32 dystonia patients, 54[46;60.25] years old; and in 76 control subjects without focal MRI lesions or neurological signs, 44[32;57.25] years old. Structural MRI was acquired using isotropic T1 sequence, and segmented using FreeSurfer software. We measured and analyzed volumes of cerebellar white matter and cortex, thalami, caudate nuclei, putamina, globi pallidi, brain stem.

**Results:** We revealed significant difference between the groups for volumes of thalami (U,  $p < 0.001$ ), volumes being less in the MND and dystonia groups, and for the brain stem in dystonia (U,  $p = 0.004$ ), volume being less in dystonia.

Structure	Control, mm <sup>3</sup>	MND, mm <sup>3</sup>	p-value	Dystonia, mm <sup>3</sup>	p-value
Left thalamus	7632.9[6992.2; 8326.5]	6994.6[6571.3; 7356.0]	0.00014	6754.0[6380.5; 7391.0]	0.00009
Right thalamus	7332.7[6729.6; 8079.7]	6746.0[6380.1; 7048.6]	0.00011	6542.7[6064.0; 7089.0]	0.00006
Brainstem	21296.1[19591.8; 22446.8]	20812.1[17850.4; 22805.5]	0.13879	19286.4[18118.0; 21104.6]	0.00448

Volumes of thalamus and brainstem in MND, dystonia, and control group; respective Mann-Whitney (1-tailed) p-values when comparing MND and dystonia groups to control.

**Conclusion:** Results of this research confirm our previous results on the involvement of the thalamus in MND. In dystonia, we confirm decrease in thalamic volume, but with more subjects we can not confirm decrease in cerebellar cortex volume. Volume of brain stem in dystonia is, probably, decreased, but this result needs further investigation.

**Disclosure:** Nothing to disclose

## EPO1294

**The importance of MRI tractography in the examination of adult patients with cerebral palsy**

K. Komshina

*Nizhny Novgorod, Russian Federation*

**Background and aims:** The aim of the study is to determine the peculiarities of microstructural changes in the white matter pathways of the brain in adult patients with cerebral palsy using diffusion tensor magnetic resonance imaging (DT-MRI) and tractography and to make a comparison between the clinical picture and the MRI examination data.

**Methods:** 50 adult patients with cerebral palsy were examined. All the patients underwent magnetic resonance imaging of the brain (structural, diffuse tensor with tractography). Functional anisotropy and average diffusion coefficient (FA and ADC) were obtained in the symmetric regions of the cerebral hemispheres.

**Results:** There was a slight decrease in functional anisotropy and an increase in the average diffusion coefficient along the corticospinal tract on the side opposite to the paresis in patients with spastic hemiparesis. FA was found to reduce in the cerebral cortex along the corticospinal tract and in thalamus along the spinothalamic tract. ADC was the highest in thalamus throughout the sensory tracts. FA and ADC of the spinothalamic pathways had a correlation with the level of GMFCS. Throughout the sensory pathways ADC and FA were higher in cerebral palsy patients with pain syndrome compared to cerebral palsy patients without pain syndrome.

**Conclusion:** These microstructural changes determined clinical manifestations in cerebral palsy and could be used in the dynamic observation of patients and determining the level of functioning. The level of functioning will allow to classify cerebral palsy patients, prescribe a rehabilitation complex according to their condition, which is important for both clinical practice and science.

**Disclosure:** Nothing to disclose

## EPO1295

**Clinical and radiological characteristics of reversible splenial lesion syndrome**S. Lee<sup>1</sup>, S.-Y. Bae<sup>2</sup>*<sup>1</sup>Daegu, Korea, Republic of, <sup>2</sup>Neurology, Daegu Fatima Hospital, Daegu, Korea, Republic of*

**Background and aims:** Reversible splenial lesion syndrome (RELES) is a reversible syndrome involving the splenium of the corpus callosum (SCC) and subcortical white matter. Etiology of RELES is diverse, including infectious disease, seizures, antiepileptic drug (AED) withdrawal, high altitude cerebral edema (HACE), or metabolic disturbances. We describe etiology, clinical and radiological characteristics of RELES.

**Methods:** We retrospectively analyzed brain MRI and medical records of patients diagnosed as RELES from February, 2010, through December, 2018.

**Results:** 10 patients were consisted of 7 male and 3 female, and their age ranged from 10 to 82 years (mean age, 37.5 years). 4 patients presented with fever and headache (2) or mental change (2), 2 patients with seizure, and cheek pain (1), headache (1), dizziness (1) and leg weakness (1). RELES was caused by various etiologies, such as viral encephalitis (3), AED (2), HACE (1), sepsis (1) and unknown (3). MRI showed small, round or ovoid cytotoxic edema at central area of SCC with bilateral symmetric shape without gadolinium enhancement in all patients. All 5 follow-up MRI showed complete resolution of the splenial lesions. 8 patients had good clinical outcome and fair in 1 case. 1 patient died of underlying sepsis.

**Conclusion:** Infectious disease such as viral encephalitis and sepsis and AED were common cause of RESLES. Characteristic MRI finding is diffusion restriction without abnormal enhancement at the central area of SCC, which were completely reversible. Most patients had good clinical outcome. Therefore, RESLES is a benign condition clinically and radiologically.

**Disclosure:** Nothing to disclose

## EPO1296

### Spinal haemangiomas imaging

S. Mizyurov<sup>1</sup>, S. Likhachev<sup>1</sup>, V. Zaretskov<sup>1</sup>,  
V. Ostrovskij<sup>1</sup>, E. Salina<sup>2</sup>, V. Arsenievich<sup>1</sup>

<sup>1</sup>Research Institute of Traumatology, Orthopedics and  
Neurosurgery of the Ministry of Health of Russian  
Federation, Saratov, Russian Federation, <sup>2</sup>Saratov, Russian  
Federation

**Background and aims:** Vertebral haemangiomas (VH) are often found on imaging in patients with back pain or neurological symptoms. VHs impair vertebra strength and in 8% of cases lead to pathologic fractures worsening the severity of clinical presentations. Surgical indications are disputable, particularly those for asymptomatic VHs with radiologic aggressive signs.

**Methods:** Software Spine-1 for calculation of support ability in VH affected vertebrae has been developed. It uses CT-obtained geometric parameters of both the affected vertebra and VH to calculate its cavity space ratio to vertebra dimensions. Support ability disorder index results from multiplying the patient's height, age and vertebra number by previously calculated cavity space to vertebra ratio as well as the coefficient defined by the patient's sex. The examination results of 86 patients have been analyzed.

**Results:** The results show that in 31 patients (36.1%) VHs do not impair their vertebra strength. In 28 patients (32.5%) the support ability decreased by 30% and in 27 patients (31.4%) by 50% or more. It has been established that in patients with strength properties decreased for 30% or more, and in more than 58% of cases they suffered from persistent moderate pain syndrome (VAS 6±2), and in 5 patients (6%) with strength decreased by 30% no pain syndrome was reported (VAS 0).

**Conclusion:** VHs reduce vertebra support ability and are unfavorable predictive factors of clinical presentations development including neurological symptoms. The decrease in vertebrae strength for 30% and more may be an indication for vertebroplasty even with asymptomatic aggressive VHs.

**Disclosure:** Nothing to disclose

## Neuroimmunology 1

## EPO1297

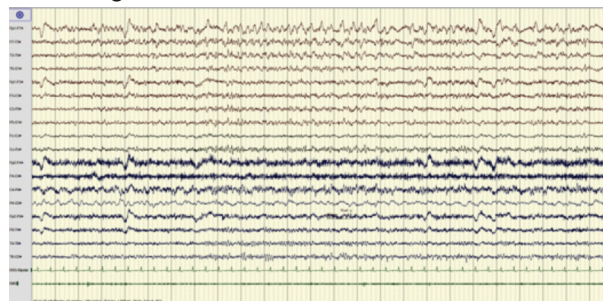
**Refractory Morvan Syndrome Responding Dramatically to Rituximab**

M. Agha, T. Chedid, R. Sawaya, A. Makki, A. Beydoun  
*Neurology, American University of Beirut Medical Center, Beirut, Lebanon*

**Background and aims:** Morvan syndrome is a rare autoimmune disorder characterized by peripheral nerve hyperexcitability, dysautonomia and encephalopathy. No clear treatment guidelines are available.

**Methods:** N/A

**Results:** The patient is a 44-year-old man with a history of seropositive myasthenia gravis and recurrent thymoma, status-post thymectomy and chemotherapy, who presented with acute-onset amnesia that followed a progressive course of fatigue associated with diffuse muscle cramps and twitching that limited his ability to ambulate. He also complained of profuse sweating and severe insomnia. His physical examination revealed tachycardia and diffuse fasciculations. Brain MRI was unremarkable. Cerebrospinal fluid analysis showed an elevated protein level. Electromyography revealed evidence of spontaneous activity in the form of neuromyotonic discharges and complex repetitive discharges. During a long-term video/EEG study, nine subclinical seizures of left temporal origin were recorded. Antibody screening revealed high serum and CSF titers of Caspr2 and LGI1 antibodies. The electrographic seizures were controlled with lacosamide. The diffuse fasciculations associated with severe pain required treatment with morphine, gabapentin and duloxetine and failed to respond to intravenous pulse steroid and to 2 courses of IVIG. Following administration of the 1st dose of rituximab, there was a dramatic improvement in the painful fasciculations with near complete resolution of signs and symptoms 2 weeks later, following administration of the 2nd dose. He remained in remission at his last follow-up 4 months later with a gradual taper of the analgesic and antineuralgic medications.



EEG showing ictal activity

**Conclusion:** Rituximab appears to be a very promising therapy for patients with anti-Caspr2 syndrome who failed to respond to steroids or IVIG.

**Disclosure:** Nothing to disclose

## EPO1298

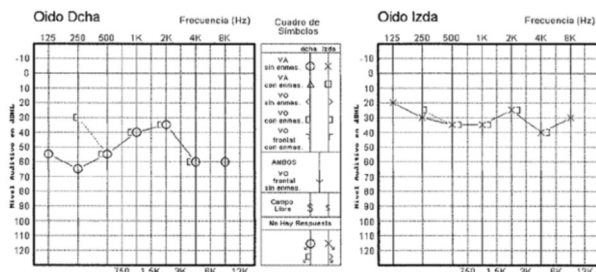
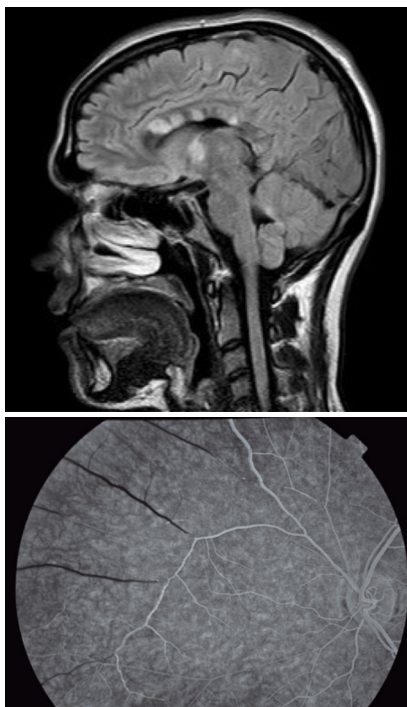
**Sex hormones secondary players in Susac's Syndrome**

A.L. Alungulese, M. Ben-Yelun Insenser,  
C. Gonzalez Robles, M.Á. García Soldevilla,  
D. Barragán Martínez, L. Izquierdo Esteban,  
R. Gordo Mañas  
*Neurology, University Hospital Príncipe de Asturias, Madrid, Spain*

**Background and aims:** Susac's Syndrome (SS) is a rare immune-mediated endotheliopathy defined by the clinical triad of encephalopathy, branch retinal artery occlusion and hearing loss. As autoimmunity is generally more common in females, female predominance in SS is in line with the putative autoimmune aetiology. This report presents clinical and paraclinical findings in a female-male transgender contributory to SS diagnosis and offers different perspective on sex hormones contribution to the disease.

**Methods:** The most important diagnostic procedures involved in diagnosis were brain MRI, audiometric testing and retinal fluorescein angiography.

**Results:** A previously healthy 22-year-old female-male transgender under treatment with testosterone for 3 years, presented with psychomotor slowing and behavioral changes. He had also been experiencing recurrent episodes of vertigo in the last 2 weeks. On admission, neurological examination showed severe inattention, short-term memory impairment, frontal release signs, gait instability and pyramidal signs. Brain MRI revealed a spectrum of findings previously described in SS: "snowball"-shaped lesions in corpus callosum and the characteristic "string of pearls" lesions in internal capsule. Audiometry showed sensorineural hearing loss in low frequency range. The fluorescein angiography disclosed branch retinal artery occlusion. Based on the association of subacute encephalopathy, branch retinal artery occlusion, hearing loss and typical MRI findings, we diagnosed that the patient had SS and started immunosuppressive therapy.



**Conclusion:** To the best of our knowledge, this is the first case of SS described in a female-male transgender and it may illustrate that sex hormones could be only secondary players in a process triggered by genetic predisposition, stochastic immune responses and environment.

**Disclosure:** Nothing to disclose

## EPO1299

### Treatment Patterns of a Large US Sample of Chronic Inflammatory Demyelinating Polyradiculoneuropathy (CIDP) Patients

J.B. Layton<sup>1</sup>, C. Anderson-Smits<sup>2</sup>, M.E. Ritchey<sup>1</sup>, S. Chavan<sup>3</sup>, N. Souayah<sup>4</sup>

<sup>1</sup>RTI Health Solutions, Research Triangle Park, USA, <sup>2</sup>Takeda Pharmaceuticals, Cambridge, USA, <sup>3</sup>Shire US Inc, a Takeda company, Lexington, USA, <sup>4</sup>Department of Neurology, Rutgers University, Newark, USA

**Background and aims:** Chronic inflammatory demyelinating polyradiculoneuropathy (CIDP) is a rare, immune-mediated neuropathy, and intravenous immunoglobulin (IVIG) is a 1<sup>st</sup>-line therapy option. We examined real-world practices with IVIG, including ramp-up, dosing patterns, switching, discontinuation, and add-on therapy. We describe treatment patterns among patients with CIDP initiating IVIG treatment.

**Methods:** Adults with CIDP without prior immunoglobulin treatment were identified in MarketScan<sup>®</sup> insurance database between 2008-2018. Patients subsequently initiating IVIG were identified. Data on timing and frequency of dosing, switching to other immunoglobulin treatments, discontinuation of the index IVIG and initiation of other CIDP treatments were described.

**Results:** A total of 32,090 immunoglobulin-naïve patients with CIDP were identified; 3,975 initiated IVIG. Few patients had previous non-immunoglobulin CIDP therapy, except for high-dose corticosteroids (34%). Median number of doses during 14-day ramp-up was 1 (interquartile range [IQR] 1-3). After ramp-up, the median interim between doses was 21 days (IQR 7-28) and median treatment duration 129 days (IQR 85-271). At year 1 of follow up a higher proportion (27%) of patients discontinued the index IVIG compared with those who switched immunoglobulin treatment (6%). Most patients who discontinued did so by the 4<sup>h</sup> treatment month; 45% of patients initiated another non-IG CIDP treatment after IVIG initiation.

**Conclusion:** Most patients that initiated IVIG treatment did not have prior CIDP treatment. IVIG is typically administered at an interval of 1 to 4 weeks. Many patients discontinued treatment by the 8<sup>th</sup> dose; after which less discontinuation happens, which is consistent with rates in the literature.

**Disclosure:** This work was supported by Takeda Pharmaceuticals.

## EPO1300

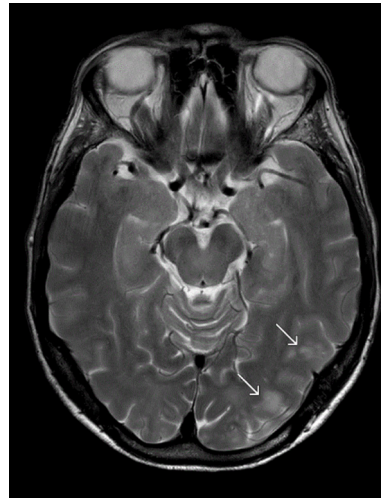
**Guillain-Barré syndrome with posterior reversible white matter lesions**

F. Arienti<sup>1</sup>, G. Franco<sup>1</sup>, G. Lazzeri<sup>1</sup>, M. Vizziello<sup>2</sup>,  
E. Monfrini<sup>3</sup>, A. Di Fonzo<sup>3</sup>

<sup>1</sup>IRCCS Foundation Ca' Granda Ospedale Maggiore Policlinico, Dino Ferrari Center, Neuroscience Section, Department of Pathophysiology and Transplantation, University of Milan, Milan, Italy., Milan, Italy, <sup>2</sup>Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy, <sup>3</sup>IRCCS Foundation Ca' Granda Ospedale Maggiore Policlinico, Dino Ferrari Center, Milan, Italy

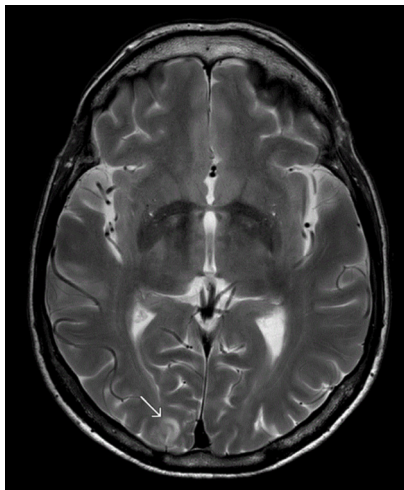
**Background and aims:** Guillain-Barré syndrome (GBS) is an immunologically mediated acute demyelinating polyneuropathy, usually selectively affecting the peripheral nervous system. Here, we report the case of a 72-year-old woman presenting with a typical Guillain-Barré syndrome, whose brain MRI showed bilateral posterior lesions in cerebral white matter.

**Methods:** On examination, all deep tendon reflexes were absent, kinesthetic sensitivity was reduced and walking was unsteady. 2 brief nocturnal episodes of confusion and visual alteration were reported to the medical staff. The anti-ganglioside antibody panel was negative. The CSF showed albumin-cytologic dissociation; oligoclonal bands were absent. The neurophysiological studies revealed reduction of motor conduction velocity and prolonged distal latency in both tibial nerves and absent F waves. T2-FLAIR weighted brain MRI demonstrated hyperintense areas involving the juxtacortical white matter in the bilateral parieto-occipital lobes, without diffusion restriction nor contrast enhancement.

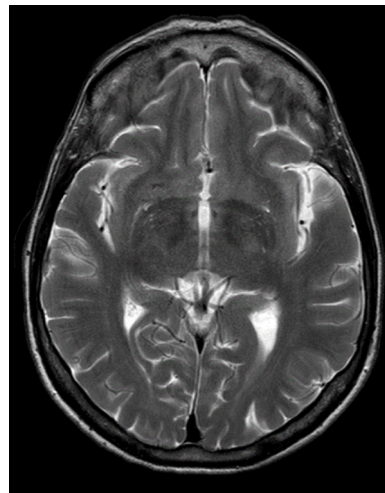


Brain MRI at onset. Axial T2-weighted imaging showing juxtacortical white matter lesions involving the occipito-parietal lobe

**Results:** The patient was diagnosed as GBS and intravenous immunoglobulin therapy was started. Her symptoms gradually resolved in two weeks. The multiple CNS lesions showed on MRI may be mainly suggestive of demyelination or posterior reversible encephalopathy syndrome (PRES). The juxtacortical localization and the U-shaped morphology of some lesions makes them compatible with an inflammatory-demyelinating origin, despite the lack of contrast enhancement. However, the episodes of confusion and visual alteration together with the radiological characteristics of the lesions and their total disappearance in the follow-up examination would direct towards a diagnosis of PRES.



Brain MRI at onset. Axial T2-weighted imaging showing U-shaped white matter lesions involving the occipito-parietal lobe



Axial T2-weighted imaging of the head demonstrating the complete resolution of the white matter abnormalities three months after symptom onset and IVIg treatment

**Conclusion:** GBS can be considered as an independent risk factor of PRES, due to dysautonomia as well as to increased capillary permeability caused by cytokine production.

**Disclosure:** Nothing to disclose

## EPO1301

### Aquaporin-4-antibody neuromyelitis optica spectrum disorders: three cases of late-onset longitudinally extensive transverse myelitis

G. Avino, D. Vecchio, C. Varrasi, E. Virgilio, R. Tarletti, R. Cantello

Department of Translational Medicine, section of Neurology, University of Eastern Piedmont, Novara, Italy

**Background and aims:** Neuromyelitis optica spectrum disorders (NMOSD) mediated by aquaporin-4-antibody (AQP4-Ab) affect predominantly optic nerve and spinal cord. Only 1/3rd presents after 50 years old, mostly with longitudinally extensive transverse myelitis (LETM): these late-onset NMOSD are frequently underestimated despite severe outcomes.

**Methods:** Case1: 54-year-old woman with acute weakness and paresthesia at lower limbs. MRI: C1-T12 LETM. Comorbidities: arthritis with serum anti-dsDNA.

Case2: 62-year-old woman with subacute asymmetric tetraparesis, vomiting and urinary retention. MRI: T2-hyperintensity midbrain-T4. Comorbidities: monoclonal gammopathy of undetermined significance.

Case3: 75-year-old woman with progressively worsening weakness at lower limbs. MRI: C6-T6 LETM. Spinal relapse 4 months later. Comorbidities: venous thrombosis with serum anti-dsDNA and antiphospholipid antibodies suggestive for Lupus erythematosus with Antiphospholipid syndrome.

**Results:** A 5-day course of methylprednisolone with marginal benefit was administered in all cases. Cyclophosphamide was started in case 1 with radiological improvement after 2 months. Plasmapheresis was performed for case 2 with no changes in 1 month (infections delayed other treatments). The case 3 commenced azathioprine after the relapse with radiological stability. All cases had severe motor and sphincteric outcomes.

**Conclusion:** A late-onset NMOSD with AQP4-Ab should be considered in isolated LETM with onset after 50 years. Autoimmune comorbidities could cause misdiagnosis but a prompt identification of NMOSD is necessary to start early immunosuppressive therapies, sometimes difficult in older cases. Our 3 patients represent typical cases of AQP4-Ab mediated LETM with severe outcome that represented a diagnostic and therapeutic challenge.

In conclusion AQP4-Ab NMOSD must be suspected in isolated LETM over 50 years old.

**Disclosure:** Nothing to disclose

## EPO1302

### A challenging case of loss of vision: Susac's Syndrome

P. Barbero, D. Vecchio, E. Virgilio, M. Bellan, P. Naldi, C. Comi, R. Cantello

Maggiore della Carità Hospital, University of Piemonte Orientale, Novara, Italy

**Background and aims:** Susac's syndrome is a rare immune-mediated endotheliopathy that is characterised by the triad of encephalopathy, branch retinal artery occlusion, and sensori-neural hearing loss.

**Methods:** A 35-year-old Caucasian woman presented an abrupt onset of right impaired vision, and arrived to our attention 2 weeks later. She had a miscarriage (and 2 normal pregnancies) several years before. Recently she had mild dizziness. The patient had no known family history of neurological disease. She underwent a fluorescein angiography showing branch retinal artery occlusions and a brain MRI revealing several supra- and infratentorial FLAIR-hyperintense white matter lesions, some with contrast enhancement. Thrombophilic, autoimmune and infective (including HIV, Borrelia burgdorferi, HBV, HCV) screening was negative. CSF analysis showed intrathecal IgG synthesis. We suspected a Primary Central Nervous System Vasculitis, and iv steroids were started. 2 months later a 2nd brain MRI showed new lesions. Moreover she developed some cognitive deficit and bilateral hearing loss confirmed at audiometry. Reviewing the clinical history and MRI, she fulfilled diagnostic criteria for Susac's syndrome. Cyclophosphamide was started and continued for 6 months with clinical improvement.



Corpus callosum 1





Corpus callosum 2

**Results:** Susac's syndrome is often misdiagnosed. Brain MRI (with multiple hyper-intense small lesions through infratentorial structures), fluorescein angiography (retinopathy with multiple retinal artery occlusions) and audiometry (hearing loss may be asymptomatic) are essential for correct diagnosis.

**Conclusion:** Only 13% of patients has the characteristic clinical triad at disease onset, and Susac's syndrome must be suspected also in presence of 2 of the pathognomonic features and a targeted search for absent components of the triad is essential.

**Disclosure:** Nothing to disclose

## EPO1303

### Anti-glutamic acid decarboxylase antibody associated epilepsy spectrum

I. Bedoui, M. Ben Hmidene, M. Mansour, M. Messelmani, A. Riahi, H. Derbali, J. Zaouali, R. Mrissa

Neurology department, Military Hospital of Tunis, Tunis, Tunisia

**Background and aims:** Anti-glutamic acid decarboxylase antibodies (GAD), initially described in type 1 diabetics, have been recently identified in some patients with epilepsy. The purpose of our work was to characterize the anti-GAD antibodies associated epilepsy.

**Methods:** Case-study of 5 patients who had pharmaco-resistant epilepsy with positive Anti GAD antibodies

**Results:** We included in our study 5 patients, 3 women and 2 men. The mean age of the beginning of the epilepsy was  $45.3 \pm 3$  years old. All of them had pharmaco-resistant epilepsy. Neuro-cognitive disorders were found in 3 cases and movement disorders in 2. A moderated lymphocytic pleocytosis was found in CSF examination in 3 patients. Anti GAD antibodies were positive in the blood in all patients, and in CSF in 3 cases. All patients received intravenous Immunoglobulin therapy with positive outcome in 4 patients.

**Conclusion:** Anti GAD antibodies are responsible of a neuronal hyperexcitability by inhibating the GABAergic neurotransmission. A better knowledge of the GAD antibodies associated neurological disorders seems to be necessary for a faster diagnosis and a better treatment.

**Disclosure:** Nothing to disclose

## EPO1304

**Cerebrospinal fluid oligoclonal bands in Neuroborreliosis are specific for *Borrelia burgdorferi***

K. Berek, H. Hegen, M. Auer, A. Zinganel, F. Di Pauli, F. Deisenhammer

*Neurology, Medical University Innsbruck, Innsbruck, Austria*

**Background and aims:** Cerebrospinal fluid (CSF) oligoclonal bands (OCB) occur in chronic or post-acute phase of inflammatory diseases of the central nervous system. Within this trial we aimed to determine whether CSF OCB in patients with neuroborreliosis (NB) are specific for *borrelia burgdorferi* sensu lato.

**Methods:** We performed isoelectric focusing (IEF) followed by immunoblotting in CSF of 10 NB patients and 11 controls (multiple sclerosis: 7, neuromyelitis optica spectrum disease: 2, dementia: 1, monoclonal gammopathy: 1). Immunoblotting was performed using an uncoated as well as a borrelia antigen pre-coated nitrocellulose membrane (NCM). The number of OCB was determined by visual inspection and photometric analysis using ImageJ. OCB were compared between uncoated and pre-coated NCM both in NB and controls. Replication experiments were performed for validation purposes to determine inter-assay precision by the coefficient of variation (CV).

**Results:** *Borrelia*-specific OCB were found in the CSF of 9 NB patients and in none of the control subjects (sensitivity: 90%, specificity: 100%). The number of OCB in NB patients did not statistically significantly differ between immunoblots using uncoated and pre-coated NCM (visual inspection: 12±5 vs. 9±5 bands,  $p=0.190$ , photometric analysis: 12±4 vs. 11±7;  $p=0.579$ ). Determining OCB number by visual inspection in NB and controls revealed a CV of 27% and 15% when an uncoated NCM was used, while 31% and 0% in case of pre-coated NCM.

**Conclusion:** Immunoblotting on precoated membranes is a simple method to demonstrate antigen specificity of clonally selected IgG.

**Disclosure:** *Borrelia* antigens were provided free of charge by Euroimmun.

## EPO1305

**Epidemiology of paraneoplastic cerebellar degeneration: a 9-year retrospective study**

A. Bernardini<sup>1</sup>, A. Vogrig<sup>2</sup>, A. Marini<sup>3</sup>, F. Bax<sup>3</sup>, J. Honnorat<sup>2</sup>, M. Valente<sup>3</sup>, G.L. Gigli<sup>3</sup>

<sup>1</sup>*Clinical Neurology Unit, Udine University Hospital, Udine, Italy*, <sup>2</sup>*CHU de Lyon, Lyon, France, Bron, France*, <sup>3</sup>*Clinical Neurology Unit, University of Udine, Udine, Italy*

**Background and aims:** Paraneoplastic cerebellar degeneration (PCD) is a neurological syndrome characterised by cerebellar ataxia due to tumour-induced autoimmunity against cerebellar antigens. Epidemiological data are mainly based on selected cohorts from third-level neuroimmunology centres.

**Methods:** We performed a 9-year (2009–2017) population-based epidemiological study in Friuli-Venezia Giulia, Italy (983,190 people). A diagnosis of PCD was made following the 2004 diagnostic criteria. Age- and sex-adjusted incidence rates were calculated.

**Results:** We observed 24 cases of definite PCD. The age-standardised incidence rate was 0.22/100,000 person-years (95% confidence interval 0.13–0.31). Median age at onset was 69 (range 40–80); female patients were 75%. Onconeural antibodies were present in 37% (anti-Yo in 25%, anti-Hu in 8%, anti-Ma2 in 4%). A tumour was found in 92%. Brain magnetic resonance imaging showed normal findings in 46%, cerebellar atrophy in 25% and vascular encephalopathy in 4%. Onset was acute in 8%, subacute in 58%, chronic in 13% and unspecified in 21%. Immunological treatment was performed in 29%, oncological treatment was administered in 17% and both in 4%. Improvement was seen in 17%, stability in 38%, worsening in 33%, insufficient outcome data in 12%; no statistically significant effect of immunological ( $p=0.288$ ) or oncological ( $p=0.567$ ) treatments was observed.

**Conclusion:** The incidence of PCD in our population was 0.22/100,000 person-years. Female sex is predominant; most patients are seronegative. A significant benefit with treatments was not seen, possibly due to small sample size; nevertheless, since a subset of patients showed a clear improvement, an immunological and/or oncological treatment trial should be warranted whenever feasible.

**Disclosure:** Nothing to disclose

## EPO1306

**Pattern of onconeural antibodies in sera from patients with renal cell carcinoma**

J. Boczan<sup>1</sup>, E. Kovács<sup>1</sup>, L. Csiba<sup>2</sup>, Z. Horváth<sup>3</sup>, J. Kocsis<sup>4</sup>

<sup>1</sup>Department of Neurology, University of Debrecen, Debrecen, Hungary, <sup>2</sup>Debrecen, Hungary, <sup>3</sup>Department of Oncology, University of Debrecen, Debrecen, Hungary, <sup>4</sup>Department of Oncology, University of Debrecen, Budapest, Hungary

**Background and aims:** Onconeural antigens expressed by tumor cells may trigger the expression of onconeural antibodies, which results in paraneoplastic neurological syndromes (PNS). We investigated the presence of 8 onconeural antibodies (amphiphysin, CRMP5, Nova/Ri, Cdr2/Yo, Elav/Hu, Zic4, Ma2, recoverin) and neurologic complaints and symptoms in 33 metastatic renal cell carcinoma patients. Overall survival (OS) and progression free survival (PFS) were also determined.

**Methods:** Sera were tested on dot blot of purified, recombinant, human onconeural antigens. Neurologic complaints were reviewed by a questionnaire and symptoms were determined by a neurologist. OS and PFS of patients were determined by Kaplan-Meier analysis.

**Results:** 57% of patients harbored at least 1 antibody, 39% of patients had multiple antibodies. 2 patients with cerebellar signs and 3 patients with polyneuropathy had onconeural antibodies, suggesting a definite PNS. 6 additional patients with polyneuropathy and without onconeural antibodies might have possible PNS. OS was significantly longer in patients harboring the anti-Hu antibody compared to those without it (median survival was 745 and 135 weeks, respectively).

**Conclusion:** Onconeural antibodies have surprisingly high occurrence in RCC patients potentially (like in the case of anti-Hu antibody) affecting their survival. Moreover, definite and possible PNS may have a negative impact on the quality of life of RCC patients.

**Disclosure:** Nothing to disclose

## EPO1307

**Severe dysautonomia as a remarkable manifestation of CLIPPERS**

D. Boon-Den Haan<sup>1</sup>, S. Huijs<sup>1</sup>, J. Beckervordersandforth<sup>2</sup>, R. Beekman<sup>1</sup>

<sup>1</sup>Neurology, Zuyderland Medical Center, Heerlen, Netherlands, <sup>2</sup>Pathology, Maastricht University Medical Center, Maastricht, Netherlands

**Background and aims:** CLIPPERS ('chronic lymphocytic inflammation with pontine perivascular enhancement responsive to steroids') is a rare inflammatory disease of the central nervous system with predilection of the pons, brachium pontis and cerebellum. Histopathology shows perivascular and diffuse parenchymal (CD3+/CD4+) T-cell infiltration. CLIPPERS manifests in a subacute manner with symptoms essentially related to brainstem and/or cerebellum. MRI characteristically shows pontine and cerebellar punctate perivascular gadolinium enhancement. Responsiveness to glucocorticosteroid treatment is another core feature.

**Methods:** In 2017 a 65-year old female patient presented with subacute, progressive symptoms of bilateral pyramidal syndrome, asymmetrical sensory loss, diplopia and ataxia. MRI demonstrated patchy spot like hyperintense T2-/FLAIR lesions and gadolinium enhancement in pons, mesencephalon and middle cerebellar peduncles. The cervicothoracic spinal cord showed comparable lesions. Patient was initially treated successfully with glucocorticosteroid therapy. Mid 2018 patient developed a dilated pupil on the right with absent light reflex but intact ocular movements despite of immunosuppressive treatment. Furthermore, she developed severe dysautonomia consisting of recurrent syncope, orthostatic hypotension, hyperthermia and tachycardia. Patient was admitted to the intensive care unit and eventually passed away. Autopsy was performed.

**Results:** Brain pathological tissue from autopsy was examined and demonstrated severe encephalitis with CD3+ T-cell infiltration with perivascular predominance as well as parenchymatous involvement, mainly in the brainstem. Extension to the cerebral hemispheres with extensive parenchymatous T-cell aggregation in the hypothalamus was observed, as an explanation for severe dysautonomia.

**Conclusion:** This case report is the 1st to report severe dysautonomia as a clinical manifestation of CLIPPERS as a result of T-cell infiltration in the hypothalamus.

**Disclosure:** Nothing to disclose

## EPO1308

**Autoimmune vermian hypermetabolism: regarding three cases**

J.-B. Brunet de Courssou<sup>1</sup>, M.-A. Castilla-Lievre<sup>2</sup>, J. Maillot<sup>3</sup>, I. Taïfas<sup>3</sup>, M.-L. Brechemier<sup>3</sup>, M. Sallansonnet-Froment<sup>3</sup>, C. Tafani<sup>3</sup>, F. Bompaire<sup>3</sup>, D. Psimaras<sup>4</sup>, D. Ricard<sup>3</sup>

<sup>1</sup>Assistance Publique - Hôpitaux de Paris, Paris, France, <sup>2</sup>Nuclear medicine department, Hôpital Antoine Bécclère, Clamart, France, <sup>3</sup>Neurology department, Hôpital d'instruction des armées Percy, Clamart, France, <sup>4</sup>Neurology <sup>2</sup> department, Hôpital Pitié-Salpêtrière, Paris, France

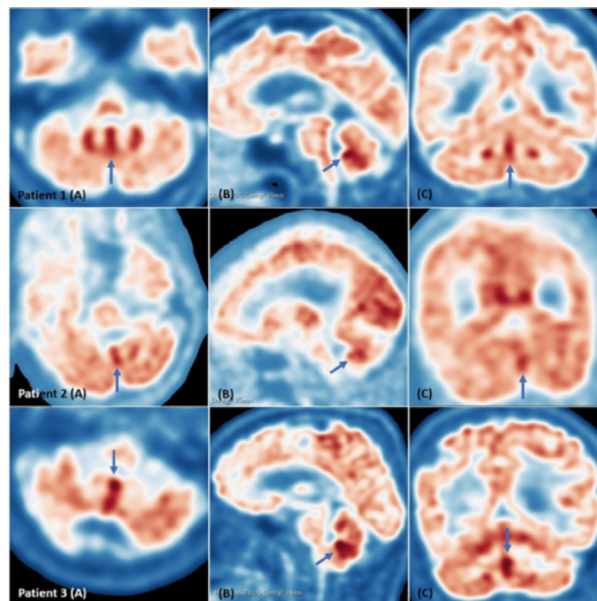
**Background and aims:** Cerebellar hypermetabolism is less commonly described than hypometabolism.

**Methods:** We report three cases of auto-immune cerebellar vermian hypermetabolism.

**Results:** Patient 1 is a 68-year-old man with excessive daytime sleepiness and progressive cerebellar syndrome. On 18F-FDG brain positron emission tomography (PET)-scanner, vermian maximum standard uptake value (SUV) normalized to lean body mass was 7.3 compared to 5.3 and 5 on right and left cerebellar hemispheres, respectively. Definite diagnosis was type 1 narcolepsy secondary to an anti-Ma2 encephalitis.

Patient 2 is a 63-year-old woman with new-onset seizures, progressive walk impairment, limb myoclonus and dysexecutive syndrome. On PET-scanner, vermian maximum SUV was 4.4 compared to 3.7 and 3.8 on right and left cerebellar hemispheres, respectively. Anti-Zic4 antibodies were eventually found in the serum.

Patient 3 is a 72-year-old man treated for a pulmonary adenocarcinoma. He presented with limbs myoclonus. Symptoms worsened with the appearance of a cerebellar syndrome after the 1st perfusion of an immune check-point inhibitor for tumour treatment. On PET-scanner, vermian maximum SUV was 7.3 compared to 5.2 and 5.6 on right and left cerebellar hemispheres, respectively. Symptoms subsided with immunosuppressive drugs although anti-neurons antibodies were absent.



18F-FDG brain positron emission tomography of the three patients. (A) Axial, (B) sagittal and (C) coronal view. Note the vermian hypermetabolism (arrows).

**Conclusion:** We reported 3 cases of auto-immune cerebellar hypermetabolism. There are only 12 previously published cases of auto-immune cerebellar hypermetabolism, some with known anti-neuron antibodies (anti-Ri and anti-Yo). Cancer was frequent but lacked in 2 cases. Other causes include Gayet-Wernicke encephalopathy, severe brain aggression, Huntington disease, dementia with Lewy bodies, Creutzfeldt-Jakob disease, essential tremor, Parkinson's disease and dystonia.

**Disclosure:** Nothing to disclose

## EPO1309

**CXCL13 marker levels for various forms of multiple sclerosis**

K. Bučilová<sup>1</sup>, J. Mareš<sup>1</sup>, P. Hok<sup>1</sup>, J. Zapletalová<sup>2</sup>, P. Kanovsky<sup>1</sup>

<sup>1</sup>Olomouc, Czech Republic, <sup>2</sup>Department of Medical Biophysics, Faculty of Medicine and Dentistry, Palacky University and University Hospital, Olomouc, Czech Republic

**Background and aims:** Multiple Sclerosis (MS) is a chronic autoimmune inflammatory disease with an unclear prognosis. Cerebrospinal fluid (CSF) is an important component of MS diagnosis. Promising markers include the chemokine CXCL13. CXCL 13 regulates lymphocyte migration and reflects the inflammatory activity in MS.

This study aimed to investigate the differences in the concentrations of CXCL13 marker in CSF in patients with various forms of MS (primary progressive MS - PPMS, relapsing-remitting MS - RRMS) and clinically isolated syndrome (CIS).

**Methods:** Patients with CIS, different forms of MS and controls were included in the study. The control group consisted of patients with the non-inflammatory disease. Overall, 170 patients (46 CIS, 9 PPMS, 15 RRMS, 100 controls) CSF were examined.

**Results:** After the data processing, significantly higher values of CXCL13 were demonstrated in the patients with CIS and RRMS compared to the control group ( $p=0.007$ ;  $p<0.0001$ ). Based on the results of this study, we can observe different values of the CXCL 13 marker. In MS patients we can see a difference in the course of the inflammatory process, wherein patients with RRMS the inflammation activity is higher compared to PPMS. Furthermore, this work could be expanded to include a larger number of patients in the population, thereby supporting the robustness of existing results.

**Conclusion:** CSF examination has an irreplaceable role in the differential diagnosis of MS. The discovery of new markers could help to better determine prognosis and subsequent therapeutic intervention. In the future, we plan to expand the patient population.

**Disclosure:** Supported by IGA-LF-2019-016 Supported by the Ministry of Health of the Czech Republic, grant nr. NV19-06-00216

## EPO1310

**Light near dissociation in Anti-GQ1b Negative Miller Fisher syndrome.**

C. Buckley<sup>1</sup>, M. Doyle<sup>2</sup>, T. Counihan<sup>1</sup>

<sup>1</sup>Galway, Ireland, <sup>2</sup>Dublin, Ireland

**Background and aims:** Miller Fisher syndrome (MFS) is a variant of Guillain Barre Syndrome characterised by ataxia, ophthalmoplegia and areflexia. As MFS is rare, signs and symptoms of the syndrome are not fully understood. We describe a case of anti GQ1b negative MFS associated with light-near dissociation.



**Methods:** Case report

**Results:** A 34-year-old woman presented to the emergency department with diplopia and ataxia following an upper respiratory tract infection 2 weeks prior. Past medical history included submandibular gland removal and a previous spontaneous abortion at 6 weeks gestation, both of which occurred a number of years previous.

Examination revealed complete ophthalmoplegia, bilateral ptosis, bilateral facial paraesthesia, areflexia and ataxia. Upper limb power was 3/5 throughout and lower limb power was 5/5. Pupils were mydriatic and unreactive to light but responsive to accommodation. Magnetic resonance imaging of the brain was normal and Anti-GQ1b and Anti-GM1 antibodies were negative. Routine laboratory studies, including full blood count, renal and liver profile, were normal. Cerebrospinal fluid analysis demonstrated a normal protein and cell count. The patient remained hemodynamically stable and was transferred to the intensive care unit for 1 to 1 nursing and supportive therapy. Intravenous immunoglobulin (IVIg) was given for a diagnosis of MFS.

**Conclusion:** The patient's upper limb power, ataxia, ophthalmoplegia and ptosis resolved with IVIg and rehabilitation, however the dissociated pupillary response and areflexia have persisted 2 years since presentation. Light-near dissociation with Anti-GQ1b negative MFS has not been previously described in the literature to our knowledge.

**Disclosure:** Nothing to disclose

## EPO1311

**Utility of SUV values on 18-FDG PET- CT in anti- NMDAr encephalitis.**

C.A. García Estrada, A. Casallas Vanegas,  
E. Gomez Figueroa, I.A. Zabala Angeles,  
J.D.J. Flores Rivera, V. Rivas Alonso  
CDMX, Instituto Nacional de Neurología y Neurocirugía  
Manuel Velasco Suárez, CIUDAD DE MEXICO, Mexico

**Background and aims:** Anti-NMDAr is 1 of the most common causes of encephalitis. 18-FDG PET- CT has been used mainly to detect brain metabolic patterns. The determination of SUV allows the evaluation of regional metabolic changes in this disease.

**Objective:** To establish the relationship between clinical manifestations of anti-NMDAr encephalitis and SUV values on 18-FDG PET- CT.

**Methods:** We performed a retrospective, transversal study. Patients with diagnosis of anti-NMDAr encephalitis and 18-FDG PET-CT with regional quantification of SUV were included. The association of regional SUV and the presence of symptoms was evaluated through T test, considering significant values of  $<0.05$ . On those comparisons with statistical significance, ROC curves were performed to determine a cut-off point for a major risk of developing the clinical manifestation.

**Results:** There was a relationship between the presence of epileptic status and regional uptake in both right and left superior temporal gyrus ( $p=0.05/0.02$ ). Dysautonomia was associated with 18-FDG uptake in the left insula ( $p=0.05$ ).

**Conclusion:** Quantification of SUV in 18-FDG PET-CT allows to expand the utility of this study in the patients with immune-mediated encephalitis. This study shows that there is an association of regional uptake and the presence of certain clinical manifestations, although we couldn't establish a significant cut-off in SUV values for these regions. More studies with a greater number of patients are necessary to reproduce these findings.

**Disclosure:** Nothing to disclose

## EPO1312

**Clinical experience in LGI-1 encephalitis: time may be brain not only in stroke**

J.L. Chico<sup>1</sup>, A. Gómez-López<sup>2</sup>, F. Rodríguez Jorge<sup>3</sup>,  
R. Sainz-Amo<sup>4</sup>, Á. Beltrán Corbellini<sup>5</sup>, P. Parra Díaz<sup>1</sup>,  
E. Natera Villalba<sup>2</sup>, E.S. Stiauren-Fernández<sup>4</sup>,  
R. Toledano-Delgado<sup>3</sup>, Í. Corral-Corral<sup>3</sup>,  
J.L. López-Sendon Moreno<sup>3</sup>, B. Parejo Carbonell<sup>6</sup>,  
M.L. Martínez Ginés<sup>7</sup>, A. Gil-Nágel Rein<sup>8</sup>,  
M. Kurtis Urra<sup>8</sup>, Á. Carrasco-Sayalero<sup>9</sup>,  
C. García-Hoz Jiménez<sup>10</sup>, R. Pariente-Rodríguez<sup>10</sup>,  
J. Buisán Catevilla<sup>11</sup>

<sup>1</sup>Madrid, Spain, <sup>2</sup>Neurology, Hospital Ramón y Cajal, Madrid, Spain, <sup>3</sup>Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain, <sup>4</sup>Neurology, Hospital Ramon y Cajal, Madrid, Spain, <sup>5</sup>Hospital Ram, Madrid, Spain, <sup>6</sup>Hospital Clínico San Carlos, Madrid, Spain, <sup>7</sup>Hospital General Universitario Gregorio Marañón, Madrid, Spain, <sup>8</sup>Neurology, Hospital Ruber Internacional, Madrid, Spain, <sup>9</sup>Immunology, Hospital Universitario Ramón y Cajal, Madrid, Spain, <sup>10</sup>Immunology, Hospital Ramon y Cajal, Madrid, Spain, <sup>11</sup>Hospital Ramón y Cajal, Madrid, Spain

**Background and aims:** Antibodies against LGI-1 are a frequent cause of autoimmune encephalitis (AE). However, uncertainty about its clinical course and treatment may be related to the low prevalence of this entity. We aim to show our clinical experience.

**Methods:** Retrospective multicentric analysis of patients with positive antiLGI-1 antibodies testing by indirect immunofluorescence and transfected cells confirmation in our Immunology laboratory.

**Results:** A total of 10 patients were included (6 males, median age 74 years, range 56-83). 9 patients fulfilled diagnostic criteria for AE. Cognitive disturbances were present in all patients. Different types of seizures were present in 8 patients. 6 patients displayed typical faciobraquial dystonic seizures (median frequency 45/day, range 30-60). 6 patients had hyponatremia, and 2 had abnormalities in CSF. 6 patients showed altered EEG registers and 5 showed temporal hyperintensities on MRI. 1 of them was found to have a bladder cancer. 2 patients were tested for HLA DRB1\*07:01, being positive. Median time to diagnosis was 90 days (range 1-1350). 8 patients received a 1st-line immunotherapy (4 high dose steroids pulses, 1 immunoglobulins and 3 both), and 3 a 2nd-line immunotherapy (mofetil mycophenolate). 7 patients received combined antiepileptic therapy without sustained response, presenting 2 patients adverse reactions. At 3 months after initiating therapy, 7 patients were independent, 2 patients remained with altered functional capacity and 1 patient had died. Poor prognosis was related to delayed both diagnosis and treatment.

**Conclusion:** Prompt recognition antiLGI-1 encephalitis is critical, as early treatment may improve prognosis. Immunotherapy is the cornerstone treatment for both seizures and cognitive alterations.

**Disclosure:** Nothing to disclose

## EPO1313

**Ocular flutter as the cardinal feature of anti-GM2 brainstem encephalitis**

A. Daponte, V. Constantinides, E. Anagnostou,

F. Boufidou, E. Kapaki, G. Paraskevas

*<sup>1</sup>sr Department of Neurology, National and Kapodistrian University of Athens, Athens, Greece*

**Background and aims:** Ocular flutter is a rare sign of abnormal ocular motility, consisting of back-to-back irregular horizontal saccadic intrusions without intersaccadic interval. It is usually encountered along with cerebellar and/or brainstem signs and is most frequently associated with infectious, paraneoplastic or autoimmune disorders.

**Methods:** A 26-year-old female with a history of Hashimoto's thyroiditis, presented with acute vertigo over a 3 week-period, followed by slowly progressive oscillopsia, mixed upper limb tremor, gait ataxia and behavioral changes over the next 1 year. The neurological examination revealed truncal and appendicular ataxia, action and postural upper limb tremor, pyramidal signs as well as ocular flutter, square wave jerks and blink nystagmus.

**Results:** Brain MRI and CSF examination were unremarkable. A thorough work-up for an underlying neoplasm, including whole body PET-CT and paraneoplastic antibodies as well as antibodies for autoimmune encephalitis, were normal. An ECG revealed slow-wave activity and an electrooculogram (EOG) verified the presence of ocular flutter. The patient tested positive for anti-GM2 IgM antibodies. She was administered a 5-day regimen of IV methylprednisolone 1gr/d, followed by methylprednisolone orally, with complete remission of her symptoms. At 6 months after treatment completion, the patient remained asymptomatic, with significant improvement of the EOG findings. Repeat testing of anti-GM2 antibodies at 6 months was still positive.

**Conclusion:** Ocular flutter has rarely been associated with anti-gaglioside antibodies (GQ1a, GD1a, GD1b, GM1). This is the first reported case of anti-GM2 brainstem encephalitis manifesting with ocular flutter.

**Disclosure:** Nothing to disclose

## Neurological manifestations of systemic diseases

### EPO1314

#### Noninfectious Central Nervous System involvement in Late-Onset Combined Immune Deficiency mimicking Multiple Sclerosis

M.P. Alonso Bejar, J.M. Gómez Argüelles  
*Neurology, Hospital Universitario del Tajo, Aranjuez (Madrid), Spain*

**Background and aims:** Common Variable Immunodeficiency (CVID) is defined by defective antibody productions; Late-Onset Combined Immune Deficiency (LOCID) is a subset characterized by added severe T-cell defect, usually expressed with opportunistic infections. Central Nervous System (CNS) involvement in CVID is rare. We present a case of noninfectious CNS involvement, mimicking Multiple Sclerosis, as diagnostic debut of LOCID.

**Methods:** A 56-year-old man with hypertension and dyslipidemia developed acute episodes of burning pain along left mandibular division of trigeminal nerve territory, suggesting trigeminal neuralgia; no previous dental manipulation. Brain magnetic resonance (MR) showed multiple T2/Flair hyperintense lesions (suggestive of demyelinating disease), periventricular and infratentorial location, 1 of them closely to left trigeminal nerve in pons; no contrast-enhancement of any lesions. A lumbar puncture was performed, normal glucose, protein and cell count in cerebrospinal fluid; mirrored oligoclonal bands were detected. With suspicion of a systemic process, laboratory tests showed serum lymphopenia with panhypogammaglobulinemia; search for infectious agents, vasculitic or lymphoproliferative processes was negative. Carbamazepine treatment obtained pain control.

**Results:** The immunologic study confirmed total lymphopenia mainly B-cells, but significant T-cell defect (CD4+ T-cell count 280x10<sup>6</sup> cells/L), diagnosis of probably LOCID. He's been treated with monthly intravenous immunoglobuline replacement. Evolutionary brain MR without changes, neurologically asymptomatic.

**Conclusion:** CNS involvement in immune deficiencies is rare, usually of infectious, granulomatous cause, or vitamin E deficiency. There are very few cases reported suggestive of autoimmune etiology, mainly spinal cord disease, T-cell defect probably implied. This case mimicks Multiple Sclerosis, with immune involvement supported by mirrored oligoclonal bands.

**Disclosure:** Nothing to disclose

### EPO1315

#### Neurosarcoidosis: Clinical manifestations, diagnosis and treatment

F. Aziouaz, M. Yassine  
*Neurology, CHU Mohammed VI oujda, Oujda, Morocco*

**Background and aims:** Sarcoidosis is a multisystemic granulomatosis of unknown etiology. Central nervous system involvement may reveal the disease or occur in a patient with known sarcoidosis. The intracranial lesions preferentially affect the meninges, the cranial nerves and the hypothalamo-pituitary axis. The objective of our study is to analyze the clinical and radiological aspects of our patients, to emphasize the role of MRI in the diagnostic approach, and to describe the different therapeutic arsenals.

**Methods:** This is a retrospective study on the medical file of 7 patients, collected at the neurology and radiology departments of the Mohammed VI University Hospital of Oujda, during a period from February 2015 to January 2020.

**Results:** The average age of our patients was 39.1 years. The sex ratio was 0.6. The etiological reasoning was based on the clinical context, MRI, the biological assessment, the anatomopathological study and the evolution under treatment. The clinical signs are multiple, made of the association with varying degrees of: multiple involvement of cranial nerves, dysfunction of the hypothalamic-pituitary axis, psychiatric manifestations, sensitivomotor deficiency, comitial crises and cephalgias. Encephalic MRI was suggestive of diagnosis in 5 patients, but the use of biology and pathological study proved necessary for diagnostic confirmation. All of our patients benefited from corticosteroid treatment and/or immunosuppressants with good clinical progress.

**Conclusion:** MRI is an essential examination in neurosarcoidosis. It provides evidence for diagnosis in cases of clinical suspicion, research subclinical impairment in patients with known sarcoidosis and can sometimes predict and especially appreciate the effectiveness of treatment.

**Disclosure:** Nothing to disclose



## EPO1316

**The multiple faces of Neurolupus**

T. Barata Silvério<sup>1</sup>, A. Duarte<sup>2</sup>, S. Sousa<sup>2</sup>, P. Gonçalves<sup>2</sup>  
<sup>1</sup>Almada, Portugal, <sup>2</sup>Rheumatology Department, Hospital Garcia de Orta, Almada, Almada, Portugal

**Background and aims:** The term Neurolupus is a generic definition that includes a wide variety of neuropsychiatric manifestations associated with systemic lupus erythematosus (SLE). Its prevalence is variable (15-95%).

**Methods:** We present a series of patients with Neurolupus, admitted between September 2017 and September 2019 in the Rheumatology and/or Neurology departments. Demographic, clinical, imaging and therapeutic data were retrospectively collected.

**Results:** We included 7 patients, 6 women and 1 man, with ages between 23 and 75 years. The neuropsychiatric diagnoses were: central nervous system vasculitis (2), recurrent ischemic stroke (2) recurrent reversible posterior encephalopathy syndrome (1), longitudinally extensive transverse myelitis (1), acute psychosis (1), multiple mononeuropathy (1), cranial mononeuropathy (1). The neuropsychiatric manifestation was the inaugural presentation of SLE in 2 patients. Associated multiorgan manifestations included immune (6), hematologic (5), mucocutaneous (6), musculoskeletal (5), renal (5), pulmonary (2), cardiac (1) and serositis (2) involvement. 3 patients had secondary antiphospholipid antibody syndrome (APS). All patients received hydroxychloroquine in combination with immunosuppressants/ immunomodulators, which included high dose glucocorticoids (7), cyclophosphamide (4), rituximab (4) and intravenous human immunoglobulin (3). Anticoagulation was also started in patients with secondary APS.

**Conclusion:** The diagnosis of Neurolupus can be extremely complex and requires extensive investigation for differential diagnosis. The treatment choice is based on the type and severity of the clinical manifestations and should take into account the infectious risk associated with immunosuppression. We intend to alert to the multiple faces of Neurolupus and to the importance of early recognition of this entity, due to its therapeutic and prognostic implications.

## EPO1317

**Different neurological affectation of granulomatosis with polyangiitis**

J.L. Batista Blasco<sup>1</sup>, N.L. Ciano Petersen<sup>2</sup>,  
 P. Cabezudo García<sup>3</sup>, I. Rodríguez Lavado<sup>4</sup>,  
 G. Pons Pons<sup>5</sup>, P. Serrano Castro<sup>6</sup>

<sup>1</sup>Neurology, Hospital Regional Universitario Málaga, Málaga, Spain, <sup>2</sup>MALAGA, Spain, <sup>3</sup>Neurology, Hospital Regional Universitario de Malaga, Málaga, Spain, <sup>4</sup>Malaga, Spain, <sup>5</sup>Neurology, Hospital Regional Málaga, Málaga, Spain, <sup>6</sup>Neurology Department, Hospital Regional Universitario de Málaga, Málaga, Spain

**Background and aims:** Vasculitis are systemic or localized syndromes in which blood vessels are damaged by inflammatory cells, causing a secondary ischemic injury. Granulomatosis with polyangiitis is a systemic vasculitis which affects both upper and lower airways, kidneys and, occasionally, the nervous system.

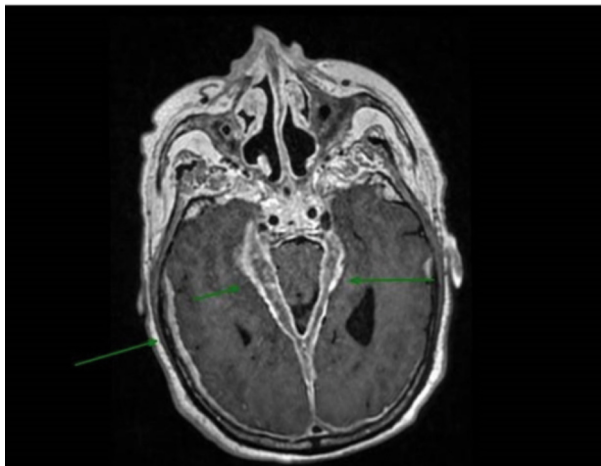
**Methods:** We expose 4 cases with a different affectation of the nervous system caused by this disease:

**Results:** The 1<sup>st</sup> is a 51 years old male patient with upper airways affectation who has also upper and lower limbs asymmetric hypoalgesia. Electroneurogram (ENG) was performed with a result of motor, asymmetric, demyelinating polyneuropathy (PNP) with conduction block, which evolved to axonal polyneuropathy in the end. Nasal mucosal biopsy was performed due to a non-responding sinusitis with the result of necrotizing granulomatosis. The 2<sup>nd</sup> is a 74-year-old male patient with sinusitis and non-responding cephalalgia. Blood tests were performed with MPO ANCA and MRI with pachymeningitis. 3<sup>rd</sup> patient: 76 years old male patient with cephalalgia and loss of vision. It was performed cerebrospinal fluid study with lymphocytic meningitis (pachymeningitis) and 61cmH<sub>2</sub>O opening pressure. Meningeal biopsy was performed in which it was observed necrotizing granulomatosis.

4<sup>th</sup> patient: 78-year-old female patient with asymmetric progressive paraparesis, hematuria and proteinuria. ENG was performed with severe axonal PNP.



CT-Scan patient 1: sinusitis



MRI patient 3: pachymeningitis.

**Conclusion:** Granulomatosis with polyangiitis is a rare pathology that must be considered as it could lead to a severe, possibly incapacitating, and even mortal affectation, but it usually has a favorable evolution with proper treatment in the majority of cases.

Disclosure: Nothing to disclose

## EPO1320

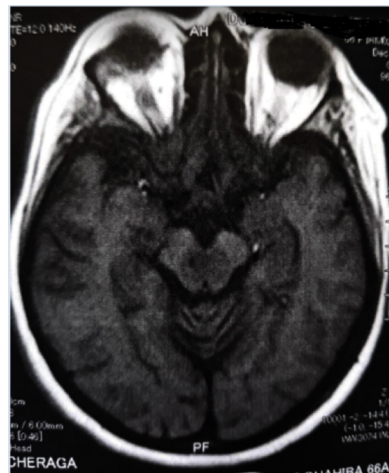
### HSV-brainstem encephalitis revealing systemic lupus erythematosus

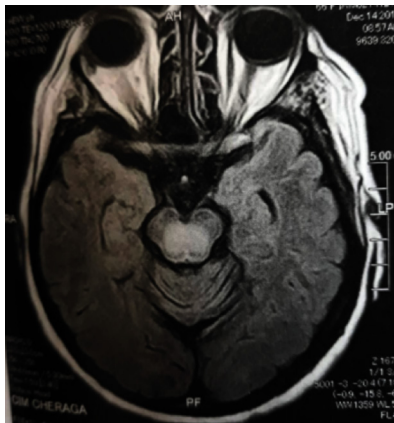
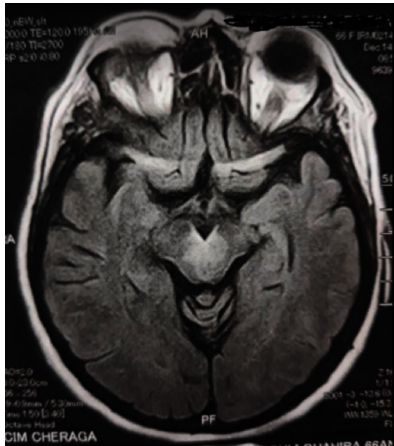
R. Benchouche<sup>1</sup>, W. Amer El Khodoud<sup>1</sup>, N. Mezghiche<sup>2</sup>, O. Chemakh<sup>3</sup>, F. Ramdane Cherif<sup>3</sup>, M. Lamine<sup>3</sup>, N. Kassouri<sup>3</sup>

<sup>1</sup>Ben akounoun, Neurology, Algiers, Algeria, <sup>2</sup>Department of Neurology, Algiers, Algeria, <sup>3</sup>Ben akounoun, Neurology, Algiers, Algeria

**Background and aims:** Neuropsychiatric (NP) symptoms of systemic lupus erythematosus (SLE) can be related to disease activity or to its complications, distinction between this 2 conditions is a priority. Herpes simplex virus type 1 (HSV-1) encephalitis (including brainstem encephalitis) is a very rare condition in patients with SLE.

**Methods:** A 66-year-old woman presented with 6-day history of dysarthria and gait ataxia. Her medical history includes thrombocytopenia, pleurisy, and photosensitive rash 1 year prior. Neurological examination showed 3rd and 6th cranial nerve palsies, and hyperreflexia. Her brain MRI demonstrated T2-hyperintense, T1-hypointense lesions in midbrain. The patient was started on empiric acyclovir and ceftriaxone, leading to significant improvement of gait ataxia and dysarthria. Cerebrospinal fluid (CSF) cytology was normal, serum ganglioside antibodies, paraneoplastic panel, serology tests were negative. CSF viral PCR was positive for HSV-1. She presented simultaneously anemia, proteinuria, pericardial effusion, positive antinuclear antibodies, which along with her medical history raises the suspicion for SLE.





**Results:** Our patient presented acute neurological disorders and T2W MRI abnormalities consistent with the diagnosis of BE. BE has a broad causes, priority should be given to infectious etiologies, our patient was treated empirically while etiologic testing was performed. Her history was suggestive of SLE, which was confirmed with the positivity of autoantibodies. The positivity of HSV1 PCR and the good response to antiviral treatment is indicative of HSV1-BE complicating SLE.

**Conclusion:** HSV-BE is rare complication of SLE, it is associated with high risk of mortality and morbidity. An empirical treatment should be started once the diagnostic is suspected.

**Disclosure:** Nothing to disclose

## EPO1321

### A chiasmal visual defect in adult patient with phenylketonuria: a rare association

L. Bernardes<sup>1</sup>, N.T. Mendes<sup>2</sup>, M.G. Maia<sup>2</sup>, E.D.S. Sousa<sup>2</sup>, E.J. Gonçalves Bechara<sup>2</sup>, M.T. Marques<sup>2</sup>, F.T. Meneses de Oliveira<sup>2</sup>, R. Gagliardi<sup>3</sup>

<sup>1</sup>Neurology, Irmandade Santa Casa de Misericórdia de São Paulo, São Paulo, São Paulo, Brazil, <sup>2</sup>Neurology, Irmandade Santa Casa de Misericórdia de São Paulo, São Paulo, Brazil, <sup>3</sup>São Paulo, Brazil

**Background and aims:** Phenylketonuria (PKU) is a disease caused by deficiency in the phenylalanine hydroxylase enzyme, which leads to phenylalanine accumulation in the blood and in the brain. The most common neurological manifestations of PKU are progressive intellectual disability, microcephaly and epilepsy; particularly when there is a delay in the diagnosis.

**Methods:** The authors present a case report of a chiasmal visual defect in adult patient with phenylketonuria, from Santa Casa de Misericórdia de São Paulo.

**Results:** A 21-year-old man, with PKU diagnosed since birth and irregular treatment, was admitted to emergency department complaining of blurred vision on both eyes and eye pain, that started one day before admission. His neurological exam had no abnormalities besides a low visual acuity on his left eye (Snellen test 20/50). Initial investigation with ophthalmoscopic exam, computed tomography of the brain and cerebrospinal fluid analysis was not elucidatory. The brain magnetic resonance imaging (MRI) showed extensive white matter involvement, also affecting optic chiasma, without contrast enhancement. The lesions were compatible with previous descriptions of the disease involvement, but the extension to optic nerve and chiasma is rarely reported. The patient followed a strict phenylalanine-free dietary plan and had improvement of symptoms in a few days

**Conclusion:** Although PKU is a well-known cause of neurologic disorders, visual symptoms due to the disease are rarely described, especially with an acute onset and in a young adult with no other neurologic symptoms. The knowledge of this presentation is important for differential diagnosis in this specific population

**Disclosure:** Nothing to disclose

## EPO1322

### Posterior Encephalopathy Reversible Syndrome secondary to hypercalcemia due to hypervitaminosis D

L. Bernardes<sup>1</sup>, E.D.S. Sousa<sup>2</sup>, E.J. Gonçalves Bechara<sup>2</sup>, M.G. Maia<sup>2</sup>, M.T. Marques<sup>2</sup>, F.T. Meneses de Oliveira<sup>2</sup>, R. Gagliardi<sup>3</sup>

<sup>1</sup>Neurology, Irmandade Santa Casa de Misericórdia de São Paulo, São Paulo, São Paulo, Brazil, <sup>2</sup>Neurology, Irmandade Santa Casa de Misericórdia de São Paulo, São Paulo, Brazil, <sup>3</sup>São Paulo, Brazil

**Background and aims:** Posterior reversible encephalopathy syndrome (PRES) is a clinical and neuroradiological condition characterized by headache, visual disturbances, seizures or altered consciousness. Although the exact pathophysiology is not known, PRES is associated with arterial autoregulatory dysfunction and vascular injury. The syndrome affects patients in all age groups, with female predominance.

**Methods:** Data obtained from the patient's medical record.

**Results:** A 29-year-old woman with dermatomyositis on oral corticosteroid therapy and vitamin D supplementation (dose of 150,000 IU per day, external therapy to this service). From the entrance the patient had reduced proximal muscle strength and 3 episodes of generalized tonicoclonic seizures. Evolved at hospitalization in need of orotracheal intubation due to lowered level of consciousness. The neurological examination revealed proximal musculature weakness, without further findings. Magnetic resonance imaging showed a diffusely white T2/FLAIR hypersignal with predominance of posterior regions of both cerebral hemispheres. Laboratory tests revealed 15.22mg/dl seric calcium. Symptoms improved with complete resolution after serum calcium normalization, with a strong response to hydration and forced diuresis. Hypercalcemia was considered the only identifiable cause of PRES.

**Conclusion:** The number of conditions associated to PRES has increased, although hypertension, kidney disease, sepsis and immunosuppressive therapy remains the most common causes. This report is important as a warning to physicians and patients about the side effects of high dose vitamin D therapies. As shown in the present case, supplementation therapy can overcome metabolic disturbances (vascular endothelial injury and consequently altered brain self-regulation)

**Disclosure:** Nothing to disclose

## EPO1323

### Hypertrophic pachymeningitis: Report of 3 cases

G. Cabral<sup>1</sup>, J. Tavares<sup>2</sup>, A. Luís<sup>2</sup>, M. Chorão<sup>3</sup>, S.L. Calado<sup>1</sup>, M. Baptista<sup>1</sup>

<sup>1</sup>Neurologia, Hospital Egas Moniz, Lisbon, Portugal, <sup>2</sup>Neurocirurgia, Hospital Egas Moniz, Lisbon, Portugal, <sup>3</sup>Anatomia Patológica, Hospital Egas Moniz, Lisbon, Portugal

**Background and aims:** Hypertrophic pachymeningitis (HP) is a rare fibrosing inflammatory process of the dura mater. The differential diagnosis of HP includes immune-mediated, malignancies and Infectious conditions but can also be idiopathic. **Aims:** To review 3 cases of HP between 2017-2019.

**Methods:** Case report.

**Results:** Case 1: A 38-year-old woman presented with a paroxysmal episodes of language dysfunction and sensitive disturbance of the right hand. MRI revealed a meningeal thickness in the frontoparietal region and meningeal biopsy non-caseating granulomas. She started steroids with neurological improvement. The final diagnosis was neurosarcooidosis. Case 2: A 32-year-old man presented to the emergency department with progressive neck pain followed by left V3 disturbance and left XII palsy. CSF had lymphocytic pleocytosis and hypoglycorrhea. MRI identified HP near magnum foramen with herniation and hydrocephalus for what was put an external ventricular drain. Meningeal biopsy showed few granulomas. IGRA was positive but cultures and PCR study for M.Tuberculosis were negative, he was treated with antibacilars with neurological symptoms resolution. Case 3: A 49-year-old woman was admitted for seizures followed by motor aphasia. Brain MRI showed dural thickening involving mainly the left temporo-occipital region. CSF study was normal. Meningeal biopsy identified diffuse lymphocyte infiltrate. After extensive investigation the final diagnosis was idiopathic HP.

**Conclusion:** HP is a rare entity and can cause neurological deficits by extension, compression or vascular obstruction. The evaluation of HP includes laboratory investigations of both blood and CSF samples, cross-sectional imaging studies and pachymeningeal biopsy, the latter being useful for differential diagnosis.

**Disclosure:** Nothing to disclose

## EPO1324

**Misleading Cavernoma – Occam's razor pitfall**

M. Ferro<sup>1</sup>, D. Melancia<sup>1</sup>, G. Almeida<sup>2</sup>,  
C. Marques-Matos<sup>1</sup>, L. Leitão<sup>1</sup>

<sup>1</sup>Neurology, Centro Hospitalar Lisboa Central, Lisbon, Portugal, <sup>2</sup>Neuroradiology, Centro Hospitalar Lisboa Central, Lisbon, Portugal

**Background and aims:** Wernicke-Korsakoff Syndrome (WKS) is caused by thiamine deficiency. The classic triad of ophthalmoparesis, gait ataxia, and delirium is present in less than 20% of cases at presentation and each particular symptom has a broad differential diagnosis. Alcoholism usually evokes this entity.

**Methods:** Case Report

**Results:** A 66-year-old male with a previous history of basal cell carcinoma, came to the emergency department due to sudden horizontal binocular diplopia. Neurological examination showed horizontal gaze-evoked and vertical pendular nystagmus. Brain CT and MRI revealed a small paramedian left pontine cavernoma with recent microbleeding. The patient was treated conservatively. In the following couple of weeks, the diplopia worsened and new symptoms ensued: incoercible vomiting, weight loss, dizziness with gait impairment, and mental confusion. He presented with complete ophthalmoplegia without ptosis, hyporeflexia and severe appendicular ataxia. Repeated brain CT revealed no signs of rebleeding. High doses of IV thiamine were started with improvement of the eye movements in the following day. Despite CSF studies revealing albuminocytological dissociation, the nerve conduction studies were normal and antigangliosides antibodies were negative. Brain MRI showed T2/FLAIR hyperintensity in the periaqueductal grey matter and medial thalamus bilaterally, with diffusion restriction, supporting the diagnosis of WKS. Extensive workup was performed, and gastric adenocarcinoma was diagnosed.

**Conclusion:** The absence of either history of alcohol consumption or the full classical triad should not keep one from considering WKS. Neoplasms are the main cause of WKS in non-alcoholic patients, so this etiology should be actively investigated. Prompted treatment with thiamine can prevent progression to Korsakoff encephalopathy.

**Disclosure:** Nothing to disclose

## EPO1325

**Intravascular lymphoma: A rare cause of longitudinal extensive transverse myelitis**

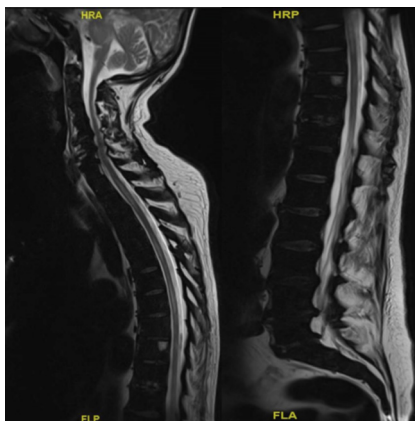
E. Ho<sup>1</sup>, M. Matar<sup>1</sup>, T. Hayat<sup>1</sup>, V. Sovani<sup>2</sup>, S. Ayob<sup>3</sup>,  
T. Moorby<sup>4</sup>, M. O'donoghue<sup>1</sup>, B. Gran<sup>5</sup>, R. Tanasescu<sup>6</sup>

<sup>1</sup>Department of Neurology, Queens Medical Centre, Nottingham, United Kingdom, <sup>2</sup>Department of Histopathology, Queens Medical Centre, Nottingham, United Kingdom, <sup>3</sup>Department of Dermatology, Queens Medical Centre, Nottingham, United Kingdom, <sup>4</sup>Department of Haematology, Sherwood Forest Hospitals NHS Foundation Trust, Nottingham, United Kingdom, <sup>5</sup>Department of Neurology, Nottingham University Hospitals NHS Trust, Nottingham, , <sup>6</sup>Nottingham, United Kingdom

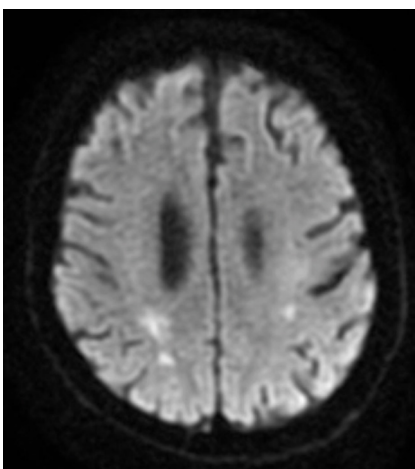
**Background and aims:** Intravascular lymphoma is a rare entity of large cell lymphoma that proliferates within the lumen of small vessels. It is often presented with central nervous system and skin signs.

**Methods:** We present a case of intravascular lymphoma, admitted with paraparesis with sensory level and encephalopathy, managed conservatively with steroid and palliation.

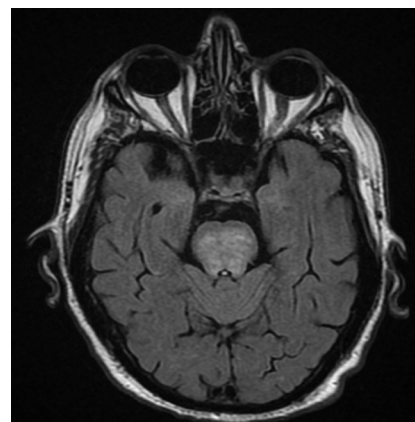
**Results:** A 72-year-old gentleman with myelodysplastic syndrome (MDS) presented with a subacute onset of paraparesis with sensory level to the umbilicus and intermittent confusion. Spinal MRI showed T2 hyperintensity from T2 to T5 and T7 to T9. Brain MRI showed multiple small foci of diffusion restriction in bilateral cerebral hemispheres. CSF analysis showed lymphocytic pleocytosis with raised protein but no bacterial growth and negative viral PCR. CSF oligoclonal bands, serum NMO and MOG were negative. His other tests including paraneoplastic antibodies, vasculitic screen, CSF cytology and CSF immunophenotyping were negative. PETCT was unremarkable. Despite absence of solid tumour in his cross sectional imaging, the suspicious of a systemic haematological infiltrative or malignant disease remained high in view of his history of MDS, multiple small infarct and abnormal spinal cord signal changes. A random skin biopsy was therefore arranged and confirmed intravascular large B cell lymphoma. He was managed conservatively with IV methylprednisolone with no significant improvement. Decision was made for palliation due to poor performance status and unfit for chemotherapy.



T2-weighted sagittal spinal MR imaging showing multi-segmental T2 hyperintensity of the cord in cervicothoracic region



Brain MRI showing multiple small foci of diffusion restriction in bilateral hemispheres suggestive of new lacunar infarct



Brain MRI demonstrating abnormal FLAIR hyperintensity in the pons

**Conclusion:** Intravascular lymphoma is often a diagnostic challenge as its symptoms are non-specific. It is prudent to consider this diagnosis in the appropriate settings as this is a potentially treatable condition.

**Disclosure:** Nothing to disclose

## EPO1326

### The extensive workup towards building a diagnosis of Neurosarcoidosis without other organ involvement

P.A. Ioan, A.-C. Ribigan, F. Antochi, O.A. Bajenaru  
Neurology, University Emergency Hospital Bucharest,  
Bucharest, Romania

**Background and aims:** Neurosarcoidosis, in the absence of a relevant biopsy is a difficult clinical and neuroimaging diagnosis.

**Methods:** We present the case of a 67-year-old female patient with a history of multiple cranial mononeuropathies in the last years: diplopia (2008), right hypoglossal paresis and perioral paresthesias (2015), left eye vertical diplopia and blurred vision (january 2018), perioral paresthesias (june 2018), left eye blurred vision and third nerve palsy (july 2018). All these episodes had a duration of 1-2 weeks and were alleviated by corticotherapy.

**Results:** Initial cerebral MRI showed a fluid accumulation (FLAIR and T2 hyperintense, gadolinium enhanced) in the left sphenoid sinus extending to the left superior orbital fissure and to the cavernous sinus. She was referred to our clinic 1 year later. Neurological examination revealed left eye diminished visual acuity and temporal quadrants. Optical coherence tomography was indicative of bilateral optic atrophy. A repeated brain MRI showed minimal inflammation and atrophy of the left optic nerve. We also performed a spinal tap with normal results (under corticotherapy). The serum ACE had an increased value. The patient was evaluated for other potential infectious, immune and neoplastic etiologies as well as for extraneural sarcoidosis (pulmonary CT, otolaryngology evaluation, cerebral angiography) but the results were negative. The clinical and neuroimaging studies point towards a diagnosis of neurosarcoidosis. The patient was given treatment with Micofenolat Mofetil, preventing further episodes.

**Conclusion:** Neurosarcoidosis represents a diagnostic challenge in patients without any other organ involvement. The ultimate goal is keeping the disease inactive and maintaining the patient's quality of life.

**Disclosure:** Nothing to disclose

## EPO1327

### Looking at the Kidney for Stroke Etiology – A Stroke Case presenting with Microscopic Polyangiitis

E. Kaçar<sup>1</sup>, M. Rados<sup>1</sup>, E. Rotteneder<sup>2</sup>, J. Moussoulides<sup>2</sup>, M. Reiter<sup>1</sup>, R. Jung<sup>1</sup>, N. Yilmaz-Kaymaz<sup>1</sup>, A. Seiser<sup>1</sup>, P. Stelzer<sup>2</sup>, W. Struhal<sup>1</sup>

<sup>1</sup>Neurology, University Clinic of Tulln, Tulln, Austria,

<sup>2</sup>Internal Medicine I, University Clinic of St. Pölten, St. Pölten, Austria

**Background and aims:** ANCA-associated vasculitis (AAV) is a rare cause of stroke, which consist of granulomatosis with polyangiitis (GPA), microscopic polyangiitis (MPA) and eosinophilic GPA. In this case report, we describe a stroke patient presenting with MPA.

**Methods:** Case report

**Results:** A 65-year-old men presented to our ED with mild right-hand paresis. He was on no medication. His wife noticed slurred speech, discoordination of the right hand and wobbly gait about 10d prior. At that time, he refused to seek medical attention. Vital signs recorded on admission were normal. Neurological examination yielded a right-sided, pure-motor brachiofacial paresis, mild psychoorganic syndrome and gait instability. He declined nasal or oral inflammation and recent infections. Cranial CT showed a parenchymal defect (right temporal lobe) and bilateral bone defects after decompression trepanation and aneurysm clipping after TBI in 1986. Cranial CT (7d after admission) revealed a lacunar infarct in the left capsula interna. Blood test showed elevated creatinine, CRP and ESR. The vasculitis workup was positive for PR3 and MPO antibodies. CSF findings were normal. The kidney biopsy revealed necrotizing glomerulonephritis with fibrocellular crescents. He received high dose steroid treatment followed by rituximab and cyclophosphamide with good treatment response.

**Conclusion:** CNS involvement in AAV is rare (5-15%). Therefore, early diagnosis can pose a challenge. Ischemic infarctions associated with AAV may present as an isolated lesion or multiple lesions affecting the white matter and are typically unresponsive to antiplatelet therapy leading to recurrent strokes without appropriate immunosuppressive treatment. This case underlines the importance of a systemic approach in stroke evaluation.

**Disclosure:** Nothing to disclose

## EPO1328

### Neurological manifestation of medium and large vessel vasculitis

V. Romanova<sup>1</sup>, K. Liuke<sup>1</sup>, E. Miglane<sup>2</sup>, A. Millers<sup>3</sup>

<sup>1</sup>Neurology, P.Stradins Clinical university hospital, Riga,

Latvia, Riga, Latvia, <sup>2</sup>Riga, Latvia, <sup>3</sup>Neurology, Riga

Stradins University Hospital, Riga, Latvia

**Background and aims:** Neurological manifestations of vasculitis are very diverse and have variable course. Nervous system vasculitis still is diagnostics and management challenge. Nervous system involvement is a common neurological complication, that is why neurologist have an important task to identify patients with systemic vasculitis and diagnose diseases.

**Methods:** This is a retrospective clinical study of patients with neurological complications of large and medium vessel vasculitis, that were treated and observed in Paul Stradins Clinical University Hospital from 2015 till 2019. Anamnesis and information about the disease evolvment, patients neurological status, patients common condition, treatment, medication and investigations was collected from available previous documentation. Within the framework of this study there was analized patients group and most common medium and large vessel vasculitis neurological complications.

**Results:** In Paul Stradins Clinical University Hospital from 2015 till 2019 were treated 98 patients with medium and large vessel vasculitis diagnosis. 45 patients with Polyarteritis Nodosa diagnosis, 34 patients had Takayasu arteritis diagnosis and 19 patients had Giant cell arteritis diagnosis. Most often neurological complication was dizziness, which was observed in 48.2% of all patients, the other most spread and serious manifestation was cerebral stroke – 34.3% of all patients and 11.5% had visual disturbance.

**Conclusion:** Vasculitis neurological manifestations are very diverse. Systemic vasculitis can affect any peripheral or central nervous system structure, causing variable neurological complications. Early neurological symptom identification allows to start treatment on time and improve outcomes. Without correct treatment neurological manifestations might be fatal, rapid diagnostic ant therapy prevents patients from serious disability.

**Disclosure:** Nothing to disclose

## EPO1329

**Neurological manifestations of systemic lupus erythematosus**

K. Liuke, E. Miglane, V. Romanova  
*Riga, Latvia*

**Background and aims:** Neurological manifestations are common in systemic lupus erythematosus (SLE). It may be one of the major presentation and occur in early stages, even before SLE is diagnosed, so early diagnosis and proper recognition is important. The study was made to highlight the pattern of neurological involvement.

**Methods:** This hospital based retrospective study was carried out from 2015 to 2018. Diagnosed cases of SLE with neurological manifestations were included. Patients with cognitive and psychiatric disturbances were not included due to the type of the study.

**Results:** In total, from 201 patients, 75 of them had some kind of neurological presentation (37%). 93% were female. The most common age group was from 33-47 years. Peripheral neuropathy was diagnosed in 46 patients (23%), which included sensory motor and also autonomic polyneuropathy and different mononeuropathies. 20% of patients had a history of cerebral infarctions, most often lacunar strokes and transitory ischemic attacks, also large ischemic strokes were found. From retrospective data 10% of lupus patients during the course of the disease were diagnosed with either tension type headaches or migraines, 3 had trigeminal autonomic cephalgias. Less common manifestations were transverse myelitis, central nervous system vasculitis and retrobulbar neuritis.

**Conclusion:** Neurological manifestation in systemic lupus erythematosus may occur at any time of the disease and be the major presentation. In this study the most common manifestation was peripheral neuropathy and cerebral infarctions.

**Disclosure:** Nothing to disclose

## EPO1330

**Tuberous Sclerosis (TS), analysis of a case series**

M. Martínez Zarco, E. Marín Conesa, E. Gómez López,  
I. Pellicer Espinosa  
*General University Hospital Reina Sofía de Murcia,  
Murcia, Spain*

**Background and aims:** Analyze systemic symptomatology, especially the neurological one, and characteristic findings in imaging tests of patients with TS in Reina Sofía's Hospital area, Murcia (Spain).

**Methods:** Digitalized medical records review of patients diagnosed with ST.

**Results:** 7 patients were included. Average age 44.8 (minimum 30, maximum 60). 57.2% men, 42.8% women. 100% had facial angiofibromas, 71.4% renal angiomyolipomas (AML) and epileptic seizures, 28.5% periungual fibroids, bone abnormalities, lymphangioliomatosis, hepatic AML, retinal astrocytic hamartomas, mental retardation and behavioral disorders (heteroaggressiveness) and 14.3% coffee spots with milk and aneurysm of the interventricular septum. In relation to brain imaging tests, 4 patients had an MRI and 2 had a CT scan, another report was not obtained from another patient. The 3 typical findings of TS, subependymal nodules, cortical/subcortical tuberomas in the cerebral hemispheres (in 1 of the patients also in the cerebellum) and alteration of the white matter (3 with radial migration and 1 with demyelination) were observed in 100% of MRIs. In the 2 patients with CT, subependymal nodules were observed.

**Conclusion:** The lesions most frequent location was the skin and the central nervous system (since all the patients had findings in the brain imaging tests), followed by the renal one. In most patients, neurological lesions caused epileptic symptoms. It is observed that the data obtained mostly agree with what is described in the bibliography.

**Disclosure:** Nothing to disclose



## EPO1331

**Diabetic striatopathy in a patient with hemichorea: a case report**

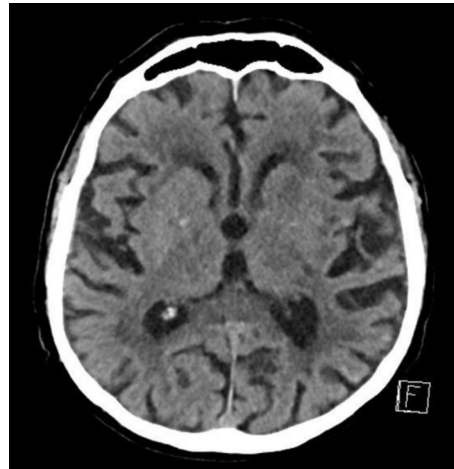
P. Mikulénka, I. Štětkařová

Department of Neurology, 3<sup>rd</sup> Faculty of Medicine, Charles University and University Hospital Kralovské Vinohrady, Prague, Czech Republic

**Background and aims:** Diabetic striatopathy is a rare condition characterized by unilateral hemichorea and/or hemiballismus in the settings of uncontrolled nonketotic diabetes mellitus. Imaging studies usually reveal striatal abnormality - subtle hyperdensity on CT and T1 hyperintensity on MRI. Resolution of clinical symptoms is prompt when optimal glycaemic control is achieved.

**Methods:** We present the case of a 90-year-old male who came to our attention for acute involuntary choreiform movements of his left-sided extremities lasting 2-weeks. Apart from that neurological examination was unremarkable. His medical history included hypertension, atrial fibrillation, previous stroke with no residual disability and poorly controlled type 2 diabetes mellitus on metformin treatment. There was no history of movement disorders or exposure to neuroleptics.

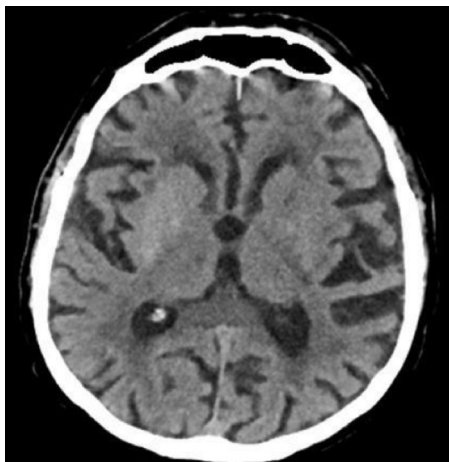
**Results:** His glucose level on admission was 512.6mg/dL, glycated hemoglobin was 14%. CT scan of the head demonstrated an abnormal increased intensity within the right striatum. Treatment consisted of symptomatic treatment of chorea and improvement of blood glucose control. Tiapride was started with a dose of 100mg 4 times a day. The patient was initiated on intensive insulin therapy which included insuline glargine (Lantus) 10 units every evening and 12 units of insuline glusine (Apidra ) 3 times a day with meals. Abnormal movements resolved after normoglycemia was achieved approximately 7 days after admission. Though striatal hyperdensity was still present at follow up CT scan after 10 days, it was less pronounced.



Follow up CT scan

**Conclusion:** Diabetic striatopathy is rare but treatable disorder and should be considered in patients with poorly controlled diabetes who present with hemichorea.

**Disclosure:** Nothing to disclose



CT scan of head on admission

## EPO1332

### **The characteristics of 4 patients with ANCA associated vasculitis developing neurological symptoms at the onset**

Y. Nakano, S. Fujiwara, H. Narai, Y. Manabe

*Neurology, Okayama Medical Center, Okayama, Japan*

**Background and aims:** It is reported that central nervous system (CNS) is affected in less than 15% of patients with ANCA associated vasculitis (AAV). CNS involvement usually presents late in the disease course.

**Methods:** We experienced 4 patients with AAV who were admitted to our hospital during the period from December 2014 to August 2019, and who developed neurological symptoms at the disease onset. The main characteristics of these 4 patients were compared to those in previous reports.

**Results:** Mean age was 67 (56-83), and 2 patients were female. 2 patients were affected with hypertrophic pachymeningitis (HP), one developed cerebral infarction, and another patient developed cavernous sinus syndrome (CSS) at the onset. MPO-ANCA was positive in one patient with pachymeningitis, and PR3-ANCA was positive in other 3 patients. No one met the diagnostic criteria of granulomatosis with polyangiitis (GPA) or microscopic polyangiitis (MPA). 3 patients excluding a patient with cerebral infarction achieved remission of CNS symptoms with steroid and other immunosuppressive drugs.

**Conclusion:** As previously reported that HP is the most frequent CNS presentation, our 2 patients developed HP. CNS can be affected late in the disease course and heterogenous neurological symptoms may hinder early diagnosis and treatment of AAV. 3 patients in our cases achieved remission of CNS symptoms probably because ANCA was early detected.

**Disclosure:** Nothing to disclose

## Neuro-ophthalmology/neuro-otology

EPO1333

**Cancer of unknown primaries (CUP) invading the jugular vein presenting with unilateral complete ophthalmoplegia: a case report**K. Adeyemi, O. Gitt, U. Hofstadt-van Oy  
Dortmund, Germany

**Background:** Cavernous sinus thrombosis (CST) accounts for 1-4% of cerebral sinus venous thrombosis. Septic CST are due to regional infections draining into the cavernous sinus (CS), aseptic CST are caused by hypercoagulability in malignancies, thrombophilia or pregnancy. Clinical signs include oculomotor palsies because these nerves run through the CS.

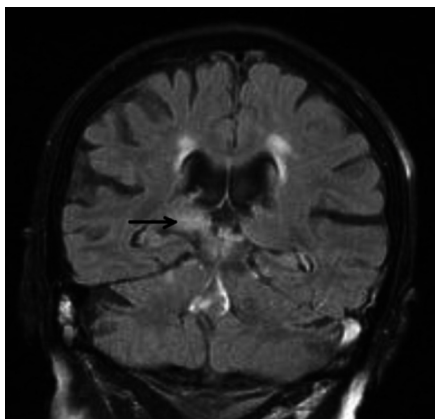
**Aims:** To present an unusual presentation of CST.

**Methods:** Case Report: An 84-year-old woman presented with a history of diminished appetite, left temporo-orbital headache and double vision. Neurological examination was normal, the erythrocyte sedimentation rate was 42mm/1h, a cranial CT was normal. Giant cell arteritis was suspected and corticosteroids given. On the following day she had developed a left abducens palsy. A brain MRI showed a hyperintense lesion of the right thalamus and midbrain, MR-spectroscopy was normal. Complete left ophthalmoplegia with ptosis developed within a week and edema of the left arm.

**Results:** Sonography revealed thrombosis of left axillary, subclavian and internal jugular veins. Another MRI demonstrated thrombosis of the left CS, sigmoid sinus and internal jugular vein, heparin was given. Further examination revealed a thyroid tumor with infiltration of the left carotid artery and jugular vein. Biopsy of pulmonal nodes revealed poorly differentiated epitheloid non-small cell malignancy. The patient deteriorated and died due to pneumonia. Postmortem examination was denied.

**Conclusion:** Our patient developed progressive unilateral ophthalmoplegia due to CST because of malignant jugular vein infiltration. In retrospect the thalamic and midbrain hyperintensities were due to thrombosis of deep cerebral veins. Our case contributes to unusual cases of CST.

**Disclosure:** Nothing to disclose



MRI coronar flair image; arrow to thalamic hyperintensity

## EPO1334

**Spinal medulloblastoma presenting with severe visual loss due to Pseudotumor Cerebri**

R. Ala<sup>1</sup>, G. Akdal<sup>2</sup>, M. Soylev Bajin<sup>3</sup>, A. Yaman<sup>3</sup>, B. Donmez Colakoglu<sup>1</sup>, E. Ozer<sup>4</sup>, E. Ada<sup>5</sup>, S. Men<sup>5</sup>, G. Yener<sup>6</sup>

<sup>1</sup>Department of Neurology, Dokuz Eylul University Faculty of Medicine, Izmir, Turkey, <sup>2</sup>Department of Neurology, Dokuz Eylul University Faculty of Medicine, Izmir, Turkey,

<sup>3</sup>Department of Ophthalmology, Dokuz Eylul University

Faculty of Medicine, Izmir, Turkey, <sup>4</sup>Department of Pathology, Dokuz Eylul University Faculty of Medicine,

Izmir, Turkey, <sup>5</sup>Department of Radiology, Dokuz Eylul University Faculty of Medicine, Izmir, Turkey, <sup>6</sup>Dokuz Eylul University Medical School, Department of Neurosciences and Department of Neurology, Izmir, Turkey

**Background and aims:** Case Report

**Methods:** A 34 year-old man presented with headache, blurred vision and diplopia. Neurological examination revealed only severe bilateral atrophic papilledema with severe constriction of the visual fields. There was also macular edema with visual acuity reduced to 0.2 and 0.3. Colour vision was 0/21. Brain MRI and CT venography were normal. CSF was xanthochromic with a pressure was 50cm water, total protein of 495mg/dl (normal 15-40), glucose of 10mg/dl (normal 40-70), but no white cells, red cells, or malignant cells. After standing for 1 hour the CSF clotted. Tests for tuberculosis, syphilis and cryptococcosis were all negative. Emergency bilateral sequential optic nerve sheath decompressions were done. Spine MRI showed a contrast-enhancing lesion in the lumbar spine, hypermetabolic on PET. Biopsy showed primitive neuroectodermal tumor (PNET).

**Results:** After 2 months visual acuity, color vision, and visual field remained same, but headaches had gone.

**Conclusion:** Spinal tumors are a rare but recognized cause of pseudotumor cerebri; we found 2 previous reported cases due to spinal PNET (1,2). The mechanism might be the very high CSF protein causing Froin's syndrome (3).

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**Disclosure:** Nothing to disclose

## EPO1335

**Biomarkers of visual deterioration in newly diagnosed Idiopathic Intracranial Hypertension patients**

W. Bahnasy<sup>1</sup>, Y. El-Heneedy<sup>2</sup>, M. Elhassanien<sup>3</sup>, A. Sharaf<sup>4</sup>, H. Khalid<sup>4</sup>

<sup>1</sup>Tanta, Egypt, <sup>2</sup>Neurology, Tanta University, Tanta, Egypt,

<sup>3</sup>Neuropsychiatry, Tanta University, Tanta, Egypt,

<sup>4</sup>Ophthalmology, Tanta University, Tanta, Egypt

**Background and aims:** Idiopathic intracranial hypertension (IIH) is a disorder of unidentified etiology characterized by raised intracranial pressure (ICP) without clinical, laboratory or radio-logical evidence of intracranial pathology. The aim of this work was to determine the visual outcome in newly diagnosed IIH patients.

**Methods:** The study included 68 IIH patients; 59 responded to medical treatment and 9 needed lumbo-peritoneal shunting (LPS). Patients were submitted to papilledema grading using Frisén Scale, water CSF manometry, brain MRI/MRV, mean deviation of visual field examination (MD-VFE), optic nerve sheath diameter (ONSD), average optic disc optical coherence tomography-retinal nerve fiber layer (OCT-RNFL) thickness and pattern-reversal visual evoked potential (VEP).

**Results:** Patients needed LPS showed statistically significant increase in baseline papilledema grade, MD-VFE, ONSD, average OCT-RNFL thickness and P100 VEP latency. On the other hand, both studied groups showed statistically non-significant differences regarding the patients' ages and opening CSF pressure.

**Conclusion:** Newly diagnosed IIH patients' evaluation must be based on multimodality neuroophthalmological assessment where papilledema grade, MD-VFE and OCT-RNFL are valuable biomarkers of PVD while P100 VEP latency delay is a predictor of poor visual outcome and ONSD is an early indicator of elevated ICP regression after LPS surgery.

**Disclosure:** Nothing to disclose

## EPO1336

**Bilateral cerebral ptosis in the patient with subdural hemorrhage: A Case Report**Y.-A. Choi

Rehabilitation Medicine, Incheon St. Mary's Hospital  
College of Medicine, The Catholic University of Korea,  
Incheon, Korea, Republic of

**Background and aims:** Differential diagnosis of bilateral ptosis can be challenging due to multiple etiologies. Although cerebral ptosis is rare, it is known to be frequently associated with the unilateral right hemispheric lesion. We report a bilateral cerebral ptosis case developed after acute right subdural hemorrhage (SDH).

**Methods:** A 79-year-old woman presented with mild left hemiparesis, bilateral complete ptosis and headache after falling accompanied by loss of consciousness. Computed Tomography of the brain revealed a traumatic right fronto-temporo-parietal SDH without midline shift and there was no evidence of parenchymal lesion in brain Magnetic resonance imaging. She underwent craniotomy with hematoma removal. However, even when she attempted to try opening her eyes, she could not open her eyes at all despite frontalis contraction. There was no evidence of abnormalities in the neuro-ophthalmologic evaluation including pupil reflex, gaze deviation or visual field loss.

**Results:** Bilateral ptosis was gradually improved with intensive rehabilitation. On neuroimaging, the brain perfusion single-photon emission computed tomography (SPECT) and Diffusion Tensor Imaging (DTI) were conducted. The brain perfusion SPECT revealed hypoperfusion in the left frontal, right temporal regions, and right basal ganglia. The bilateral intact corticospinal tract was visualized in DTI. Bilateral ptosis resolved almost completely and she could walk independently at hospital discharge.

**Conclusion:** In our case, the brain perfusion SPECT can provide additional information. Right hemispheric hypoperfusion in brain perfusion SPECT implied that lateralization of eyelid control is dominant to the right hemisphere consistent with previous reports. Bilateral cerebral ptosis after the right SDH showed a favorable prognosis of recovery.

**Disclosure:** Nothing to disclose

## EPO1337

**Is the HINTS plus approach in dizziness infallible?**

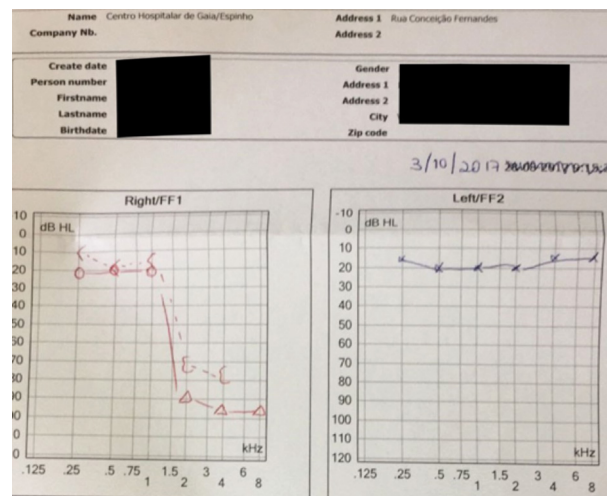
J. Costa Novo<sup>1</sup>, J. Larangeiro<sup>2</sup>, H. Felgueiras<sup>1</sup>

<sup>1</sup>Neurology, Centro Hospitalar Vila Nova de Gaia/Espinho, Vila Nova de Gaia, Portugal, <sup>2</sup>Otorhinolaryngology, Head and Neck Surgery, Centro Hospitalar Vila Nova de Gaia/Espinho, Vila Nova de Gaia, Portugal

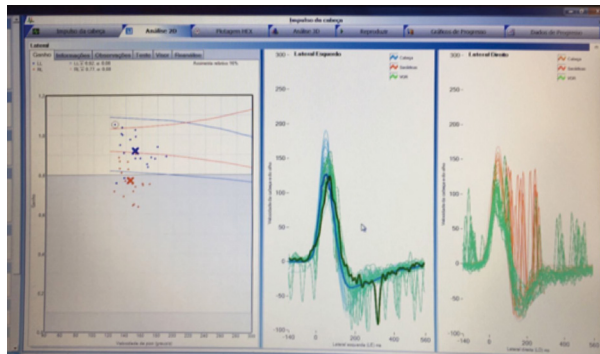
**Background and aims:** Acute labyrinthitis is characterized by the sudden onset of persistent vertigo, nystagmus, nausea, hypoacusis and head movements intolerance, which may last days to weeks and resolve gradually. Some neurological diseases should be considered in their differential diagnosis (namely stroke and demyelinating diseases of the central nervous system (CNS)).

**Methods:** Case report

**Results:** An 18-year-old woman comes to the emergency department for vertigo, right hearing loss, nausea and worsening vomiting in the last 3 days. The clinical examination highlighted: left horizontal-rotatory grade III nystagmus, a positive right-sided head impulse test and absence of skew deviation. The audiogram revealed neurosensory deafness above 1000Hz. Acute labyrinthitis, was assumed. She was hospitalized for treatment with dexamethasone and betahistine, with complete recovery during hospitalization and improvement of the audiogram parameters. For this reason a brain magnetic resonance imaging was ordered, revealing multiple lesions in a typical demyelinating disease topography including 1 in the right middle cerebellar peduncle and in the cerebellar hemisphere white matter. Later, as the study was completed, Multiple Sclerosis (MS) was diagnosed and treatment started.



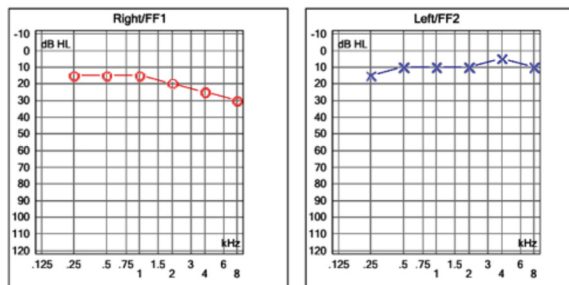
First audiogram



Video Head Impulse Test report

Create date	06-10-2017 14:20	Gender	Female
Person number	[REDACTED]	Address 1	[REDACTED]
Firstname	[REDACTED]	Address 2	[REDACTED]
Lastname	[REDACTED]	City	[REDACTED]
Birthdate	[REDACTED]	Zip code	[REDACTED]

06-10-2017 14:20:31



Second audiogram (three days later)

**Conclusion:** In this case, the HINTS plus (head-impulse test/nystagmus/test-of-skew, 'plus' new hearing loss) protocol was initially applied and there were no findings suggestive of central etiology. The evidence of rapid hearing recovery was important as it provided the diagnostic clue for CNS disease. Acute vertigo syndrome in young patients is one frequent presentation of MS and should be considered in its differential diagnosis. It is therefore mandatory to follow up these patients.

**Disclosure:** Nothing to disclose

## EPO1338

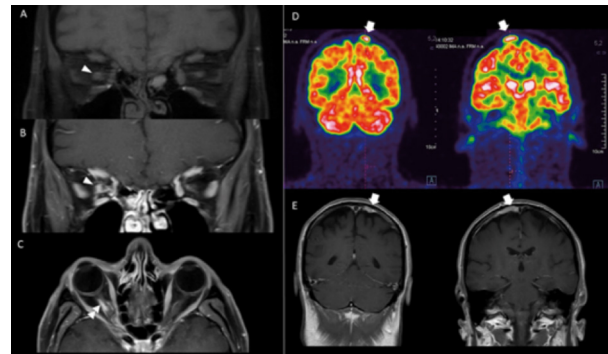
## Slowly progressive optic perineuritis as the first clinical manifestation of sarcoidosis

E. Garri<sup>1</sup>, F. Rinaldi<sup>1</sup>, D. Simonato<sup>2</sup>, M. Margoni<sup>1</sup>, P. Gallo<sup>3</sup>

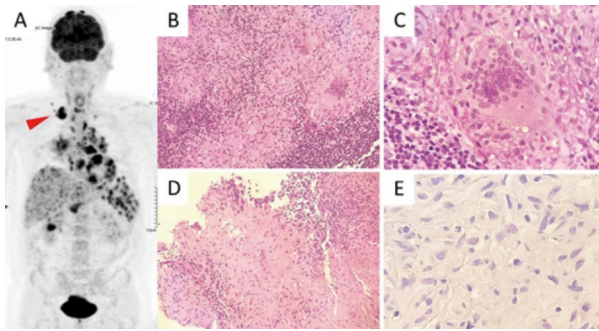
<sup>1</sup>Department of Neurosciences, Neurology Clinic, Padua, Italy, <sup>2</sup>University of Padua, Padua, Italy, <sup>3</sup>Padua, Italy

**Background and aims:** Isolated involvement of the optic nerve in neurosarcoidosis is a rare event. The inflammation of the optic nerve sheath, i.e., optic perineuritis, is even more rare especially at clinical onset. We report a quite unique case of optic perineuritis, as the first presenting manifestation of sarcoidosis.

**Methods:** In November 2018, a 56-year-old man developed a painless blurred vision in the right eye with mild photophobia. Neuro-ophthalmological examination and brain-MRI performed at this time were normal. Haematological and immunological screenings were unremarkable. The patient arrived at our attention on April 2018. He reported a further marked reduction in visual acuity. A Brain-MRI disclosed the gadolinium-enhancement with tram track and doughnut signs of the right optic nerve, suggestive of optic perineuritis, while no abnormality in the left optic nerve was detected (Fig. 1 A-C). CSF examination was not significant. ACE was negative in blood and CSF. The patient's visual acuity continued to worsen, and brain and orbit 3Tesla MRI performed in June showed the appearance of two focal areas of dura mater thickening (Fig. 1D). Thus, a whole body combined PET/MRI was performed showing the hypermetabolic signal of the 2 dura mater thickenings (Fig. 1E) as well as multiple widespread hypermetabolic areas. A lymph-node was biopsied disclosing a typical sarcoid granuloma (2 B,C,D,E)



**Results:** MRI may be unrevealing if performed early in the disease course. Thus, serial MRI scans are recommended.



**Conclusion:** Whole body  $^{18}\text{F}$ -FDG PET/MRI has to be considered since it may provide evidence of a systemic pathology as sarcoidosis.

**Disclosure:** Nothing to disclose

## EPO1339

### Functional and structural assessment of the visual pathway increases diagnostic accuracy in several neurological conditions: a case series.

S. Guerrieri, M. Pisa, R. Santangelo, L. Moiola, V. Martinelli, G. Comi, L. Leocani

Department of Neurology and INSPE, Ospedale San Raffaele - Vita-Salute San Raffaele University, Milan, Italy

**Background and aims:** visual disturbances represent a common complaint in neurological clinical practice. Full-field visual evoked potentials (ff-VEPs) are a widely used tool to document functional abnormalities subtending these symptoms. Sometimes ff-VEPs accuracy may be not sufficient to detect the pathological process going on. In these situations the diagnostic work-up may be completed with other techniques, like multifocal VEPs (mf-VEPs) and optical coherence tomography (OCT).

**Methods:** case collection showing the usefulness of a neurophysiological evaluation, comprehensive of OCT and mf-VEP, in the presence of normal or non-diagnostic ff-VEPs

**Results:** mf-VEPs are useful to detect visual pathway involvement in the case of suspected optic neuritis (ON) in the presence of non-diagnostic ff-VEPs and OCT (case 1). Sometimes mf-VEPs can be useful also to characterize the pathological process when ff-VEPs are not informative, as in the case of severe visual loss due to NMOSD with absent ff-VEPs response (case 2). In other cases OCT may support differential diagnosis, as in a MS patient with a visual loss due to central retinal vein occlusion and not to recurrent ON, as initially postulated (case 3). Mf-VEPs also proved to be useful to objectivate visual pathway abnormalities in the case of compressive disorders (case 4) or cerebrovascular conditions (case 5).

**Conclusion:** these cases exemplify ff-VEPs may fail in identifying abnormalities particularly in the presence of a sectoral involvement of the visual pathway. In the presence of a complaint for visual disturbances and normal ff-VEPs examination, we suggest a multimodal approach, including OCT and mf-VEPs.

**Disclosure:** Nothing to disclose

## EPO1340

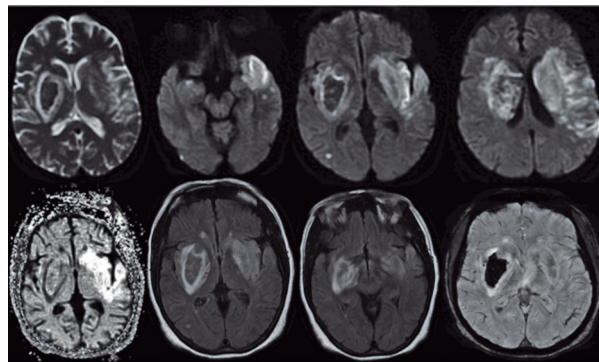
**Ping-Pong Gaze: the eyes that look at the injury**

G. Carvalho Monteiro<sup>1</sup>, M. Pacheco Martinez-Atienza<sup>2</sup>,  
B. Povedano Margarit<sup>1</sup>, J.M. Celi Celi<sup>1</sup>,  
D.E. Barbero Jiménez<sup>1</sup>, A. Garcia-Puente Garcia<sup>3</sup>,  
I. López-Zuazo Aroca<sup>1</sup>, J. Hernandez Cristobal<sup>1</sup>,  
A. Yusta Izquierdo<sup>1</sup>

<sup>1</sup>Neurology, Guadalajara University Hospital, Spain, Guadalajara, Spain, <sup>2</sup>Internal Medicine, Guadalajara University Hospital, Spain, Guadalajara, Spain, <sup>3</sup>Family Medicine, University Hospital of Salamanca, Salamanca, Spain

**Background and aims:** We present an unusual case of bilateral hemispheric Stroke of undetermined cause with atypical clinical presentation Ping-Pong Gaze (PPG).

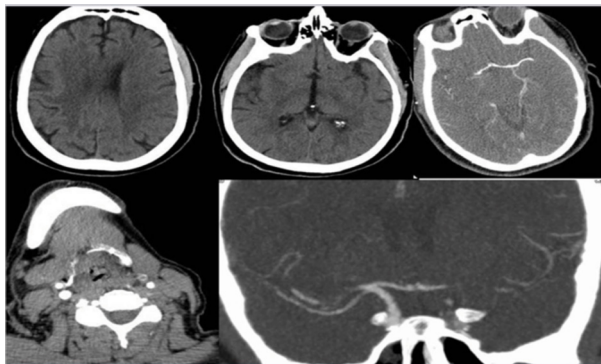
**Methods:** A 66-year-old woman with a history of schizophrenia, brought to the Emergency Department after being found obnubilated, with the impossibility of language emission and weakness in the left hemibody. Intrahospital stroke code is activated presenting NIHSS 19. Thrombectomy is rejected by RANKIN 3 and IV fibrinolysis is initiated. At the end rTPA she stayed in deep coma (Glasgow 4) accompanied by horizontal alternating Roving movements. Hemorrhagic transformation and intracavitary heart thrombus are ruled out. Brain MRI is performed by diagnosing bilateral hemispheric ischemic stroke.



Brain MRI

**Conclusion:** We present a rare case of bilateral hemispheric stroke of undetermined cause, probably embolic (ESUS) that led to the death of the patient in less than 6 hours. We also highlight the atypical clinical presentation with PPG, described by Senelick in 1976. In PPG the eyes move horizontally, conjugately, and rhythmically (with a cycle lasting few seconds) in a pendular manner between the 2 extreme positions, without any associated head movements. This occurs as a result of severe bilateral hemispheric injury, or posterior fossa damage with the brain stem intact and, more rarely, drug toxicity (monoamine oxidase inhibitors administered with or without neuroleptics).

**Disclosure:** Nothing to disclose



Cranial CT and AngioTC

**Results:** Cranial CT with angioTC is performed presenting ASPECT 10 and thrombus in M1 of right ACM and occlusion of CII in its proximal and intracavernous portion. Urgent ecocardiosthoracic without cavity thrombus. Brain MRI ischemic stroke ACMI and in frontal and parietal right territory.



## EPO1341

**No significant Endolymphatic Hydrops in Vestibular Paroxysmia**

E.-L. Kierig<sup>1</sup>, V. Kirsch<sup>1</sup>, J. Gerb<sup>1</sup>, S. Becker-Bense<sup>1</sup>, B. Ertl-Wagner<sup>2</sup>, M. Dieterich<sup>1</sup>

<sup>1</sup>Department of Neurology, University Hospital, Ludwig-Maximilians University, Munich, Germany, <sup>2</sup>Department of Medical Imaging, The Hospital for Sick Children, Toronto, Canada

**Background and aims:** Current studies point to endolymphatic hydrops (ELH) being a pathophysiological syndrome not discriminatory to Menière's disease. Rather ELH seems to be triggering other recurrent dizziness attacks [1] such as in vestibular migraine. However, the data remains scarce.

**Methods:** Therefore, 18 patients with vestibular paroxysmia (VP; 6 females, mean age 55, range 20-77) – a neurovascular cross-compression (NVCC) of the 8th nerve [2] – were age- and gender-matched to 18 healthy controls (HC; 9 females, mean age 53, range 21-84) and underwent delayed intravenous MRI of the inner ear. ELH was characterized [3,4] and quantified using atlas-based segmentation and local thresholding algorithms. Further diagnostic workup included VOG during caloric stimulation, head-impulse test and audiometry.

**Results:** As a result, 22% of VP showed an ELH grade I, 39% a mild accumulation of endolymph fluid (ELA) (grade I following Nakashima 2009, grade 0 following Barath 2014) without qualifying as a hydrops and 89% visualized the NVCC. A unilateral ELH in VP was always accompanied by evidence of an ipsilateral NVCC. In comparison, no HC had an ELH, and only 3% showed an ELA ( $p > 0.01$ ). No correlations between electrophysiological data or grade of ELH and duration of illness or number of attacks were found.

**Conclusion:** In conclusion, for the most part, VP does not seem to entail an ELH in the proper sense. However, VP seems to cause a mild accumulation of endolymphatic fluid when compared to healthy controls, possibly as a sign of disturbance of the inner ear homeostasis by the NVCC.

**Disclosure:** Nothing to disclose

## EPO1342

**Acute vertigo: diagnostic concordance after Neurology observation at emergency department**

J. Lourenço Rosa, A. Barros, A. Fernandes, D. Melancia, F. Godinho, M. Ferro, M. Machado, M. Sequeira, S. Vaz, M. Dias, M. Manita

Neurology Department, Centro Hospitalar Universitário de Lisboa Central, Lisbon, Portugal

**Background and aims:** Acute vertigo (AV) is often a challenging condition. Because of its multidisciplinary nature and multiple causes, patients are frequently observed not only by Neurologists, but also Physicians from other areas, such as Internal Medicine and particularly Otorhinolaryngology. We aimed to assess the diagnostic concordance of AV in patients observed by Neurology and other medical specialties.

**Methods:** Retrospective study with selection of all patients with AV observed by Neurology at the emergency department (ED) of a tertiary centre in 2019, regarding demographic data, imaging studies, diagnosis by Neurology at ED, diagnostic concordance after Otorhinolaryngology observation at ED and after ED discharge by different medical specialties.

**Results:** 104 patients were identified, 54 (52%) of them females. The mean age was 57.6 years. 45% had a history of AV. 80% underwent imaging studies (CT scan and/or MRI). The most frequent diagnosis established by Neurology was benign paroxysmal positional vertigo, followed by vestibular neuronitis. 58 patients were also observed by Otorhinolaryngology with an overall concordance rate of diagnosis of 45%. 54 patients were observed after ED discharge, mostly in Balance Disorders Outpatient Clinic. Diagnosis by Neurology at ED was not significantly different from observation by other medical specialties after ED discharge ( $p = 0.15$ ) regarding the distinction between peripheral and central causes of AV.

**Conclusion:** Taking into account diagnosis concordance rate at ED and after discharge, our data suggest that patients with AV should be primarily evaluated by Neurology at ED, avoiding redundant observations and allowing faster patient management.

**Disclosure:** Nothing to disclose

## EPO1343

**Superior ophtalmic vein thrombosis.**

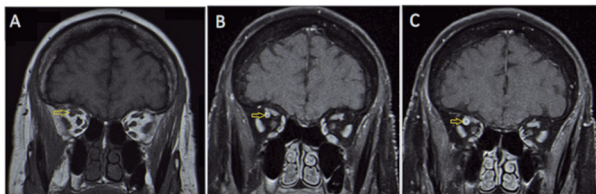
E. Marin Conesa<sup>1</sup>, A.M. García Medina<sup>1</sup>,  
I. Pellicer Espinosa<sup>1</sup>, E. Gómez López<sup>1</sup>,  
M. Martínez Zarco<sup>1</sup>, M. Morales de la Prida<sup>2</sup>,  
F.J. Pareja Herrero<sup>1</sup>, L. Sanchez Alonso<sup>1</sup>,  
I. Pena Fernández<sup>1</sup>, N. Lacasa Perez<sup>3</sup>, J. Marín Marín<sup>1</sup>,  
J.M. Rodríguez García<sup>1</sup>, J.A. Iniesta Valera<sup>1</sup>

<sup>1</sup>Neurology, Hospital General Universitario Reina Sofía, Murcia, Spain, <sup>2</sup>Murcia, Spain, <sup>3</sup>Hospital General Universitario Reina Sofía, Murcia, Spain

**Background and aims:** Superior ophthalmic vein thrombosis (SOVT) may present similar to, or occur together with, orbital cellulitis (OC) or cavernous sinus thrombosis (CST). According to a recent review of SOVT, the aseptic etiologies were more frequent than septic ones. Aseptic causes include vascular malformations, autoimmune/systemic diseases, trauma, Haematological diseases, Malignancies or neoplasms, Hormonal Minestrine and others (e.g: diabetes, idiopathic). Septic ones are sinusitis, orbital infections, facial infections and others (e.g: otomastoiditis, Lemierre syndrome).

**Methods:** We describe a 77-year-old woman with a sudden palsy of 3<sup>rd</sup> and 4<sup>th</sup> cranial nerves due to a superior ophthalmic vein thrombosis.

**Results:** A 77-year-old woman with a history of high blood pressure, diabetes mellitus, obesity, atrial fibrillation in treatment with Rivaroxaban (15mg/24h), obstructive sleep apnea hypopnea syndrome and chronic renal disease, presented a sudden ptosis of right eyelid. At the hospital, a complete 3<sup>rd</sup> and 4<sup>th</sup> right cranial nerves palsy was observed. Brain MRI (figure, A-E) revealed right superior ophthalmic vein thrombosis (SOVT). Analyses showed high homocysteine levels. Other possible differentials were excluded. Treatment with Acenocumarol was initiated with an improvement of symptoms.



Brain and orbits contrast MRI scan: T2-FLAIR (A) sequence reveals enlargement of caliber of right superior ophthalmic vein wall (A, arrow). Gadolinium-enhanced fat-saturated T1-weighted imaging (B and C) shows an increase in caliber and abnormal enhancement of right superior ophthalmic vein wall (B and C, arrow).

**Conclusion:** The patient presented a painless complete 3<sup>rd</sup> and 4<sup>th</sup> cranial nerve palsy due to acute isolated superior ophthalmic vein thrombosis. This pathological condition usually accompany cavernous sinus thrombosis, but not this time. Many pathologies can cause this disease, hence an exhaustive study must be done in order to rule out treatable conditions. Aseptic causes are more frequent than septic ones. Whether all complementary tests are normal, idiopathic cause may be considered.

**Disclosure:** Nothing to disclose

## EPO1344

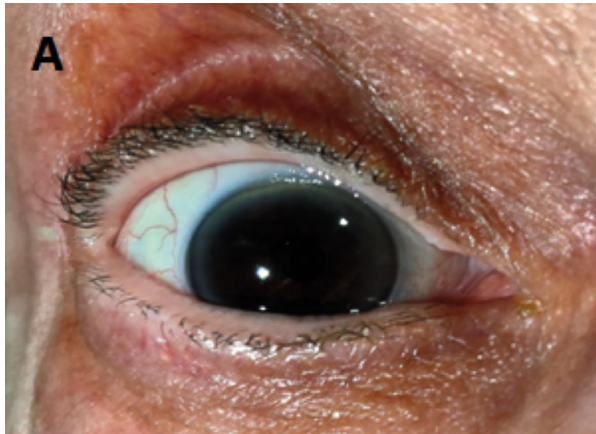
**Incomplete third nerve palsy with pupillary involvement following intravitreal anti-VEGF therapy for neovascular age-related macular degeneration: case report and literature review**

F. Perez Trapote, J. Gómez Corral, R. Sainz Amo,  
A. Celdrán de Castro García, B. Baena Álvarez,  
A. Saez Marin, P. Lorenzo Barreto,  
E.S. Stiauren Fernandez, N. García Barragán, F.J. Buisan  
Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain

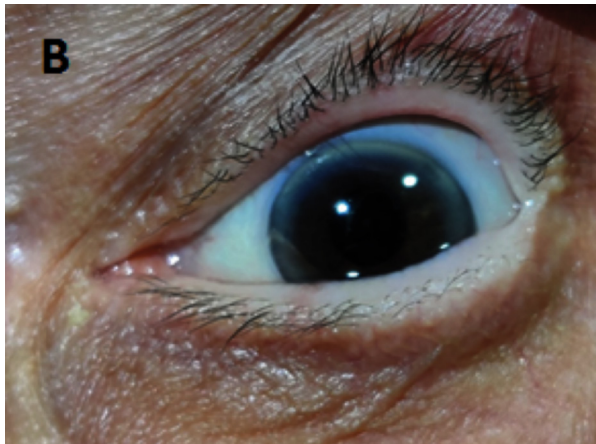
**Background and aims:** Intravitreal injection of anti-vascular endothelial growth factor (VEGF) has been extended as a useful therapy at neovascular age-related macular degeneration (NVAMD) treatment. Reviewing medical literature suspected adverse systemic events are scarcely described including a sixth and one sparing pupil third nerve palsy .

**Methods:** A literature review on cranial nerve palsy following intravitreal anti-VEGF was done. Herein we present the 1<sup>st</sup> case of 3<sup>rd</sup> nerve palsy with pupillary involvement in a patient on Bevacizumab treatment.

**Results:** An 85-year-old woman with left NVAMD and mild hypertension presented to the emergency room complaining about dizziness and double vision after the 4<sup>th</sup> bevacizumab injection given 3 weeks before. On examination she had a marked reduction in adduction and elevation as well as ptosis and mild light reactive mydriasis in the left eye. Angio and brain MRI scan showed no evidence of infarction of any relevant abnormalities of the major cerebral vessels. Based on this we consider a vasculopathic form of oculomotor nerve palsy by occlusion of the small penetrating arteries secondary to the antiangiogenic therapy.



A: Right eye, showing a reactive to light pupil with normal size.



B: Left eye, showing a mild light reactive mydriatic pupil due to parasympathetic fibers damage.

**Conclusion:** Intravitreal anti-VEGF therapy appeared to be safe and well tolerated. Nevertheless, some severe systemic side effects related to its antiangiogenic activity may show up. As physicians we should be aware of this potential relationship between microvascular damage and anti-VEGF therapy when using this treatment on an elderly AMD population.

**Disclosure:** Nothing to disclose

## EPO1345

### Bilateral optic neuritis of immune etiology by nivolumab, an anti-PD-L1 antibody.

#### A case report.

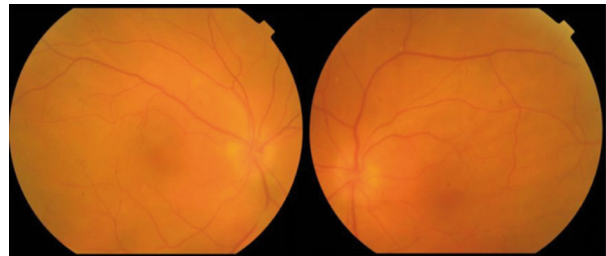
M. Vicente-Pascual<sup>1</sup>, K. Rosas-Soto<sup>2</sup>, E.P. Murata-Yonamine<sup>3</sup>, D. Vázquez-Justes<sup>1</sup>, F. Purroy<sup>1</sup>, A. Traveset-Maeso<sup>4</sup>

<sup>1</sup>Department of Neurology, Arnau de Vilanova Hospital, Lérida, Spain, <sup>2</sup>Department of Neurosurgery, Arnau de Vilanova Hospital, Lérida, Spain, <sup>3</sup>Department of Oncology, Arnau de Vilanova Hospital, Lérida, Spain, <sup>4</sup>Department of Ophthalmology, Arnau de Vilanova Hospital, Lérida, Spain

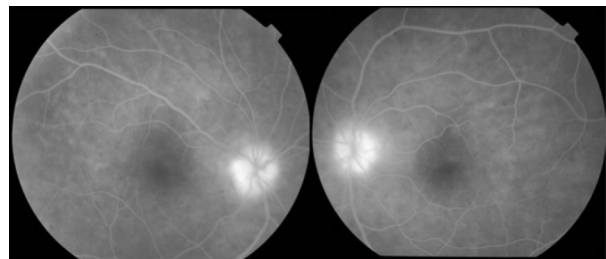
**Background and aims:** Checkpoint inhibitors have been established as an alternative treatment for various cancers, including renal cancer. Among these drugs are nivolumab, a human monoclonal antibody immunoglobulin type G4 that binds to the programmed death receptor 1. Since these treatments exert their activity by activating the immune system to attack tumor cells, immune adverse reactions are being described.

**Methods:** We presented a 70-year-old woman with a history of cell renal carcinoma, with nephroureterectomy and subsequent adjuvant chemotherapy with sunitinib. After 2 years it was discontinued due to symptomatic hypothyroidism and neutropenia. Therefore, treatment with nivolumab was started. After the third cycle, a decrease in bilateral visual acuity began.

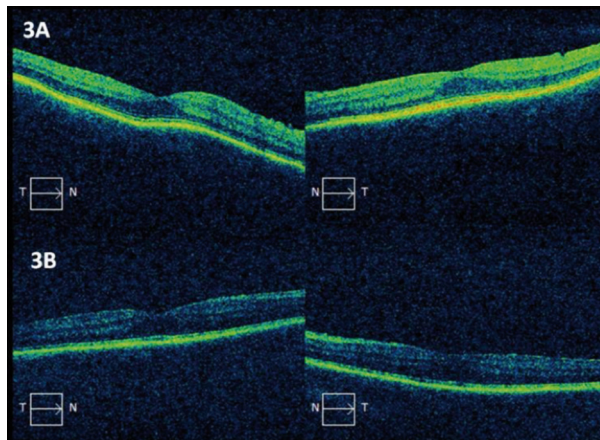
**Results:** The ophthalmological study showed papillae edema (figure 1), a fluorescein angiography showed bilateral hyperfluorescence (figure 2) and the optical coherence tomography showed thickening of ganglion fibers (figure 3A), all compatible with bilateral optic neuritis. The neurological study was normal. After removing the drug, papillae edema disappeared, without progressing the visual deficit (figure 3A).



Fundus showing bilateral papillae edema. Right eye in the image on the left. Left eye in the image on the right.



Fluorescein angiography shows bilateral papillary hyperfluorescence.



A: Optical coherence tomography (OCT) performed with treatment with nivolumab. It showing thickening of ganglionic fibers. Right eye in the image on the left. Left eye in the image on the right. B: OCT performed after removing the nivolumab. Normal OCT. Right eye in the image on the left. Left eye in the image on the right.

**Conclusion:** To date 2 cases similar to our patient have been described. 1 of them presents a child with a glioblastoma multiforme, who developed optic neuritis 3 days after the 2<sup>nd</sup> cycle of treatment. The 2<sup>nd</sup> is about an adult with lung carcinoma, who presented a left optic neuritis, associated with hypopituitarism. We reported the 3rd case presenting with optic neuritis, which is possibly an immune related adverse event associated with anti-PD-L1 antibody treatment. We concluded that optical toxicity of nivolumab should be considered as a serious and possible adverse event.

**Disclosure:** Nothing to disclose

## Neurotoxicology/occupational neurology

EPO1346

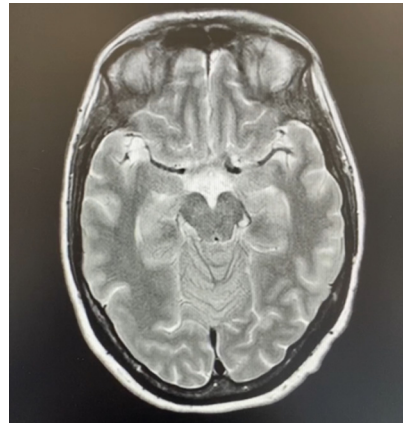
### Neurotoxicity after bupivacaine administration: description of 2 cases.

G. Agirre Beitia<sup>1</sup>, A. Moreno Estébanez<sup>1</sup>,  
T. González-Pinto González<sup>1</sup>, L. Cabral Martínez<sup>1</sup>,  
A. Jauregui Barrutia<sup>2</sup>, M. Fernández Martínez<sup>1</sup>,  
J.J. Zarranz Imirizaldu<sup>1</sup>, A. Rodríguez-Antigüedad<sup>1</sup>  
<sup>1</sup>Neurology, Cruces University Hospital, Barakaldo, Spain,  
<sup>2</sup>Neurology, Cruces University Hospital, Osakidetza,  
Barakaldo, Spain

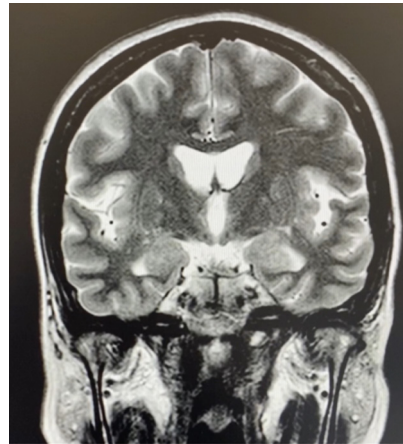
**Background and aims:** Bupivacaine is a common anesthetic, frequently used in surgical procedures. The use of bupivacaine had not been associated with permanent effects in memory, until now.

**Methods:** We describe 2 cases of patients with permanent anterograde amnesia, lymphocytic meningitis and bilateral hippocampal lesion following bupivacaine administration.

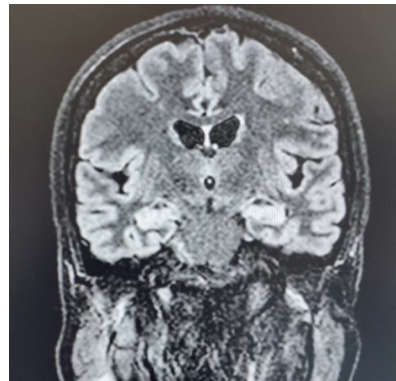
**Results:** The 1<sup>st</sup> patient is a 38-year-old pregnant woman who received bupivacaine epidurally during labor induction. 2 hours later, the patient presented confusion, disorientation and anterograde amnesia. The 2<sup>nd</sup> patient is a 68-year-old woman who underwent renal calculi coral surgery who received spinal anesthesia with bupivacaine. After the intervention, the patient presented disorientation and anterograde amnesia. In both cases, the study of cerebrospinal fluid showed lymphocytic pleocytosis, with a normal biochemical and microbiological study. The cerebral MRI of the patients show a diffuse, bilateral and symmetrical alteration in both hippocampi, without detecting other parenchymal or vascular alterations (Figure 1, 2 and 3). In none of the cases, despite a large study, no other possible precipitant of the condition was found, establishing as a more probable diagnosis the bupivacaine neurotoxicity with bilateral hippocampal involvement.



Axial T2 MRI image



Coronal T2 MRI image



Coronal STIR Flair MRI image

**Conclusion:** Despite the passage of time, the 2 patients continue with a permanent amnesia of anterograde predominance, with a striking defect in topographic memory. We have not found in the literature any article describing a similar sequence of events. Although infrequent, given the severity and disabling effect it has on patients, we consider it important to describe these cases. The possible adverse drug reaction has been reported to the European pharmacovigilance service.

**Disclosure:** Nothing to disclose

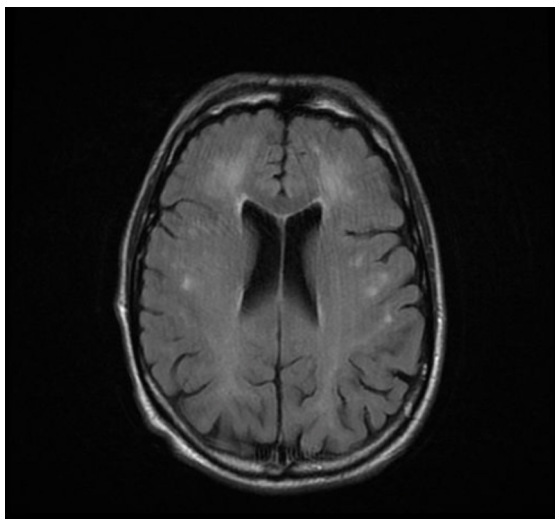
## EPO1347

**Acute retention of urine as an initial symptom of delayed hypoxic encephalopathy**

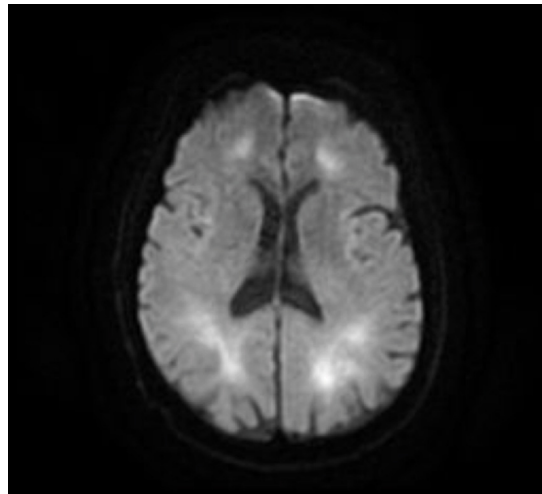
D.E. Barbero Jiménez, G. Carvalho Monteiro, J. Celi Celi, B. Povedano Margarit, J. Hernandez Cristobal, J.M. Fernández Carril, A. Yusta Izquierdo  
 Neurología, Hospital Universitario Guadalajara, Guadalajara, Spain

**Background and aims:** Delayed posthypoxic leukoencephalopathy (DPHL) is a demyelination syndrome characterized by the onset of neuropsychiatric symptoms weeks after exposure to low concentrations of oxygen or CO poisoning. It's diagnosed by medical history and diagnostic test, especially magnetic resonance imaging (MRI).

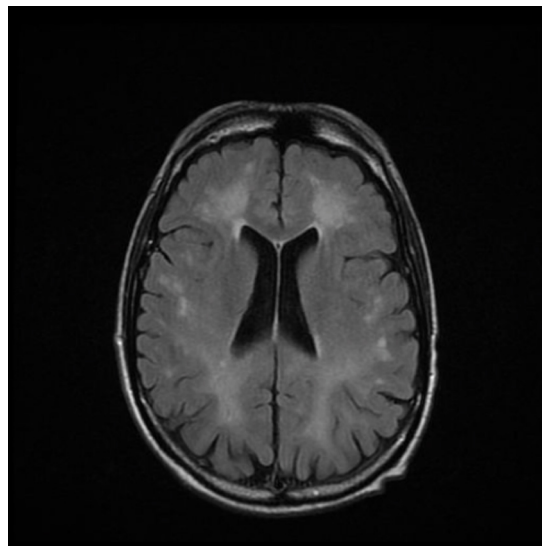
**Methods:** We present a 63-year-old man who, after climbing in Bolivia at 3600 meters, is found unconscious in his shelter the next day, near a combustion engine. He regained consciousness spontaneously and was diagnosed with altitude sickness. After 10 days, he begins with temporo-spatial disorientation and bradypsychia, in neurological examination appears dysnomia and agrafia with Mini-Mental State Examination of 14/30. EEG demonstrated slow and desynchronized activity in a generalized way. Brain MRI<sup>1,2</sup> showed demyelinating lesions in bilateral white matter at the frontoparietotemporal level with cytotoxic edema. Brain MRI<sup>3</sup> at 7 days showed lesion growth, initiating treatment with hyperbaric oxygen for 25 sessions. MRI was repeated at 5 months with decrease of described radiological findings and almost complete clinical recovery.



Brain MRI1: Extensive involvement of the white, bilateral and symmetrical substance, at the frontoparietotemporal level, with some left occipital lesion, with hypersensal in T2 and FLAIR



Brain MRI2: In diffusion weighted imaging (DWI) hypersensal is observed due to restriction of the movement of free water molecules, translating the presence of cytotoxic edema,



Brain MRI3: The extensive involvement of deep white, periventricular and semioval centers at the frontal, parietal, temporal and occipital, bilateral and symmetric levels, hyperintense in T2 and FLAIR is even more striking than in the previous study.

**Results:** In DPHL the symptoms that may appear are extrapyramidal syndrome, memory disorders and urinary incontinence, among others. In our patient, draws attention to the appearance of acute retention of urine and the subsequent presentation of cognitive symptoms, with 2 possible pathophysiological mechanisms such as hypobaric hypoxia and poor CO combustion.

**Conclusion:** DPHL has a variable prognosis, it must be recognized early. The treatment in hyperbaric chambers is discussed, although after the good clinical and radiological evolution of our patient we support the performance of deferred hyperbaric therapy to reduce cerebral edema and increase remyelination.

**Disclosure:** Nothing to disclose

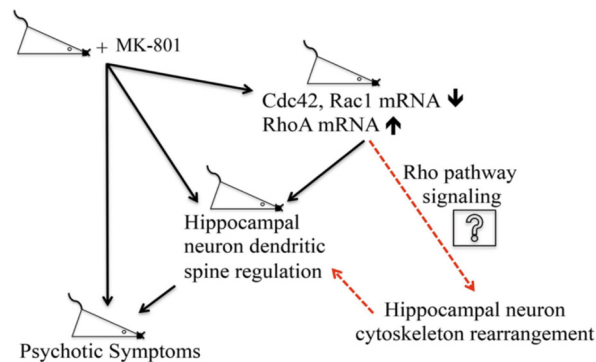
## EPO1348

## Haloperidol induced behavior rehabilitation and Rho signaling regulation in the brain of dizocilpine rat model of schizophrenia

M.-L. Chen

Department of Research, Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, New Taipei City, Taiwan, Chinese Taipei

**Background and aims:** The molecular mechanisms for antipsychotic drug (APD) in smoothing psychotic symptoms are still unclear. Dizocilpine, also named MK-801, was mentioned could induce schizophrenia-like psychotic symptoms in various animals. Also, MK-801 was reported that can modulate Rho family proteins mRNA expressions and also the dendritic spines morphology in rat hippocampus. MK-801 induced hippocampal neuron impairments and dendritic spines modulation have been linked to the psychotic symptoms in rats. This study tries to clarify the relations between Rho signaling regulation and MK-801 induced abnormal psychotic behaviors in mice.



MK-801 could induce psychotic symptoms in mice and also could modulate RhoA/Cdc42 expression. The RhoA/Cdc42 were also mentioned could modulate hippocampal neuron post-synaptic dendrite expression related to psychotic symptoms. **We try to verify whether Rho signaling pathway controlled cytoskeleton rearrangement and F-actin condensation are related to hippocampal neuron dendritic spines expression and psychotic symptoms induction in MK-801 psychotic mice model.**

**Methods:** Hyperactivity in C57BL/6 mice was induced by MK-801 treatment and eased by haloperidol treatment. Open field test was used to determine locomotor activity of mice. Immunoblotting were applied to examine Rho signaling protein regulation in the mice cortex. Cytoskeleton rearrangement and cell migration ability in primary neuron culture will be tested further.

**Results:** Our data showed haloperidol could rescue MK-801 induced hyperactivity in mice (Figure 1). We also found that MK-801-induced RhoA expression induced would be reduced by haloperidol or clozapine treatment (Figure 2) in mice cortex. Both haloperidol and clozapine might recover MK801 induced Cdc42 reduction in mice cortex (Figure 3). MK-801-induced reduction of PSD95 (post-synaptic density 95 protein) would be recovered by clozapine treatment (Figure 3). Also, PAK1 expression would be

reduced by haloperidol treatment in mice cortex (Figure 2) treated with MK-801.

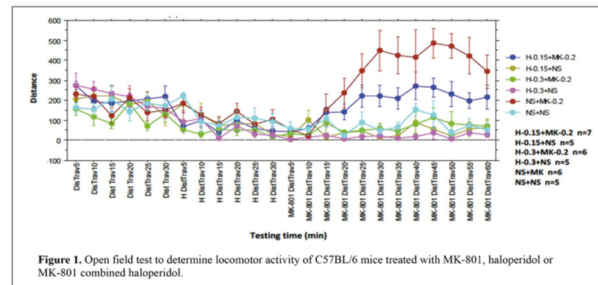


Figure 1. Open field test to determine locomotor activity of C57BL/6 mice treated with MK-801, haloperidol or MK-801 combined haloperidol.

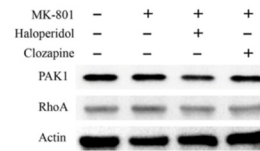


Figure 2. Effects of haloperidol and clozapine on MK-801 induced RhoA and PAK1 modulation.

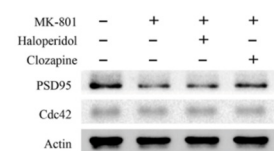


Figure 3. Effects of haloperidol and clozapine on MK-801 induced Cdc42 and PSD95 modulation.

**Conclusion:** We proposed that APDs might modulate cell biological functions of cortical neurons by regulating Rho signaling to ease the psychotic symptoms or abnormal behaviors induced by MK-801 in mice.

**Disclosure:** This work was supported by the grant (TCRD-TPE-106-23) of the Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, New Taipei City, Taiwan, Republic of China.

## EPO1349

**An unsuspected toxic can solve a rare clinical case**

M. Fernández García, M. Hernández Holgado, A. Fernández Revuelta, A. Baltasar Corral, C. Delgado Suárez, A. Gómez Esteban, A. Guerrero Sola, A. Marcos Dolado, E. Lopez Valdes, R. Ginestal  
*Neurology, Hospital Clínico San Carlos, Madrid, Spain*

**Background and aims:** Neurotoxicology is a vast field of study, with a never-ending list of toxics and syndromes. However, recognizing the patterns of the syndromes now considered rare can help us to better diagnose and treat the patients who suffer from them.

**Methods:** We present the case of a 66-year-old female admitted for dysarthria, paresthesias of the tongue and the limbs, and weakness of the lower limbs, evolving over 3 weeks. As relevant previous history, she denies alcohol consumption. She suffered a car crash in her youth that caused head and hip trauma resulting in right 6th cranial nerve palsy and right hip replacement. The hip prosthesis had to be replaced 3 months prior to her admittance due to prosthetic infection. She was treated with metronidazole since surgery until 2 days before admittance. The neurological examination upon arrival found dysarthria, upbeat nystagmus, weakness of the left leg, hypopalesthesia of the lower limbs, lack of proprioception in hands and feet and ataxia of the left arm, along with a subtle frontal syndrome.

**Results:** The magnetic resonance showed bilateral red nucleus and olivary nucleus hyperintensity, along with bilateral subcortical white matter hyperintensity (Figure 1). The nerve conduction study disclosed a sensory axonal polyneuropathy. Without metronidazole treatment, the neurological signs significantly improved and the patient was discharged with only mild sensory symptoms remaining.

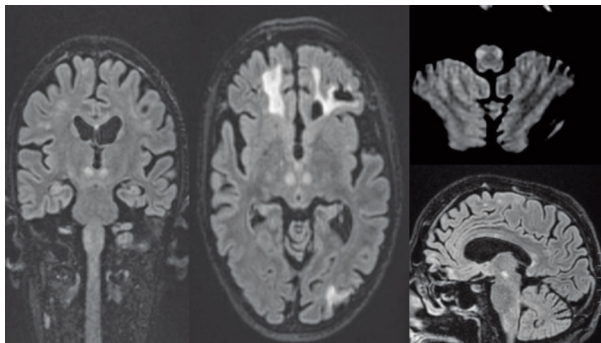


Figure 1. FLAIR sequence cuts (coronal, axial, and sagittal) showing bilateral red nucleus and olivary nucleus hyperintensity, along with bilateral subcortical white matter hyperintensity, besides known lesions secondary to head trauma.

**Conclusion:** Metronidazole-induced neurotoxicity should be considered in metronidazole-treated patients showing neurological symptoms otherwise unexplained. The magnetic resonance findings are quite specific and help diagnosis. After stopping metronidazole, the majority of patients improve.

**Disclosure:** Nothing to disclose

## EPO1350

**Myoneuropathy induced by colchicine toxicity: divergent prognosis for myopathic and neuropathic symptoms.**

A. Fernández Revuelta<sup>1</sup>, A. Baltasar Corral<sup>1</sup>, M. Fernández García<sup>1</sup>, M. Hernández Holgado<sup>1</sup>, E. Sanesteban Beceiro<sup>1</sup>, R. Cortés Bonilla<sup>2</sup>, L. Iglesias Alonso<sup>2</sup>, J.C. Plaza Hernández<sup>3</sup>, I. Casado Fariñas<sup>3</sup>, A. Horga<sup>1</sup>, A. Marcos Dolado<sup>1</sup>, E. Lopez Valdes<sup>1</sup>, R. Ginestal<sup>1</sup>  
<sup>1</sup>*Neurology, Hospital Clínico San Carlos, Madrid, Spain,*  
<sup>2</sup>*Neurophysiology, Hospital Clínico San Carlos, Madrid, Spain,*  
<sup>3</sup>*Anatomical pathology, Hospital Clínico San Carlos, Madrid, Spain*

**Background and aims:** Colchicine prevents gout attacks. Its neuromuscular adverse effects are unusual, with only few cases of myoneuropathy published and a prognosis not clearly established.

**Methods:** A 56-year-old man with stage 5 chronic renal disease and colchicine-treated gout started suffering from distal numbness in all 4 limbs 6 months before admittance. 1 month before consulting, he developed progressive gait instability and weakness in all extremities leading to the loss of independent walking. He had proximal limb weakness with absent muscle stretch reflexes in the legs. Vibration sensation was reduced, and position sensation was abolished in all four limbs. A marked sensory gait ataxia was present.

**Results:** Laboratory tests showed deterioration of renal function and increase of serum creatine kinase. EMG demonstrated signs of acute sensory motor axonal polyneuropathy. Muscle biopsy showed intracellular vacuoles with basophilic granular material, confirming the diagnosis of vacuolar myopathy induced by colchicine (Figure 1, figure 2). Treatment with colchicine was terminated, resulting in rapidly progressive weakness improvement, consistent with the steady normalization of creatine kinase levels (Figure 3). Numbness and disturbance of vibration and position sensations continued months after discharge revealing that myopathic changes were shortly reversible, not so the neuropathic pathology induced by colchicine.



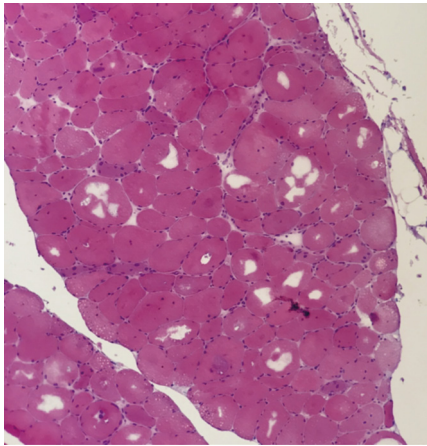


Figure 1- Skeletal muscle with preserved architecture and intracellular vacuoles (H-E, x200)

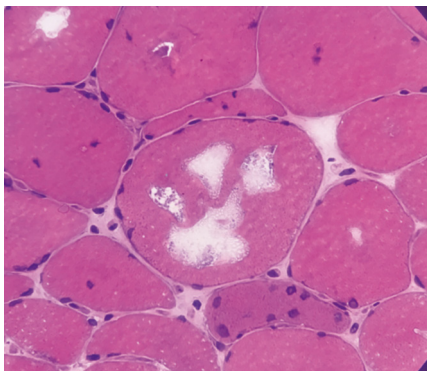


Figure 2- Image of intracellular vacuoles (H-E, x400)

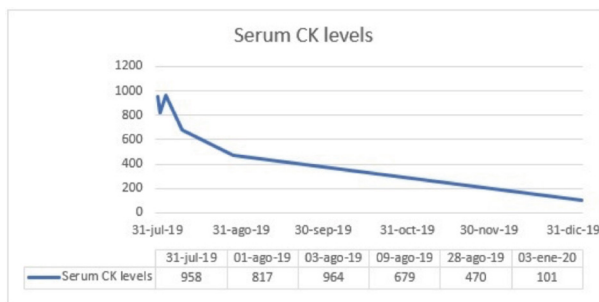


Figure 3- Serum CK levels

Figure 3- Serum CK levels

**Conclusion:** Colchicine-induced myoneuropathy is characterized by subacute, painless and proximal lower limb weakness. Although uncommon, it should be considered after prolonged colchicine use, even within the usual dose range, especially with risk factors like chronic renal disease or treatments metabolized by the CYP3A4 system. Prognosis seems good for myopathic symptoms, uncertain for neuropathic ones.

**Disclosure:** Nothing to disclose

## EPO1351

### Neurological and hematological disturbances joined by the Occam's razor

D. Ferreira<sup>1</sup>, A. Lúcia Costa<sup>2</sup>, A. Costa<sup>1</sup>, P. Abreu<sup>1</sup>  
<sup>1</sup>Neurology, Centro Hospitalar e Universitário São João, Porto, Portugal, <sup>2</sup>Psychiatry and Mental Health, Centro Hospitalar Tondela-Viseu, Viseu, Portugal

**Background and aims:** Excessive zinc ingestion might cause a decreased copper absorption. It is a possible pathogenic etiology for neurodegeneration of central and peripheral nervous system and hematologic manifestations.

**Methods:** Case-report.

**Results:** A 47-year-old male presented a 1-year history of weakness and numbness with a proximally progressive pattern, walking imbalance and urinary symptoms. His previous medical history included a 2-years study of anaemia and leukocytopenia for which he was being investigated by haematology. His examination showed a mild paraparesis with decreased distal pinprick perception to the wrist in the upper limbs and to the hips in the lower limbs; hypopalesthesia to T10 level, hyporeflexia in the upper limbs and lower limbs hiperreflexia, positive Romberg sign and ataxic gait. Analytical study revealed a low serum level of copper and elevated serum and urine levels of zinc. Nerve conduction studies depicted a severe axonal sensorimotor polyneuropathy and spinal cord MRI showed abnormal signal on T2-weighted images confined to the dorsal columns between C2-C6 segments (figure 1). After inquiring for environmental exposures, we found a 5-years daily use of denture fixative containing zinc. He was advised to switch to a zinc-free cream and started on oral copper supplementation with a complete resolution of cytopenias but only a slight improvement in pinprick sensation after 3 months.

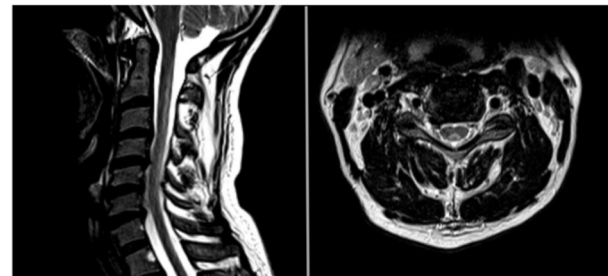


Figure 1. Sagittal (A) and axial (B) T2-weighted MRI demonstrates a contiguous, non-enhancing, increased signal lesion in the posterior columns between the cervical segments C2-C6.

**Conclusion:** Unexplained cytopenia associated with neurological manifestations should prompt clinicians to look for causes of copper deficiency, namely excessive zinc intake. This case illustrates the diagnostic challenge and insidious clinical manifestations of an unusual cause of myeloneuropathy with a potentially unfavourable outcome.

**Disclosure:** Nothing to disclose

## EPO1352

**Posterior reversible encephalopathy syndrome after exposure to disulfiram**

P. Ferreira, F. Hierro, M.I. Vilas Boas, A. Monteiro  
*Neurology, ULSM - Hospital Pedro Hispano, Senhora da Hora, Portugal*

**Background and aims:** Posterior reversible encephalopathy syndrome (PRES) is characterized by acute cerebral endothelial lesion followed by blood-brain-barrier disruption, with predominantly occipito-parietal vasogenic edema. Drug toxicity is among the most common causes, especially chemotherapy agents and immunosuppressants. PRES after exposure to disulfiram is seldom reported.

**Methods:** Clinical description of a PRES case after exposure to disulfiram.

**Results:** A 55-year-old male, with a history of chronic alcohol abuse was found unconscious. 3 days prior, he was started on disulfiram 500mg/day. Tonic-clonic seizure was reported during transportation to the emergency department. On admission, blood pressure was 144/92mmHg, 38°C temperature. Neurological examination revealed global aphasia and right hemiparesis. Cerebral CT scan showed bilateral subcortical parieto-occipital hypodensities. Tests for blood alcohol and other drugs were negative. Lumbar puncture showed slightly elevated protein but was otherwise normal. Antiepileptics, benzodiazepines and high-dose thiamine were started and disulfiram was discontinued. Cerebral MRI showed extensive bilateral subcortical occipital T2 hyperintensities with extension to parieto-frontal areas. The patient remained free of seizures for the remaining hospitalization, and fully recovered from the deficits, maintaining amnesia for the events 3 days prior to admission. Infectious and autoimmune testing were negative. A cerebral MRI 3 weeks after admission showed almost complete regression of the hyperintensities.

**Conclusion:** The pathophysiology and aetiology of PRES are still largely unknown. We describe a case of PRES after a short period of exposure to disulfiram. Some neurotoxic effects of disulfiram are well known and documented, but its association with PRES is still unclear. Disulfiram should be recognised as a potential aetiology.

**Disclosure:** Nothing to disclose

## EPO1353

**Neurointoxication with Saxitoxin: "Alimentary, my dear Watson!"**

C. IoneI, I.R. Marques, M.D. Grunho  
*Neurology, Hospital Garcia de Orta, Almada, Portugal*

**Background and aims:** Paralytic shellfish poisoning (PSP) occurs after ingestion of shellfish contaminated with saxitoxin, a neurotoxin produced by algae. Gastrointestinal and neurological symptoms usually develop within hours after consumption, and rapidly progressive muscle paralysis and respiratory arrest may ensue. Treatment is supportive since there is no available antidote.

**Results:** A 69-year-old male presented with sudden onset of dizziness, perioral and bilateral hand tingling, myalgia and generalized muscle weakness. Neurological examination revealed flaccid tetraparesis, dysphonia, dysarthria, bilateral peripheral facial palsy, and symmetrical distal limb hypoesthesia. He additionally reported that he and his sister had consumed recreationally harvested mussels a few hours before developing the symptoms. His sister, a 63-year-old female, presented with vomiting, dizziness and perioral tingling starting 30 minutes after consuming the mussels. On neurological examination she had mild tetraparesis, and perioral and distal lower limbs hypoesthesia. Both patients were hospitalized, initially in Intensive Care Unit for close monitoring. It was not possible to analyze a direct sample of the harvested shellfish, but the urine samples were positive for saxitoxin, thus confirming the diagnosis of PSP. They improved gradually and were later discharged almost symptom-free.

**Conclusion:** We report 2 cases of PSP with different clinical severity. PSP outbreaks have been reported worldwide. Although it seems to be a rare phenomenon in our country, it might be underdiagnosed as mild symptoms may not be recognized. PSP can be fatal without the appropriate management, so it is crucial that healthcare professionals, especially neurologists, are aware of this clinical entity.

**Disclosure:** Nothing to disclose

## EPO1354

**An unusual case of ataxia of toxic origin**

A. Raskurazhev, P. Kuznetsova, M. Tanashyan  
*Department of Angioneurology, Research Center of Neurology, Moscow, Russian Federation*

**Background and aims:** Ataxia implies a clinical syndrome of incoordination, which may result from disorders affecting cerebellum and associated pathways. Among the most prominent presentations of ataxia are: dysarthria, nystagmus, gait disturbances and dysmetria. We present an unusual case of subacute ataxia of toxic origin due to phenobarbital exposure.

**Methods:** Patient J., male, 32 years, had an appointment in our clinic where he complained of slurred speech, vertigo, unsteadiness and “woozy” gait. The symptoms developed gradually in the course of several days with no apparent cofounder.

**Results:** On examination the patient was responsive, mildly lethargic. Neurologic examination revealed moderate dysarthria, severe horizontal and vertical nystagmus, dysmetria during finger-to-nose test, dysrhythmic tapping of hands. Other signs included kinetic tremor, muscular hypotonia, and hyporeflexia. The gait was unsteady, wide-based. A brain MRI scan was performed which showed no signs of ischemic or degenerative pathology. A more thorough inquiry was performed. It was found out that during the past month the patient had trouble sleeping, which prompted him to use a drug marketed in Russia by the name of “Valocordin”. Subsequent blood and urine tests were performed (Image 1), which demonstrated a marked increase of phenobarbital excretion. This led us to believe that the patient had experienced subacute phenobarbital intoxication with ataxia as the most prominent clinical presentation.

Image 1. Laboratory findings in patient J., 32 yrs

	Value	Reference
<b>Complete blood count</b>		
Hemoglobin	151 g/l	131 – 173 g/l
Red blood cells	5,06 x 10 <sup>12</sup> /l	4,3 – 5,7 x 10 <sup>12</sup> /l
Hematocrite	44,3%	39–49%
Platelets	386 x 10 <sup>9</sup> /l	180–320 x 10 <sup>9</sup> /l
White blood cells	7,29 x 10 <sup>9</sup> /l	4,5 – 11,3 x 10 <sup>9</sup> /l
ESR	17 mm/h	0 – 15 mm/h
<b>Hemostasis</b>		
APTT	31,9 s	25,1 – 36,5 s
PTI	98%	70 – 130%
Fibrinogen	5,11 g/l	1,8 – 4,0 g/l
Antithrombin III	153%	75–125%
<b>Blood chemistry</b>		
Creatinine	68,0 mcmol/l	62–106 mcmol/l
Glucose	5,0 mmol/l	4,1 – 5,9 mmol/l
ALT	18,6 U/l	< 41 U/l
AST	28,3 U/l	< 40 U/l
Creatin kinase	211 U/l	< 190 U/l
Bilirubin	3,1 mcmol/l	< 24 mcmol/l
C-reactive protein (hs)	83,97 mg/l	< 5 mg/l
Uric acid	468,0 mcmol/l	202,3 – 416,5 mcmol/l
<b>Barbiturate detection in urine</b>		
Amobarbital	0,0 ng/ml	0 – 200 ng/ml
Butalbarbital	0,0 ng/ml	0 – 200 ng/ml
Pentobarbital	0,0 ng/ml	0 – 200 ng/ml
Secobarbital	0,0 ng/ml	0 – 200 ng/ml
Phenobarbital	501538,9 ng/ml	0 – 200 ng/ml

**Conclusion:** A broad spectrum of underlying pathologies is associated with ataxia, sometimes presenting a major difficulty for differential diagnosis. The described case underlines the necessity of a detailed and thorough patient interview.

**Disclosure:** Nothing to disclose

## EPO1355

**Lupin bean intoxication: an odd case of dysautonomic symptoms**

D. Silva, S. Parreira, A.P. Antunes, A.F. Valadas  
*Department of Neurosciences and Mental Health, Hospital de Santa Maria, Centro Hospitalar Universitário de Lisboa Norte, Lisbon, Portugal*

**Background and aims:** Lupinus albus is a traditional bean cultivate in the Mediterranean region, especially popular in Portugal as a snack. We report a case of dysautonomic symptoms after lupin bean consumption.

**Methods:** Case report description

**Results:** A 39-year-old man with no past medical history was admitted to the ER complaining of inability to read at nearest distances and blurred vision with bright light, beginning 9 hours earlier, accompanied by dry eyes and mouth, and feeling anxious. He was hemodynamically stable. The neurological examination revealed fixed bilateral mydriasis with no accommodation reflex, xerophthalmia, xerostomia and restless. Lab work and head CT scan showed no abnormalities. Given this clinical picture, the patient was asked about the ingestion or contact with any canned food, medications, drugs, organophosphates but he denied it. He only insisted on the ingestion of a large amount of lupin beans harvested and home prepared, 3 hours before symptoms onset. At the time, this information was not considered relevant to explain patient’s symptoms. During the observation period the patient vomited, including the lupin beans he had eaten earlier. 16 hours after symptoms onset the patient recovered completely, with no further actions required.

**Conclusion:** Lupinus albus has a quinolizidine alkaloid component which is toxic and associated with anti-cholinergic symptoms if improperly prepared with unprolonged soaking. After some research we found that the patient’s lupin crop was not fully prepared yet, thus explaining the dysautonomic symptoms. This case reminds us that patients often provide the etiology of their condition if we listen them carefully.

**Disclosure:** Nothing to disclose

## EPO1356

### **A rare cause of Parkinsonism - Manganese toxicity**

P.K. Yadav

*Durgapur ,Burdwan, India*

**Background and aims:** 43-year-old male presented with 6 months history of gradual onset and progressive bradykinesia, tremors of upper limbs and imbalance and short shuffling gait. He also had slurring of speech with hypophonia. Neurological examination revealed slow broken saccades, rigidity with cogwheeling, bradykinesia and short shuffling, festinant gait. He had action and postural tremors of upper limbs. Pull test was positive. Thus a diagnosis of Young onset Parkinsonism was considered.

**Methods:** Occupational history revealed that he worked in blast furnace of a steel plant since past 14 years. He was evaluated with MRI Brain which showed symmetrical hyperintensities involving basal ganglia and subcortical white matter in T2 weighted images. T1 weighted images showed evidence of basal ganglia hyperintensities probably related to mineral deposition. KF Ring, S.ceruloplasmin, Liver function tests and Ultrasound abdomen was normal. Pheripheral smear did not show any acanthocytes. Renal and thyroid function tests were normal.

**Results:** Anti thyroid antibodies were normal. CSF was normal. In view of occupational exposure and clinical features, a possibility of Manganese toxicity was strongly considered. Serum Manganese was done which was elevated (Twice of upper limit of normal). Patient was started on symptomatic medications like levodopa and trihexiphenidyl. He had stopped working which eliminated occupational exposure to manganese. His parkinsonism gradually started to improve over 3 months period of followup.

**Conclusion:** Occupational history of manganese exposure is very important in cases of Parkinsonism. Early removal from the work environment can lead to improvement of symptoms and prevent permanent neurological deficits

**Disclosure:** Nothing to disclose

## Peripheral nerve disorders 1

## EPO1357

**Small fiber neuropathy in the context of cancer before and after oxaliplatin treatment.**

M. Albayrak, J. Casanova Molla, M. Campolo, E. Gabarron, C. Figueras, E. Seguí, J. Maurel  
*Hospital Clinic de Barcelona, Barcelona, Spain*

**Background and aims:** Small fiber neuropathy results in one damage at sensory unmyelinated small neurons or its terminal axons. Oxaliplatin-induced chemotherapy (OIN) produces widespread sensory damage with unclear information regarding large and small fibers' involvement. We aimed to evaluate selectively the sensory profile and also if possible a timeline comparison in patients at risk of OIN.

**Methods:** 32 patients (between 44-77 ages) mostly with colorectal cancer under oxaliplatin-based chemotherapy regime at least 6 cycles were followed up before initiation and after finishing treatment. At each visit, we recorded symptoms assessment with a neurological and neurophysiological examination based on nerve conduction studies and thermal sensory testing.

**Results:** Patients complained of sensory symptoms in more than 95% which were referred as pain in less than 15%. Amplitudes of the sural and the cubital nerve were significantly ( $p < 0.01$ ) reduced after treatment in all patients. Elevated warm detection threshold (WDT) at feet was found abnormal in 40% of patients before treatment and in 72% when finished. Cold hypoesthesia and cold allodynia were also present after the treatment (40%). WDT was found at feet clearly abnormal ( $p < 0.01$ ) while there was no significant alteration on hands despite they were symptomatic. No correlation was found with the accumulated dose of oxaliplatin.

**Conclusion:** Subclinical small fiber damage could reflect a systemic deterioration by cancer itself. OIN is characterized by affecting all sensory nerve fibers in a distance-dependent pattern in which small fibers seem to be more resistant.

**Disclosure:** Nothing to disclose

## EPO1358

**Modeling innervation branches and distribution of the femoral nerve in rodents: Biometric analysis of femoral nerve in middle aged male and female C57BL/6 mice.**

D. Alveal-Mellado<sup>1</sup>, L. Giménez-Llort<sup>2</sup>  
*<sup>1</sup>Institute of Neuroscience, Universitat Autònoma de Barcelona, Barcelona, Spain, <sup>2</sup>Psychiatry and Forensic Medicine, Universitat Autònoma de Barcelona, Barcelona, Spain*

**Background and aims:** Translational research involving peripheral neuropathy is focused on reproducing the functional impact of peripheral nerve disorders or traumatic lesions, and to assess neurorehabilitation strategies. Scarce number of studies address the relationship between the morphology of a nerve and its functional implications. Interestingly, biometrics studies of human femoral nerve have correlated the shape and number of motor branches to quadriceps femoris muscle with patello-femoral pain and cartilage lesions. In the present work we analyze the methodological advantages and limitations encountered in the biometric characterization of the femoral nerve of an aging mouse.

**Methods:** 25 12-month-old male and female mice with C57BL/6 background were used. Detailed dissection of the femoral nerve was carried out, distinguishing motor branches of the nerve until their penetration in the quadriceps femoris muscle. Nerve length and number of motor points were identified and quantified.

**Results:** As compared to studies in humans, the characterization of the femoral nerve in mice was facilitated by methodological advantages intrinsic to the use of rodents, such as effortless to reach sample size, higher homogeneity and easier dissection procedures. Besides, we found a simplified innervation and distribution of the nerve in contrast to the complex and diverse patterns that we have previously described in humans. With regards to limitations, the small size of nerves resulted in strong constraints for visual direct observation and quantification of ramifications.

**Conclusion:** Femoral nerve ramification in mice was simplified as compared to humans, and its biometric characterization can help to provide further understanding of the neurological-functional relationships.

**Disclosure:** Daniel Alveal-Mellado is recipient of a CONICYT/BECAS CHILE/73200493.

## EPO1359

**Familial Amyloidosis of the Finnish type: clinical and neurophysiological features of two index cases**

I. Antunes Cunha, A.C. Brás, L. Almendra, A. Geraldo, L. Negrão, F. Silva, A. Matos  
*Neurology, CHUC, Coimbra, Portugal*

**Background and aims:** Familial amyloidosis of the Finnish type (FAF) is a rare autosomal dominantly inherited form of systemic amyloidosis, caused by gelsolin gene mutations. The main clinical manifestations are progressive cranial and peripheral neuropathy, corneal lattice dystrophy, and skin changes (cutis laxa). Although it has initially been described in Finland, it was recently reported in Portugal. We hereby describe the clinical and neurophysiological features of the first cases of FAF diagnosed in our Center.

**Methods:** Clinical cases

**Results:** Patient 1. A 76 year-old female presented with slowly progressive facial weakness and gait imbalance since her 70s, followed by changes in visual acuity. Her mother and 2 maternal aunts had similar complaints. When examined, she presented cutis laxa, corneal lattice dystrophy, facial diplegia with facial myokymia, hypopallescsthesia and axial and appendicular ataxia.

Patient 2. A 68 year-old male complained of progressive visual loss and facial weakness since the age of 50, with increased of gait difficulties over last years. His familiar history was positive for ophthalmologic problems and facial palsy (maternal grandmother, mother and brother). He presented cutis laxa, corneal lattice dystrophy, facial diplegia, limitation of eye movements, tetraparesis, hyperreflexia and axial and appendicular ataxia.

Gelsolin-gene sequencing revealed the heterozygous c.640G>A mutation in both. The neurophysiological study and clinical features of patients and their relatives are presented.

**Conclusion:** These index patients are the first cases of FAF diagnosed in our Neuromuscular Outpatient Clinic. Although there was no known Finnish ancestor, FAF should be considered in the differential diagnosis of progressive bilateral facial neuropathy.

**Disclosure:** Nothing to disclose

## EPO1360

**Prospective study of autonomic dysfunction in patients with Guillain - Barre syndrome**

M. Arsenijevic<sup>1</sup>, I. Bozovic<sup>1</sup>, I. Berisavac<sup>1</sup>, I. Basta<sup>2</sup>, B. Bjelica<sup>1</sup>, A. Stojanov<sup>3</sup>, S. Rajić<sup>4</sup>, M. Petrovic<sup>5</sup>, B. Vujovic<sup>6</sup>, Z. Vukojevic<sup>7</sup>, G. Djordjevic<sup>3</sup>, M. Stojanovic<sup>8</sup>, A. Dominovic Kovacevic<sup>7</sup>, V.V. Martić<sup>9</sup>, D. Jovanovic<sup>1</sup>, S.Z. Perić<sup>1</sup>

<sup>1</sup>Belgrade, Serbia, <sup>2</sup>Neurology Clinic, Clinical Center of Serbia, Belgrade, Serbia, <sup>3</sup>Nice, Serbia, <sup>4</sup>Novi Sad, Serbia, <sup>5</sup>Neurology Clinic, Clinical Center Kragujevac, Kragujevac, Serbia, <sup>6</sup>Podgorica, Montenegro, <sup>7</sup>Banja Luka, Bosnia and Herzegovina, <sup>8</sup>Kragujevac, Serbia, <sup>9</sup>Military medical academy, Belgrade, Serbia

**Background and aims:** Autonomic nervous system can be affected in approximately 2 3rds of patients with Guillain-Barre syndrome (GBS). Autonomic dysfunction may increase mortality in GBS patients. The aim of our study was to prospectively monitor autonomic symptoms in patients with GBS over a 6-month follow-up period.

**Methods:** Study included newly diagnosed GBS patients hospitalized in 7 tertiary healthcare centers from May 2017 until May 2018. Patients were age- and gender-matched with healthy controls (HCs). As a measure of autonomic function, each subject filled in the SCOPA-AUT questionnaire on day 14 (D14), day 28 (D28), month 3 (M3) and month 6 (M6) from symptom onset.

**Results:** We registered 74 GBS patients (54% males, 52±16 years old). Mean SCOPA-AUT score was higher in GBS patients vs. HCs on D14 (25.2±11.5 vs. 4.0±4.9, p<0.01), D28 (14.0±12.6 vs. 4.0±4.9, p<0.01) and M3 (6.4±5.9 vs. 4.0±4.9, p<0.01). However, no difference was observed 6 months after disease onset (4.5±4.9 versus 4.0±4.9, p>0.05). Patient with AMAN had more severe autonomic dysfunction compared to AIDP patients subtype on D14 (p<0.01) and M3 (p<0.05).

**Conclusion:** Significant autonomic dysfunction is present in the acute phase of GBS, and it completely normalizes six months after disease onset.

**Disclosure:** Nothing to disclose

## EPO1361

**Guillain-Barré syndrome associated to Hepatitis E virus**

M. Ben Hmidene, I. Bedoui, H. Derbali, M. Messelmani, A. Riahi, M. Mansour, B. Ines, J. Zaouali, R. Mrissa  
*Neurology department, Military Hospital of Tunis, Tunis, Tunisia*

**Background and aims:** Hepatitis E virus (HEV), previously known as enterically transmitted viral hepatitis, is hyper-endemic in many countries. Neurologic complications as Guillain and Barré Syndrome (GBS) are less known.

**Methods:** Case report of Guillain and Barré Syndrome associated to Hepatitis E virus

**Results:** We report a 63-year-old immunocompetent woman who presented acute asthenia with muscle weakness in lower limbs, numbness, and impossibility to walk. Physical examination showed hypotonic motor weakness with areflexia in all limbs, bilateral facial nerve palsy and labored breathing. Cerebrospinal fluid examination and electrophysiological study were in agreement with the diagnosis of GBS associated to a lymphocytic meningitis reaction. Liver function tests showed elevated levels of liver enzymes and Serological study was positive for IgM antibodies for HEV. The patient was treated with intravenous immunoglobulin at a dose of 0.4mg/kg per day for 5 days with good recovery. A month later, liver function was improved.

**Conclusion:** HEV infection should be strongly considered in patients with neurological symptoms, especially those with elevated levels of liver enzymes.

**Disclosure:** Nothing to disclose

## EPO1362

**Guillain-Barré-like onset in young patient with chronic inflammatory demyelinating polyradiculoneuropathy and central nervous system demyelination**

S. Elena<sup>1</sup>, M. Elena<sup>2</sup>, L. Vitalie<sup>1</sup>, O. Olesea<sup>3</sup>, M. Liuba<sup>3</sup>  
<sup>1</sup>USMF, Chisinau, Moldova, <sup>2</sup>USMF, Chisinau, Moldova, <sup>3</sup>INN, Chisinau, Moldova

**Background and aims:** Chronic inflammatory demyelinating polyradiculoneuropathy (CIDP) is an immune-mediated disease with symmetrical motor and sensory manifestations, specific electromyographic (EMG) characteristics and diverse evolution: progressive, recurrent remissive, monophasic. In up to 1/3<sup>rd</sup> of cases the disease can manifest with demyelinating involvement of the central nervous system (CNS), and in up to 18% of patients it may have an acute onset as in Guillain-Barre syndrome (GBS).

**Methods:** We present the clinical case of a patient with acute onset CIDP with CNS involvement.

**Results:** Male of 27 years, previously healthy, was hospitalized with flaccid tetraplegia, areflexia, pain along the spine and limbs, facial asymmetry. The clinical manifestations evolved over several days. Brain MRI revealed periventricular demyelinating lesions, suggestive for multiple sclerosis. It was initiated pulse therapy with methylprednisolone without any improving. The cerebrospinal fluid (CSF) examination was acellular with increased level of proteins and positive oligoclonal bands. EMG revealed typical signs of demyelination. It was administered plasma exchange (PLEX), subsequently IVIG with partial recovery of motor functions. After 6 months his condition worsened again to the level of tetraplegia. CSF examination showed proteo-cellular dissociation, MRI examination - foci of cerebral and cervical demyelination with gadolinium enhancement. Finally, the diagnosis of atypical CIDP was established. It was applied PLEX and later Prednisolone 1mg/kg/day with rapid regression of symptoms and signs, with almost full recovery 2 months later.

**Conclusion:** GBS-like onset, brain and cervical spinal cord demyelinating lesions on MRI and CSF positive oligoclonal bands could contribute to the delay of atypical CIDP diagnosis.

**Disclosure:** Nothing to disclose

## EPO1363

**Omalizumab Induced Acute Motor Conduction Block Neuropathy: Case report and literature review**H. Elshony<sup>1</sup>, W. Khatir<sup>2</sup><sup>1</sup>Makkah, Saudi Arabia, <sup>2</sup>Neurophysiology, security forces hospital, Makkah, Saudi Arabia

**Background and aims:** Omalizumab is a recombinant, humanized, monoclonal antibody against human immunoglobulin E (IgE). Numerous reports and case series of neurological adverse events due to these biological monoclonal antibodies, specially anti-TNF $\alpha$  blockers, have been reported, including demyelinating conditions, optic neuritis, chronic inflammatory demyelinating polyneuropathy, mononeuritis multiplex, Guillain-Barré syndrome and others, whether literature reviews indicate that there are a limited number of studies investigating the effect of omalizumab on the nerves.

**Aim:** Report a case with acute motor conduction block neuropathy after 1st dose of Omalizumab, for possible causal association with literature review for monoclonal antibodies induced neuropathy

**Methods:** We describe a 45-year-old asthmatic patient with acute quadriplegia, 1 week after first dose of Omalizumab, electrophysiological studies, CSF analysis, Serology for antigangliosides, MRI brain and spine were done on admission with follow up after 1 year.

**Results:** Clinically, patient had acute quadriplegia, happened 1 week after first dose Omalizumab, no sensory, no bulbar or cranial nerve affection. MRI was free, Electrophysiological findings suggested acute motor conduction block neuropathy (AMCBN), CSF show protein 60 and cells 7, negative antigangliosides antibodies. Patient received IVIG with poor response then undergone extensive rehabilitation. After 1 year patient become ambulant and NCS show resolution of the conduction block with decrease CMAP in ulnar and tibial nerves bilaterally with signs of denervation.

**Conclusion:** Omalizumab considered risk factor for peripheral neuropathy, ranging from merely subclinical electrophysiological changes to GBS like picture with long term disability, by indirect or direct pathological mechanisms, but this conclusion need more studies and long term follow up

**Disclosure:** Nothing to disclose

## EPO1364

**The role of vascular endothelial growth factor and its high-affinity receptor in peripheral nerve dysfunction in diabetic polyneuropathy.**T. Filimonova<sup>1</sup>, Y. Karakulova<sup>2</sup><sup>1</sup>Perm, Russian Federation, <sup>2</sup>Neurology, Perm State Medical University, Perm, Russian Federation

**Background and aims:** It is little known about potential neurotrophic effects of vascular endothelial growth factor (VEGFA) its high-specific receptor VEGFR2 in diabetic polyneuropathy (DPN).

**Aim:** to determine a prognostic significance of VEGFA and VEGFR2 in the diagnosis of diabetic polyneuropathy and in prevention of diabetic foot syndrome (DFS).

**Methods:** 65 patients with DPN were examined with clinical examination, measuring of serum levels VEGFA and VEGFR2 by enzyme immunoassay. The peripheral nerve dysfunction was confirmed by electroneuromyography by measuring nerve conduction velocity (NCV). Control group consisted of 12 healthy persons.

**Results:** The 1<sup>st</sup> group included 30 patients with moderate DPN, mean NCV was 35.12 $\pm$ 7.04m/s. Serum level of VEGF-A was 42.44 $\pm$ 12.71pg/ml (versus control 25.13 $\pm$ 2.75pg/ml, p=0.001) and quantitative content of VEGFR2 was 25.14 $\pm$ 4.75ng/ml (versus control 12.58 $\pm$ 1.24ng/ml, p=0.002). The 2<sup>nd</sup> group consists of 35 patients with severe DPN associated with DFS, the average NCV was 24.81 $\pm$ 6.55m/s. In this group serum content of VEGFA was significantly lower than in the 1st group (24.68 $\pm$ 5.05pg/ml, p=0.001), as well as serum level of VEGFR2 (11.74 $\pm$ 0.84ng/ml, p=0.001). There were revealed correlations between the severity of neuropathy by NCV and the decrease in serum levels of VEGFA and VEGFR2 (R=0.392, R=0.354 accordingly, p<0.01).

**Conclusion:** The obtained data testify to the important role of endothelial dysfunction in progression of peripheral neuropathy. The high expression of VEGFA and VEGFR2 in serum may be considered as a marker of developing diabetic polyneuropathy and the deficiency of the factors can be a predictor of a diabetic foot syndrome.

**Disclosure:** Nothing to disclose



# EPO1365

## Identification of factors influencing severity and activities of daily living in patients with chronic inflammatory demyelinating polyneuropathy

R. Gapeschin, E. Barantsevich

Neurology and manual medicine, Pavlov First Saint-Petersburg State Medical University, Saint-Petersburg, Russian Federation

**Background and aims:** Chronic inflammatory demyelinating polyneuropathy (CIDP) is an acquired progressive or relapse-remitting immune-mediated disease of peripheral nervous system. The diagnosis of CIDP reveals on clinical presentation and electrophysiological data due to EFNS/PNS criteria. The aim of this study was to determine factors influencing severity and activities of daily living (ADL) in CIDP patients.

**Methods:** Clinical and laboratory assessment was performed to 101 patients with confirmed CIDP diagnosis, whereof 20 were with diabetes mellitus (DM). Neurological deficit was based on Neurology Impairment Scale (NIS) and Medical Research Council (MRC) scales and Barthel index (BI) for ADL.

**Results:** Statistically significant differences were found between groups of patients with DM and without (table 1). Also there were significant correlations between level of deficit and blood folic acid concentrations (-0.389 (NIS), +0.442 (MRC)) (fig. 1, 2) ( $p < 0.05$ ).

	DM group	Non-DM group	Statistical significance
NIS, points	63,09±6,97	44,45±2,93	$p < 0,05$
MRC, points	45,26±2,24	51,08±0,96	$p < 0,05$
BI, points	78,50±5,76	93,02±1,56	$p < 0,05$

Table 1. Differences in neurological deficit and activities of daily living in patients with diabetes mellitus and without

Table 1. Differences in neurological deficit and activities of daily living in patients with diabetes mellitus and without

Figure 1. Correlations between level of neurological deficit (NIS) and blood concentration of folic acid

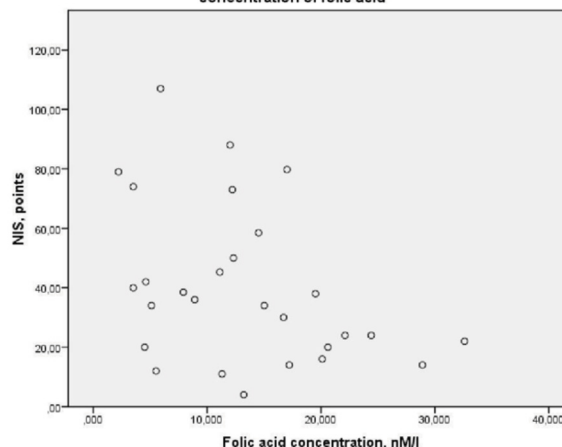


Figure 1. Correlations between level of neurological deficit (NIS) and blood concentration of folic acid

Figure 2. Correlations between level of neurological deficit (MRC) and blood concentration of folic acid

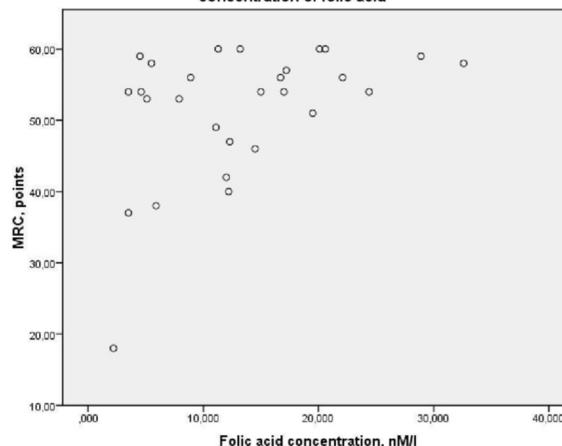


Figure 2. Correlations between level of neurological deficit (MRC) and blood concentration of folic acid

**Conclusion:** DM is a widespread disease negatively affecting course of many other diseases. Patients with CIDP and DM have greater neurological deficit and lower degree of self-care. The co-existing of DM and CIDP gives an ultimate competition for clinicians to manage status of these patients. Special international recommendations for management and treatment of CIDP in patients with DM are needed to simplify the follow-up of such patients. Folic acid is essential for nucleic acids synthesis, but its role in CIDP wasn't established yet. Our data suggests that level of FA can influence the course of CIDP, so analysis for FA is necessary for assessment patient's condition and subsequent decision of folic acid supplementation to CIDP patients.

**Disclosure:** Nothing to disclose

## EPO1366

**Fatigue in patients with chronic inflammatory demyelinating polyneuropathy**

R. Gapeshin, E. Barantsevich  
Saint Petersburg, Russian Federation

**Background and aims:** Chronic inflammatory demyelinating polyneuropathy (CIDP) is an acquired progressive or relapse-remitting immune-mediated disease of peripheral nervous system. The diagnosis of CIDP reveals on clinical presentation and electrophysiological data due to EFNS/PNS criteria. The aim of this study was to assess the severity of fatigue in CIDP patients and determine relationships between levels of deficit and fatigue in these patients.

**Methods:** Assessment was performed to 34 patients with confirmed CIDP diagnosis. Neurological deficit was based on Neurology Impairment Scale (NIS) filled by doctor and Rasch Overall Disability Scale (RODS) filled by patient himself and level of fatigue – on Multidimensional Fatigue Inventory-20 (MFI-20).

**Results:** Statistically significant differences were found between normal MFI-20 sum score (30 points) and CIDP group points ( $62.11 \pm 2.76$  points) ( $p < 0.05$ ). Correlations between NIS, RODS and subgroups of MFI-20 are presented in table 1.

	NIS, points	RODS, points
MFI general fatigue, points	0,399*	-0,415*
MFI reduced activities, points	0,449*	-0,457* <sup>1</sup>
MFI reduced motivation, points	0,369*	-0,368* <sup>1</sup>
MFI physical fatigue, points	0,310*	-0,441* <sup>1</sup>
MFI mental fatigue, points	0,255	-0,286 <sup>1</sup>
MFI overall score, points	0,444*	-0,490* <sup>1</sup>

Table 1. Correlations between MFI subscales and level of neurological deficit (\* – mark of statistically significant correlations ( $p < 0.05$ ), 1 – Pearson's coefficient was used, in other cases – Spearman's coefficient was used)

**Conclusion:** Due to trial, fatigue is one of the major symptoms in CIDP patients and it is need to be treated. Treatment includes physical exercises and recommendations for life style modification based on patient's level of disability. Because of correlations between neurological deficit and fatigue subgroups, the relevance of fatigue correction is increased in CIDP patients with high levels of disability.

**Disclosure:** Nothing to disclose

## EPO1367

**Clinical-Electrophysiological Correlation of the Hoffmann-Tinel Sign in Carpal Tunnel Syndrome**

O.J. Hernandez Fustes<sup>1</sup>, O. Hernandez Cossio<sup>2</sup>,  
O.J. Hernandez Fustes<sup>3</sup>, A. Hernandez Marques<sup>4</sup>,  
A. Hernandez Marques<sup>5</sup>

<sup>1</sup>Curitiba, Brazil, <sup>2</sup>InNeuro, Curitiba, Brazil, <sup>3</sup>Clinica Neurologica das Americas, Curitiba, Brazil, <sup>4</sup>UFPR, Curitiba, Brazil, <sup>5</sup>PUCPR, Curitiba, Brazil

**Background and aims:** A tingling sensation referred distally, produced by tapping over the course of a nerve, has been thought to indicate the nerve regeneration. This test is called Tinel's test. However, Hoffman first described it in March of 1915 as blight percussion of a finger during extension, in October 1915, Tinel described it as application of pressure to an injured nerve trunk induces a sensation of tingling, who called it "le signe de fourmillement."

Carpal Tunnel Syndrome (CTS) is the most frequent compressive neuropathy. History and physical examination, including the Hoffmann-Tinel test (HTT), were considered highly suggestive of the diagnosis.

**Methods:** We performed a cross-sectional study of patients with positive HTT who were referred for NCS/EMG with suspected CTS. The HTT was made with the percussing of the median nerve in the wrist and was repeated five times. The presence of pain or paresthesia radiating in the median nerve distribution was recorded.

**Results:** 100 consecutive patients with positive HTT, 55 bilateral, 74 woman with a mean age of 36 years and 26 men with 41 years of mean. We found electrophysiological criteria for CTS in 72 patients, 30 with bilateral CTS.

**Conclusion:** The HTT test is a clinical indicator of suspected CTS that in our study showed 72% correlation with the electrophysiological evidence of CTS.

Paresthesias in the hands are nonspecific findings and may have several causes, such as other neuropathies, cervical radiculopathy, thoracic duct syndrome and musculoskeletal injuries, such as fibromyalgia. Judgment that relies solely on clinical findings can be misleading.

**Disclosure:** Nothing to disclose

## EPO1368

**Coexistence of post zoster myelitis and brachial plexopathy in a patient: A rare complication**

S.H. Kalegasi, S. Mazman, A. Özgür  
Mersin, Turkey

**Background and aims:** Herpes zoster is characterized by a painful, unilateral vesicular eruption in a restricted dermatomal distribution and results from reactivation of latent Varicella zoster virus. It may be complicated by neurologic disorders such as post herpetic neuralgia, myelitis, plexopathy, meningoencephalitis and vasculopathy. Here we present a case of herpes zoster complicated with both brachial plexopathy and cervical myelitis.

**Methods:** A 61-year-old immunocompetent male presented with left arm weakness 5 days after a zoster skin lesion affecting the left C3-C7 dermatomes. Neurologic examination revealed paresis (3/5) and hypoactive deep tendon reflexes at left upper extremity, hypesthesia and paraesthesia on C3-C7 dermatomes.

**Results:** Cervical spinal MRI showed hyperintense lesion at C3-C6 on T2 weighted images. Patient treated with antiviral drug and high dose intravenous methylprednisolone. Weakness did not improve and electromyography and brachial plexus MRI were performed. Electromyography and brachial plexus MRI were consistent with left brachial plexopathy. HIV serology was negative.

**Conclusion:** Transverse myelitis is a rare complication of herpes zoster and usually occurs within days to weeks following the initial onset of skin lesions. Brachial plexopathy related with zoster infection is also rarely described. These complications should be suspected in presence of post zoster neurologic symptoms. Evaluation of symptoms with both MRI and electromyography can provide useful information about neurologic involvement.

**Disclosure:** Nothing to disclose

## EPO1369

**Carpal tunnel syndrome: dynamic of clinical, neurophysiological and ultrasound parameters after single local steroid injection combined with wrist splinting**

V. Kiselev<sup>1</sup>, N. Alexandrov<sup>2</sup>, T. Alexeeva<sup>2</sup>

<sup>1</sup>Neurology department, Nickiforov centre, Saint-Petersburg, Russian Federation, <sup>2</sup>Neurology department, Almazov centre, Saint-Petersburg, Russian Federation

**Background and aims:** Carpal tunnel syndrome is the most frequent entrapment neuropathy. Local injection of corticosteroids is effective for relief symptoms and improvement of nerve conduction, but the duration and point maximum of effect is unclear. Our aim was to evaluate clinical, neurophysiological and ultrasound parameters during 6 month after single local steroid injection in combination with splinting in patients with carpal tunnel syndrome.

**Methods:** We analyzed 44 patients with mild to moderate single side CTS (in according on classification by Stevens J.C. 1997). Evaluated clinical symptoms (SSS scale of Boston Carpal Tunnel Questionnaire), nerve conduction studies (sensory conduction velocity, distal motor latency, amplitudes of motor and sensory potentials of median nerve) and cross-sectional area of median nerve on entrance to carpal tunnel by ultrasound before injection and after 2, 4 and 6 month. Local injection of betamethasone 7mg and lidocaine 20 mg performed on landmark-guide standart manner. Also we recommended all of patients to use wrist splint for night sleep and hard handwork.

**Results:** We register significant ( $p < 0.05$ ) improvement all of clinical and instrumental signs 2 months after injection. 4 month after only amplitudes of motor and sensory potentials were significant better than in 2 month, other parameters unchanged. At 4 and 6 month was no difference from 2 and 4 month respectively in all signs. See the details in table 1.

**Table 1.** Dynamic of clinical, neurophysiological and ultrasound signs after single local steroid injection in combination with wrist splinting in patient with mild to moderate carpal tunnel syndrome

Parameter	Before injection	2 month after	4 month after	6 month after
SSS scale of BCTQ, total points	17,5±8,3	7,7±6,7	9,8±10,8	9,1±9,2
Median nerve sensory conduction velocity, m/s.	33,4±8,3	38,4±6,9	39,2±8,4	39,1±8,4
Median nerve distal motor latency, ms.	5,9±1,7	5±1,3	5,2±1,4	5,1±1,2
Median nerve amplitude of motor response, mV.	6,9±2,8	7,5±2,4	8±3	8,5±3,3
Median nerve amplitude of sensor response, mV.	16,1±13,2	19±13,1	23,2±14,2	22,4±14,9
Median nerve cross-sectional area, sq.mm.	14,8±5,2	13,4±5,5	12,7±5,9	13,3±6,2

**Note:** Significant changes compared with previous point is red-marked ( $p < 0,05$ ).

Table 1

**Conclusion:** In case of mild to moderate carpal tunnel syndrome the maximum improvement of clinical, neurophysiological and ultrasound parameters occurred in first 2 month after local steroid injection.

**Disclosure:** Nothing to disclose

## EPO1370

### Hysterical and Traumatic Peripheral Nerve Disorder: Immunology Aspects

D. Labunskiy<sup>1</sup>, S. Kiryukhina<sup>2</sup>, V. Podsevatkin<sup>2</sup>, O. Zheleznikova<sup>3</sup>, F. Kiryukhin<sup>3</sup>, V. Kolmykov<sup>3</sup>, N. Kurgaev<sup>3</sup>

<sup>1</sup>Neurology and Psychiatry, Ogarev Mordovia State University, Saransk, Russian Federation, <sup>2</sup>Neurology and Psychiatry, N.P.Ogarev Mordovia State University, Saransk, Russian Federation, <sup>3</sup>Ogarev Mordovia State University, Saransk, Russian Federation

**Background and aims:** There are many causes of peripheral neuropathies. We observed and discussed here traumatic and, as an outcome, inflammatory neuropathy (TIN) on one hand, and peripheral nervous pathology caused by hysterical conversion personality disorder (CPDN), on another. Our goal was to study and compare main immunological involvement in both types of neuropathies including the study of IgG and inflammatory cytokines (IL)-2, IL-6, IL-10, IL-11, IL-17, IL-32, TGF- $\beta$ , TNF- $\alpha$ , IFN- $\gamma$  in blood serum of the 26 TIN patients and CPDM patients.

**Methods:** Control group included 54 healthy donors. All patient's and donor's groups included men and women aging by 17-62 year old. Ig G was detected using diffusion in gel by Mancini. Concentrations of all pro-inflammatory cytokines were measured by ELISA. We used meta-analysis for statistical evaluation of our results.

**Results:** It was revealed that in 77% of TIN patients IgG and IL-6, IL-10, IL-11, IL-17 serum concentrations were markedly increased. In 48% of CPDN patients serum concentrations of these substances were also increased but in much lower extent. We observed decreased levels of IL-32, TGF- $\beta$ , TNF- $\alpha$ , IFN- $\gamma$  in 79% of CPDN patients.

**Conclusion:** We know that the persons with hysterical personality have markedly higher level of interferon. Contrary to that, concentrations of pro-inflammatory cytokines were not significantly increased on these patients, but in case of traumatic and inflammatory neuropathies IgG and IL-6, IL-10, IL-11, IL-17, was substantially raised, which stressed their pathogenic role namely in these type of peripheral nerve lesions. Our finding will play an important role in future treatment modalities.



Vertebral Column in Traumatic Injury



Spondillitis

**Disclosure:** Nothing to disclose

## EPO1371

### Comparison of the effectiveness of platelet-rich plasma and betamethasone in carpal tunnel syndrome

I. Leta<sup>1</sup>, I. Shcherb<sup>2</sup>, A. Levanchuk<sup>3</sup>, P. Dyachenko<sup>4</sup>, T. Smotriska<sup>5</sup>

<sup>1</sup>Vinnitsa, Ukraine, <sup>2</sup>Visualization, Neuromed clinic, Vinnitsa, Ukraine, <sup>3</sup>Vascular Surgery, Vinnitsa National Medical University, Vinnitsa, Ukraine, <sup>4</sup>Neurology, Vinnitsa National Medical University, Vinnitsa, Ukraine, <sup>5</sup>Neurology, VNMU, Vinnitsa, Ukraine

**Background and aims:** Compression of the median nerve in carpal canal is a common problem. There is some evidence of platelet-rich plasma (PRP) efficacy. Also, the standard treatment is local administration of betamethasone.

**Methods:** 18 patients (4 men) with confirmed moderate by nerve conduction study (NCS) and ultrasound diagnostics and do not have concomitant blood diseases not previously treated. After randomization by random numbers, PRP or betamethasone was injected into the carpal tunnel under ultrasound control (the patient was blinded to treatment). Prior to treatment NCS distal latency of compound muscle action potential (CMAP), Boston carpal tunnel questionnaire (BCTQ), visual analog scale (VAS) data were evaluated. After 3 months, the effect was monitored.

**Results:** in the PRP group there were 10 people, in the betamethasone group 8. The groups were homogeneous in age  $-46 \pm 7$  and the severity of CTS. 3 months after treatment, there was a significant improvement in both groups, but there was no significant difference in the PRP and betamethasone groups.

	Before treatment PRP	Before treatment betametason	3 month after treatment PRP	3 months after treatment betametason
<b>N</b>	10	8	10	8
<b>Distal latency</b>	5,44 s.d. 0,68	5,20 s.d. 0,46	4,49 s.d. 0,33	4.26 s.d. 0,25
<b>CMAP</b>			(p<0.05)	(p<0.05)
<b>BCTQ</b>	2,77 s.d. 0,4	2,5 s.d. 0,41	1,52 s.d. 0,33	1,50 s.d. 0,22
			(p<0.05)	(p<0.05)
<b>VAS</b>	5,6 s.d. 0,84	5,12 s.d. 1,12	2,4 s.d. 1,07	1,62 s.d. 1,4
				(p<0.05)

**Conclusion:** PRP injection may be an alternative to betamethasone. In the future, the selection will be increased.

**Disclosure:** Nothing to disclose

## Spinal cord and root disorders

### EPO1372

#### Tarlov's Cyst: an underestimated cause of Persistent Genital Arousal Disorder. Case report and review.

S. Dallagiocoma<sup>1</sup>, A. Federico<sup>2</sup>

<sup>1</sup>Department of Medicine, surgery and neuroscience, Univeristà degli studi di Siena, Sienna, Italy, <sup>2</sup>Clinical Neurology and Neurometabolic Diseases, University of Siena, Sienna, Italy

**Background and aims:** Tarlov cyst syndrome is a rare, often asymptomatic disorder, characterized by nerve-root cysts, usually occurring in the sacral spine, near the dorsal root ganglion. The cysts may cause lower back pain, sacral radiculopathy, urinary incontinence, bowel disorders and dyspareunia. The cysts are also reported to produce genital symptoms similar to those described for Persistent-Genital-Arousal-Disorder (PGAD).

**Methods:** We report a case of a 31-year-old woman with symptoms of persistent, unwanted genital sensations without sexual desire. From early infancy she experienced unpleasant orgasmic-like sensations extremely embarrassing and guilt-inducing, spontaneous or precipitated by mechanical stimuli. A lumbosacral MRI (figure 1) showed sacral Tarlov Cysts with S2-S3 radicular involvement. Neurological examination showed diffused hyperesthesia, bilateral radicular S2-S3 pain and hyperactive symmetrical deep tendon reflexes in the lower limbs.

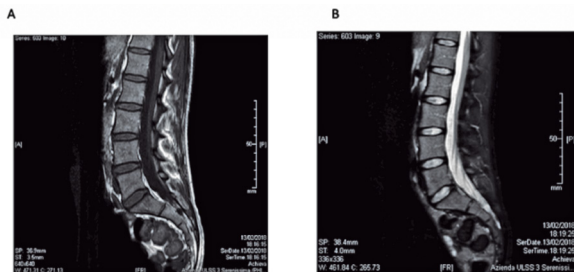


Figure 1. Sagittal T1 (A) and T2 (B) weighted images of the same cyst at S2-S3.

**Results:** PGAD is a rare syndrome of unremitting sexual arousal in the absence of conscious feelings of sexual desire. The arousal does not resolve with ordinary orgasmic experience, which is distressing and intrusive. Tarlov cysts have a prevalence of 66.7% in PGAD population, much higher than in the general one (up to 9%). The shame and embarrassment attached to the symptoms has contributed to the absence of reliable epidemiological data of PGAD and its underestimation. Surgical decompression of the cyst can lead to elimination or improvement of PGAD symptoms.

**Conclusion:** It is reasonable to recommend lumbar MRI in patients with PGAD. Future research are necessary to clarify the relationship between PGAD and Tarlov cysts in order to establish an appropriate and effective therapeutic management.

**Disclosure:** Nothing to disclose

### EPO1373

#### Pallister-Killian syndrome associated to Froin's syndrome

M.G. Maia<sup>1</sup>, L. De Sousa Bernardes<sup>2</sup>, R. Sergio Pallotta Filho<sup>3</sup>, L. Ramos de Freitas<sup>2</sup>, P. Henrique Maia de Freitas<sup>2</sup>

<sup>1</sup>São Paulo, Brazil, <sup>2</sup>Neurology, Santa Casa de Misericórdia de São Paulo, São paulo, Brazil, <sup>3</sup>Internal Medicine, Santa Casa de Misericórdia de São Paulo, São paulo, Brazil

**Background and aims:** Pallister-Killian syndrome is a rare chromosomal duplication disorder caused by additional copies of the short arm of chromosome 12. It is characterized by craniofacial dysmorphism with fronto-temporal alopecia, hypertelorism, low-set ears, kyphoscoliosis, intellectual disability, epilepsy, and abnormal muscle tone. Neurological abnormalities common to PKS include cerebral volume loss, malformations of cortical development, corpus callosum dysgenesis, craniofacial malformations, hypotonia and hyporeflexia.

**Methods:** Data obtained through review of medical records, after evaluation and authorization of the patient and photographic record of the diagnostic methods to which the patient was submitted and literature review.

**Results:** A 19-year-old young adult with KPS was admitted to the emergency department of our institution referring recurrent episodes of seizures, followed by inappetence, horizontal nystagmus, hypertonia and global hyperreflexia. At the admission, the patient's laboratory exams were normal. The spinal tap showed xanthochromia with high protein level of cerebrospinal fluid (3,114.5mg/dl). Magnetic resonance imaging and computed tomography scans of the brain/spine showed multiple abscesses at the posterior fossa and spinal cord, at the thoracic and lumbar level determining mass effect and obstruction of the spinal canal.

**Conclusion:** The neurological symptoms were associated to the Froin's syndrome, that is characterized by marked cerebrospinal fluid (CSF) xanthochromia (yellow discoloration of the CSF) and hypercoagulability due to increased protein content. Pseudo-Froin's syndrome has also been described as stagnation of the CSF distal to a spinal block due to spinal disc bulging or tumor. In our case, the spinal obstruction was determined by multiple abscesses at the spinal cord.

**Disclosure:** Nothing to disclose

## EPO1374

**Intramedullary spinal-cord tumor-like lesions**

E. Martins<sup>1</sup>, C. Maia<sup>2</sup>, J. Pinto<sup>2</sup>, S. Batista<sup>1</sup>

<sup>1</sup>Neurology, Coimbra University Hospital Centre, Coimbra, Portugal, <sup>2</sup>Neuroradiology, Coimbra University Hospital Centre, Coimbra, Portugal

**Background and aims:** Isolated intramedullary lesions present a diagnostic challenge for the neurologist, particularly when they display tumor-like features. The most common etiology of these lesions are primary demyelinating, other inflammatory diseases, vascular and infectious. The real challenge when approaching these lesions is differentiation the tumors from the tumor-like lesions.

**Objectives:** Describe our population of “tumefactive” spinal-cord lesions.

**Methods:** We collected data from clinical database and spinal-cord MRI’s from January 1st 2010-December 31st 2018 using the keywords “tumefactive”, “medullary expansion” and “edema” and included patients which met the following definition of “tumefactive”: spinal-cord lesion with diameter >2cm and causing medullary expansion, mass effect or edema. We excluded patients with concurrent brain lesions or extramedullary lesions.

**Results:** We included 21 patients with a median age at presentation of 53.6 years (range 23-78 years), 13 men (61.9%). 4 (19%) had NMOSD, 1 (4.8%) had neurosarcooidosis, 1 (4.8%) had syringomyelia, 5 (23.8%) had idiopathic myelitis and 10 (47.6%) had a tumour. Comparing inflammatory pseudo-tumoral with tumoral etiologies, there were significant differences in: sphincter involvement; T1 hypointensity/isointensity and T1 signal heterogeneity; T2 hyperintensity and T2 signal heterogeneity. There were no significant differences in other clinical features, gadolinium enhancement, number of vertebral segments affected, location of lesions and CSF characteristics.

**Conclusion:** Clinical features, other than sphincter involvement, and CSF characteristics do not appear to help in the distinction between tumors and tumor-like lesions. MRI’s T1 and T2 signal pattern appear to be the most helpful in the differential diagnosis of tumors and tumor-like lesions.

**Disclosure:** Nothing to disclose

## EPO1375

**Malignancy in low back pain – clinical and paraclinical features**

M. Cholakova, N. Mihnev, I. Staikov

Neurology, MHAT Tokuda Hospital Sofia, Sofia, Bulgaria

**Background and aims:** It is estimated that up to 84 percent of adults have low back pain at some time in their lives. Malignancy is rare as a cause of low back pain. In patients with low back pain presenting to primary care, less than 1% have malignancy as underlying cause. According to previous studies the most useful feature is previous history of cancer. To find other important red flags we performed retrospective study between January 2012 to December 2018 among all patients with persistent low back pain (VAS>8) and signs or symptoms of spinal stenosis hospitalized in neurological clinic of Tokuda Hospital Sofia. The age of the patients were between 18 and 95 during the hospitalization.

**Methods:** Somatic and neurological status, laboratory tests, magnetic resonance tomography (MRI) and computed tomography of lumbar spine (CT).

**Results:** Our study included 236 patients (138 female and 98 male). We found malignancy in 28 (11.86%) of patients (11 female and 17 male). The most common malignancies were: lung carcinoma - 9, prostate carcinoma - 5, breast carcinoma - 5, melanoma malignum - 3; other - 6. The most common red flags are: decreased hemoglobin values (85.7%), slightly increased C-reactive protein (96.4%), history of malignancies (71.4%); refractory to analgesia pain increased from the beginning (92.8%), autonomic symptoms (17.8%); weight loss (25%); Age between 45-65 (64.2%).

**Conclusion:** According to our study malignancy is not a rare cause for back pain probably because of different defined inclusion criteria. It seems that the patients who failed to respond to conservative management are more likely to have malignancy.

**Disclosure:** Nothing to disclose

## EPO1376

**Prognostic factors of spinal cord decompression sickness**

K. Laabidi<sup>1</sup>, M. Messelmani<sup>1</sup>, R. Ben Sassi<sup>2</sup>, M. Mansour<sup>3</sup>, H. Gharsallah<sup>2</sup>, R. Mrissa<sup>3</sup>, J. Zaouali<sup>3</sup>  
<sup>1</sup>Department of neurology, Military Hospital, Tunis, Tunisia, <sup>2</sup>Hyperbaric Medicine, Military hospital of Tunis, Tunisia, <sup>3</sup>Neurology, Military hospital of Tunis, Tunisia, Tunisia

**Background and aims:** Spinal decompression sickness (DCS) is 1 of the most serious forms of diving related injuries. Its pathophysiology isn't completely understood. Our aim was to describe clinical and paraclinical features of patients having spinal DCS, to identify its risk factors, the therapeutic procedures and the clinical outcome.

**Methods:** We performed a retrospective study that included patients having spinal DCS treated between 2009 and 2018.

**Results:** We included 32 males. The mean age was 33.7±9.5 years. Factors favouring the occurrence of DCS were diving procedure errors, cold weather, addictive behaviours, working time at the bottom >20 minutes, cervico-osteoarthritis, and the presence of a patent foramen ovale. A severe motor deficiency at onset (paraplegia or tetraplegia) was noted in 28% of cases. Bladder dysfunction was noted in 48% of cases. MRI demonstrated increased signal intensity in the spinal cord on T2-weighted images in 41% of cases. The poor prognostic factors were an age greater than 40 years, a depth greater than 60 meters, a consultation time of more than 24 hours, and an extensive myelitis. The treatment was based on recompression in hyperbaric chamber, rehydration and acetylsalicylic acid in all cases. Half of patients had a complete resolution after one month while 25% of patients had neurologic sequelae.

**Conclusion:** The diagnosis of spinal DCS is based on clinical signs and should be suspected in any person with neurological symptoms and a recent history of diving. The outcome is unpredictable with a high risk of incomplete recovery whatever the treatment undertaken.

**Disclosure:** Nothing to disclose

## EPO1377

**Trends in traumatic spinal cord injuries in Estonia during 22 years**

M. Niinemets<sup>1</sup>, A. Asser<sup>2</sup>, J. Kõrv<sup>3</sup>, L. Sabre<sup>3</sup>  
<sup>1</sup>University of Tartu, Tartu, Estonia, <sup>2</sup>Neurosurgery Centre, North Estonia Medical Centre, Tallinn, Estonia, <sup>3</sup>Department of Neurology and Neurosurgery, University of Tartu, Tartu, Estonia

**Background and aims:** To investigate trends in the incidence and causes of traumatic spinal cord injuries (TSCI) in Estonia from 1997 to 2018.

**Methods:** Medical records of patients with TSCI from Estonian regional hospitals from 2008 to 2018 were retrospectively reviewed. The new epidemiological data were compared with the data from the previous period 1997-2007.

**Results:** A total of 383 new patients with TSCI were identified. The average annual incidence rate (standardized to the Estonian population by age and gender) decreased significantly from 39.3 per million population (95% CI 36.2-42.5) at the 1st period (1997-2008) to 26.2 per million population (95% CI 23.6-28.8) during the 2nd period (2008-2018) (incidence rate ratio (IRR) 0.63 (95% CI 0.57-0.75),  $p < 0.0001$ ). The mean age at injury increased from 39.0 ( $\pm 17.0$ ) years to 46.6 ( $\pm 19.9$ ) years,  $p < 0.0001$ . The male to female ratio decreased from 5.5:1 to 3.8:1 ( $p = 0.04$ ). Falls were the leading cause of injury during both periods followed by traffic accidents and sports injuries. Still, the percentage of traffic accidents decreased significantly (from 29.7% to 20.6%,  $p = 0.002$ ) and falls increased (from 41.4% to 59.5%,  $p < 0.0001$ ) during the 2nd period. Alcohol consumption prior to injury also decreased significantly from 65.6% to 55.1% ( $p = 0.007$ ).

**Conclusion:** Estonia has become more similar to other European countries during the last decade: TSCI incidence has significantly decreased, the mean age at injury and the percentage of falls have increased. In addition to increased alcohol taxes, better preventive measures probably have important role in the decreased burden of TSCI in Estonia.

**Disclosure:** Nothing to disclose



## EPO1378

### Efficiency of application of various schemes of treatment of neuropathic pain in cervical radiculopathies

D. Orazimbetova<sup>1</sup>, K. Maksudova<sup>2</sup>, D. Usmanova<sup>1</sup>, M. Niyazova<sup>1</sup>

<sup>1</sup>Department of Neurology, Pediatric Neurology and Medical Genetics, Tashkent Pediatric medical institute, Tashkent, Uzbekistan, <sup>2</sup>Neurology, child neurology and medical genetics, Tashkent Pediatric Medical Institute, Tashkent, Uzbekistan

**Background and aims:** To evaluate the effectiveness of various regimens for the use of lornoxicam, tolperisone and gabapentin for the treatment of acute pain in patients with cervical radiculopathies

**Methods:** 62 patients with cervical radiculopathy were examined. All patients were divided into 2 groups. The 1st group included 31 patients, 2-31. The examination was carried out twice: before and after treatment. In different groups, 2 treatment regimens were compared: the use of lornoxicam in combination with tolperisone, in the 2nd - the use of dimensions in combination with lornoxicam. Investigated serum levels of IL-6 in patients before and after treatment

**Results:** According to the VAS scale, a decrease in pain from 9 points to 3 points was evaluated in patients of group 2, compared with group 1, which also showed a slight decrease from 9 points to 7 points. The level of IL-6 in patients of group 1 before treatment was 14.9pg/ml, after treatment it was 10.6pg/ml. In patients of group 2, the cytokine level before treatment was 13.1pg/ml, after - 6 pg/ml ( $p < 0.001$ )

**Conclusion:** As a result of the study, it was found that the use of gabapentin in combination with lornoxicam has a positive effect in reducing pain, compared with the results of patients who received lornoxicam in combination with tolperisone. Patients with pain in cervical radiculopathies are recommended to use this scheme to reduce neuropathic pain

**Disclosure:** Nothing to disclose

## EPO1379

### Cervical and Thoracolumbar Traumatic Spinal Cord Injury and the impact on Quality Of Life: A Comparative Study

B. Popinhak<sup>1</sup>, A. Tholl<sup>2</sup>, A. Dos Santos<sup>2</sup>

<sup>1</sup>Neurology, Moinhos de Vento Hospital, Porto Alegre, Brazil, <sup>2</sup>Rehabilitation, Catarinense Rehabilitation Centre, Florianópolis, Brazil

**Background and aims:** Traumatic Spinal Cord Injury (TSCI) may be the most traumatic and devastating event in one's life and can significantly compromise one's Quality Of Life (QOL).

**Methods:** Cross-sectional study conducted at the Catarinense Rehabilitation Centre (CRC) population, Southern Brazil, to verify the impact on QOL according to injury level and time since injury and associated factors in SCI patients older than 18 years old who have suffered TSCI and were undergoing rehabilitation. The WHOQOL-bref instrument was chosen to measure patients' QOL after SCI. Analysis was made in the SPSS 18.0 where there were compared average scores from the WHOQOL-bref, t-student test was used in independent samples ( $p < 0,05$ ). Questionnaire analysis was carried out without any particularities or adjustments to the subject under study, t-Student test and  $p \leq 0,05$ . The study was approved by the Ethics Research Committee (ERC) of the Institution.

**Results:** Prevalence of young men between 30 and 50 years old (30.5%) who suffered traffic accident (33.3%). There were differences in QOL scores between paraplegic and tetraplegic patients, mainly in physical (64.45x45.47) and psychological areas (70.2x60.0). There was predominance of injuries older than 6 months (94.4%) and rehabilitation time also lasting more than 6 months (77.7%).

GRAPHIC 1

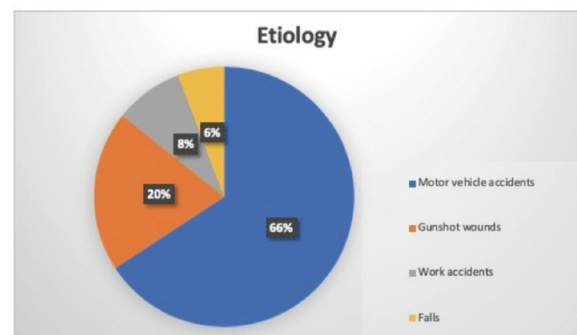


Table 1 – Analysis of the population sociodemographic characteristics

Variables (n = 36)	Cervical n (%)	Thoracolumbar n (%)
<b>Gender</b>		
Male	13 (36,1)	19 (52,7)
Female	2 (5,5)	2 (5,5)
<b>Age</b>		
18 – 30 years old	6 (16,6)	6 (16,6)
30 – 50 years old	8 (22,2)	13 (36,1)
≥ 50 years old	1 (2,7)	2 (5,5)
<b>Injury Time</b>		
< 6 months	1 (2,7)	1 (2,7)
> 6 months	17 (47,2)	17 (47,2)
<b>Rehabilitation Time</b>		
< 6 months	3 (8,3)	5 (13,8)
>6 months	12 (33,3)	16 (44,4)

Source: Author elaboration.

Table 2 – Association between injury level and quality of life domains

Variables	Physical	Psychological	Social Relations	Environment
	Average (SD) <i>p</i> value	Average (SD) <i>p</i> value	Average (SD) <i>p</i> value	Average (SD) <i>p</i> value
<b>Injury Level (n=36)</b>				
Cervical (n=15)	45,47 (13,8)	60,0 (10,0)	61,11 (20,0)	61 (14,2)
Thoracolumbar (n=21)	64,45 (12,4)	70,23 (10,3)	69,44 (23,3)	65,47 (15,7)
	<i>p</i> <0,001	<i>p</i> <0,01	<i>p</i> =0,27	<i>p</i> =0,39

Source: Author elaboration.

**Conclusion:** Predominance of young men victims of traffic accident who became paraplegic. Lower QOL scores were obtained mainly in the physical and psychological domains. The main factors associated with TSCI are male, youth, traffic accidents, paraplegia, physical and psychological losses.

**Disclosure:** Nothing to disclose

## EPO1380

## Gender, age-related features and frequency of spine surgery in patients with large lumbar disc herniation

S. Rachin, N. Sharapov, E. Barantsevich, V. Andreev, S. Zevachin

*Department of Neurology and Manual Medicine, Pavlov First Saint Petersburg State Medical University, Saint Petersburg, Russian Federation*

**Background and aims:** The most common cause of spinal roots compression in intervertebral foramen is disc herniation. Clinically significant changes are mostly seen in patients with large disc herniation. Study aimed to analyze gender, age distribution and frequency of spine surgery in patients with large lumbar disc herniation (LLDH).

**Methods:** Study recruited adults with signs of compression of spinal roots of lumbar localization that required hospital admission. Clinical, neuroimaging data were evaluated. Patients were divided into 2 groups - with LLDH (≥ 8mm) and smaller lumbar disc herniation (SLDH) (<8mm). Standard statistical tools were applied, *p*-value <0.05 was considered statistically significant.

**Results:** Altogether 90 patients were enrolled. LLDH was diagnosed in 31 patients (34%; 18/31 female, mean age 47±2.7 years old), SLDH – 59 patients (66%; 41/59 female, mean age 59.5±2.0). Patients with LLDH were younger (*p*<0.05), there was no significant difference in gender between groups (*p*>0.05). Surgical treatment was much frequently performed in patients with LLDH as compared to SLDH (32% vs 14%, *p*<0.05).

**Conclusion:** Formation of LLDH doesn't depend on gender but is much more common in younger patients. Surgical treatment is more often applied in patients with LLDH as compared to SLDH.

**Disclosure:** Nothing to disclose

## EPO1381

**Spontaneous Spinal Cord Infarction – retrospective cohort of a tertiary center**

A.L. Rocha, P. Castro, M. Carvalho, E. Azevedo, P. Abreu

*Neurology, São João Hospital Centre, Porto, Portugal*

**Background and aims:** Spontaneous Spinal Cord Infarction (sSCI) is uncommon but often very disabling. Differential diagnosis is sometimes difficult, leading to diagnostic delay and compromising acute phase treatment. Our goal is to describe patients diagnosed with sSCI in our center and retrospectively to apply Nicolas Zalewski and colleagues (2018) diagnostic criteria.

**Methods:** Retrospective review and descriptive analysis of sSCI cases admitted in a 10-year period.

**Results:** We included 18 patients, 72% male, median age 60 years (IQR:22.5); 78% with previous mRS  $\leq 1$ . 72 percent reached the neurological deficit nadir within 12 hours (median: 3h; IQR:17.3). 2 patients had contraindication to MRI; of the remaining, 75% had spinal cord hypersignal and 29% had diffusion restriction. Of the 14 patients who underwent AngioCT/AngioMRI, 2 had aortic dissection, 2 had occlusion of intercostal arteries, and 1 had segmental artery occlusion. CSF study (performed in 10 patients), showed pleocytosis (22 cells) in 1 and increased protein in 3. No patient underwent revascularization treatment. At 3 months, 50% of patients had functional disability (mRS $\geq 3$ ); at 12 months this percentage was similar (46%). According to the criteria proposed by Zalewski et al., 5 patients met criteria for definitive sSCI and 8 for possible (of these, 2 without MRI and 4 without CSF study).

**Conclusion:** Our results agree with previous published data regarding the delay of sSCI diagnosis, limiting the possibility of a proper acute phase treatment, and leading to poor functional prognosis. A more timely and complete diagnostic study is warranted to reverse these results.

**Disclosure:** Nothing to disclose

## EPO1382

**Objective evaluation of paresis in patients with lumbar disc herniation**

A. Shatokhin<sup>1</sup>, S. Karpov<sup>2</sup>, S. Bazhanov<sup>3</sup>, A. Kuzuberdin<sup>2</sup>, I. Vyshlova<sup>1</sup>, A. Shatokhin<sup>4</sup>

<sup>1</sup>Stavropol, Russian Federation, <sup>2</sup>Neurology, Stavropol state medical university, Stavropol, Russian Federation, <sup>3</sup>Neurosurgery, Saratov Medical University, Stavropol, Russian Federation, <sup>4</sup>Neurosurgery, Stavropol Emergency Hospital, Stavropol, Russian Federation

**Background and aims:** Motor disorders of the lower extremities caused by compression radiculopathy at the lumbar level are the main disabling factor. The number of decompressive operations of the lumbar spine is increasing, but the problem of restoring paresis of the lower extremities is still relevant.

**Methods:** The analysis of 26 patients was performed, including 16 patients with L4-L5 disc herniation with L5 compression radiculopathy, 11 patients with L5-S1 disc herniation with S1 radiculopathy. Compression of the spinal root was detected on an MRI. In order to detect paresis was used a standard paresis scale and a test was performed on an isokinetic dynamometry device (Humac Norm). The strength of the lower leg muscles on the affected side was compared with a healthy limb. This examination was performed before surgery, 14 days after microdiscectomy, and 3 months later.

**Results:** The following parameters were obtained m. Gastrocnemius of the affected side: eccentricity: PT (before surgery vs 90 days after surgery) 42Nm vs 57Nm; concentricity: PT 34Nm vs 39Nm; M. Gastrocnemius of the healthy limb: eccentricity: PT 52Nm vs 46Nm; concentricity: PT 42Nm vs 43Nm. In the antagonist muscle-M. Peroneus Long. of the affected limb: eccentricity: PT 19Nm vs 22Nm; concentricity: PT 14Nm vs 23Nm. M. Peroneus Long. of a healthy limb: eccentricity: 23Nm vs. 24Nm; concentration: 22Nm vs. 2 Nm.

**Conclusion:** Isokinetic dynamometry is effective in objectively assessing the dynamics of motor disorders in patients after decompression of the lumbar spine root.

**Disclosure:** Nothing to disclose

## EPO1383

**Spinal Epidural Lipomatosis in a Patient with Chronic Alcoholism: Case Report**

V. Stefanova<sup>1</sup>, B. Benishev<sup>2</sup>, M. Dimitrova<sup>1</sup>

<sup>1</sup>Neurology, UMHATEM "N.I. Pirogov", Sofia, Bulgaria,

<sup>2</sup>General and Endoscopic Surgery, UMHAT "SV. Ivan Rilski", Sofia, Bulgaria

**Background and aims:** To present a rare case of spinal epidural lipomatosis (SEL) with slowly progressing neurological symptoms in patient without other risk factors except chronic alcoholic abuse. SEL is described as the accumulation of fat in the extradural territory and observed in patients receiving long-term exogenous steroid therapy, obesity, endocrinological disorders and rarely in chronic alcoholism. The hypertrophy of the epidural adipose tissue causes a narrowing of the spinal canal and compression of neural structures. Patients present with progressive myelopathy, but radicular symptoms are also common. Conservative treatment - weaning from alcohol, steroids or weight loss - can reverse the hypertrophy and relieve the neural compression. Failing conservative management indicates surgery.

**Methods:** A 41-year-old man, non-obese, experienced low back pain, numbness and lower limbs weakness, bladder and sexual dysfunction with progressive deterioration over 1 year. Objectively we found bilateral peroneal and tibial paresis. MRI demonstrated fat tissue overgrowth in the epidural space with compression of the dural sac, incipient degenerative disc disease L2-S1. The patient had no history for long term exogenous steroid therapy, no endocrinologic disorders, only over 2 bottles of alcoholic drinks/day for one decade. The patient was treated conservatively with simultaneously weaning from alcohol.

**Results:** A significant improvement in the patient's neurological status is recorded. The patient remained under observation.

**Conclusion:** There is relationship between alcohol and fat deposition in several studies, since SEL and metabolic syndrome share many components. Etiological mechanism is assumed to be a malfunction in fat metabolism due to mitochondrial DNA. Some studies have shown the role of alcohol on the development of metabolic syndrome.

**Disclosure:** Nothing to disclose

## EPO1384

**Spontaneous spinal epidural haematomas in the era of anticoagulant treatment**

I. Štětkářová<sup>1</sup>, E. Ehler<sup>2</sup>, K. Brabec<sup>1</sup>, L. Jelínková<sup>1</sup>, T. Peisker<sup>1</sup>

<sup>1</sup>Prague, Czech Republic, <sup>2</sup>Pardubice, Czech Republic

**Background and aims:** Spontaneous spinal epidural haematomas (SSEH) are rare nosological units wherein acute collections of blood develop in the spinal canal with no clear traumatic or iatrogenic cause, usually after a sharp increase in intra-abdominal or intra-thoracic pressure. Further risk include anticoagulant or antiplatelet therapies. SSEH are usually manifested by sudden severe back pain, which is accompanied by the development of neurological symptoms. Although surgical treatment remains the gold standard, conservative management may be also chosen in cases with minor neurological deficits.

**Methods:** Between 2012 and 2019, we examined 14 patients (age range 17–89 years, 10 women) diagnosed with spontaneous spinal epidural haematomas. 9 cases were patients using anticoagulant therapy (7 warfarin, 1 dabigatran, 1 apixaban). The exact localisation and extent of changes was determined from acute magnetic resonance imaging. 4 people using warfarin had INR higher than 3.0 at the time of their diagnosis.

**Results:** In 7 patients SSEH were localised in the cervical spine, in 3 patient in the middle thoracic spine, and in 4 patients in the thoracic/lumbar level. 6 patient underwent acute surgery due to rapidly developing spinal cord compression. The clinical condition was favourable in the other patients and a conservative approach was chosen.

**Conclusion:** 1 of the serious risk factors for the development of SSEH is the use of anticoagulant therapy. Early decompression in cases with severe clinical symptoms is an important therapeutic approach to SSEH, but it is also possible to choose conservative management in cases with minor neurological involvement.

**Disclosure:** Nothing to disclose

## EPO1385

## An uncommon cause of subacute myelopathy misdiagnosed as transverse myelitis

C. Valencia-Sanchez, L.W. Howard, J.L. Carter  
Neurology, Mayo Clinic Arizona, Scottsdale, USA

**Background and aims:** The differential diagnosis of subacute myelopathy is broad and includes mainly inflammatory and infectious etiologies. Metabolic etiologies, intramedullary tumors, and spinal dural arteriovenous fistula should also be considered.

**Methods:** Case report

**Results:** A 67-year-old male with history of focal epilepsy and multiple brain cavernomas, presented with subacute paraparesis. 1 year prior to presentation, he had an episode of acute bilateral lower extremity weakness, bowel and bladder incontinence. At another facility, he was found to have a T8-T9 spinal cord lesion diagnosed as transverse myelitis. After treatment with high-dose intravenous steroids he nearly completely recovered. Over 2 months, the patient noticed gradual difficulty walking. He then developed acute lower back pain and lower extremity weakness while changing car tires. Within days, he was wheelchair bound, had constipation and inability to urinate. Neurological examination revealed flaccid paresis of the right lower extremity proximally worse than distally, and mild weakness of left hip flexion. Plantar responses were equivocal bilaterally. Lower extremity vibration and position sense were absent distally. He had urinary retention of 875 cc. Spine MRI showed increased T2 signal from T7-T8 to T11-T12, with regions of T2-hypointensity suggesting hemosiderin deposition, with heterogeneous enhancement and cord expansion. CSF was normal. Aquaporin-4 antibody was negative. The lesion was surgically resected, and histopathology revealed a benign vascular lesion consistent with cavernoma.



Figure 1: MRI of the thoracic spinal cord, sagittal T2-weighted (A) and post-contrast T1-weighted (B) images. Increased T2 signal from T7-T8 to T11-T12, with regions of T2-hypointensity suggesting hemosiderin deposition. There was also a central cystic component of the mass (A) with heterogeneous enhancement and moderate cord expansion (B).

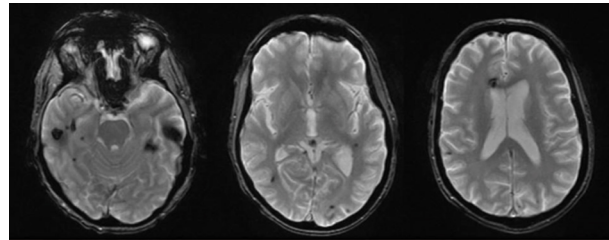


Figure 2: Brain MRI, axial gradient echo sequences, showing multiple small cavernomas scattered in the cerebral hemispheres

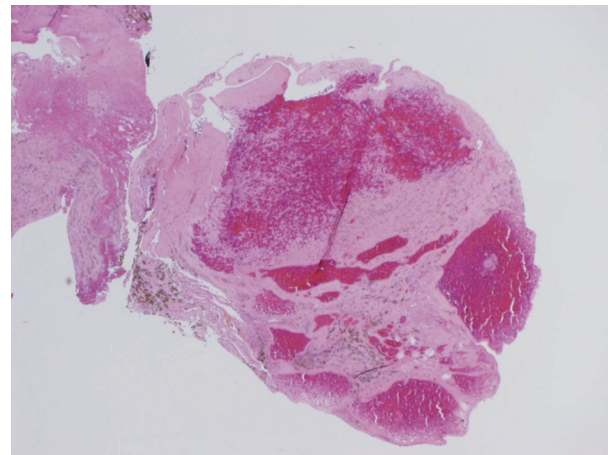


Figure 3: Biopsy specimen. Hematoxylin and eosin stain. The lesion consisted of an aggregate of irregularly-shaped vascular spaces filled with blood. Hemosiderin-laden histiocytes were seen in the surrounding connective tissue.

**Conclusion:** Spinal intramedullary cavernomas are rare vascular malformations. Clinical presentation and imaging characteristics can be confused with inflammatory processes and neoplasms. This diagnosis should be considered especially in patients with brain cavernomas.

**Disclosure:** Nothing to disclose

## EPO1386

### **Mass media and Movement disorders: a study of the effects of media on mass psychogenic illness**

*J. McVige, L. Mechtler, S. Shukri, P. Eugeni, V. Headd  
Dent Neurologic Institute, Buffalo, NY, USA*

**Background and aims:** This study presents clinical data from a rare case of Mass Psychogenic Illness (MPI) involving movement disorders and explores how symptom exacerbation was influenced by media coverage.

**Methods:** A retrospective study evaluated clinical histories, precipitating events, treatment strategies, severity and duration of illness for the 16 patients seen at DENT Neurologic Institute. Publications, broadcasts, and other forms of public documentation regarding the affected patient cohort were retrospectively collected. A timeline of patients' encounters and media reporting was developed to examine the evolution of the MPI event and factors which may have prolonged symptomatology.

**Results:** The completed timeline displays a relationship between mainstream media and the exacerbation of patients' symptoms. Noticeable increased frequency in tics, syncopal episodes, and psychogenic seizures coincided with media attention. When public attention on the case ceased, symptoms resolved in sixteen patients and improved in one patient. There were 14 instances of media attention and 13 reported incidents of exacerbations amongst the patients. Patients reported from 0 to 5 exacerbations. Observed worsening of symptoms occurred within 72 hours of a media event for these reported exacerbations.

**Conclusion:** There is a possible relationship found between media attention/events and exacerbation of symptoms of MPI in this cohort. These findings may give researchers and clinicians more insight into the symptomology and demonstration of MPI in a modern setting. Occurrences of MPI may be affected by media involvement and clinicians should be aware of the possible associated risks.

**Disclosure:** Nothing to disclose

## ePoster Sessions

**Sunday, May 24 2020**

Ageing and dementia 2

**EPO2001**

**Epilepsy in early onset Alzheimer's disease**

S. Haoudy<sup>1</sup>, T. Jonveaux<sup>2</sup>, O. Aron<sup>1</sup>, S. Puisieux<sup>1</sup>, L. Hopes<sup>1</sup>, J. Roudil<sup>1</sup>, L. Tyvaert<sup>2</sup>

<sup>1</sup>CHRU Nancy, Nancy, France, <sup>2</sup>Nancy, France

**Background and aims:** Epilepsy seems to be an important comorbidity in patients with Alzheimer's disease (AD), especially in young onset AD (<65 years old). At this time, epileptic seizures are still underestimated in this population. However, seizures may interact with AD evolution with possible acceleration of cognitive decline. This study aims to determine the prevalence of the epileptic comorbidity in patients with early onset AD. Secondly, it will extract characteristics of AD patients at higher risk of epilepsy.

**Methods:** All patients diagnosed as early-onset AD between 2013 and 2019 and followed at the University Hospital of Nancy were selected. The usual follow-up was extended with a prolonged EEG and a consultation with an epilepsy expert. Based on this interrogation and EEG results, patients were classified as epileptic or non-epileptic. We collected demographic data and information on epilepsy and AD disorders.

**Results:** Among the 22 included patients, 10 were classified as epileptic with a prevalence of 45%. Considering seizure types, patients presented generalized seizures (n=4), typical temporal seizures (n=4), myoclonus (n=1) and extratemporal seizures (n=1). Epileptic patients presented a more severe cognitive decline than patients without seizures (MMSE 8.4±6.9 versus MMSE non epileptic 20.9±5.45). 100% of patients with a MMSE <10 were epileptic.

**Conclusion:** Epilepsy appears to be a frequent comorbidity in early onset AD patients and seems to be a marker for severe AD. The role of the epileptic disorder in the acceleration of cognitive decline as the positive impact of antiepileptic drugs still need to be determined.

**Disclosure:** Nothing to disclose

**EPO2002**

**Abstract withdrawn**

**EPO2003**

**Improvement of long-term care requirements one year after surgery for idiopathic normal pressure hydrocephalus**

M. Ishikawa<sup>1</sup>, S. Yamada<sup>2</sup>, M. Miyajima<sup>3</sup>, H. Kazui<sup>4</sup>, E. Mori<sup>5</sup>

<sup>1</sup>Kyoto, Japan, <sup>2</sup>Neurosurgery, Shiga Medical University, Ohtsu, Japan, <sup>3</sup>Department of Neurosurgery, Juntendo Tokyo Koto Geriatric Medical Center, Tokyo, Japan, <sup>4</sup>Department of Neuropsychiatry, Kochi Medical School, Kochi University, Kochi, Japan, <sup>5</sup>Behavioral Neurology and Neuropsychiatry, Osaka University United Graduate School of Child Development, Osaka, Japan

**Background and aims:** Idiopathic normal pressure hydrocephalus (iNPH) is well-known as “treatable dementia”. However, in contrast to evident improvements in gait disturbance, improvement of the dementia is ambiguous, although previous studies have reported improvements in the results of cognitive tests such as the mini-mental state examination. In this study, changes in long-term care (LTC) requirements for physical disability and dementia were studied using data from a cooperative study of iNPH in Japan (SINPHONI-2 [UMIN000002730]).

**Methods:** SINPHONI was designed for a 1-year follow-up with after treatment of lumbo-peritoneal shunt surgery. Among 83 participants, 69 participants with data available on the severity of disability and dementia with respect to LTC requirements were analyzed in this study. In the LTC insurance system in Japan, disabilities in elderly people are categorized into 5 major grades (9 levels including subdivisions) and dementia is divided into 6 major grades (8 levels). Postoperative changes at 12 months were classified as improved, unchanged, or worse. Comparisons between pre- and post-operative states were studied using the Brunner-Munzel analysis for ordinal scales

**Results:** Out of the 69 patients who underwent surgery, improvement in disability and dementia 1 year after surgery was observed in 53.6% and 47.7%, respectively. Statistical analysis revealed that both were significant improvements (p<0.05).

**Conclusion:** The present study revealed a reduction in the LTC requirements for both disability and dementia one year after surgery for iNPH. Thus, it was confirmed that iNPH is a “treatable dementia” from the viewpoint of LTC.

**Disclosure:** Nothing to disclose

## EPO2004

**Transdermal Opioid Use among Elderly with Dementia**

C. Jensen-Dahm<sup>1</sup>, J. Koebstrup Zakarias<sup>1</sup>, C. Gasse<sup>2</sup>,  
G. Waldemar<sup>1</sup>

<sup>1</sup>Neurology - Danish Dementia Research Centre, Rigshospitalet, Copenhagen, Denmark, <sup>2</sup>Psychiatry - Department of Depression and Anxiety/Psychosis Research Unit, Aarhus University Hospital, Aarhus, Denmark

**Background and aims:** A recent study reported that transdermal opioid use was frequent among elderly with dementia and has been increasing (Jensen-Dahm 2019). Long-acting opioids, such as transdermal fentanyl, have been associated with severe adverse events. To determine possible factors contributing to the high consumption of transdermal opioids, we aimed to investigate potential geographical differences, which might reflect variances in clinical practice.

**Methods:** Register-based cross-sectional study of the entire elderly ( $\geq 65$  years) population of Denmark in 2015. Data included place of residence (region; municipality; home-living or nursing home), prescriptions, and discharge diagnosis from hospital contacts. Transdermal opioid (buprenorphin and fentanyl) use among elderly patients with dementia ( $n=36,014$ ) and without dementia ( $n=1,011,787$ ) was compared across 98 municipalities.

**Results:** Across the 98 municipalities transdermal opioid use among home-living elderly with dementia ranged between no use and 12% (36% of total opioid use), whereas it ranged between 0.6% (4% of total use) and 1.9% (11% of total use) for home-living elderly without dementia.

Among nursing home residents transdermal opioid use varied from 6.7% (22% of total) to 29.1% (56% of total) among elderly with dementia and from 5.8% (16% of total) to 27.5% (47% of total) among elderly without dementia.

**Conclusion:** Transdermal opioid use in elderly with dementia was frequent despite concern about serious adverse events associated with the drugs. The large difference across municipalities, particular among elderly with dementia, suggests variance in how chronic pain is treated in primary care. Our study suggests that more guidance on how to treat pain in elderly with dementia is needed.

**Disclosure:** Nothing to disclose



## EPO2005

## Expanding the clinical phenotype spectrum of Prion Protein Gene polymorphism p.met129val: a Greek family with a clinical phenotype of Primary Progressive Aphasia-Motor Neuron Disease

S. Kallivoulos, P. Maiovis, A.-N. Terzakis, K. Migkos, V. Giantzi, D. Parissis, T. Afrantou, N. Grigoriadis, P. Ioannidis

<sup>2</sup>nd Department of Neurology, Aristotle University of Thessaloniki, AHEPA University Hospital of Thessaloniki, Thessaloniki, Greece

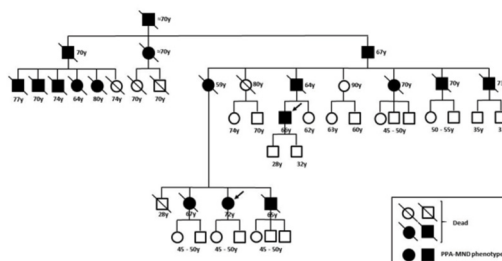
**Background and aims:** Frontotemporal Dementia (FTD) and Motor Neuron Disease (MND) represent a spectrum of overlapping clinical entities. The behavioral variant of FTD (bvFTD) is considered the most common case and Primary Progressive Aphasia (PPA) is often underrecognized. Prion protein gene (PRNP) mutations and single nucleotide polymorphisms (SNPs) are considered to play a key role apart from Prion Diseases in many Neurodegenerative Diseases, with ongoing field research.

**Methods:** We evaluated a Greek family with a clinical phenotype of PPA-MND.

**Results:** 18 family members presented progressive speech (3 of them subtle) and motor disorders around the 6th decade of their lives (PPA-MND spectrum). 16 died, most of them after 5-10 years since symptom onset. 2 members are still alive and underwent genetic testing. 1<sup>st</sup> patient is a 66-year-old male with progressive speech and upper/lower motor neuron disorders since the age of 57. PPA diagnosis is supported by neuropsychological evaluation and <sup>99m</sup>Tc-HMPAO brain SPECT. Whole exome sequencing revealed an heterozygous SNP in PRNP [c.385A>G/p.Met129Val]. 2nd patient is a 72-year-old female with progressive upper/lower motor neuron disorders since the age of 60. Speech disorders appeared only recently and are subtle. Targeted genetic testing revealed an homozygous SNP in PRNP [c.385A>G/p.Met129Val].

**Conclusion:** This Greek family (1st description in the literature) represents a rare clinical phenotype of PPA-MND spectrum with strong evidence of genetic background. Unfortunately, only 2 members underwent genetic testing. Hence, the exact genetic association is open to further investigation such as the hypothesis that Methionine/Valine heterozygosity predisposes to a prominent PPA phenotype.

**Disclosure:** Nothing to disclose



A Greek family with eighteen members presenting a clinical phenotype of PPA-MND

## EPO2006

**Muscione promotes Abeta clearance and ameliorates cognitive deficiency in APP/PS1 mice through HDAC2 degradation**Y. Liu<sup>1</sup>, X. Cao<sup>1</sup>, S. Shu<sup>1</sup>, Y. Xu<sup>1</sup>, J. Chen<sup>2</sup><sup>1</sup>Department of Neurology, Nanjing Drum Tower Hospital, Nanjing, China, <sup>2</sup>Department of Neurology, Drum Tower Hospital of Nanjing University Medical School, Nanjing, China, Nanjing, China

**Background and aims:** In the pathology of Alzheimer's disease (AD), Abeta deposition causes degeneration of synaptic plasticity, leads to memory loss and cognition impairment. Histone deacetylases 2 (HDAC2) has been shown to promote the pathologic alterations. Muscone (Mus), 1 of the simplex ingredients of traditional Chinese medicine, has been discovered neuroprotective effects on cerebral ischemia models. It is aimed to finding new drug targets for the treatment of AD.

**Methods:** Mus was intraperitoneally (i.p.) injected into the 6-month-old APP/PS1 or WT mice every day. 20 days later, Novel object recognition test (NOR) and Morris water maze (MWM) test were performed to evaluate spatial reference and working memory. Enzyme linked immunosorbent assay (ELISA), Immunofluorescence, Golgi staining and long-term potentiation (LTP) were used to measure the Abeta clearance and synaptic morphology. Western blot was conducted to detect the expression of target proteins.

**Results:** Behavioral results showed that the APP/PS1 mice with Mus treatment has a longer exploration time for NOR and more crossing platform times for MWM compared with APP/PS1 mice without it. The expression of Abeta was decreased and synaptic plasticity was rescued by administration of Mus in ELISA, Immunofluorescence, Golgi and LTP results. It also decreased the protein levels of HDAC2 in the brain tissues compared with APP/PS1 mice.

**Conclusion:** Our results indicated that Mus exhibited a protective effect against Abeta and synaptic plasticity via degradation of HDAC2 in APP/PS1 mice. These results provided evidences for the novel and potential application of Mus for the treatment of AD.

**Disclosure:** Nothing to disclose

## EPO2007

**Could in vivo measured cerebral tissue pH be an indicator of neurodegenerative diseases associated with age and pathological protein aggregation?**E.E. Lyros<sup>1</sup>, A. RagoSchke-Schumm<sup>1</sup>, P. Kostopoulos<sup>2</sup>, A. Sehr<sup>1</sup>, M. Backens<sup>3</sup>, S. Kalampokini<sup>1</sup>, Y. Decker<sup>4</sup>, M. Lesmeister<sup>1</sup>, Y. Liu<sup>1</sup>, W. Reith<sup>5</sup>, K. Fassbender<sup>1</sup><sup>1</sup>Neurology, Saarland University Medical Center, Homburg, Germany, <sup>2</sup>Medical Park Bad Camberg, Bad Camberg, Germany, <sup>3</sup>Neuroradiology, Saarland University Medical Center, Homburg, Germany, <sup>4</sup>Neurology, Saarland University Medical Center, Homburg, Germany, <sup>5</sup>Neuroradiology, Saarland University Medical Center, Homburg/Saar, Germany

**Background and aims:** There is in vitro evidence that low pH can enhance the pathological aggregation of proteins such as amyloid peptide and alpha-synuclein. The clinical relevance of these experimental findings is however largely unknown. We recently showed in vivo that Alzheimer's disease (AD) patients have lower pH than controls in the periventricular white matter (WM).

**Methods:** We extended our study to 12 patients with idiopathic Parkinson's disease (PD) who underwent proton spectroscopy after oral administration of histidine. We compared pH measurements from 3 brain regions (periventricular WM, hippocampus and cerebellum) of PD patients to those of 30 controls by means of ANCOVA to adjust for variation in age and scanner used.

**Results:** ANCOVA revealed a trend toward lower WM pH in PD patients than in controls ( $6.87 \pm 0.04$  vs  $6.91 \pm 0.06$ ,  $p=0.06$ ). The difference in cerebellar pH also approached statistical significance ( $p=0.08$ ) with lower values in PD, whereas the comparison of hippocampal pH revealed no trend ( $p=0.36$ ). Within all participants, worse visuoconstructive task performance (figure drawing) correlated with lower WM pH ( $r=0.44$ ,  $p=0.004$ ).

**Conclusion:** These preliminary results demonstrate a tendency towards a more acidic brain pH also in PD and complement our recently published data in normal brain aging and AD. We thus raise the plausible hypothesis that alterations in cerebral tissue pH may be involved in the initiation and progression of neurodegenerative diseases characterized by pathological aggregation of either amyloid beta or alpha-synuclein and appearing more frequently with increasing age. Consequently, targeting pH warrants investigation as a therapeutic approach for tackling these diseases.

**Disclosure:** This work was supported by Grants to K.F. and Y.L. from SNOWBALL, an EU Joint Programme for Neurodegenerative Disease (JPND) (01ED1617B).

## EPO2008

**Cholesterol content in peripheral blood cells of patients with Alzheimer's disease**

A. Martin Montes<sup>1</sup>, M. Recuero<sup>2</sup>, I. Sastre<sup>2</sup>,  
J.M. Sanchez-Caro<sup>1</sup>, A. Frank-Garcia<sup>1</sup>, M.J. Bullido<sup>2</sup>  
<sup>1</sup>Neurology, University Hospital La Paz, Madrid, Spain,  
<sup>2</sup>Molecular Biology Center Severo Ochoa, Madrid, Spain

**Background and aims:** Alzheimer's disease (AD) is the most frequent degenerative dementia, with a prevalence expected to increase in coming years. Deposits of amyloid and hyperphosphorylated TAU protein constitute the characteristic pathological findings of the disease, although its etiology in sporadic cases is still unknown. Cholesterol metabolism has been related to AD through multiple evidences. Filipin is a macrolide that binds to cholesterol and allows its quantification. We consider assessing whether there are differences in cholesterol content determined by Filipin's fluorescence (FF) in peripheral blood mononuclear cells (PBMCs) of patients with AD and healthy controls.

**Methods:** Cross-sectional study. Patients diagnosed with AD at different stages with support of biomarkers in cerebrospinal fluid (CSF) and cognitively healthy controls were included. PBMCs obtained from whole blood were co stained with Filipin and antibodies for several leucocyte subpopulations (CD8, CD4, CD11b, CD19, CD14 and CD16). FF was measured by flow cytometry in PBMCs and in different subpopulations

**Results:** N=61 (51AD, 10 controls). When the whole PBMCs were compared, no significant differences in filipin fluorescence among diagnostic groups were observed (AD 1280, controls 1218.9;  $p=0.65$ ). However, subpopulation analysis revealed significant decrease in cholesterol content in CD14+ cells of patients with AD (AD 2623.9, controls 4433.2;  $p=0.007$ ). Differences in cholesterol content in this CD14+ subpopulation were also significant in ApoE4 carriers (2427.1 in carriers, 3130.43 non-carriers,  $p=0.017$ )

**Conclusion:** Cholesterol content of CD14+ peripheral blood mononuclear cells could be a neurodegeneration biomarker and it could be related with AD, which supports the involvement of cellular cholesterol homeostasis in the pathophysiology of the disease.

**Disclosure:** This research has been granted by Economy Ministry of Spain (institutional support)

## EPO2009

**Clinical and imaging characteristics of high amyloid-producing Alzheimer's disease patients**

M. Leroy<sup>1</sup>, A. Alleman<sup>2</sup>, A.L. Aziz<sup>3</sup>, B. Maxime<sup>4</sup>,  
F. Pasquier<sup>5</sup>, T. Lebouvier<sup>1</sup>  
<sup>1</sup>Univ.lille, Inserm 1172, C HU Lille, Lille, France, <sup>2</sup>CHU Pellegrin, Bordeaux, France, <sup>3</sup>Nuclear Department, Univ. Lille, CHU Lille, Lille, France, <sup>4</sup>INSERM, Lille, France, <sup>5</sup>CMRR, DISTALZ, CHU Lille, Lille, France

**Background and aims:** In 2018, the ATN criteria recognized CSF A $\beta$ 42/40 ratio as a surrogate biomarker of amyloid deposition in Alzheimer's disease (AD) when CSF A $\beta$ 42 is in the normal range. Pathological A $\beta$ 42/40 ratio yet normal A $\beta$ 42 is a situation commonly seen in high amyloid-producing patients (HAP), where there is a relative decline of A $\beta$ 42 that remains in the normal range.

We aim to compare the clinical, biochemical and neuroimaging profile of HAP AD patients (A+T+N+, A positivity being determined with the A $\beta$ 42/40 ratio) as compared to low amyloid-producing patients (LAP).

**Methods:** Among the 547 A+T+N+ patients that attended our memory clinic since 2011, 402 were LAP and 146 were HAP. Analysis of the cognitive profile was performed in the 215 (138 LAP and 77 HAP) patients that had a MMSE >20 at baseline. VBM analysis was performed on a subset of 80 patients paired by age and MMSE (38 HAP and 42 LAP) with both MRI and FDG-PET scans available.

**Results:** HAP are older have a higher MMSE score at baseline than LAP (72y $\pm$ 9 vs 69y $\pm$ 8 and 20 $\pm$ 6 vs 19 $\pm$ 6).. However, the cognitive profile at baseline was identical in patients with a MMSE >20. CSF Tau biomarkers are not statistically different between the 2 groups ( $p=0.27$ ). VBM analysis did not show any significant difference on brain atrophy nor FDG metabolism.

**Conclusion:** Our study reinforces the use of the A $\beta$ 42/40 ratio when A $\beta$ 42 is normal since there are no cognitive, biochemical and neuroimaging point of view. Analyses of ApoE genotype and MMSE progression are currently undergoing.

**Disclosure:** Nothing to disclose

## EPO2010

## Functional connectivity in patients with Alzheimer's disease as a biomarker of cognitive decline

A. Medvedeva

*Moscow, Russian Federation*

**Background and aims:** Alzheimer's disease (AD) is 1 of most frequent neurodegenerative disorder. EEG-coherence is a sensitive marker of connectivity in brain, whereas fMRI detect activation patterns, which could be coupled. The aim of this study was to correlate fMRI activation patterns and EEG-coherence in AD, mild cognitive impairment (MCI) and age-matched healthy controls, investigating differences of connectivity between groups.

**Methods:** 53 patients with AD, 45 patients with MCI were included in the investigation according to diagnostic criteria of DSM V and MKB 10. The control group includes 45.

We performed fMRI (3 Tesla ,TRIO, Siemens, Erlangen, Germany) and resting EEG-recordings (NeuroScan Synamps System). EEGs were recorded in a wakeful resting state with eyes closed using a standard protocol and montage. Coherences between regions of interest, based on fMRI activation patterns, were calculated.

**Results:** We found significant differences between AD and MCI - theta band coherences, between anterior cingulate and left temporal gyri ( $p < 0.05$ ), (fig3); between AD and control subjects for theta -anterior cingulate and right temporal gyri, anterior cingulate gyrus and left hippocampus ( $p < 0.01$ ), (fig2). Theta coherence was significantly lower in patients with MCI compared with controls between anterior and posterior cingulate gyri, anterior cingulate and left/right temporal gyri, posterior cingulate and superior frontal gyri ( $p < 0.01$ ), and between right and left temporal gyri ( $p < 0.05$ ), (fig1).

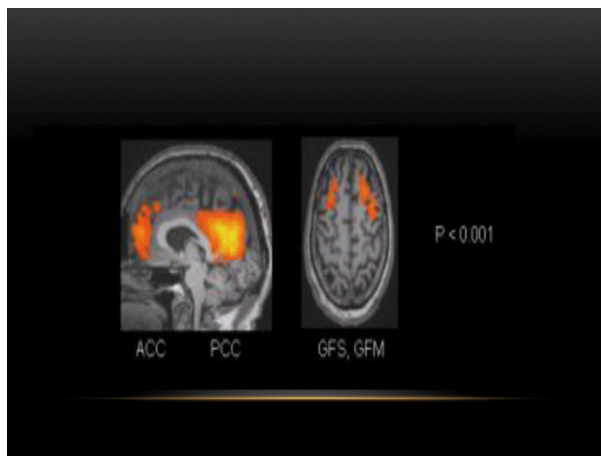


Fig.1 Comparison of healthy elderly subjects vs. MCI patients. fMRI activations ( $p < 0.001$ ) Correspondence in frontal, but not in posterior regions

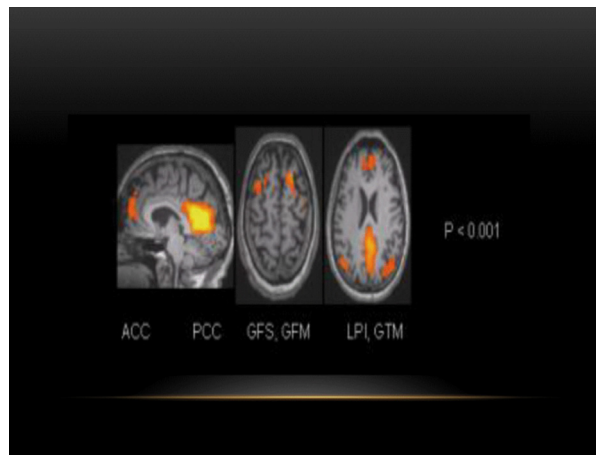


Fig.2 Comparison of healthy elderly subjects vs. AD patients. fMRI activations ( $p < 0.001$ ). Correspondence in frontal, but not in posterior regions



Fig.3 Comparison of MCI and AD patients. fMRI activations ( $p < 0.001$ ).

**Conclusion:** EEG coherence could serve biomarker of AD and help in the early detection of the neurodegenerative disease.

**Disclosure:** Nothing to disclose

## EPO2011

**A systematic review of QEEG as a tool for differential diagnosis of Alzheimer's disease with other forms of dementia**

D.F. Muresanu<sup>1</sup>, L. Popa<sup>2</sup>, O. Verisezan Rosu<sup>2</sup>, S. Strilciuc<sup>2</sup>

<sup>1</sup>Neurosciences, "Iuliu Hatieganu" University for Medicine and Pharmacy, Cluj, Romania, <sup>2</sup>Neurosciences, "RoNeuro" Institute for Neurological Research and Diagnostic, Cluj-Napoca, Romania, Cluj, Romania

**Background and aims:** The differential diagnosis of Alzheimer's disease (AD) with other dementias is often difficult. The literature of the past 30 years suggests the presence of certain QEEG alterations associated with cognitive impairment. This systematic review aims at offering a comprehensive analysis of possible QEEG patterns which might improve the differential diagnosis of AD.

**Methods:** The systematic review process was performed in compliance with the PRISMA statement and checklist. PubMed, Embase and PsycNet databases were queried using equivalent combinations of 'quantitative EEG' and 'Alzheimer'.

**Results:** 10 articles were selected after title, abstract and full-text screening of 667 search results. The most often used QEEG parameters in differential diagnosis were absolute power, relative power and coherence. Diffuse alterations are found in the  $\delta$  and  $\theta$  frequency bands in AD, with reduction of  $\alpha$ -central activity, but the enhancement of the slow global activity is more pronounced in dementia associated with Parkinson's disease. The reduction of coherence in frontal and central areas appears specific in AD in contrast to vascular dementia. 2 studies integrated QEEG parameters into classification algorithms based on machine learning, increasing the precision of algorithm by 8%.

**Conclusion:** This review is among the 1st in the literature to propose an assessment of the role of QEEG in recognizing AD and discriminating between other forms of dementia. In this problematic process, QEEG may serve as an alternative technique for a more accurate diagnosis. Further research should explore this topic through comparable quantitative approaches.

**Disclosure:** Nothing to disclose

## EPO2012

**Metabolic failure of right inferolateral frontal cortex impairs prospective memory (PM) in MCI due to Alzheimer's disease (MCI-AD)**

S.G. Grisanti<sup>1</sup>, N. Girtler<sup>1</sup>, A. Brugnolo<sup>1</sup>, E. Doglione<sup>2</sup>, B. Orso<sup>1</sup>, S. Morbelli<sup>2</sup>, M. Baucknhet<sup>2</sup>, M. Grazzini<sup>1</sup>, F. Massa<sup>1</sup>, D. Arnaldi<sup>1</sup>, M. Pardini<sup>1</sup>, P. Origone<sup>1</sup>, F. Nobili<sup>1</sup>

<sup>1</sup>Dept of Neuroscience (DINOEMI), University of Genoa, Genoa, Italy, <sup>2</sup>IRCCS Ospedale Policlinico San Martino, Genoa, Italy, Genoa, Italy

**Background and aims:** Prospective memory (PM) involves executive processes such as forming and maintaining an intention in memory over time while performing another task. Prefrontal regions could be involved in PM although little is known in early Alzheimer's disease (AD). We investigated the brain metabolic correlates of PM in patients with MCI-AD compared to healthy controls (HC).

**Methods:** 18 patients (10 males, age: 74±4.9; MMSE score: 27.7±1.6) with intermediate (FDG-PET, 6 patients) or high (plus a positive amyloidosis biomarker, 12 patients) likelihood of MCI-AD were enrolled. In 10 patients the diagnosis of AD dementia was made 2.7 years later (range: 0.8-3.4) while eight patients are not converted after 3.4 years (range: 0.25-6.9). HC included 23 subjects (11 males, age: 71.5±5.7) undergoing FDG-PET and neuropsychological evaluation. PM was evaluated with the Ungvari et al (Arch Clin Neuropsychol. 2008; 23:613-622) paradigm test. Brain metabolism was compared between MCI-AD and HC (SPM-12) and correlated with the PM score in all the 41 subjects, then in HC and in MCI-AD groups separately, with age and education as nuisance variables.

**Results:** In MCI-AD group significant hypometabolism was found in the precuneus/posterior cingulate (PC/PCC) region. PM score was positively correlated (uncorrected  $p < 0.001$ ) with the same PC/PCC region in all subjects, with right inferior frontal and orbitofrontal gyri (uncorrected  $p < 0.005$ ,  $p < 0.05$  FWE-corrected at cluster level) in MCI-AD patients (Fig. 1); no correlation was found in HC.

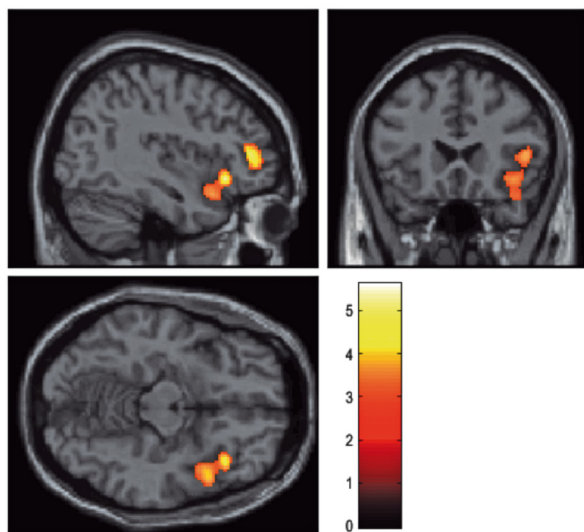


Fig.1

**Conclusion:** Progressive impairment of brain function in right inferolateral frontal cortex is responsible for loss of PM in early AD.

**Disclosure:** Nothing to disclose

## EPO2013

### A rare case of adult onset neuronal intranuclear disease

G. Oh<sup>1</sup>, J. Schepel<sup>2</sup>, M. Phillips<sup>3</sup>

<sup>1</sup>Neurology, Waikato DHB, Hamilton, Waikato, New Zealand,

<sup>2</sup>Hamilton, Waikato, New Zealand, <sup>3</sup>Neurology, Waikato

DHB, Hamilton, New Zealand

**Background and aims:** Adult onset neuronal intranuclear inclusion disease (NIID) is a rare and slowly progressive neurodegenerative disorder that can be sporadic or familiar in onset. The clinical manifestations are highly variable but patients have been reported to present with dementia or encephalitic episodes. It is characterised by eosinophilic intranuclear inclusions in the nervous system and visceral organs.

This case study aims to increase awareness and deepen other clinicians' understanding of this disease.

**Methods:** 59-year-old lady presented to ED with 3 days of profound expressive dysphasia and worsening confusion on background of gastrointestinal symptoms and episodic migraines with left sided hemispheric dysfunction since 2012.

**Results:** There was progressive cortical thickening and signal hyperintensity on MRI with hypometabolic change on PET-CT in left temporal, parietal and occipital region with EEG consistent with moderate to severe encephalopathy resulting in commencement of steroids and Levetiracetam. Ongoing debilitating symptoms led to a brain biopsy from the left temporal region that revealed intranuclear eosinophilic inclusions. She received multidisciplinary team input and had slow improvement in ability to perform activities of daily living.

**Conclusion:** This case was a diagnostic challenge and was academically stimulating. It reminds us of the importance of keeping broad differentials in mind when dealing with encephalopathy. NIID is increasingly recognised as an under diagnosed entity and an important differential diagnosis of leukoencephalopathy and neuropathy.

I will be presenting an overview of NIID and discuss when to suspect this disease and the use of skin biopsy, which is a reliable and practical diagnostic method.

**Disclosure:** Nothing to disclose

## EPO2014

**Perspective taking abilities in Alzheimer's disease**

*M. Parizkova, J. Kalinova, M. Vyhnalek, J. Hort, J. Laczó*  
*Department of Neurology, Charles University, 2<sup>nd</sup> Faculty of Medicine, Motol University Hospital, Prague, Czech Republic*

**Background and aims:** There is an increasing effort to find simple and reliable tests for the early diagnosis of Alzheimer's disease (AD). Spatial orientation deficits are present early in AD and could thus serve as an early cognitive marker of the disease. We aimed to evaluate the potential of perspective taking tests to identify individuals with early AD and to differentiate them from those with cognitive deficit of other etiology.

**Methods:** 57 participants with amnesic mild cognitive impairment (aMCI) and positive AD-biomarkers (aMCI due to AD, n=14), aMCI and negative biomarkers (aMCI AD-negative, n=12), mild AD dementia (n=12) and cognitively normal (CN) older adults (n=19) underwent clinical and neuropsychological evaluation, MRI brain scan, amyloid PET imaging, cerebrospinal fluid biomarker assessment and 2 perspective taking tasks: Standardized Road-Map test of Direction Sense (RMTDS) and Perspective Taking/Spatial Orientation test (PTSOT). In the RMTDS, the participants followed a pathway on a city map indicating a direction of turning (left or right) at each intersection. The PTSOT included pictures of arrays of objects and participants indicated direction between selected objects.

**Results:** The aMCI due to AD and mild AD dementia groups had lower scores in the PTSOT compared to the CN ( $p<0.05$ ) and aMCI AD-negative ( $p<0.05$ ) groups. There were no differences between CN and aMCI AD-negative groups in the PTSOT. All groups had similar performance in the RMTDS.

**Conclusion:** The PTSOT reliably detects spatial orientation impairment typical for early stages of AD. This test can differentiate aMCI participants due to AD from those with non-AD etiology.

**Disclosure:** Supported by: Grant Agency of Charles University grant no. 693018

## EPO2015

**H.pylori infection and cortical thinning in cognitive normal individuals**

*J.H. Park<sup>1</sup>, J. Song<sup>2</sup>, H.Y. Shin<sup>3</sup>, H. Jang<sup>1</sup>, D.L. Na<sup>4</sup>, S.W. Seo<sup>4</sup>, H.J. Kim<sup>4</sup>, T.J. Kim<sup>2</sup>*

*<sup>1</sup>Neurology, Samsung Medical Center, Seoul, Korea, Republic of, <sup>2</sup>Internal Medicine, Samsung Medical Center, Seoul, Korea, Republic of, <sup>3</sup>Center for Health Promotion, Samsung Medical Center, Seoul, Korea, Republic of, <sup>4</sup>Neuroscience Center, Samsung Medical Center, Seoul, Korea, Republic of*

**Background and aims:** Helicobacter pylori (H.pylori) is a well known bacteria for development of stomach cancer and chronic inflammation. However, H.pylori's contribution to the neurodegeneration remains largely unknown. We aimed to evaluate the association between H.pylori infection and brain cortical thickness in cognitively normal individuals.

**Methods:** Total 3996 participants (age $\geq$ 45 years) were recruited from Health Promotion Center in Samsung Medical Center from September 2008 to December 2014. After excluding participants with missing variables, 1,594 were selected in final analysis. Participants underwent brain magnetic resonance images including 3-dimensional volume images. We measured cortical thickness using the standard Montreal Neurological Institute image processing tool CIVET. H. pylori infection was defined pathologically with esophagogastroduodenoscopy biopsy. Multiple linear regression analysis was done to evaluate the relationship between H.pylori infection and brain cortical thickness after controlling for age, intracranial volume, CRP.

**Results:** In male, H. pylori infection was associated with cortical thinning in the bilateral lateral temporal, lateral frontal, and right occipital areas after adjusting for age, intracranial volume, CRP. However, in female, H. pylori infection was not associated with cortical thickness.

**Conclusion:** Our findings suggest that H.pylori infection is associated with neurodegenerative changes in cognitive normal male, regardless of chronic inflammation.

**Disclosure:** Nothing to disclose

## EPO2016

**Serum neurofilament light chain levels and disability milestones in Lewy body diseases**

A. Pilotto<sup>1</sup>, A. Imarisio<sup>1</sup>, F. Conforti<sup>1</sup>, A. Lupini<sup>2</sup>, S. Gipponi<sup>1</sup>, E. Cottini<sup>1</sup>, A. Scalvini<sup>1</sup>, S. Masciocchi<sup>1</sup>, S. Nocivelli<sup>1</sup>, R. Grasso<sup>1</sup>, R. Turrone<sup>3</sup>, B. Borroni<sup>1</sup>, C. Rizzetti<sup>4</sup>, L. Bonanni<sup>5</sup>, H. Zetterberg<sup>6</sup>, N. Ashton<sup>7</sup>, A. Hye<sup>8</sup>, A. Padovani<sup>9</sup>

<sup>1</sup>Department of Clinical and Experimental Sciences, University of Brescia, Brescia, Italy, <sup>2</sup>Department of Clinical and Experimental Sciences, University of Brescia, Brescia, Italy, <sup>3</sup>Neurology Unit, Department of Clinical and Experimental Sciences, University of Brescia, Brescia, Italy, <sup>4</sup>S. Isidoro Hospital, FERB ONLUS, Trescore Balneario, Italy, <sup>5</sup>Neurology, University of Chieti, Chieti, Italy, <sup>6</sup>Section of Clinical Neuroscience and Rehabilitation, University of Gothenburg, Mölndal, Sweden, <sup>7</sup>Department of Psychiatry and Neurochemistry, University of Gothenburg, Gothenburg, Sweden, <sup>8</sup>Psychiatry, Psychology and Neuroscience, King's College London, London, United Kingdom, <sup>9</sup>Department of Neurology, University of Brescia, Brescia, Italy

**Background and aims:** Blood and CSF neurofilament light chain (NfL) levels have been proposed as a marker of neurodegeneration. Several studies show NfL levels could be used to discriminate between Parkinson's disease (PD) and atypical parkinsonism. Aim of the study was to evaluate the correlation between NfL and milestones of disability in Parkinson's disease (PD) and dementia with lewy bodies (DLB)

**Methods:** Plasma NfL concentration was measured using Single molecule array technology in a cross-sectional study including patients with PD, n=92 and DLB, n=27. We evaluated the correlation between NfL concentrations and motor, non-motor symptoms, cognitive and behavioral abnormalities in PD and DLB. All analyses are corrected for age, sex and disease duration.

**Results:** Plasma NfL correlated with age and age at onset in the cohort; PD showed lower NfL levels compared with DLB patients (p=0.001). In PD, higher NfL correlated with hyposmia (p=0.01), total UPDRS-II and UPDRS-III scores (p=0.001), gait speed (p=0.04) and several disability milestones, including cognitive impairment (p=0.001), symptomatic dysautonomia (p=0.001), loss of independency in activities of daily living (p=0.01) and instrumental daily living (p=0.001). In DLB, NfL correlated with disease duration, hyposmia and neuropsychiatric symptoms, but not with motor function assessed by UPDRS-III. At follow-up, NfL was the best predictor of motor progression in PD, beyond the classification of malignant phenotype.

**Conclusion:** Elevated plasma NfL levels are associated with disability milestones in PD patients and neuropsychiatric abnormalities in DLB. Further longitudinal investigations are warranted in order to evaluate NfL as a predictive biomarker of disability progression in Lewy bodies disorders.

**Disclosure:** Nothing to disclose

## EPO2017

**Extrastriatal dopaminergic and serotonergic pathways in Alzheimer's disease: a 123I-FP-CIT study**

A. Pilotto<sup>1</sup>, S.P. Caminiti<sup>2</sup>, C. Liguori<sup>3</sup>, V. Garibotto<sup>4</sup>, L. Presotto<sup>5</sup>, A. Sala<sup>6</sup>, R. Turrone<sup>7</sup>, S. Caratozzolo<sup>8</sup>, A. Scalvini<sup>9</sup>, L. Rozzini<sup>9</sup>, M. D'amelio<sup>10</sup>, N.B. Mercuri<sup>3</sup>, B. Paghera<sup>11</sup>, E. Premi<sup>11</sup>, C. Rizzetti<sup>12</sup>, A. Stefani<sup>3</sup>, A. Padovani<sup>13</sup>, D. Perani<sup>5</sup>

<sup>1</sup>Brescia, Italy, <sup>2</sup>Milan, Italy, <sup>3</sup>Rome, Italy, <sup>4</sup>Department of Nuclear Medicine, University Hospitals of Geneva, Geneva, Switzerland, <sup>5</sup>Vita-Salute San Raffaele University, Milan, Italy, <sup>6</sup>Neuroscience, Vita-Salute San Raffaele University, Milan, Italy, <sup>7</sup>Neurology Unit, Department of Clinical and Experimental Sciences, University of Brescia, Brescia, Italy, <sup>8</sup>Department of Clinical and Experimental Sciences, University of Brescia, Brescia, Italy, <sup>9</sup>Neuroscience Section, Department Clinical and Experimental Sciences, Neuroscience Section, Department Clinical and Experimental Sciences—University of Brescia – Italy, Brescia, Italy, <sup>10</sup>Medicine, Campus Biomedico Roma, Rome, Italy, <sup>11</sup>Department of Nuclear Medicine, University of Brescia, Brescia, Italy, <sup>12</sup>S. Isidoro Hospital, FERB ONLUS, Trescore Balneario, Italy, <sup>13</sup>Department of Neurology, University of Brescia, Brescia, Italy

**Background and aims:** Pathological reports suggest that dopaminergic and serotonergic pathways are early involved in Alzheimer's disease (AD). 123I-FP-CIT SPECT imaging allows the evaluation of both dopamine transporter (DAT) and serotonin transporter (SERT) in several brain regions. Aim of the study was to evaluate extrastriatal dopaminergic and serotonergic pathways in AD patients by using a 123I-FP-CIT SPECT imaging.

**Methods:** 69 subjects with AD were included in a multicenter study and underwent neurological examination, structural and functional imaging or CSF, in order to reach a biomarker diagnosis of AD (i.e. A+T+N+). Each individual underwent 123I-FP-CIT SPECT imaging. The occipital-adjusted binding (SBR) in extrastriatal regions were compared between AD subjects and controls, adjusting for the effect of age, sex, disease duration and serotonergic/dopaminergic treatment.

**Results:** 52 AD subjects A+T+N+ and 75 controls entered in the study. AD patients (n=35) showed lower 123I-FP-CIT SPECT SBR in the cingulate gyrus (p=0.001) and temporal lobe (p=0.007) as well as in the insula (p=0.01) and thalamus (p=0.025) compared to controls. When dividing AD subjects according to severity, MCI due to AD (n=17) showed significantly lower parietal SBR compared to controls (p=0.002) and significantly higher SBR in the insula (p=0.01), thalamus (p<0.001) and temporal lobe (p=0.008) compared to AD dementia cases.

**Conclusion:** We demonstrated extrastriatal dopaminergic and serotonergic impairment in Alzheimer's disease and from the prodromal phase and become widespread during disease course. Longitudinal studies will be necessary in order to evaluate the clinical value of extrastriatal 123I-FP-CIT SPECT assessment in AD patients.

**Disclosure:** Nothing to disclose



## EPO2018

**“Don’t know” sign: description and evaluation of its diagnostic accuracy for cognitive impairment, comparing to other observation based signs**

I. Rego Garcia<sup>1</sup>, J.A. Medina Gamez<sup>1</sup>,  
C. Valderrama Martin<sup>1</sup>, V. Guillen Martinez<sup>1</sup>,  
R.M. Vilchez Carrillo<sup>1</sup>, C. Carnero-Pardo<sup>2</sup>

<sup>1</sup>Neurology Unit, Hospital Virgen de las Nieves, Granada, Spain, <sup>2</sup>FIDYAN Neurocenter, Granada, Spain

**Background and aims:** In neurology clinic, sometimes patients do not know the main complaint or the reason for the consultation. We have called this circumstance “don’t know” sign (DKS). Our objective is to define this new sign and its modalities and to evaluate its prevalence and diagnostic accuracy for cognitive impairment (CI), comparing with other observation based signs.

**Methods:** Cross-sectional, prospective study, which includes all new patients evaluated by authors in outpatient settings, during 5 months. We recorded the presence of DKS during the consultation. We used global deterioration scale (GDS) to assess cognitive status, using clinical history, caregivers’ interview and cognitive tests. We considered CI if GDS $\geq$ 3. We analyzed prevalence and diagnostic accuracy of DKS, “head turning sign”, “attending with” and verbal repetition, by calculating their Sensibility (Se), Specificity (Sp), positive predictive value (PPV) and negative predictive value (NPV).

**Results:** We included 673 patients (62% female), with a wide range of age (14-97 years old; 59.3 $\pm$ 20.2 (average $\pm$ sd)). DKS was positive in 14% of the sample and its presence was strongly associated to GDS. DKS has Se 0.41, Sp 0.98, PPV 0.89 and NPV 0.79. Remarkably, “attending with” sign has Se 0.97, Sp 0.34, PPV 0.39, and NPV 0.96.

**Conclusion:** DKS is common in neurology outpatient; its Se is low but it is very specific for CI, and it has high PPV. It does not cost any extra time and we recommend its use in combination with other signs based on observation (particularly “attending with” sign).

**Disclosure:** Nothing to disclose

## EPO2019

**Metabolic connectivity alterations of dorsal attention, ventral attention and limbic networks are associated with visual hallucinations in Lewy Body Dementia (DLB): a FDG-PET/MRI study**

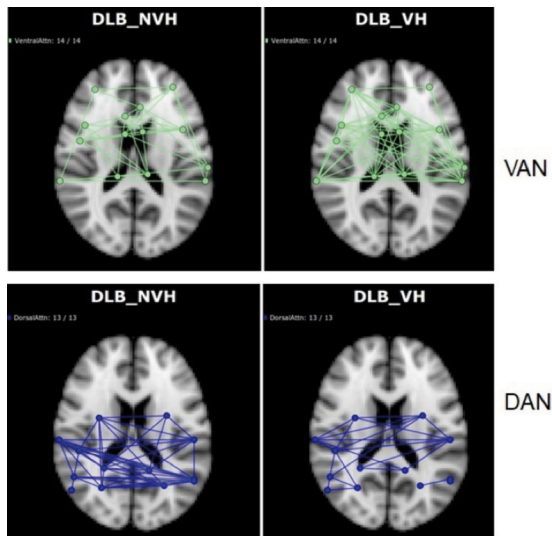
G. Zorzi<sup>1</sup>, D. Cecchin<sup>2</sup>, F. Fragiaco<sup>1</sup>, C. Bussè<sup>1</sup>,  
G. Gazzola<sup>1</sup>, S. Mozzetta<sup>1</sup>, M. Corbetta<sup>1</sup>, A. Cagnin<sup>1</sup>

<sup>1</sup>Department of Neurosciences, University of Padova, Padua, Italy, <sup>2</sup>Nuclear Medicine, University of Padova, Padua, Italy

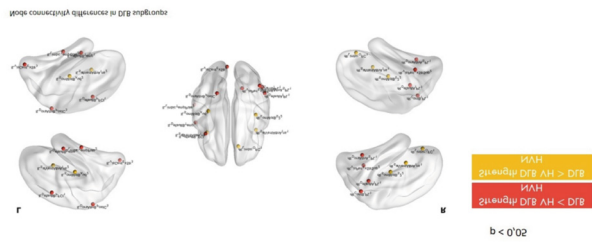
**Background and aims:** Recurrent-complex-visual-hallucinations-(VH) are common in dementia with Lewy-bodies-(DLB). Only 1 study investigated metabolic connectivity in DLB with VH using PET-FDG. We explore connectivity changes of PET-FDG data acquired with a hybrid-PET/MRI scanner in DLB-VH+ patients

**Methods:** 26-patients with a diagnosis of probable DLB (13VH+, 13VH-; mean age: 72.9 $\pm$ 6.87yrs versus 70.2 $\pm$ 7.96yrs) and 14-controls subjects (mean age: 65.5 $\pm$ 7.94yrs) were enrolled. T1-MPRAGE-MRI and PET-FDG data were co-acquired for all subjects. T1-sequences were processed using Freesurfer standard-pipeline adapting Shaefer-Yeo-functional-atlas 7N for cortical parcellation. The standardized-uptake-values (SUV) for each ROI corrected for partial volume (Symmetric-Geometric-Transfer-Matrix-method), normalized to the cerebellum, were extracted. Graph analysis was performed using BrainGraph-package-R to extract clustering-coefficient, strength degree, and characteristic-path-length and hubs

**Results:** CTRL showed higher SUVr values for each network as compared to both DLB groups. SUVr values of the dorsal attention network were lower in the VH+ group compared to VH-. Graph analysis showed lower nodal strength globally in the dorsal attention, parietal and ventral attentive networks in VH+. VH+ patients showed lower strength degree in the inferior parietal lobe (default network) and post-central regions (dorsal attention) nodes; and higher strength degree in the orbitofrontal cortex and temporal-pole (limbic), and inferior frontal cortex (ventral attention) nodes. In VH+ many dorsal attention networks posterior hubs were lost, and anterior hubs in the default mode, fronto-parietal, ventral and limbic networks were



Connectivity of DAN and VAN between the two DLB subgroups  
 Connectivity of DAN and VAN between the two DLB subgroups



Node strength connectivity differences between DLB subgroups

**Conclusion:** The presence of VHS are associated with metabolic decrements of connectivity in parieto-occipital-cortex, connectivity alteration of the dorsal and ventral attention networks, and relatively higher connectivity in the limbic system

**Disclosure:** Nothing to disclose

## Cerebrovascular diseases 4

### EPO2020

#### Mechanical thrombectomy in Albania

R. Gjini<sup>1</sup>, A. Rroji<sup>2</sup>, O. Taka<sup>1</sup>, E. Basha<sup>3</sup>, M. Petrela<sup>4</sup>  
<sup>1</sup>Tirana, Albania, <sup>2</sup>Neuro-Radiology, Mother Tereza, Hospital Center, Tirana, Albania, <sup>3</sup>Neurosciences, University Hospital Center "Mother Teresa", Tirana, Albania, <sup>4</sup>Neuroscience, University of Medicine, Tirana, Tirana, Albania

**Background and aims:** Large vessel occlusion causes major cerebral lesions with a high mortality or recurrent disability (60-80%). Since 2014, with the publication of large studies of mechanical thrombectomy, the treatment of these patients has entered a new perspective where Albania has been involved too.

**Methods:** This prospective study includes results from the 1st 5 years of mechanical thrombectomy in Albania, in large vessel occlusion. It evaluated the association between NIHSS and mRS scores with the door-to-groin interval, localization, age, hospital stay and other variables on records of the "Mother Thereza" Hospital from January 2015 to October 2019. 43 patients were enrolled, subdivided in 3 groups according to door-to-groin interval, evaluating NIHSS upon discharge and the mRS upon discharge and after 90 days.

**Results:** Mean interval from symptoms onset to thrombectomy  $M=5.4\pm 2.9$  hours, anterior localization (79.1%) and posterior (20.9%). Mean NIHSS improvement from admission to discharge was 5.6 (-2.8) points with a significant difference ( $p<0.01$ ). Mean mRS improvement from admission to discharge was 1.4 (-0.4) points, with a significant difference ( $p<0.01$ ). Mean thrombectomy interval was higher in posterior localization ( $M=8.7\pm 4.8$  hours). At 90 days, symptomatic intracranial hemorrhage rate was 16.7%, death rate was 14% (95%CI). Mean mRS at the 90 days follow-up was  $M=1.4 (\pm 1.9)$ , with a significant difference with admission mRS ( $p<0.01$ ).

**Conclusion:** Study confirms that early endovascular treatment was safe and effective in reducing disability score at 90 days and superior to intravenous thrombolysis in large-artery occlusion.

**Disclosure:** Nothing to disclose

### EPO2021

#### Mechanical thrombectomy in Albania

R. Gjini<sup>1</sup>, E. Enesi<sup>2</sup>, J. Kruja<sup>1</sup>, M. Petrela<sup>3</sup>, A. Rroji<sup>2</sup>  
<sup>1</sup>Neurology, Faculty of Medicine, UMT, Tirana, Albania, <sup>2</sup>Neuroimaging, UHC Mother Teresa, Tirana, Albania, <sup>3</sup>Neuroscience, University of Medicine, Tirana, Tirana, Albania

**Background and aims:** Occlusion of large cerebral vessels causes major lesions with a high mortality or disability. Noninvasive methods such as intravenous thrombolysis have a low success rate in recanalization of large vessels. Since 2014, with the publication of large studies of mechanical thrombectomy, the treatment has entered a new perspective where Albania has been involved quite rapidly.

**Methods:** We evaluated the association between the NIHSS and mRS scores with the door-to-groin interval, localization, sex, age, risk factors, hospital length of stay and other variables recorded from the medical charts of the UHC Mother Teresa from January 2015 to October 2019. The enrolled patients are subdivided in 3 groups according to door-to-groin interval, evaluating NIHSS upon discharge and the mRS upon discharge and after 90 days.

**Results:** 43 patients were enrolled, with a mean interval of time from symptoms onset to thrombectomy  $M=5.4\pm 2.9$  hours. The mean NIHSS improvement from admission to discharge was 5.6 (-2.8) points ( $p<0.01$ ). The mean mRS improvement from admission to discharge was 1.4 (-0.4) points ( $p<0.01$ ). The mean interval of thrombectomy was higher in patients with posterior localization ( $M=8.7\pm 4.8$  hours) ( $p=0.04$ ). At 90 days, the rates of symptomatic intracranial hemorrhage were 16.7%, and rates of death were 14% (95%CI). The mean mRS at the 90 days follow-up was  $M=1.4 (\pm 1.9)$ , with a significant difference with the admission mRS ( $p<0.01$ ).

**Conclusion:** The early treatment with mechanical thrombectomy is safe and effective in reducing the score of disability at 90 days in cases of large-artery occlusion.

**Disclosure:** Nothing to disclose

## EPO2022

### The woman who could not read the initial part of the words, but could otherwise see - an atypical stroke presentation as hemialexia

L.M. Gonçalves Ribeiro<sup>1</sup>, M.J. De Melo Lima<sup>1</sup>, P. Bem<sup>2</sup>, M. Calejo<sup>1</sup>

<sup>1</sup>Neurology, Hospital Pedro Hispano, Matosinhos, Portugal,

<sup>2</sup>Neuroradiology, Hospital Pedro Hispano, Matosinhos, Portugal

**Background and aims:** Besides striated cortex, visual information is spread over a wide area of cortical and subcortical regions. The ventromedial occipital cortex and left angular gyrus are essential for color vision and reading, respectively.

**Methods:** A 57-year-old woman with diabetes mellitus and dyslipidemia presented with vision impairment with sudden onset 7 days before: she couldn't see the initial part of the words (but was able to write) and saw colorless and unfocused left hemifaces.

Neurological examination showed left hemialexia and hemiacromatopsia without visual field deficit nor visual neglect. No agraphia, digitagnosia, dyscalculia were noted. The remaining examination was normal.

**Results:** Brain magnetic resonance imaging revealed a right thalamocapsular lesion with extension to the ipsilateral cerebral peduncle (hyperintense on FLAIR and DWI, without clear restriction on the ADC nor contrast uptake) and also a FLAIR hyperintense left posterior occipital lesion.

The neurovascular and cardiac studies were normal. Blood workup was unremarkable (including immune study). Lumbar puncture was normal, with negative oligoclonal bands.

A small vessel stroke was assumed and the patient was discharged with statin and aspirin.

**Conclusion:** This case represents an hemialexic syndrome, a very unusual and challenging stroke presentation. This is usually due to splenic lesions of the corpus callosum.

The patient's left occipital lesion seems to affect the fibers originating from the right visual cortex, containing left visual field information (arising from cortical regions responsible for reading).

The thalamic lesion could explain the remaining visual deficits.

**Disclosure:** Nothing to disclose

## EPO2023

### Recurrence rate and hemorrhagic complications in patients with cardio-embolic transient ischemic attacks

M. Gracia<sup>1</sup>, E. Garcés Antón<sup>2</sup>, D. Cantero Lozano<sup>3</sup>, M.P. Navarro Pérez<sup>1</sup>, S. Ballesta Martínez<sup>4</sup>, J. Rodríguez Montolio<sup>2</sup>, Y. Martín Aleman<sup>2</sup>, A. López Bravo<sup>5</sup>

<sup>1</sup>Neurology, Hospital Clínico Lozano Blesa, Saragossa, Spain, <sup>2</sup>Neurology, Hospital Clínico Universitario Lozano Blesa, Saragossa, Spain, <sup>3</sup>Cardiology, Hospital Clínico Lozano Blesa, Saragossa, Spain, <sup>4</sup>Neurology, Saragossa, Spain, <sup>5</sup>Neurology, Hospital Reina Sofía, Tudela, Spain

**Background and aims:** 20-30% of transient ischemic attacks (TIA) are due to cardio-embolic cause. Atrial fibrillation is frequently diagnosed after TIA. A prior detection is important to start anticoagulation. Therapy with direct-oral anticoagulants (DOACs) has shown no inferiority and less haemorrhagic risk in comparison with warfarin. Our aim is to describe clinical characteristics of patients who suffered an embolic or cryptogenic TIA as well as the recurrence and haemorrhagic complication rates due to anticoagulant treatment.

**Methods:** Retrospective cohort study of patients who were attended at Emergency room or admitted between 2014-2018.

**Results:** 49 patients with a median follow-up of 33±28 months. Most were men (61.2%), median age 75.5±16, hypertension 75.5%, dyslipidemia 53%, previous TIA/stroke 12.2%, diabetes 16.3%. 75.5% were cardio-embolic and 24.5% were cryptogenic. AF was newly diagnosed in 40.8% and was known in 42.9%. Most frequent clinical onset was aphasia 34.7%. An echocardiogram was performed to 59.2% showing moderate-severe left atrial dilatation in 40.9% and atrial septum aneurysm and/or patent foramen ovale (PFO) in 2 cases. MRI was performed in 34% and acute lesion was demonstrated in diffusion-weight imaging in 10.2%. The anticoagulation prescribed was warfarin 18.4%, apixaban 34.7% and dabigatran 18.4%. 53.1% was treated by usual dose. Recurrence rate was 12.2% or 0.37% cases per month. There was one haemorrhagic stroke and no deaths.

**Conclusion:** Accordingly to our data, the recurrence rate was lower in comparison to the data described in literature, possibly due to early implementation of an effective and safe treatment strategy.

**Disclosure:** Nothing to disclose

## EPO2024

**Understanding seasonal variability in cervical artery dissection in the Russian population**

L. Kalashnikova, M. Gubanova, L. Dobrynina, M. Danilova

*Research Center of Neurology, Moscow, Russian Federation*

**Background and aims:** Cervical artery dissection (CeAD) is the most frequent cause of ischemic stroke in young adults and some other manifestations. American, European and Australian authors showed seasonal CeAD variation with increased frequency in cold season.

**Aim:** To investigate the seasonal variation in incidence of CeAD in the Russian population.

**Methods:** We examined 270 patients (mean age  $37.9 \pm 8.7$ ; 151 females, 56%) with CeAD, verified by MRI/MRA. We analyzed CeAD frequency during all months of the year and compared its frequency in the cold season (September 22–March 21) and warm season (March 22–September 21). Chi-square compliance criteria were used to test whether the difference was significant.

**Results:** CeAD frequency ranged from 11 to 26 over the months, being lowest in April (11), July (16) and November (19). The difference was not statistically significant ( $p=0.2875$ ). CeAD had a tendency to occur more frequently in cold season compared to warm season (145 dissection, 54% vs 125 dissections, 46%;  $p=0.22$ ). The frequency of infection, 1 of the precipitating factor of dissection did not differ in cold and warm seasons ( $p>0.05$ ).

**Conclusion:** The absence of CeAD seasonal variability in Russia does not exclude the importance of environmental factors in its development. It is assumed the significance of atmospheric pressure fluctuation, which is typical for all seasons in Russia. Its decrease could cause vasodilatation, which in condition of arterial wall dysplasia could lead to an intimal tear and CeAD development. The cold season and associated infection and increased blood pressure do not play a role in CeAD provoking.

**Disclosure:** Nothing to disclose

## EPO2025

**Ischemic stroke due to calcium embolism**

P.A. Guirado Ruiz<sup>1</sup>, R. Piñar Morales<sup>1</sup>, M. Carrasco García<sup>1</sup>, M. Rodríguez Camacho<sup>1</sup>, F.J. Barrero Hernandez<sup>2</sup>

<sup>1</sup>Granada, Spain, <sup>2</sup>HOSPITAL UNIV. NUEVO SAN CECILIO, Ogijares, Spain

**Background and aims:** Calcium embolism is an infrequent cause of ischemic stroke, with a prevalence around 2.7%. The most common causes of these emboli are calcified heart valves and calcified atheroma plaques.

**Methods:** A case of ischemic stroke due to calcium embolism is presented.

**Results:** A 34-year-old patient with a history of chronic renal disease secondary to extracapillary Glomerulonephritis type I (anti-Glomerular Basal membrane disease) in hemodialysis, secondary hyperparathyroidism and arterial hypertension in treatment with 5 drugs, who attended the emergency department with aphasia and left hemiparesis of unknown time of evolution. The patient had left-hand dominance. Advanced neuroimaging study was performed, which showed compatible images with 2 subocclusive calcium embolisms in segments M3 and M4 of the right middle cerebral artery and ischemic penumbra in the right parietal lobe and posterior frontal lobe.

The study was completed during his admission to the neurology ward. The analysis showed renal insufficiency and hyperparathyroidism (Hyperparathyroid hormone: 1558 picograms per milliliter -normal values: 10–25 picograms per milliliter-). Echocardiography was performed, showing severe calcification of the mitral ring.

**Conclusion:** Calcium cerebral embolism is a rare condition which can appear both spontaneously and after invasive procedure such as valve surgery. Because of the infrequency of this condition, there are not enough studies to establish a consensus on how to act in a patient with an ischemic stroke due to calcium embolism. Due to the nature of the embolus, it is considered that only thrombectomy could be useful, having already described some cases of good evolution after this procedure.

**Disclosure:** Nothing to disclose

## EPO2026

### Dual Mechanisms of Ischemic Stroke – Frequency and Outcomes in a University Hospital based Stroke Registry.

A. Gujjar<sup>1</sup>, D. Lal<sup>1</sup>, S. Kumar<sup>1</sup>, R. Nandagopal<sup>1</sup>, S. Ganguly<sup>2</sup>, A. Al-Asmi<sup>1</sup>

<sup>1</sup>Medicine (Neurology), College of Medicine and Health Sciences, Sultan Qaboos University, Muscat, Oman,

<sup>2</sup>Epidemiology and Public Health, College of Medicine and Health Sciences, Sultan Qaboos University, Muscat, Oman

**Background and aims:** Ischemic strokes (IS) are classified based on pathophysiologic mechanisms into large artery atherosclerosis (LAA), cardioembolism (CES), small-vessel disease (SVD) or others. Co-existence of dual stroke mechanisms in a patient is sometimes recognized.

This study examines the frequency and patterns of dual stroke mechanisms among patients with IS and its relation to stroke outcomes.

**Methods:** Case records of patients with IS entered into a University Hospital based stroke registry using TOAST classification were reviewed for reasonable evidence of an additional/coexisting stroke mechanism. Examples are significant extra/intracranial atherosclerotic stenosis with SVD or CES, or SVD with CES. Demographics, risk factors and stroke outcomes were compared between cohorts with single and dual stroke mechanisms. Univariate and multivariate analyses were used to explore factors influencing outcomes.

**Results:** Of a total of 772 patients with IS (mean age: 63±12 ys; M:F=1.7:1), 106 (13.7%) had an additional stroke mechanism. The most frequent additional stroke diagnoses were SVD (53%) and CES (33%). Patients with dual stroke diagnoses were older, had higher BP and lower GCS ( $p<0.05$ ). Advanced age, a dual stroke diagnosis, presence of CES either as single or additional diagnosis, and anterior circulation stroke were associated with poor discharge outcome (MRS3-6). On logistic-regression analysis, age and GCS were independent predictors of outcome but not additional stroke mechanism.

**Conclusion:** Up to 1 in 8 patients with ischemic stroke may have an additional mechanism of stroke. Though SVD is more frequent as an additional stroke mechanism, cardioembolism may be associated with worse outcomes. Studies addressing long term management of such patients with dual stroke mechanisms are indicated.

**Disclosure:** Nothing to disclose

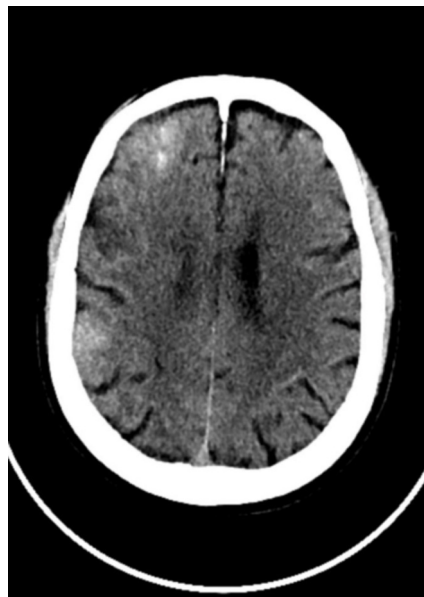
## EPO2027

### Am I still at CT room? A palinopsia case report secondary to acute stroke

I. Hernandez, D. García Azorín, M. Gutiérrez Sánchez de la Fuente, B. Talavera de la Esperanza, M.I. Pedraza Hueso, A.L. Guerrero Peral  
Valladolid, Spain

**Background and aims:** Palinopsia is an infrequent visual phenomenon defined as the persistence or recurrence of visual images once the stimulus disappeared. The hallucinatory palinopsias, long-lasting and of high resolution, represent a dysfunction in visual memory, and may present after cortical lesions. We aim to present a case of a palinopsia secondary to an acute stroke.

**Methods:** An 87-year-old man was admitted due to left faciobrachial weakness, being diagnosed of right hemisphere acute ischemic stroke, treated with primary mechanical thrombectomy. In a control computed tomography (CT), 12 hours after thrombectomy a right parietal as well as frontal hemorrhagic transformation was observed (Figure 1). After leaving the CT room, the patient began to perceive in the ceiling of the stroke unit (Figure 2), images of multiple voluminous green leaves, binocular and in all the visual field, either fixed or moving. They perseverated with some fluctuations during 48 hours.



CT with hemorrhagic transformation in parietal and frontal lobes.



The ceiling of the Stroke unit.

**Results:** Those images were really afterimages of the ceiling decoration of the CT room (Figure 3). This phenomenon did not cause negative emotional impact in the patient. However, as they were realistic, the patient tried many times to touch the leaves with his hands.



Picture in the roof of the TC room.

**Conclusion:** We describe a case of hallucinatory palinopsia, subtype formed image perseveration, due to a stroke complication affecting non-dominant parietal cortex. It is important to recognize this infrequent symptom of a stroke, in order to avoid unnecessary therapies. The patients must receive information about its benign nature and a probable spontaneous resolution.

**Disclosure:** Nothing to disclose

## EPO2028

### Post-partum Reversible Cerebral Vasoconstriction Syndrome: misdiagnosis of post-lumbar puncture headache and postpartum depression

M. Hernández Holgado<sup>1</sup>, M. Fernández García<sup>1</sup>, A. Baltasar Corral<sup>2</sup>, A. Fernández Revuelta<sup>2</sup>, A. Marcos Dolado<sup>1</sup>, E. Lopez Valdes<sup>3</sup>, R. Ginestal<sup>1</sup>  
<sup>1</sup>Neurology, Hospital Clínico San Carlos, Madrid, Spain, <sup>2</sup>Madrid, Spain, <sup>3</sup>Neurology, Hospital Clínico San Carlos, Madrid, Spain

**Introduction:** Reversible cerebral vasoconstriction syndrome (RCVS) is characterized by thunderclap headaches and focal neurological signs, although wide clinical heterogeneity has been described. Puerperium has been related to RCVS. Differential diagnosis in postpartum is challenging because this period is also associated with pathologies like venous thrombosis, preeclampsia, autoimmune encephalitis, posterior reversible encephalopathy syndrome, postpartum depression, post-lumbar puncture headache, and migraine relapse.

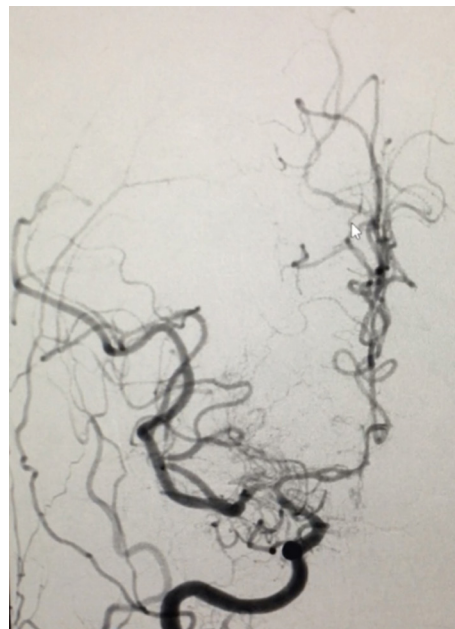


Figure 2. Arteriography shows moderate vasospasm of terminal intracranial segment of right internal carotid artery and proximal segment of media cerebral artery

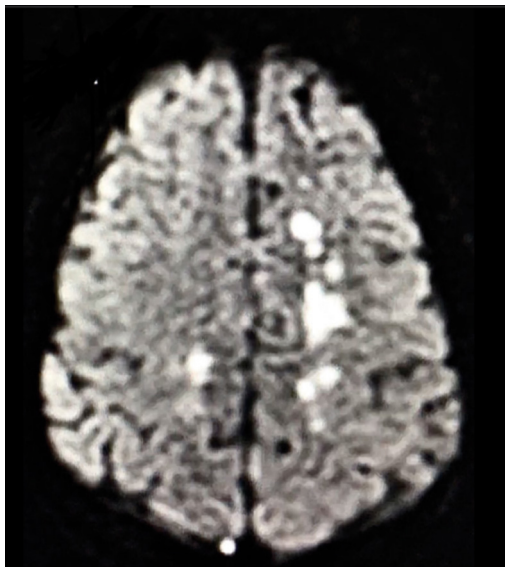


Figure 1. Bilateral hiperintense watershed lesions on diffusion-weighted magnetic resonance imaging with reduced apparent diffusion coefficient values (not shown), which confirm ischaemic etiology.

**Methods:** A 38-year-old 1st-time mother, immediately after delivery, developed post-lumbar puncture headache and computer tomography signs of intracranial hypotension attributed to epidural anaesthesia. With unimproved headache, she progressively started with severe depressive symptoms, refusing to eat and willing to die. 2 weeks postpartum, she was admitted to the neurology department because of a fluctuating incomplete left hemispheric syndrome. Lumbar puncture and electroencephalogram revealed no alterations. A magnetic resonance imaging study (Figure 1) showed bilateral watershed infarcts. A narrowing of M1 segments of both middle cerebral arteries was confirmed by angiography (Figure 2)

**Outcomes:** An extraordinarily fast and complete resolution of headache and psychiatric symptoms was observed with blood pressure management and the administration of intraarterial, intravenous and oral nimodipine. One week after diagnosis, left hemisphere focal signs had disappeared and the patient was discharged asymptomatic.

**Conclusion:** Retrospectively, non-improving headache credited to epidural anaesthesia and depression attributed to puerperium were the only RCVs symptoms for 2 weeks. Therefore, a high grade of suspicion is needed for an early diagnosis of RCVS. Differential diagnosis is wide and treatment for other conditions, such as glucocorticoids and serotonergic antidepressants, can be deleterious for RCVS.

**Disclosure:** Nothing to disclose

## EPO2029

### Inflating balloons uncovers patent foramen ovale

S. Huijs<sup>1</sup>, A. Bruijnes<sup>1</sup>, N.A. Sutedja<sup>2</sup>, J.E. Staals<sup>2</sup>

<sup>1</sup>Zuyderland Medical Center, Heerlen, Netherlands,

<sup>2</sup>Maastricht, Netherlands

**Background and aims:** 20–45% of young ischemic strokes is caused by cardiac embolism. Occult atrial fibrillation, cardiomyopathy, valvular disease and endocarditis are the main cardiac sources. Patent foramen ovale (PFO) is another cause, especially at young age. PFO can be detected by contrastechocardiography, or transcranial Doppler ultrasound (TCD) with bubble-contrast injection, detecting a right-to-leftshunt. Performing Valsalva maneuver increases the sensitivity. The RoPE-score (Risk of Paradoxical Embolism) assesses the likelihood that a PFO is related to the stroke. Young age, absence of classic vascular risk factors and cortical brain infarction lead to a higher probability.

**Methods:** We saw a 37-year-old man, without significant medical history or cardiovascular risk factors, who suffered a sudden numbness and weakness of the left arm during 5–7 minutes, occurring after blowing several balloons. Clinical assessment showed no abnormalities. Brain MR-imaging showed a FLAIR-hyperintensity in the right precentral gyrus with corresponding diffusion restriction which confirmed the diagnosis cortical brain infarction. Blood results were normal. Electrocardiogram and 24-h Holter rhythm detection showed sinus rhythm. MR-angiography showed no abnormalities, especially no carotid dissection.

**Results:** TCD of the middle cerebral artery with a ‘bubble test’ showed microembolic signals (MES). After performing Valsalva maneuver, a ‘MES-curtain’ was detected. This supports the diagnosis of PFO. The RoPe-score is 9, corresponding with a 85–90% likelihood that PFO is related to stroke.

**Conclusion:** Inflating balloons, resembling Valsalva maneuver, has created a right-to-left atrial shunt through a PFO in our patient, which led to paradoxical embolism and cortical brain infarction. The PFO and its functional impact could be diagnosed by TCD.

**Disclosure:** Nothing to disclose



## EPO2030

**Spontaneous intracranial hemorrhage due to rivaroxaban- associated thrombocytopenia- a case report**D. Iliev<sup>1</sup>, M. Dimitrova<sup>2</sup>, J. Samuel<sup>1</sup><sup>1</sup>Sofia, Bulgaria, <sup>2</sup>Neurology, UMHATEM "N.I.Pirogov", Sofia, Bulgaria

**Background and aims:** Rivaroxaban, a factor Xa inhibitor is a novel oral anticoagulant (NOAC) used to prevent ischemic strokes in patients with atrial fibrillation. Thrombocytopenia as a side effect has been reported immediately after treatment onset, but in rare cases, it can also present after long term therapy.

**Methods:** An 81-year-old woman with a history of hypertension and arrhythmia presented with acute right-sided weakness, drowsiness, unresponsiveness to verbal commands and with a high blood pressure of 190/90mmHg. The patient had been on oral anticoagulant therapy with Rivaroxaban (20mg/day), 20 months prior for atrial fibrillation (AF). The patient underwent physical and neurological examination (NE), laboratory tests with complete blood count and computer tomography(CT) of the brain.

**Results:** NE revealed right-sided hemiparesis, right upper motor neuron (UMN)- type Cranial nerve (CN) VII palsy, sensory-motor aphasia and impaired consciousness (NIHSS=18p., GLCS-13p.) Brain CT revealed intraparenchymal hemorrhage in the left hemisphere. Results from initial platelet counts were 44g/L with an INR of 1.06, 6 months previously her platelet levels had been normal. She was treated with vitamin K and Rivaroxaban was discontinued. The platelet count recovered rapidly soon after, and her secondary brain imaging showed cessation of bleeding. Possible etiologies for coagulation abnormalities and thrombocytopenia were excluded.

**Conclusion:** The incidence of thrombocytopenia due to NOACs is rare and can lead to life-threatening intracranial hemorrhages. Hence, careful and regular monitoring of patients during treatment is mandatory.

**Disclosure:** Nothing to disclose

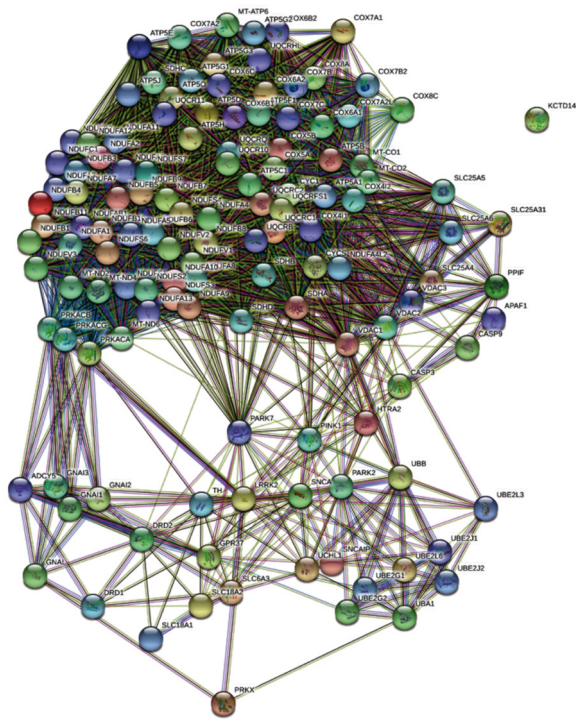
## EPO2031

**PARK7 as a peripheral blood biomarker in ischemic stroke: pathway analysis of its molecular function within peripheral blood mononuclear cells**G. Vavougios<sup>1</sup>, M. Ioakeimidis<sup>2</sup>, T. Doskas<sup>3</sup><sup>1</sup>Athens, Greece, <sup>2</sup>2<sup>nd</sup> Department of Neurology, Athens University, Attikon University Hospital, Athens, Greece, <sup>3</sup>Athens Naval Hospital, Athens, Greece

**Background and aims:** The PARK7 protein is a prospective biomarker for the early detection of stroke, regardless of etiology. Despite being considered brain specific, PARK7 is ubiquitously expressed, including in peripheral blood; Considering that stroke induces epigenetic changes in peripheral blood cells, and their potential contribution to measured PARK7 plasma levels, its functional and pathway associations should be further elucidated. The purpose of this study is to discover whether PARK7 is differentially expressed in peripheral blood donated by stroke patients, and further elucidate its functions and relevant pathways.

**Methods:** The Gene Expression Omnibus (GEO) database was inquired using a query containing the keywords "Stroke". Included studies involved ex vivo samples of peripheral blood mononuclear cells (PBMCs) following a case – control design. Differentially expressed genes and their functional correlates were detected via the GeneTrail2 software, employing a false discovery rate (FDR) cutoff of <0.05.

**Results:** Following the initial search, a single study fulfilled the predetermined criteria, GSE22255. PARK7 was differentially expressed, and included in several significantly enriched pathways involved primarily in mitochondrial and endoplasmic reticulum related stress response, cellular homeostasis and proteostasis (FDR<0.0001).



**Conclusion:** This is the 1<sup>st</sup> study to explore the functional correlates of PARK7 in ischemic stroke. Furthermore, its role as a regulator of PBMC stress during the acute phase of stroke may account for the noted fluctuations in measured protein levels. Despite the notion of PARK7 being a brain specific marker, this study provides indirect evidence that stroke induces a concurrent peripheral dysregulation of its expression.

**Disclosure:** Nothing to disclose

## EPO2032

### Therapeutic parent artery occlusion – a good treatment option for a giant unruptured saccular intracranial internal carotid aneurysm

P.A. Ioan<sup>1</sup>, O.C. Ioghen<sup>1</sup>, A.-C. Ribigan<sup>1</sup>, B. Dorobat<sup>2</sup>, O.A. Bajenaru<sup>1</sup>, F. Antochi<sup>1</sup>

<sup>1</sup>Neurology, University Emergency Hospital Bucharest, Bucharest, Romania, <sup>2</sup>Interventional Neuroradiology, University Emergency Hospital Bucharest, Bucharest, Romania

**Background and aims:** There is no actual consensus regarding the choice of treatment of intracerebral giant aneurysms (GA). Parent artery occlusion (PAO) is a percutaneous procedure that provides immediate thrombosis, improvement of compression symptoms and the prevention of recanalization.

**Methods:** We present the case of a 63-year-old female patient who gradually developed left inferior temporal quadransopia, limitation of vertical and horizontal left eye movements, partial left ptosis, stabbing paresthesia of the ophthalmic and maxillary divisions of the left trigeminal nerve and diminished left photomotor and corneal reflex 5 months prior to the hospital admission. The cerebral contrast MRI and the CT angiography scans showed a saccular unruptured GA (32/33/29mm) of the left ICA in its supraclinoid segment, with partial intraluminal thrombosis, wall enhancement and significant compression of the optic chiasm and cavernous sinus (PHASES score=10 points, 5 year rupture risk=5.3%). We performed therapeutic percutaneous PAO using 7 platinum coils, preceded by a balloon occlusion test.

**Results:** The therapeutic result was optimal, with immediate aneurysm thrombosis. After the procedure, due to a drop in blood pressure the patient developed transient right hemiparesis and aphasia, which resolved after fluid replacement.

**Conclusion:** We chose to present this case in order to highlight that in selected cases PAO might be the only choice of treatment for GAs with a high rupture risk, in which surgical procedure is not an option. It seems that maintaining a higher blood pressure after this procedure may lower the risk of immediate secondary ischemic events but further studies are needed.

**Disclosure:** Nothing to disclose

## EPO2033

**Diagnostic challenge of Adult onset Mitochondrial myopathy, encephalopathy, lactic acidosis and stroke-like syndrome (MELAS)**

N. Ghedamsi<sup>1</sup>, C. Jeridi<sup>1</sup>, C. Drissi<sup>2</sup>, S. Ben Sassi<sup>1</sup>, Z. Saied<sup>1</sup>, F. Nabli<sup>1</sup>, A. Rachdi<sup>1</sup>, S. Belal<sup>1</sup>

<sup>1</sup>Neurology, National institute of neurology Mongi Ben Hmida, Tunis, Tunisia, <sup>2</sup>Neuroradiology department, National Institute of Neurology, Tunis, Tunisia

**Background and aims:** MELAS usually presents in childhood, with 65–76% of affected individuals presenting at/or before the age of 20 years. Adult onset of the disease and the wide neurological manifestation in MELAS can be misleading.

**Methods:** We report 2 cases of MELAS and we discuss clinical and radiological features.

**Results:** Case 1 is a 33-year-old female who presented with sudden right hemiplegia. The initial diagnosis was ischemic infarction. One year later, she presented with sudden left hemiplegia and epilepsy. Brain MRI showed stroke-like images with restricted diffusion in the right temporal, occipital and parietal lobes which did not correspond to a vascular territory. Spectroscopy revealed lactate accumulation. Muscle biopsy showed ragged red fibers.

Case 2 is a 26-year-old female. She presented with confusion, psychiatric disorders and seizures. Clinical features and radiological involvement of temporal lobe lead to the diagnosis of herpes simplex encephalitis (HSE). Antiviral treatment was initiated with full recovery. 1 year later, she relapsed. Brain MRI with spectroscopy revealed signal abnormalities with restricted diffusion in the right temporal and parietal lobes with lactate accumulation, not confined to a vascular territory. Muscle biopsy showed ragged red fibers. Genetic test revealed a A3243G mutation.

**Conclusion:** The clinical presentation of MELAS is markedly variable. Recurrent stroke-like episodes are the most common initial manifestation of MELAS and can easily be misdiagnosed as cerebrovascular diseases. MELAS presenting with the features of herpes simplex encephalitis is rare and can raise diagnostic challenges. Specific attention to imaging features can help suggest the diagnosis of MELAS.

**Disclosure:** Nothing to disclose

## EPO2034

**Unusual radiological features of posterior reversible encephalopathy syndrome (PRES) complicating a pheochromocytoma: a case report**

C. Jeridi<sup>1</sup>, C. Drissi<sup>2</sup>, Z. Saied<sup>1</sup>, E. Jemel<sup>2</sup>, A. Rachdi<sup>1</sup>, F. Nabli<sup>1</sup>, S. Ben Sassi<sup>1</sup>, S. Belal<sup>1</sup>

<sup>1</sup>Neurology, National institute of neurology Mongi Ben Hamida, Tunis, Tunisia, <sup>2</sup>Neuroradiology department, National Institute of Neurology, Tunis, Tunisia

**Background and aims:** PRES is a clinico-radiographic diagnosis of transient cerebral vasogenic edema occurring preferentially in the posterior circulation that is frequently attributed to primary hypertension and drug. Secondary hypertension due to a pheochromocytoma and predominant involvement of the brainstem are less common causes of this syndrome.

**Methods:** We report and discuss a case of PRES with an unusual clinical and radiological features.

**Results:** A 47-year-old woman was admitted to our institution with subacute headache and sudden speech disorder. The patient had a history of confirmed pheochromocytoma. Clinical examination revealed conduction aphasia and high blood pressure. Brain computed tomography showed a non-specific cortico-subcortical parietal hypodensity. Brain magnetic resonance imaging (MRI) showed multiple supra-tentorial lacunar infarcts, watershed parietal infarct with hemorrhagic transformation. It also revealed bilateral and symmetrical T2/FLAIR hyperintensity of the brainstem, predominantly the pons with no enhancement nor diffusion restriction. The brainstem lesions were suspected to be in relation with a diagnosis of PRES. Clinically, the patient's symptoms resolved; speech improved and headaches disappeared following the normalization of blood pressure.

**Conclusion:** PRES may complicate the clinical course of a pheochromocytoma and should be considered after the onset of neurological signs. MRI is fundamental to allow an early diagnosis and obtain differential diagnosis. Our case highlights the importance of considering the diagnosis of PRES in brainstem involvement. The clinical and radiological features can resolve after stabilization of blood pressure.

**Disclosure:** Nothing to disclose

## EPO2035

**Changes in the quality of care in Polish stroke units - the role of RES-Q registry**

M. Karlinski<sup>1</sup>, N. Pozarowszczyk<sup>1</sup>, A. Maczkowiak<sup>2</sup>, J. Hübner<sup>3</sup>, B. Wyluda<sup>4</sup>, P. Sobolewski<sup>5</sup>, M. Rogoziewicz<sup>6</sup>, A. Kozak-Sykała<sup>7</sup>, K. Kozak<sup>7</sup>, A. Gałązka<sup>8</sup>, W. Broła<sup>9</sup>, A. Stepien<sup>10</sup>, J. Staszewski<sup>10</sup>, R. Kaźmierski<sup>11</sup>, P. Kram<sup>11</sup>, H. Sienkiewicz-Jarosz<sup>12</sup>, E. Bucior<sup>1</sup>, A. Tomczak<sup>13</sup>, K. Rejdak<sup>14</sup>, P. Luchowski<sup>14</sup>, M. Fudala<sup>15</sup>, H. Bartosik-Psujek<sup>16</sup>, R. Kaczorowski<sup>16</sup>, M. Wiszniewska<sup>17</sup>, U. Włodarczyk<sup>17</sup>, B. Adamkiewicz<sup>18</sup>, E. Horoch-Lyszczarek<sup>19</sup>, W. Fryze<sup>20</sup>, M. Niewada<sup>21</sup>, A. Czlonkowska<sup>21</sup>

<sup>1</sup>Institute of Psychiatry and Neurology, Warsaw, Poland,

<sup>2</sup>Specialist Hospital in Wejherowo, Wejherowo, Poland,

<sup>3</sup>Radomsko Hospital, Radomsko, Poland, <sup>4</sup>Kedzierzyn-Kozle

Hospital, Kedzierzyn-Kozle, Poland, <sup>5</sup>Sandomierz, Poland,

<sup>6</sup>Military Hospital in Walcz, Walcz, Poland, <sup>7</sup>Jankowski

Regional Hospital in Przeworsk, Przeworsk, Poland,

<sup>8</sup>Specialist Hospital in Sucha Beskidzka, Sucha Beskidzka,

Poland, <sup>9</sup>Department of Neurology, Saint Lukasz Hospital,

Konskie, Poland, <sup>10</sup>Department of Neurology, Military

Institute of Medicine, Warsaw, Poland, <sup>11</sup>Department of

Neurology and Cerebrovascular Disorders, Poznan

University of Medical Sciences, Poznan, Poland, <sup>12</sup>1<sup>st</sup>

Department of Neurology, Institute of Psychiatry and

Neurology, Warsaw, Poland, <sup>13</sup>Szpital Św. Wincentego a

Paulo in Gdynia, Gdynia, Poland, <sup>14</sup>Neurology, Medical

University of Lublin, Lublin, Poland, <sup>15</sup>Skarżysko-Kamienna

Hospital, Skarżysko-Kamienna, Poland, <sup>16</sup>University of

Rzeszow, Rzeszow, Poland, <sup>17</sup>Stanisław Staszic Specialist

Hospital, Pila, Poland, <sup>18</sup>Lodz, Poland, <sup>19</sup>T. Marciniak Lower

Silesian Specialist Hospital, Wroclaw, Poland, <sup>20</sup>Copernicus

Hospital in Gdansk, Gdansk, Poland, <sup>21</sup>Department of

Experimental and Clinical Pharmacology, Medical

University of Warsaw, Warsaw, Poland

**Background and aims:** The Registry of Stroke Care Quality (RES-Q) was designed for quality monitoring and has been incorporated in Angels Initiative. Previous analyses showed that Polish centres participating in RES-Q perform significantly better than the national average. Our aim was to investigate whether they still manage to achieve improvement.

**Methods:** This analysis of Polish patients reported to RES-Q included only centres reporting  $\geq 25$  patients each consecutive year from January 2017 to December 2019.

**Results:** Of 175 Polish stroke units 68 participates in RES-Q. 20 centres reported patients from each year (2017, n=1873; 2018, n=3362 and 2019, n=3425). We found no differences in the proportion of ischaemic strokes (90%, 81%, 90%, respectively), age (median 72, 72, 73 years), gender (48% , 49%, 48% women). Baseline median NIHSS was 7 in each period. The length of hospital stay decreased from median 10 (year 2017) to 9 days (years 2018 and 2019). Proportion of ischaemic strokes treated with alteplase did not change (25%, 27%, 27%) but each year door-to-needle was shorter (median 50, 41, 35min) and early dysphagia screening more common (73%, 82%, 88%).

Although hospital mortality increased (from 12% in year 2017 to 13% in 2019), survivors were more often discharged home (from 67% to 70%).

**Conclusion:** Polish stroke units reporting cases to RES-Q in years 2017-2019 significantly improved their performance, including door-to-needle time and early dysphagia screening. It confirms that regular involvement in this quality oriented project may drive improvement, even in centres with high baseline standards of care.

**Disclosure:** Nothing to disclose

## EPO2036

**S 100 protein serum level as indicator of acute ischemic stroke severity**

S. Kazakov<sup>1</sup>, E. Koroleva<sup>1</sup>, V. Alifirova<sup>1</sup>, K. Kucherova<sup>1</sup>, L. Levchuk<sup>2</sup>

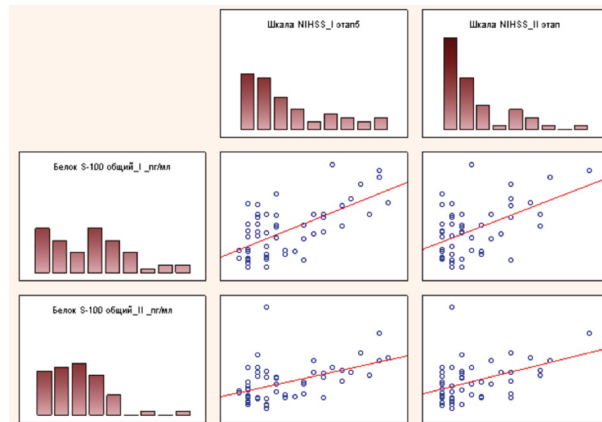
<sup>1</sup>Department of neurology and neurosurgery, Siberian State Medical University, Tomsk, Russian Federation, <sup>2</sup>Laboratory of Molecular Genetics and Biochemistry, Mental Health Research Institute, Tomsk, Russian Federation

**Background and aims:** S-100 is a calcium binding protein expressed mainly in human astroglial cells and is released in peripheral blood after hypoxic brain damage. Hence serum S-100 levels can be used as marker of severity in patients with acute ischemic stroke (AIS).

**Aim:** To investigate relationship between stroke severity with serum level of S-100 in patients with AIS.

**Methods:** The study was carried out in a total 120 patients with AIS in the middle cerebral artery (middle age  $65 \pm 6.3$  years; NIHSS 1-18 points). Control group includes 40 healthy individuals. Patient's examination and blood sampling were performed on the 1st day and on 14th day from the stroke onset. Clinical neurological examination was completed with the National Institute of Health Stroke Scale (NIHSS). Patients were divided into low severity stroke (NIHSS 1-6, n=68) and moderate severity stroke (NIHSS 7-18, n=52) groups. Serum S-100 was determined by using DY1820-05 Human S100B DuoSet ELISA-kit (R&D Systems, USA.)

**Results:** Serum S-100 concentration was significantly elevated in patients with AIS  $5.4 (+2.3)$ pg/ml compared to controls  $2.6 (\pm 1.3)$ pg/ml ( $p < 0.007$ ). Serum S-100 concentration was higher in low severity stroke group then in moderate severity stroke group at all time points: on 1 day  $4.7 (\pm 1.6)$  vs  $7.7 (\pm 1.8)$  pg/m ( $p < 0.0005$ ), on 14<sup>th</sup> day  $4.0 (\pm 1.3)$  vs  $6.2 (\pm 1.7)$ pg/m ( $p < 0.0009$ ).



Serum S-100 concentration was higher in low severity stroke group then in moderate severity stroke group at all time points

**Conclusion:** S-100 protein measurement can be used as a marker of acute ischemic stroke severity.

**Disclosure:** This study was supported by the Russian Science Foundation (RSF), grant No. 18-15-00082 “Laboratory for robotic rehabilitation”

## EPO2037

**The relationships between S-100 protein serum level on short-term functional outcome of patients with acute ischemic stroke**

S. Kazakov, K. Kucherova, V. Alifirova, E. Koroleva  
Department of neurology and neurosurgery, Siberian State Medical University, Tomsk, Russian Federation

**Background and aims:** S-100 proteins, identified as a plasmatic biomarker released in peripheral blood after hypoxic brain damage. S-100 protein may represent a useful neuro-biochemical marker of brain damage and functional outcome resulting from acute ischemic stroke.

**Aim:** To investigate relationships between S-100 protein serum level on short-term functional outcome of patients with acute ischemic stroke.

**Methods:** The study was carried out in a total 120 patients with acute ischemic stroke in the middle cerebral artery (middle age  $65 \pm 6.3$  years; NIHSS 1-18 points). Control group includes 40 healthy individuals. Blood sampling were performed on 1<sup>st</sup> day from the stroke onset. Functional outcome was assessed by the modified Rankin Scale (mRS) on 90 day after discharge. Serum S-100 was determined by using DY1820-05 Human S100B DuoSet ELISA-kit (R&D Systems, USA).

**Results:** Serum S-100 concentration was significantly elevated in patients with acute ischemic stroke  $5.4 (+2.3)$ pg/ml compared to controls  $2.6 (\pm 1.3)$ pg/ml ( $p < 0.007$ ). S-100 protein concentrations on 1st day from the stroke onset were associated with values on modified Rankin Scale on 90 day after discharge ( $r = 0.701$ ,  $p < 0.047$ ).

**Conclusion:** S-100 protein showed ability to predict short-term functional outcome of patients with ischemic stroke.

**Disclosure:** This study was supported by the Russian Science Foundation (RSF), grant No. 18-15-00082 “Laboratory for robotic rehabilitation”

## Cerebrovascular diseases 5

## EPO2038

**Prevalence of chronic kidney disease among patients in the Stroke Unit with acute cerebrovascular disorder**

A. Khrulev, N. Shestakova

*Neurology, Privolzhsky Research Medical University, Nizhny Novgorod, Russian Federation*

**Background and aims:** The cause of death in 50% of patients with stroke is extracerebral pathology, including impaired kidney function.

**Purpose:** To study the state of kidney function and the prevalence of chronic kidney disease (CKD) among the patients of the Acute Stroke Unit.

**Methods:** 142 patients with acute cerebrovascular events were examined in the Stroke Unit of Nizhny Novgorod Regional Hospital, Russia, in 2018-2019: 74 men (52%) and 68 women (48%). The average age of patients was 68±12 years. The diagnosis of stroke was carried out according to the World Health Organization Guidelines, the type of stroke (ischemic or hemorrhagic) was verified by CT. Renal function was investigated by determining GFR, evaluating proteinuria, microalbuminuria, and ultrasound of the kidneys. CKD was diagnosed and classified according to the KDIGO Guidelines (2012).

**Results:** CKD was detected in 69 patients (49%): 17.4%-CKDG2; 62.3%-CKDG3A; 17.4%-CKDG3B, and 2.9%-CKDG4. CKD was significantly more frequent ( $p<0.05$ ) in patients with ischemic stroke (65 patients). The age of patients in the groups with CKD and without CKD did not differ significantly. History of IHD (RR1.3; 95% CI:0.9-1.9), atrial fibrillation (RR1.2; 95% CI:0.9-1.7), CHF (RR1.5; 95% CI:1.1-2.1), diabetes mellitus (RR1.4; 95% CI:1-1.9) and obesity (RR1; 95% CI: 0.3-4.2) in patients with stroke and CKD were diagnosed.

**Conclusion:** The prevalence of CKD among patients with acute cerebrovascular events in the Stroke Unit is very high (49%). This fact, apparently, is associated with negative renovascular interactions and an increase of cardiovascular risk in patients with CKD.

**Disclosure:** Nothing to disclose

## EPO2039

**Characteristics of antiphospholipid antibody in Korean ischemic stroke**Y. Kim<sup>1</sup>, S.-H. Lee<sup>2</sup>*<sup>1</sup>Department of Neurology, Kangdong Sacred Heart Hospital, Hallym University College of Medicine, Seoul, Korea, Republic of, <sup>2</sup>Department of Neurology, Seoul National University Hospital, Seoul, Korea, Republic of*

**Background and aims:** Antiphospholipid syndrome (APS) is a multi-organ autoimmune disease, characterized by arterial and/or venous thrombosis, recurrent miscarriage, and circulating antiphospholipid antibodies (aPLs). Although prevalence of the aPLs in the general population is 1-5%, aPLs are positive in 13% of Ischemic stroke (IS) patients. However, the diagnostic criteria has not been clear, the distribution and significance of aPLs is not known well.

**Methods:** We collected ischemic stroke patients with aPLs. According to the latest APS diagnostic criteria, we evaluated 3 aPLs including lupus anticoagulant (LA), anticardiolipin antibodies (ACA IgM, IgG), and anti-Beta2 glycoprotein I (IgM, IgG). Since positive cut-off value was not defined clearly, we included patients with moderate or elevated levels.

**Results:** Among a total of 183 IS patients, mean age was 52.1±15.3 years. More than half of them showed embolic lesion patterns (52%). Although mono positivity was most common, double and triple positivity accounted for 12.3% and 2.8%, respectively. After adjusting multiple variables, LA was significantly associated with severe stroke (NIHSS≥4) (HR 2.391, 95% CI 1.079-5.296).

**Conclusion:** Although aPLs had been evaluated in only young patients with unknown stroke etiology, it might be more important risk factor for cryptogenic strokes. To evaluate the significance of aPLs in IS, further research should be needed.

**Disclosure:** This research was supported by the Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Science and ICT (NRF-2018R1C1B5086320).

## EPO2040

**Delirium in Acute Stroke**

M. Korkmaz<sup>1</sup>, N. Kuloğlu Pazarıcı<sup>2</sup>, Z. Tanriverdi<sup>3</sup>,  
D. Necioğlu Orken<sup>4</sup>

<sup>1</sup>Neurology, Bingöl Devlet Hastanesi, Bingöl, Turkey,

<sup>2</sup>Neurology, Şişli Hamidiye Etfal Education ve Research

Hospital, ISTANBUL, Turkey, <sup>3</sup>Neurology, İzmir Atatürk

Education and Research Hospital, Izmir, Turkey, <sup>4</sup>Istanbul,  
Turkey

**Background and aims:** Delirium is frequently seen in intensive care units and acute stroke patients. Also delirium cause long-term hospitalizations, severe complications, high morbidity mortality of these patients.

**Methods:** The research included 115 patients who were hospitalized in Şişli Etfal Neurology Intensive Care Unit(ICU) with the diagnosis of acute stroke. Richmond-Agitation-Sedation-Scale(RASS) and Confusion Assessment Method for ICU(CAM-ICU) were applied to these patients for delirium diagnosis on the 1st-3rd-5th days of hospitalization. Delirium results were compared with sociodemographic data, comorbidities and cranial parenchymal&vascular radiological findings of these patients.

**Results:** The incidence of delirium in the research was 41.8%. Presence of grade 1 central and cortical atrophy, presence of grade 2-3 periventricular and deep white matter hyperintensities (Odds Ratio-OR, 4.86), presence of grade 2-3 perivascular space in white matter (OR, 3.86), presence of hemorrhage, microhemorrhage (OR, 5.73), hemorrhagic transformation (OR, 3.49), presence of <50% stenosis in left internal carotid arter, presence of intracranial occlusion (OR, 4.68), high NIHS(16.39±4.44) and mRS score (4.68±1.50), long-term ICU admission (12.36±8.96 day), GCS <15 (OR, 3.73), neglect (OR, 3.18), hemiparesis (OR, 2.77), metabolic disorder (OR, 4.09), aspiration pneumonia (OR, 5.8), presence of major risk factors in the outcome of transthoracic-echocardiogram were found to be significant risk factors for delirium.

**Conclusion:** Delirium was more frequent in patients with severe cranial parenchymal load and neurological deficit. Patients with these characteristics should be followed up closely for delirium. Therefore, we wanted to emphasize that early diagnosis and treatment can be possible and the complications that may occur will be prevented.

**Disclosure:** Nothing to disclose

## EPO2041

**Cerebrovascular disease and platelet reactivity in patients with diabetes mellitus.**

A. Kornilova, A. Naminov, M. Tanashyan  
Moscow, Russian Federation

**Background and aims:** Cerebrovascular disease (CVD) is the main cause of death and disability in patients type 2 diabetes mellitus (T2DM). Platelet activation plays a key role in atherothrombosis in T2DM and increased platelet activation. Aspirin is essential antiplatelet therapy in patients with high risk of acute thrombotic events. Aspirin resistance can be defined as inability of the usual dose of aspirin to produce its antithrombotic effect.

**Methods:** Study included 60 patients, who were divided into 2 groups: the 1st group 30 with CVD and T2DM and 2nd group 30 patients with CVD without T2DM. All patients received 100mg of aspirin daily. Aggregation of platelets to agonists was estimated by light transmission aggregometry (LTA), fibrinogen, anti-thrombin III were measured. Its relationship with diabetes status, response to aspirin were investigated.

**Results:** With the usage of LTA, high platelet reactivity (HPR), was found in 23 (76%) patients with CVD and T2DM and in 14 (46%) patients with CVD without T2DM ( $p<0.05$ ). HPR, level of fibrinogen found in patients with T2DM was significantly related to duration of diabetes ( $p<0.05$ ). The level of anti-thrombin III was lower averagely in the first group, comparing to second group.

**Conclusion:** Our results showed that high-on-aspirin residual platelet reactivity was found more often in patients with CVD and T2DM. Blood coagulability investigation tests showed increased level of fibrinogen and subnormal level of anti-thrombin III in the 1st group, comparing to 2nd group. Monitoring of hemostasiological markers and active correction of antiagregant therapy are required for patients with CVD and T2DM.

**Disclosure:** Nothing to disclose

## EPO2042

### Influence of circulating CD34+ stem cells in the acute phase of ischemic stroke on patients' neurological status assessed according to the NIH scale.

L. Kotula<sup>1</sup>, K. Garabowska-Alekasandrowicz<sup>1</sup>, K. Kądziołka<sup>1</sup>, P. Aleksandrowicz<sup>1</sup>, J. Jaworski<sup>2</sup>, K. Rejdak<sup>3</sup>, J. Kocki<sup>4</sup>

<sup>1</sup>Uniwersytet Medyczny w Lublinie, Lublin, Poland, <sup>2</sup>Lublin, Poland, <sup>3</sup>Neurology, Medical University of Lublin, Lublin, Poland, <sup>4</sup>Department of Clinical Genetics, Medical University of Lublin, Lublin, Poland

**Background and aims:** The analysis of the number of circulating CD34+ stem cells concerning all leukocytes examined in patients on the 1st day of ischemic stroke and investigation of changes in neurological status (according to NIHSS) assessed on the 1st and 8th day.

**Methods:** The study included 32 patients with stroke symptoms who were hospitalized in the Stroke Department and Early Post-stroke Rehabilitation Clinic of the Neurology Clinic of the Independent Public Clinical Hospital No. 4 in Lublin in 2015.

Peripheral blood was collected from patients, nuclear cells were isolated (erythrocytes were lysed), stem cells and leukocytes were labeled with fluorochrome-conjugated antibodies.

The patients were then divided into subjects whose neurological status had or did not improve (assessed using NIHSS, on the first and eighth day after stroke).

Then, the levels of CD34+ cells in all groups were evaluated for all leukocytes. The results were compared using the Mann-Whitney U test to obtain a statistically significant result ( $p < 0.05$ ).

**Results:** In the group of patients with improved neurological status, there were more than 2.5 times more CD34+ cells (middle value: 0.2432% vs 0.0929%) concerning the total number of mononuclear cells.

**Conclusion:** In the group of patients with improved neurological status, there were more than 2.5 times more CD34+ cells (middle value: 0.2432% vs 0.0929%) concerning the total number of mononuclear cells.

**Disclosure:** Nothing to disclose

## EPO2043

### Diffusion tensor Magnetic resonance imaging (MRI) pattern of small vessel disease (SVD) and cognitive functions in elderly patients with atrial fibrillation (AFib)

P. Krupenin, V. Perepelov, A. Skripka, S. Bordovsky, A. Sokolova, D. Napalkov, I. Preobrazhenskaya, O. Voskresenskaya  
Sechenov First Moscow State Medical University, Moscow, Russian Federation

**Background and aims:** AFib is a complex cardiovascular risk factor that contributes to SVD and cognitive impairment by decreased brain perfusion due to altered cardiac cycle.

**Methods:** Elderly outpatients with AFib treated with one of the direct oral anticoagulants were enrolled in the study. Neuropsychological testing with Montreal cognitive assessment (MoCA), Free and Cued Selective Reminding Test (FCSRT), Trail making test part A (TMTA), and Digit coding test were performed. Patients with a major cognitive deficit were excluded. MRI was obtained in T1, T2, FLAIR, susceptibility-weighted imaging (SWI), diffusion tensor imaging (DTI) sequences along with non-contrast angiography. Fractional anisotropy (FA) data were obtained in the following white matter fascicles, tracts, and regions bilaterally: uncinate (UNC), corticospinal (CS), posterior thalamic radiation (PTR), inferior fronto-occipital (IFO), and corpus callosum with a region of interest of 0.09 sq.cm.

**Results:** 20 patients with a median age of 71.5 years (65-84) were enrolled. 11 patients had mild cognitive impairment with MoCA < 26. 13 patients had 1 of the FLAIR SVD signs, Table 1. Patients with signs of SVD had lower FA values in the right CS tract (U-test,  $p = 0.02$ ). Executive functions showed a moderate correlation with FA values in several of the studied regions, Table 2.

Table 1: White matter hyperintensities on fluid-attenuated inversion recovery (FLAIR) sequence

	Microangiopathy	Fazekas 1	Fazekas 2	Fazekas 3
Number of patients	4	3	5	1

Table 2: Fractional anisotropy (Siemens MAGNETOM Skyra 3.0T) correlates with executive functions. Spearman correlation coefficient (r).

Region (median FA)	Right PTR 594 (447-705)	Left PTR 583 (436-677)	Left UNC 274 (226-406)	Left CS 639 (555-792)
Test				
TMTA, seconds	$r = -0.48, p = 0.031$	–	–	–
FCSRT Free recall, words	$r = -0.48, p = 0.028$	–	–	–
Verbal fluency, words	–	–	–	$r = -0.4, p = 0.07$
Digit coding, seconds	$r = -0.61, p = 0.005$	$r = -0.56, p = 0.011$	$r = -0.51, p = 0.025$	–

**Conclusion:** Vascular cognitive impairment and executive domain dysfunction are thought to emerge from frontal brain lesions. The study showed executive function to correlate with FA of posterior brain regions. It is of particular interest that primary hippocampal memory disorder (Free recall) correlates with white matter integrity in the PTR, which is a future studies aim.

**Disclosure:** The reported study was funded by RFBR according to the research project 19-015-00383

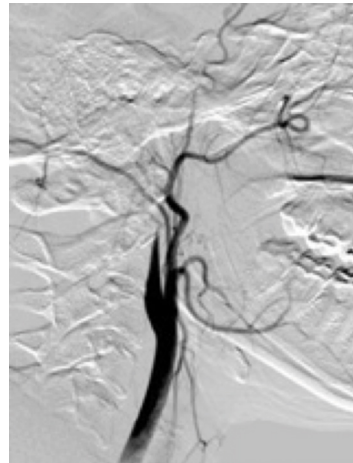
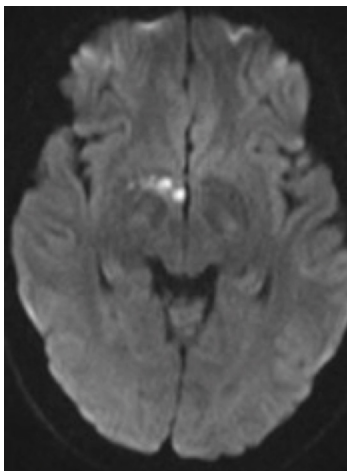
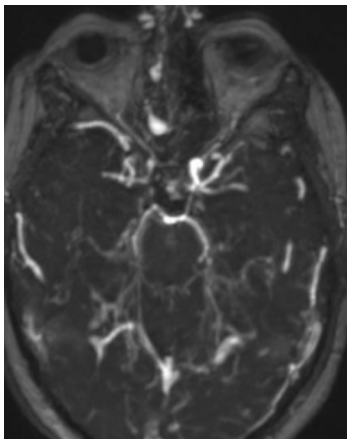


## EPO2044

### Cavernous sinus and internal carotid thrombosis with hypothalamus infarction secondary to sinusitis.

F. Labella Alvarez, A. Rodríguez Martín,  
 Á. Monterde Ortega, I. Rivero Martínez,  
 A. Peral Quirós, I. Pérez Villegas  
*Neurología, Hospital Universitario Reina Sofía, Córdoba,  
 Spain*

**Background and aims:** Cavernous sinus thrombosis (CST) is an entity which can be triggered by a local infection process as well as, by an infected region whose venous drainage goes through the cavernous sinus. We present a case of sphenoid-ethmoidal sinusitis (SES), complicated with meningitis, CST, internal carotid artery thrombosis (ICAT) and hypophysis insufficiency (HI) due to an acute hypothalamus infarction.



**Methods:** To present a case report.

**Results:** A 21-year-old woman who presented at the emergency department complaining about one week duration headache and diplopia followed by right eyelid drooping. She was smoker and was taking oral contraceptive pills. She had ptosis, arreactive mydriasis and complete ophthalmoplegia in her right eye and hypoesthesia in the 1st 2 right trigeminal branches. She underwent a brain CT with contrast which showed a SES along with a CST and right ICAT. In the lumbar puncture pleocytosis with neutrophilia was found starting with empiric antibiotherapy and corticosteroid treatment. After endonasal sinus surgery with sampling was performed, anticoagulation was initiated. Cerebral angiography confirmed ICAT and brain MRI showed, a recent hypothalamus infarction HI. Culture samples were positive to *Enterococcus Faecalis*. The patient evolved favourably, persisting a right 6th nerve palsy and a hypoesthesia in the 1<sup>st</sup> 2 right trigeminal branches at the 3-month follow-up.

**Conclusion:** SES is a well known etiology of CST, however ICAT is a rare complication. Our patient developed both CST and ICAT with an hypothalamus infarction. To exclude a HI, a hormonal study is advisable in these cases.

**Disclosure:** Nothing to disclose

## EPO2045

**Don't stop until you understand it - case series of Artery of Percheron infarction**

O. Lacatus<sup>1</sup>, O.M. Mihalcea<sup>1</sup>, C. Coclitu<sup>2</sup>,  
A.A. Dimancea<sup>1</sup>, A. Ene<sup>3</sup>, D.M. Morosanu<sup>1</sup>, C. Tiu<sup>1</sup>,  
O. Bajenaru<sup>4</sup>

<sup>1</sup>Bucharest, Romania, <sup>2</sup>Neurology, Chu Grenoble Alpes, Grenoble, France, <sup>3</sup>Neurology, University Emergency Hospital Bucharest, Bucharest, Romania, <sup>4</sup>Geriatrics and Gerontology, "Ana Aslan" National Institute of Geriatrics and Gerontology, Bucharest, Romania

**Background and aims:** Early diagnosis of Percheron artery occlusion (AOP) is often missed due to its scarce occurrence and the inconsistency of its clinical picture. A high clinical suspicion is needed as it is difficult to detect the infarct on early brain imaging unless comprehensive evaluation is performed. AOP infarction represents only 0.1% to 2% of all ischemic strokes.

**Methods:** We present a series of 3 cases of AOP occlusion, each having different clinical presentation, physiopathological setting and outcome.

Initial brain CT scan was unremarkable for all of them and emergency MRI was unavailable. Neither was treated with intravenous alteplase.

**Results:** An 81-year-old patient presented to the emergency department with sudden behavioral changes. A diagnosis of stroke was made 24 hours later. The patient died subsequently due to the reactivation of her previously stable chronic lymphocytic leukemia. The 2<sup>nd</sup> patient was admitted with sudden alteration of consciousness following percutaneous coronary intervention. She was discharged to a rehabilitation center a few weeks later. A 70-year-old woman was admitted for sudden ocular movement abnormalities and aphasia. She eventually died 3 months later, after another infarction in the MCA territory, without an identified cause for her strokes. All the patients had bilateral thalamic and mesencephalon infarcts on their repeated brain scans.

**Conclusion:** Strokes in the AOP territory should be considered in patients with nonlaterizing neurological symptoms especially if MRI brain scan is not available and if the clinical features are not fully explained by the initial CT scan or the laboratory work-up.

**Disclosure:** Nothing to disclose

## EPO2046

**Basilar artery diameter and stroke risk in Chinese patients with Fabry disease**

Y.L.T. Lam, B. Sheng, Y.P. Chu, W.T. Wong, H.H. Kwan, L.P. Ng, C.H. Cheung

Department of Medicine & Geriatrics, Princess Margaret Hospital, Hong Kong, Hong Kong (SAR of China)

**Background and aims:** Fabry disease is associated with end-organ involvement, and cerebrovascular events remain as one of the most debilitating conditions that occur with little warning. Vertebrobasilar dolichoectasia, a characteristic finding in Fabry disease, has been reported to be closely related with higher stroke risk. This study aims to evaluate the correlation between basilar artery (BA) diameter with stroke occurrence in Chinese patients with Fabry disease.

**Methods:** We retrospectively reviewed 22 patients who were diagnosed with Fabry disease and had neuroimaging (magnetic resonance imaging or computed tomography) done during the disease course. We assessed the association between stroke occurrence with neuroimaging markers (deep white matter hyperintensities, periventricular hyperintensities, and BA diameter) and other organ involvement (cardiomyopathy and nephropathy).

**Results:** 22 patients (aged 57.3±11.7years, 16 [72.7%] males) were evaluated. 5 patients (23%) developed ischaemic stroke, among which 2 patients demonstrated cortical infarcts. The mean basilar artery diameter was 3.74±0.81mm, and larger BA diameter was observed in patients who developed stroke than those who did not (4.74±0.64mm versus 3.44±0.58mm, p<0.001). BA diameter also showed moderate correlation with more extensive white matter changes (p=0.028, correlation coefficient 0.59). Cardiomyopathy and nephropathy, on the other hand, were not associated with higher stroke occurrence.

**Conclusion:** Larger BA diameter is associated with more extensive white matter changes and higher cerebrovascular event occurrence in patients diagnosed with Fabry disease. Baseline neuroimaging and regular monitoring is important in predicting stroke risk among this group of patients.

**Disclosure:** Nothing to disclose

## EPO2047

**Reasons and risk factors of cardioembolic stroke**

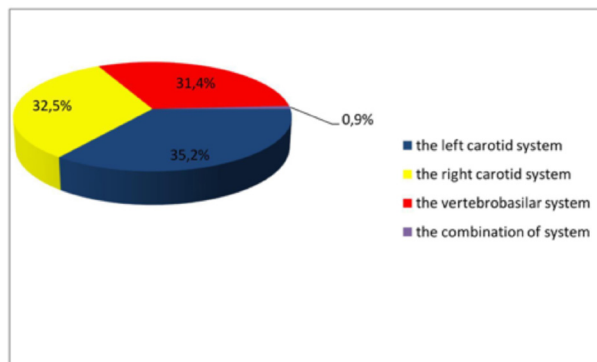
L. Novikova, A. Akopian, K. Sharapova, R. Latypova  
Bashkir state medical university, Ufa, Russian Federation

**Background and aims:** Cardioembolic ischemic stroke (CIS) accounts 30-40% of all stroke cases, characterized by an unfavorable life and rehabilitation prognosis. The aim is analysis of risk factors for cardioembolic subtype of ischemic stroke.

**Methods:** 1294 case histories of patients who were hospitalized to the Regional vascular center in Ufa were studied, 440 (34%) of them with CIS. The diagnosis was established on the basis of clinical, instrumental, laboratory and neuroimaging examinations.

**Results:** The average age of patients was  $71.3 \pm 0.56$  years, 258 (58.6%) women and 182 (41.4%) men. 380 (86.4%) patients suffered a stroke for the 1st time and 60 (13.6%) patients had recurrent stroke. The localization of the stroke is shown in picture 1. The CIS risk factors are presented in Table 1.

Thus, the main risk factor for CIS in our study was nonvalvular atrial fibrillation (AFib) with a predominance of a constant form of AFib in 246 (73.4%) patients. Coagulogram indices in 259 (58.9%) patients indicated hypercoagulation. The results of the risk assessment of stroke and thromboembolism according to the CHA2DS2-VASc scale in patients with nonvalvular AFib ranged from 3 to 6 points. All these patients needed antocoagulant therapy, however, adherence to anticoagulant therapy remains low. Most patients with AFib reserved ineffective antiplatelet therapy or did not regularly take anticoagulants. All patients were instructed to continue therapy with anticoagulants.



The localization of the stroke

Risk factor	Number of patients (%)
1. Atrial fibrillation (nonvalvular)	327 (74,3%)
2. Mitral insufficiency	173 (39,3%)
3. Global pathology of myocardial wall movements	97 (22%)
4. Calcification of the mitral ring	92 (20,9%)
5. Mechanical valve prostheses	34 (7,7%)
6. Mitral stenosis	19 (0,2%)
7. Sick sinus syndrome	15 (3,4%)
8. Infective endocarditis	8 (1,8%)
9. Dilated cardiomyopathy	4 (0,9%)
10. Myocardial infarction less than 4 weeks	4 (0,9%)
11. Myxoma	3 (0,7%)
12. Open oval window	2 (0,5%)

Risk factors of cardioembolic stroke

**Conclusion:** Thus, considering that nonvalvular AFib - based risk factor for CIS, the priority direction of its primary and secondary prevention is adequate systematic anticoagulant therapy.

**Disclosure:** Nothing to disclose

## EPO2048

### Primary Angiitis of the Central Nervous System involving Internal Carotid, Vertebral Arteries and their main branches.

M. Legenko, L. Kalashnikova, L. Dobrynina, T. Lesnykh, M. Dreval

*Research Center of Neurology, Moscow, Russian Federation*

**Background and aims:** Primary angiitis (PA) of the central nervous system is one of the less-studied causes of ischemic stroke (IS). To study clinical manifestations of PA involving internal carotid (ICA), vertebral arteries (VA) and their main branches.

**Methods:** 45 patients (mean age  $37.5 \pm 11.5$  years, men – 58%), with PA of ICA, VA and their main branches were prospectively studied. PA was verified by high-resolution vessel-wall MR imaging (by arterial-wall thickening and contrast enhancement). Atherosclerosis and dissection were excluded.

**Results:** Steno-occlusive process involved ICA in 25 patients (56%), in 8 of them with concomitant middle cerebral artery (MCA) damage; isolated MCA – in 9 (20%), VA – in 6 (13%), different combinations of anterior and posterior circulation in 5 (11%). The whole number of affected arteries was 76 (36% patients had bilateral damage). Clinical manifestations included IS (93%), transient ischemic attack (TIA) (2%), Tolosa-Hunt syndrome (2%). 1 patient was clinically asymptomatic. In 24 patients (57%) IS combined with TIA, which usually preceded IS by few weeks-months. In 48% of patients IS recurred over a period from 2 weeks to 2 years. Headache shortly before or concurrently with IS was presented in 36%. Before IS some patients (16%) noted unexplained fatigue for several weeks/months. Concomitant diseases and conditions included frequent herpetic rashes (27%), chickenpox at the age 18-28 years (4%), arthralgia (11%), psoriasis (4%).

**Conclusion:** Clinical manifestations of PA involving ICA, VA and their main branches have some peculiarities that, along with arterial-wall MR imaging, can be taken into account to recognize this pathology.

**Disclosure:** Nothing to disclose

## EPO2049

### A Case of Cadasil with Spinal Cord Involvement

C. Lima<sup>1</sup>, R. Machado<sup>2</sup>, M.C. Macário<sup>1</sup>, S. Batista<sup>3</sup>

*<sup>1</sup>Neurology, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal, <sup>2</sup>Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal, <sup>3</sup>Neurology, CHUC, Coimbra, Portugal*

**Background and aims:** Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukodystrophy (CADASIL) is an hereditary disease presenting with recurrent strokes, migraine and cognitive impairment. While small arteries throughout the body are pathologically affected, these are not usually symptomatic. Spinal cord involvement has been previously described, albeit rarely, and is not typically considered as part of the disease phenotype.

**Methods:** A 32-year-old male presented with acute onset left hemiparesis. Brain MRI showed multiple periventricular and centrum semiovale white matter lesions. 2 years later, he again presented with acute onset dysphagia, dysarthria, dysphonia and right facial palsy. A lumbar puncture was performed and CSF was negative for oligoclonal bands. At this time, the patient was diagnosed with multiple sclerosis (MS) and started on interferon-beta therapy.

**Results:** At 41 years old he was admitted with an acute onset cerebellar syndrome. Brain MRI showed progression of white matter lesions, including bilateral involvement of the anterior temporal lobes. Cervical cord MRI revealed a central right paramedian cord lesion at the C3-4 level. On revision, family history was positive for early onset stroke. Both the patient and a symptomatic sibling tested positive for Notch-3 mutation, confirming the diagnosis.

**Conclusion:** Given the nature and initial transience of focal neurological impairment and white matter involvement on MRI, CADASIL is a frequent mimic of MS. Spinal cord involvement may further confound diagnosis. While coexistence of both diseases is possible, in this instance, the absence of documented inflammatory activity on CSF and the imagiological aspects of the cord lesion point toward a vascular etiology.

**Disclosure:** Nothing to disclose

## EPO2050

**Assessment of risk for cerebral ischemic recurrence in TIA patients with low-medium ABCD2 score**

S. Lorenzut<sup>1</sup>, G. Causero<sup>2</sup>, G. Merlino<sup>3</sup>, C.L. Smeralda<sup>3</sup>, M.R. Valente<sup>3</sup>, G.L. Gigli<sup>3</sup>

<sup>1</sup>Udine, Italy, <sup>2</sup>Emergency Department, Udine University Hospital, Udine, Italy, <sup>3</sup>Neurology Unit, Udine University Hospital, Udine, Italy

**Background and aims:** The aim of our study was to identify clinical variables useful to provide prognostic information and help the management decisions in patients affected by transient ischemic attack (TIA) with low and medium ABCD2 score.

**Methods:** We analyzed data from patients discharged from the Emergency Department of Udine Hospital with diagnosis of TIA with ABCD2 score  $\leq 5$ . The duration and typology of clinical symptoms, cardiovascular risk factors, previous history of cerebral and cardiac ischemic events and etiological work-ups were recorded retrospectively from electronic medical records. Our aim was to assess the risk of stroke and TIA recurrence, new acute coronaric event and death from cardiovascular causes respectively at 90 days and 1 year follow up.

**Results:** In total 286 subjects fulfilled all our inclusion criteria. Mean age was 75.8 years. 90-day major vascular event occurred in 24 patients (8.3%), whereas 46 patients (16.1 %) had a 1 year cerebral ischemic recurrence (16.1%). Dyslipidemia, dementia, mRS $\geq 3$ , age and prior TIA/Stroke history were associated with higher risk of recurrence in univariate analyses. In the multivariate analyses the prior transient ischemic attack remained as independent predictor of stroke recurrence at both 90-day and 1-year follow-up.

**Conclusion:** our present ability to identify patients at risk for early recurrence based only on clinical scales remains limited. Prior TIA history might help to identify a subgroup of patients at higher risk for early recurrence among TIA patients with low and medium ABCD2 score.

**Disclosure:** Nothing to disclose

## EPO2051

**Carotid dissection as the clinical presentation of Eagle syndrome: a case report**

C. Lunardon, R. Tarletti, C.N. Comi, R. Cantello  
Department of Translational Medicine, section of Neurology, University of Eastern Piedmont, Novara, Italy

**Background and aims:** Eagle syndrome is a clinical condition related to abnormally elongated styloid processes. Several patients present with unilateral facial pain, tinnitus and ophthalmalgia. The vascular form is a variant due to close contact between the styloid process and the extracranial tract of the internal carotid artery (ICA). We describe a patient diagnosed with Eagle syndrome after the development of carotid dissection and parietal ischemic stroke.

**Methods:** A 53-year-old woman presented to the emergency ward in a foreign hospital due to the sudden onset of right visual field impairment, confusion and decreased strength of the right arm. Cephalalgia was also reported. Brain computed tomography (CT) detected a left parietal ischemia, with a left ICA dissection. Heparin was started. Willing to seek another medical opinion, she was admitted to our Clinic.

**Results:** Both Magnetic resonance (MRI) and CT confirmed the ischemic stroke (figure 1) and the carotid dissection (figure 2). Neck scan detected elongated styloid processes, the left one being in close contact with the ICA (figure 3). After an otorhinolaryngologist and surgical evaluation, the diagnosis of Eagle syndrome was made. The woman was discharged with Aspirin and Clopidogrel. A follow-up CT detected increased canalization of the left ICA, with a reduction of the carotid diameter down to 7.1 mm.

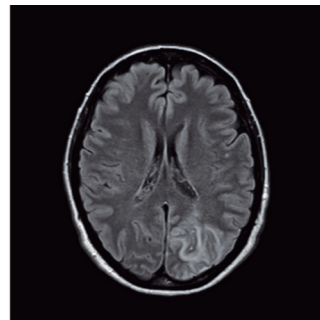


Figure 1: MRI - FLAIR sequence showing a left occipital ischemic lesion.

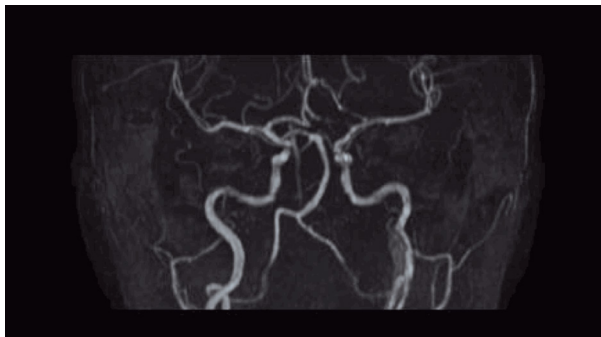


Figure 2: MRI showing the left carotid dissection

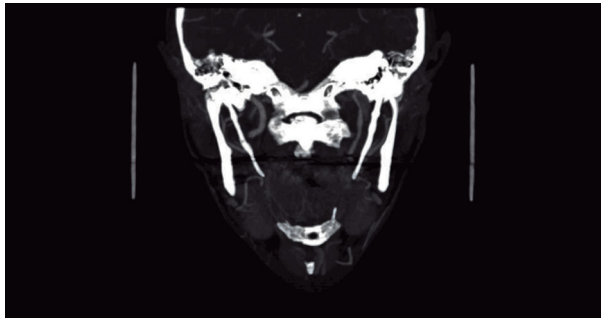


Figure 3: CT scan showing elongated styloid processes, the left one being in close contact with the dissected ICA.

**Conclusion:** Eagle syndrome is a rare condition, which can be slightly symptomatic or extremely disabling by triggering cerebrovascular damage. It must be considered in the presence of stroke in young population, in order to carefully evaluate the patient and start an adequate treatment.

**Disclosure:** Nothing to disclose

## EPO2052

### Neurological singularities of Posterior Circulation Stroke: functional outcome

N. Lupi Manso<sup>1</sup>, T. Pinho E Melo<sup>2</sup>, A.C.G. Fonseca<sup>2</sup>  
<sup>1</sup>Lisbon, Portugal, <sup>2</sup>Neurology, centro Hospitalar Lisboa Norte - Hospital de Santa Maria, Lisbon, Portugal

**Background and aims:** The NIHSS scale is used to assess functional disability after stroke. However, limitations to this scale are recognized. Namely, clinical features of posterior circulation ischemic strokes (PCIS) are usually not considered which might compromise prognostic stratification. We aimed to evaluate the correlation between neurological changes characteristic of PCIS at admission and the modified Rankin scale (mRS) at discharge

**Methods:** Retrospective study of a cohort of patients with PCIS admitted to a stroke unit between 2017-2018. We collected data regarding demographics, past medical history, neurological examination, mRS and NIHSS scores at admission and discharge. 2 groups were defined with  $mRS \leq 1$  and  $mRS \geq 2$  at discharge. We performed a multivariate analysis to determine which neurological findings were independent predictors of  $mRS \geq 2$  at discharge.

**Results:** We included 98 patients, with a median age (standard deviation) of 62.6 ( $\pm 15.4$ ) years and 66 (67.3%) were men. 52 had  $mRS \geq 2$  at discharge. Diabetes (48.8% vs 25.7%,  $p=0.058$ ), atrial fibrillation (32.3% vs 9.4%,  $p=0.032$ ), altered state of consciousness (32.7% vs 6.5%,  $p=0.002$ ), visual fields defects (28.8% vs 6.5%,  $p=0.008$ ) and paresis (65.4% vs 43.5%,  $p=0.042$ ) were significantly associated to  $mRS \geq 2$  group in a bivariate analysis. Following multivariate analysis, independent predictors of  $mRS \geq 2$  were visual fields defects (OR 0.08 IC95% [0.008-0.820],  $p=0.033$ ) and altered state of consciousness (OR 0.110 IC95% [0.0018-0.669],  $p=0.017$ ).

**Conclusion:** Neurological findings in PCIS which were independently associated with  $mRS \geq 2$  were visual field defects and altered state of consciousness. Taking this into consideration, acute phase therapy should be considered in these patients despite  $NIHSS \leq 4$ .

**Disclosure:** Funding: Faculdade de Medicina da Universidade de Lisboa (Programa "Educação pela Ciência" GAPIC/FMUL) 20190021

## EPO2053

### Cerebral autosomal recessive arteriopathy with subcortical infarcts and leukoencephalopathy (CARASIL): neuromuscular characterization

R. Machado<sup>1</sup>, L. Almendra<sup>2</sup>, C. Fernandes<sup>2</sup>, O. Galego<sup>3</sup>, M.R. Almeida<sup>4</sup>, I. Baldeiras<sup>5</sup>, A.R. Silva<sup>6</sup>, L. Negrão<sup>7</sup>, G. Santo<sup>2</sup>

<sup>1</sup>Centro Hospitalar e Universitário de Coimbra, Neurology, Coimbra, Portugal, <sup>2</sup>Neurology, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal, <sup>3</sup>Neuroradiology, Coimbra University and Hospital Centre, Coimbra, Portugal, <sup>4</sup>Genetics, CNC, Coimbra, Portugal, <sup>5</sup>Laboratório de Neuroquímica, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal, <sup>6</sup>Centro de Neurociências e Biologia Celular da Universidade de Coimbra, Coimbra, Portugal, Coimbra, Portugal, <sup>7</sup>Neuromuscular Disease Unit, Neurology Department, University and Hospital Center of Coimbra, Coimbra, Coimbra, Portugal

**Background and aims:** Cerebral autosomal recessive arteriopathy with subcortical infarcts and leukoencephalopathy (CARASIL) is a rare disease caused by HTRA1 gene mutations. In approximately 80% of cases, acute lumbago or spondylosis deformans occurs. While recent studies have focused on CARASIL small-vessel brain pathology, neuromuscular involvement is still unclear. Our aim was to investigate the peripheral nervous system involvement in CARASIL patients.

**Methods:** Patients who received a genetic diagnosis of CARASIL at a tertiary hospital were enrolled. Neurophysiologic evaluation included sensory (ulnar, median and sural nerves) and motor (ulnar, median and deep peroneal nerves) nerve conduction studies and electromyography. All patients underwent lumbar CT/MRI.

**Results:** Three male patients aged 30, 34 and 36 years were included. Median age at onset for ischaemic episodes was 31 years (range, 22-33). Initial symptoms were binocular diplopia in 2 patients and transient right hemiparesis in one. Median age at acute lumbago onset was 27 years (range, 16-33). In 2 patients, lumbago preceded initial ischaemic symptoms in 6 years. All patients had radiological evidence of spondylosis deformans. Median interval from lumbago onset to NCS was 7 years (range, 3-14). Neurophysiologic assessment was normal in all patients except in one, who showed chronic bilateral L5 radiculopathy and right carpal tunnel syndrome.

**Conclusion:** In line with recent evidence, all patients had early-onset acute lumbago, sometimes preceding ischaemic episodes in years. Surprisingly, although lumbago and spondylosis deformans were present in all patients, radiculopathy was only evident in one. These results indicate that peripheral neuropathy and myopathy may not be part of CARASIL phenotype.

**Disclosure:** Nothing to disclose

## EPO2054

### Eight-and-a-half-syndrome: neuro-ophthalmological manifestations

M.G. Maia<sup>1</sup>, L. De Sousa Bernardes<sup>2</sup>, F. Tomaz de Oliveira<sup>2</sup>, L. Ramos de Freitas<sup>2</sup>, P. Henrique Maia de Freitas<sup>2</sup>

<sup>1</sup>São Paulo, Brazil, <sup>2</sup>Neurology, Santa Casa de Misericórdia de São Paulo, São paulo, Brazil

**Background and aims:** Eight-and-a-half-syndrome is a rare neuro-ophthalmologic syndrome, 1st described by Eggenberger in 1998, characterized by conjugate horizontal gaze palsy, ipsilateral internuclear ophthalmoplegia and ipsilateral lower motor neuron-like facial palsy. It is most often caused by vascular etiology such as infarction or ischemia at the pontine level, but it may also be caused by demyelinating conditions at the level of the pons such as multiple sclerosis.

**Methods:** Data obtained through review of medical records, after evaluation and authorization of the patient and photographic record of the diagnostic methods to which the patient was submitted and literature review.

**Results:** A 50-year-old man attended our service complaining of dizziness, associated with diplopia and eye mobility weakness 9 hours before admission. He was referred to our neurology staff at the emergency room. The neurologic exam revealed conjugate horizontal gaze palsy to the left, ipsilateral internuclear ophthalmoplegia and central facial palsy. The cerebrospinal fluid analysis was normal. The brain magnetic resonance imaging showed signs of ischemia, at the periventricular and subcortical white matter around the cerebral hemispheres.

**Conclusion:** Conjugate horizontal gaze palsy, ipsilateral internuclear ophthalmoplegia, and ipsilateral peripheral facial nerve palsy features the eight-and-a-half-syndrome. Although it is most commonly caused by an infarction or demyelination, in rare cases, a space-occupying lesion, such as a cavernoma located at the level of the pons, can be the etiology. Recognizing the symptoms of the disease is paramount, so as to be able properly order the diagnostic exams, localize the lesion, and determine the proper treatment regimen catered to each patient.

**Disclosure:** Nothing to disclose

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## EPO2055

**Non transitory global amnesia**

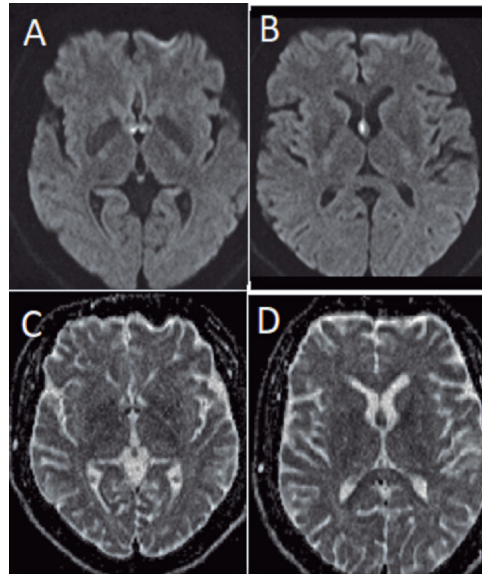
E. Marín Conesa<sup>1</sup>, E. Gómez López<sup>1</sup>, M. Martínez Zarco<sup>1</sup>, I. Pellicer Espinosa<sup>1</sup>, J. Iniesta Valera<sup>2</sup>

<sup>1</sup>General University Hospital Reina Sofía de Murcia, Murcia, Spain, <sup>2</sup>Neurology, General University Reina Sofía's Hospital, Murcia, Spain

**Background and aims:** Damage to the hippocampus, mammillary bodies, anterior thalamic nuclei, and cingulate gyrus can result in anterograde amnesia in patients. The mammillary bodies are considered to be relay nuclei, passing information from the hippocampal formation to the anterior thalamic nuclei, by way of the mamillothalamic tract. More than a half of the fibers of fornix continue forward to form the precommissural fornix and only one quarter participate in hippocampal-mammillary projections, being this part crucial in memory.

**Methods:** A 43-year-old male came to the emergency department due to repeated questions and the inability to remember previous 72-hour. He had a severe anterograde episodic amnesia with verbal predominance and slight reduction of verbal fluency with a phonetic key, mild retrograde episodic amnesia was also observed.

**Results:** Restricted and hypersensitive of both mammillary bodies and of the anterior column and anterior region of the body of the right fornix was observed in DWI-MRI. Within 2 months, this lesions turned into hypo-signal in ADC, congruent with ischemic injury. The patient was diagnosed of ischemic stroke in perforating territory of the anterior communicating artery. He had a fixed impairment of short term memory 6 months later so he lived like previous 4 years had not exist.



Brain MRI scan: DWI-MRI sequence reveals hyperintensity of mammillary bodies (A) and anterior region of the body of the right fornix (B). ADC-MRI, made 2 months after the stroke, shows hypointensity of the mammillary bodies (C) and anterior region of the body of the right fornix (D).

**Conclusion:** This is a peculiar case in which a minimal lesion located in the Papez Circuit causes great symptomatology and functional limitation of the patient's life. It should be remembered that in cases of apparent transient global amnesia whose duration exceeds 24 hours, screening of ischemic lesions must be performed.

**Disclosure:** Nothing to disclose



## EPO2056

**Middle cerebral artery occlusion presenting as hemichorea**P. Marques<sup>1</sup>, E. Martins<sup>1</sup>, C. Maia<sup>2</sup>, F. Silva<sup>1</sup><sup>1</sup>Neurology, Coimbra University Hospital Centre, Coimbra, Portugal, <sup>2</sup>Neuroradiology, Coimbra University Hospital Centre, Coimbra, Portugal

**Background and aims:** Less than 1% of all strokes may present, as an hyperkinetic syndrome rather than the typical loss of function. In older patients with vascular risk factors, small lesions of basal ganglia or transient hypoperfusion by hypotension in the context of carotid stenosis may occasionally elicit these neurological presentations. We report the case of a patient with sudden hemichorea due to arterial embolization, resolved after thrombolysis.

**Methods:** Non applicable

**Results:** Case: An 81-year-old woman, with hypertension and dyslipidemia, fully autonomous for daily activities, presented to the emergency room after sudden onset of involuntary movements of her right members. Neurological evaluation revealed a slight right hemiparesis and choreic movements on the same side (NIHSS 3). No acute lesions were observed at initial brain computed tomography, but she had a thrombus at the M1 segment of her left middle cerebral artery. Prompt initiation of endovenous thrombolysis, about 3 hours after symptoms onset, was coincident with the cessation of the involuntary movements. Arterial reperfusion was angiographically documented. A few days after, brain magnetic resonance imaging revealed a ischemic vascular lesion affecting the left caudate nucleus. On follow-up, at 5 months, she didn't report new episodes of involuntary movements. Her 24 hour-Holter revealed atrial fibrillation and she is now on hypocoagulation therapy.

**Conclusion:** The presented case is notable because of the atypical presentation of a main cerebral artery occlusion that could, otherwise, be attributed to a less serious condition. Early diagnosis and treatment with thrombolysis were crucial for the patient's prognosis.

**Disclosure:** Nothing to disclose

## EPO2057

**Acute Bilateral Vocal Cord Paralysis After Stroke**E. Martins Silva<sup>1</sup>, J. Dentinho<sup>2</sup>, F. Antunes<sup>1</sup>, L. Pereira<sup>1</sup>, M. Rodrigues<sup>1</sup><sup>1</sup>Neurology, Hospital Garcia de Orta, Almada, Portugal, <sup>2</sup>Otorhinolaryngology, Hospital Garcia de Orta, Almada, Portugal

**Background and aims:** Vocal cord paralysis (VCP) is uncommon in stroke and a bilateral presentation is even rarer. Clinical severity depends on glottic opening. VCP affects airway protection, respiration and phonation. We present 3 cases of bilateral VCP followed at a stroke unit in the previous year.

**Results:** 71-year-old female, with right deep parenchymal haemorrhage, was febrile and coughing purulent sputum at day 8, rapidly worsening with respiratory distress, stridor and hypoxemia. Laryngoscopy showed very small glottic aperture due to bilateral VCP and emergent surgical tracheostomy was performed. Tracheostoma closure was possible 6 months after stroke.

61-year-old male, with embolic ischemic stroke of the right middle cerebral artery (MCA), suddenly developed dyspnea and stridor at day 3. Laryngoscopy confirmed bilateral VCP requiring tracheostomy. The following day, pneumonia symptoms emerged. Tracheostoma closure was possible 3.5 months post-stroke.

57-year-old male, with malignant right MCA infarction requiring decompressive craniectomy. After prolonged mechanical ventilation, elective tracheostomy was conducted. Weeks later, recovering and breathing spontaneously, it wasn't possible to start the tracheostoma closure process due to bilateral VCP. He had marginal glottic space improvement at 7-month follow-up.

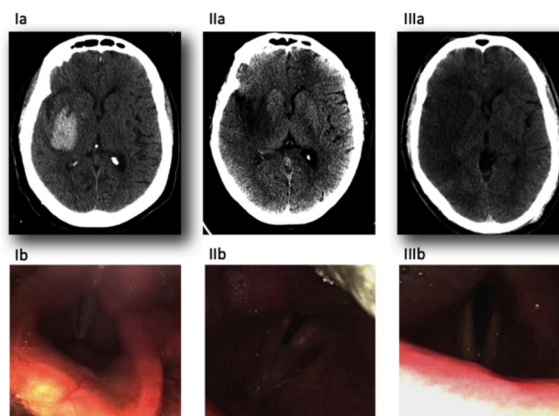


Image 1: CT scans showing lesions (Ia, IIa, IIIa) and laryngoscopy images with bilateral VCP (Ib, IIb, IIIb): Ia and Ib correspond to the 1st patient, IIa and IIb correspond to the 2nd patient and IIIa and IIIb correspond to the 3rd patient

**Conclusion:** VCP after a cortical event may be explained by dominant unilateral cortical projections to both ambiguous nuclei. Insular lesions and decreased vagus nerve activity have also been proposed as contributors. In the 1st 2 cases, there was sudden and severe upper airway obstruction and concomitant pneumonia. Why this event occurs late after stroke remains unclear.

**Disclosure:** Nothing to disclose

## EPO2058

### Mortality predictors in acute stroke

M.M. Martoiu<sup>1</sup>, S. Petrescu<sup>2</sup>, C. Panea<sup>1</sup>

<sup>1</sup>Bucharest, Romania, <sup>2</sup>Neurology, University Hospital ELLIAS, Bucharest, Romania

**Background and aims:** Stroke is considered to be the main cause of death and disability after cancer throughout the world. Numerous studies have been conducted in recent years predicting factors for mortality in acute stroke.

The present study aims to analyse the most influential factors involved in mortality through acute stroke.

**Methods:** The study included 200 patients with bad outcome with acute stroke hospitalized in Neurology Department. Knowing vascular risk factors, analysing clinical, paraclinical evaluation and complications, a series of statistical correlations were made to identify the main predictors of mortality.

**Results:** The study included 200 patients with a mean age of 78 years, 128 females (64%) and 72 males (36%). Out of 200 patients, 147 (73.5%) presented ischemic stroke and the rest of 53 (26.5%) had haemorrhagic stroke.

The mean NIHSS disability score was 18.3.

86 (43%) patients had as cause of death aspiration pneumonia, 99 (49.5%) patients died because of intracranial hypertension, 12 (6%) patients had as causes of death a combination between aspiration pneumonia and intracranial hypertension, 2 (1%) patients associated acute myocardial infarction.

**Conclusion:** Stroke is a main cause of death throughout the world among elderly. The main predictors of mortality are considered to be advanced age, vascular risk factors such as arterial hypertension, diabetes mellitus and dyslipidaemia, association of cardiac rhythm disorders – atrial fibrillation, disability score NIHSS, size of the stroke, complications like intracranial hypertension and aspiration pneumonia, urinary tract infections and cardiac complications such as acute myocardial infarction.

**Disclosure:** Nothing to disclose

## EPO2059

**Artery of Percheron occlusion: Complex clinical course and acute diagnostic challenge**

M. Mendes<sup>1</sup>, C. Azoia<sup>1</sup>, R. Raimundo<sup>1</sup>, I. Rego<sup>2</sup>, R. Almendra<sup>1</sup>

<sup>1</sup>Neurology, Centro Hospitalar de Trás-Os-Montes e Alto Douro, Vila Real, Portugal, <sup>2</sup>Neuroradiology, Centro Hospitalar de Trás-os-Montes e Alto Douro, Vila Real, Portugal

**Background and aims:** Artery of Percheron occlusion (APO) classically produces bilateral thalamic infarctions, frequently involving the midbrain. Early diagnosis of APO can be difficult because it presents with a challenging clinical picture and early CT or MRI may be negative.

The aim of our study is to characterize the clinical features seen in these patients and their outcome.

**Methods:** We retrospectively identified all patients with brain imaging demonstrating a pattern compatible with an APO from 2017 to 2019. All patients had cerebral angiography (MRI or CT). Patients were excluded if a more likely etiology was suggested.

**Results:** 6 patients were included. There were 3 men and 3 women and the mean age (SD) was 79 (13). All patients had mental status changes ranging from delirium to stuporous. Ocular disturbances were present in 5 of them: 5 had vertical gaze palsy, 3 had partial horizontal gaze disturbances and 2 had ptosis. Motor disturbance was also present in 4 patients. None of the patients received tissue plasminogen activator (tPA) In addition to bilateral thalamic infarction, most patients (83%) also had unilateral deep midbrain lesions and the median time from initial symptoms to radiologic diagnosis was 26 hours.

There were 2 in-hospital deaths and 3 patients still presented significant morbidity, at 6 months follow up.

**Conclusion:** In our study, the prognosis seems to be not as good as some described. The most vital reason for timely recognition of APO infarct is intervention with tPA, which can improve the outcome of this patients.

**Disclosure:** Nothing to disclose

## EPO2060

**EMS triage of acute stroke optimized by use of the Los Angeles Motor Scale (LAMS)**

F. Merzou<sup>1</sup>, M. Bachhuber<sup>1</sup>, S.A. Helwig<sup>1</sup>, A. Ragoschke-Schumm<sup>1</sup>, L. Schwindling<sup>1</sup>, M. Kettner<sup>2</sup>, S. Roumia<sup>3</sup>, J. Kulikovski<sup>3</sup>, M. Lesmeister<sup>1</sup>, I. Keller<sup>1</sup>, D. Martens<sup>1</sup>, K. Ewen<sup>1</sup>, K. Fassbender<sup>1</sup>

<sup>1</sup>Neurology, Saarland University Medical Center, Homburg, Germany, <sup>2</sup>Neurology and Neuroradiology, Saarland University Medical Center, Homburg, Germany,

<sup>3</sup>Neuroradiology, Saarland University Medical Center, Homburg, Germany

**Background and aims:** Transferring patients with large-vessel occlusion (LVO) or intracranial haemorrhage (ICH) to hospitals of the appropriate level of care. We aimed to determine how prehospital use of the Los Angeles Motor Scale (LAMS) allows accurately triaging stroke patients with LVO or ICH to target hospitals with (comprehensive stroke centre, CSC) or without (primary stroke centre, PSC) interventional treatment options.

**Methods:** In this stroke management pathway the LAMS was included in prehospital triage decision making by the emergency medical services. The proportion of patients accurately triaged to either CSCs (LVO and ICH) or PSCs (other types of strokes) was assessed.

**Results:** Of 53 patients, an accurate triage decision was reached for 37 (69.8%) patients. 7 of 17 (41.2%) patients with LVO or ICH required inter-hospital transfers from a PSC to a CSC. If selectively evaluating for the accuracy of the LAMS at a cut-point  $\geq 4$ , an accurate diagnosis of LVO or ICH for 42 of 53 patients (79.2%) and of LVO alone for 38 of 53 patients (71.7%) was reached.

**Conclusion:** Prehospital use of a simple stroke severity scale allows accurate triage decisions for approximately 70% of patients. This low-cost intervention may reduce the number of patients with LVO transferred to thrombectomy non-capable hospitals.

**Disclosure:** Nothing to disclose

# EPO2061

## Efficacy and prognostic factors of mechanical thrombectomy in acute basilar artery occlusion: a single centre study

N. Messaoudi<sup>1</sup>, E. Doche<sup>2</sup>, N. Laksiri<sup>2</sup>, C. Rey<sup>2</sup>, C. Perot<sup>2</sup>, B. Audoin<sup>2</sup>, H. Brunel<sup>3</sup>, N. Bruder<sup>4</sup>, E. Robinet<sup>2</sup>, J. Pelletier<sup>2</sup>

<sup>1</sup>Marseilles, France, <sup>2</sup>Neurology, APHM Timone, Marseilles, France, <sup>3</sup>Radiology, AP-HM, Marseilles, France, <sup>4</sup>APHM, Marseilles, France

**Background and aims:** Stroke due to acute basilar artery occlusion (BAO) is rare but is potentially lethal. The benefit of endovascular treatment in acute ischemic stroke caused by BAO remains unestablished. Due to the severe neurological prognostic of BAO, thrombectomy is sometimes used as a rescue procedure, past this time window. Aims is to identify the prognostic factors of good functional outcome after thrombectomy for basilar artery occlusion in our centre.

**Methods:** Between January 2014 and December 2018, all patients referred to La Timone University Hospital of Marseille, France for thrombectomy of basilar artery were retrospectively included. Clinical data, radiological data and treatment procedure were collected. mTICI grades of 2b and 3 was defined as successful revascularization. Favourable outcome was defined as mRS (modified Rankin Score) between 0 and 2 at 90 days.

**Results:** 63 patients with a median age of 67 [56-74] were included. 25 patients were intubated on admission. Revascularization was achieved in 45 cases (71%). 19 of 63 had a favourable outcome. Absence of intubation (OR 4.19; IC 95% [1.05-20.3]; p=0.043) and revascularization with mTICI grades of 2b-3 (OR 6.40; IC 95% [1.32-48.5]; p=0.020) were both statistically significant predictors of favourable outcome. Intubated patients were younger (p=0.018) and had initially more extensive cerebral lesion on MRI.

Table 1 : Characteristics of the Study Population

characteristics	Total n=63	Favourable outcome (mRS 0-2) n=19	Poor outcome (mRS 3-6) n=44	p
Male gender n (%)	43 (68%)	12 (63%)	31 (70%)	0.57
Age years median [IQR]	67 [56-74]	65 [50-70]	68.5 [56-83.5]	0.19
Transfer prior to thrombectomy	19 (30%)	3 (16%)	16 (36%)	0.10
<b>Risk factor</b>				
Diabetes	6 (10%)	1 (5%)	5 (11%)	0.59
HBP	34 (54%)	8 (42%)	26 (59%)	0.32
Dyslipidaemia	18 (29%)	6 (32)	12 (27%)	0.77
Prior stroke	11 (17%)	3 (16%)	8 (18%)	0.51
Smoker	10 (16%)	4 (21%)	6 (14%)	0.73
OH consumption	5 (8%)	1 (5%)	4 (9%)	0.85
coronopathy	7 (11%)	0	7 (16%)	0.18
cervical atheroma	3 (5%)	0	3 (7%)	0.48
Atrial fibrillation	10 (16%)	2 (11%)	8 (18%)	0.58
Obesity	8 (13%)	4 (21%)	4 (9%)	0.35
Anticoagulant therapy	10 (16%)	1 (5%)	9 (20%)	0.13
Antiplatelet therapy	18 (29%)	5 (26%)	13 (30%)	0.79
<b>Admission characteristics</b>				
NIHSS	14 [7.5-19]	9 [5-17]	15 [11-21]	0.34
Intubation	25 (40%)	4 (21%)	21 (48%)	0.041
Glycaemia	1.32 [1.14-1.56]	1.32 [1.13-1.68]	1.32 [1.18-1.45]	0.42
INR	1.11 [1.03-1.20]	1.08 [0.99-1.17]	1.12 [1.04-1.22]	0.023
<b>Radiological characteristics</b>				
DWI-pc-ASPECTS	7 [5-8]	8 [5-8]	6 [5-8]	0.28
Basilar artery occlusion				0.56
Proximal	35 (58%)	13 (68%)	22 (54%)	
Middle	8 (13%)	2 (11%)	6 (15%)	
Distal	17 (28%)	4 (21%)	13 (32%)	
<b>Treatment characteristics</b>				
Thrombolysis	36 (57%)	14 (74%)	22 (50%)	0.081
Time from symptom onset to groin puncture min	268 [212-418]	230 [192-272]	332 [226-475]	0.032
Time from symptom onset to revascularization min	336 [257-507]	270 [239-336]	397 [283-547]	0.022
Thrombectomy duration min	62 [40-89]	43 [25-69]	65.5 [48-91]	0.034
mTICI grades 2b-3	45 (71%)	17 (89%)	28 (64%)	0.037
Per procedure adverse event	13 (21%)	4 (21%)	9 (21%)	0.96
Intracerebral haemorrhage	8 (15%)	3 (17%)	5 (15%)	0.85

Table 2 : Predictors of outcome: Multivariable Ordinal Logistic Regression Analysis

	OR	Confidence interval 95%	p
Thrombolysis	2.1	[0.49-10.2]	0.32
Absence of Intubation	4.19	[1.05-20.3]	0.043
Time from symptom onset to revascularization min	0.996	[0.990-1]	0.066
mTICI grades 2b-3	6.40	[1.32-48.5]	0.020

Table 3 : Predictors of outcome: Subgroup analysis on intubated patient

characteristics	Intubated n=25	Non-intubated n=38	p
Age years	57 [44-72]	70 [58.75-78]	0.018
Time from symptom onset to groin puncture min	270 [247.5-402.5]	241 [186-577.2]	0.16
Time from symptom onset to revascularization min	367 [266-448.5]	322 [251.5-520.5]	0.17
Thrombectomy duration min	54 [39.5-70.5]	65 [41-104.25]	0.078
DWI-pc-ASPECTS	6 [4-7]	7.5 [6-8]	0.011
mTICI grades 2b-3	21 (84%)	24 (63%)	0.073
Thrombolysis	14 (56%)	22 (58%)	0.88
Good outcome	4 (21%)	15 (39%)	0.041
Dead	16 (53%)	14 (36%)	0.034

**Conclusion:** In stroke due to BAO, successful thrombectomy revascularization is associated with a better outcome. Intubation upon admission was a clinical predictor of poor outcome. Identifying predictive factors could lead to personalised medical care for these patients.

**Disclosure:** Nothing to disclose

## EPO2062

**Three-year follow-up of elderly patients with “silent” infarctions**

V.M. Mishchenko, I.M. Nikishkova  
*Kharkiv, Ukraine*

**Background and aims:** The prevalence of “silent” infarction (SI) in the total population ranges from 5.5% to 48.0% and is much higher in patients with cardiovascular diseases. Dynamics of the SI course is poorly researched. The aim was to perform dynamic monitoring of patients with arterial hypertension, atherosclerosis and SI during 3 years.

**Methods:** 72 patients with average age of 66.5±1.9 years were observed. Clinical-neurological, psychodiagnostic, MRI, and EEG methods were used.

**Results:** Analysis of vascular risk factors showed increasing the number of patients with hypertension ( $\phi=2.025$ ), dyslipidemia ( $\phi=1.690$ ), sleep apnea ( $\phi=1.709$ ) during the observation, as well as with amyostatic ( $\phi=1.676$ ), pseudobulbar ( $\phi=1.697$ ) and asthenic ( $\phi=1.770$ ) syndromes. The average Tinetti score decreased by 1.3±0.2 points, indicating the progression of movement disorders in these patients. Dynamics of cognitive functions, according to the MoCA scale, showed that the mean score significantly decreased from 25.6±1.4 to 23.1±0.9 points due to impairments in memory, abstract thinking, visual-spatial capabilities, constructive praxis. The number of patients with single SI is decreased from 27.8% to 13.9%. New lacunae were localized mainly in the basal ganglia, subcortically. The number of patients with leukoaraiosis was increased by 25%, sometimes there was a progression of its severity and cerebral atrophy. EEG studies demonstrated a lower spectral power and density of alpha-rhythm indices over time.

**Conclusion:** SI as a particular form of cerebrovascular pathology is progressive in nature and can lead to stroke development and impaired cognitive function.

**Disclosure:** Nothing to disclose

## EPO2063

**Reactivity features of cytokines and vasoendothelial growth factor in patients with chronic cerebral ischemia and metabolic syndrome**

T.S. Mishchenko<sup>1</sup>, V.M. Mishchenko<sup>1</sup>, I. Darii<sup>2</sup>,  
 V. Bokatieva<sup>1</sup>

<sup>1</sup>*Kharkiv, Ukraine*, <sup>2</sup>*Department of the brain vascular pathology, SI "Institute of Neurology, Psychiatry and Narcology of NAMS of Ukraine", Kharkiv, Ukraine*

**Background and aims:** Metabolic syndrome (MetS) is a risk factor for cerebral stroke. Along with this, there is a need to research a pathogenesis of chronic cerebral ischemia (CCI) in MetS more profoundly. The purpose of the study is to determine the relations of cytokines, vasoendothelial growth factor (VEGF), biochemical and anthropometric indicators in patients with CCI on the background of MetS

**Methods:** 77 patients with CCI were examined. They were divided to 2 groups: the main 1 with MetS and the comparison group without MetS. Average age of patients was 58.29±0.92 years old. Clinical and neurological, anthropometric, neuroimaging, biochemical (level of interleukin-6 (IL-6), interleukin-10 (IL-10), VEGF in blood serum) methods were used.

**Results:** In the patients, neurological syndromes, mild cognitive impairments, psycho-emotional disorders, structural brain changes (“silent” infarcts, leukoaraiosis, atrophy, dilatation of perivascular spaces) were identified. It was found out that patients with CCI and MetS had significantly higher levels of IL-6 and VEGF as compared with the group without MetS (see table). In the examined patients with CCI it was found a direct correlation between IL-6 and glucose concentration, weight, waist size (WS) and between VEGF and WS, whereas in the group with MetS the direct correlation was found between IL-6 and IL-10.

Table - Concentration of biomarkers of IL-6, IL-10, VEGF in patients with and without CCI and MS.

Group	Main group (n=41)	Comparison group (n=36)	Normal
IL-6, pg/ml (min, max)	2,11 (1,23; 3,32) <sup>1</sup>	1,45 (0,94; 2,02)	< 10,00
IL-10, pg/ml (min, max)	6,05 (5,00; 7,81)	5,75 (5,00; 8,67)	< 31,00
VEGF, pg/ml (min, max)	230,82 (84,65; 359,49) <sup>1</sup>	64,21 (20,41;202,13)	< 691,00
Note: 1 - p < 0,01 as compared with the comparison group			

Concentration of biomarkers of IL-6, IL-10, VEGF in patients with and without CCI and MS.

**Conclusion:** Inflammation and endothelial dysfunction plays an important role in the pathogenesis of the CCI development in patients with MetS.

**Disclosure:** Nothing to disclose

## EPO2064

**Neurovascular coupling impairment: a useful biomarker for cerebral small vessel disease in hypertensive subjects?**

A. Monteiro<sup>1</sup>, P. Castro<sup>2</sup>, G. Pereira<sup>2</sup>, C. Ferreira<sup>2</sup>, F. Sorond<sup>3</sup>, J. Polonia<sup>4</sup>, E. Azevedo<sup>2</sup>

<sup>1</sup>Neurology, Hospital Pedro Hispano, Matosinhos, Portugal,

<sup>2</sup>Neurology, São João Hospital Centre, Porto, Portugal,

<sup>3</sup>Department of Neurology, Division of Stroke and

Neurocritical, Northwestern University Feinberg School of Medicine, Chicago, USA, <sup>4</sup>HTA and Cardiovascular Risk Unit, Hospital Pedro Hispano EPE, Matosinhos, Portugal

**Background and aims:** The mechanistic link between hypertension and cerebral small vessel disease (CSVD) is still poorly understood. We hypothesized that hypertension could impair cerebrovascular regulation prior to established cerebrovascular disease.

**Methods:** 59 hypertensive patients [56% males; age 64±10 years; 58% with comorbid diabetes mellitus (DM)] without irreversible symptomatic cerebrovascular disease, underwent transcranial Doppler (TCD) monitoring in the middle (MCA) and posterior (PCA) cerebral arteries, to assess dynamic cerebral autoregulation (dCA), vasoreactivity to carbon dioxide (VR) and neurovascular coupling (NVC), as well as brain MRI. TCD data from 20 healthy controls was obtained for comparison (24% males; age 59±16 years).

**Results:** Hypertensive patients showed significant impairment of neurovascular coupling in the PCA, with smaller increases in cerebral blood flow (CBF) velocity during visual stimulation ( $p=0.037$ ), as well as disturbed NVC time-varying properties, with lower natural frequency ( $p<0.001$ ) and lower rate time ( $p=0.010$ ), when compared to controls. dCA and VR remained relatively preserved in MCA and PCA. NVC dysfunction was more pronounced in those with coexisting DM resulting in lower natural frequency ( $p=0.025$ ) and smaller increase in CBFV during visual stimulation ( $p=0.052$ ). TCD measures did not relate to white matter burden on MRI in the monitored vascular territories.

**Conclusion:** These findings suggest that hypertension and DM particularly affect NVC in PCA territory, irrespective of established white matter lesions. Neurovascular coupling could be useful as an early, non-invasive surrogate marker for CSVD to guide therapies and prevent future clinically relevant impairment.

**Disclosure:** Nothing to disclose

## EPO2065

**Posterior Reversible Encephalopathy Syndrome with an unusual trigger.**

M. Morales de la Prida<sup>1</sup>, L. Albert Lacal<sup>1</sup>, M. Cánovas Iniesta<sup>1</sup>, J. Vazquez Lorenzo<sup>1</sup>, M.T. Alba Isasi<sup>1</sup>, V.M. Pérez Navarro<sup>1</sup>, M.O. Lozano Caballero<sup>1</sup>, E. Gómez López<sup>2</sup>, J. Díaz Perez<sup>1</sup>, J.M. Cabrera Maqueda<sup>1</sup>, E. Carreón Guarnizo<sup>1</sup>, B. Palazon Cabanes<sup>1</sup>, R. Hernández Clares<sup>1</sup>, F.A. Martínez García<sup>1</sup>, B. García-Villalba Navaridas<sup>3</sup>, T. Valda de Miguel<sup>4</sup>, I. Jiménez López<sup>4</sup>, V. Martínez Jiménez<sup>4</sup>, A.M. Morales Ortiz<sup>1</sup>

<sup>1</sup>Neurology, Virgen de la Arrixaca University Clinical Hospital, Murcia, Spain, <sup>2</sup>Neurology, Reina Sofia University General Hospital, Murcia, Spain, <sup>3</sup>Neuroradiology, Virgen de la Arrixaca University Clinical Hospital, Murcia, Spain, <sup>4</sup>Nephrology, Virgen de la Arrixaca University Clinical Hospital, Murcia, Spain

**Background and aims:** Posterior Reversible Encephalopathy Syndrome (PRES), caused by endothelial dysfunction, is related to many diseases (hypertension, autoimmune disorders, immunosuppressive drugs, renal failure...). It usually presents with confusion, headache, seizures, parieto-occipital symptoms and brain MRI lesions that are hyperintense in T2 and FLAIR sequences without significant restricted diffusion (vasogenic edema) and predominantly parieto-occipital. The trigger must be solved and the hypertension and seizures must be controlled. It has good prognosis, not always reversible.

**Methods:** Male, 43 years, no background. In September, he presented rapidly progressive glomerulonephritis and hemoptysis, positive for anti-glomerular basement membrane antibodies. Goodpasture syndrome was diagnosed and hemodialysis and treatment with corticosteroids, cyclophosphamide and plasmapheresis were initiated until antibodies negativization. Cyclophosphamide was stopped due to leukopenia, switching to Rituximab in November. In December, he suffered pneumonia due Enterococcus, being Meropenem prescribed. During admission he had hypertension, and after 3 days of non-disabling headache, he presented 2 seizures. He had chronic infarction in the right caudate nucleus and subtle occipital hypodensity in cranial CT and normal cerebrospinal fluid.

**Results:** Due to the fact that PRES was suspected, blood pressure control was intensified and antiepileptic drugs were prescribed. In brain MRI typical frontal-parieto-occipital lesions were identified. He had a good progress with thunderclap headache episodes, and nimodipine was added due to possible associated reversible cerebral vasoconstriction syndrome (RCVS). No brain MRI lesions after one month.

**Conclusion:** PRES has been associated with various autoimmune diseases, with few cases related to Goodpasture syndrome. In our case, hypertension and renal failure could participate in the etiopathogenesis.

**Disclosure:** Nothing to disclose

## EPO2066

### Superficial siderosis of central nervous system. Report of four cases and review of literature

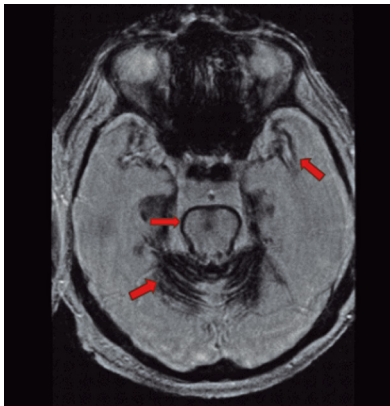
C. Muñoz Martínez<sup>1</sup>, E. Fernandez Villalba<sup>2</sup>,  
R. Villaverde<sup>3</sup>

<sup>1</sup>Granada, Spain, <sup>2</sup>Murcia, Spain, <sup>3</sup>Neurology, Hospital General Universitario Morales Meseguer, Murcia, Spain

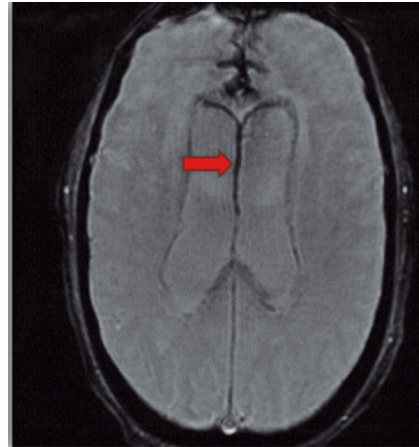
**Background and aims:** Superficial siderosis is a rare entity produced by hemosiderin deposits in subpial layers of the brain, cerebellum and spinal cord due to chronic bleeding into the subarachnoid or intraventricular space. It produces a characteristic clinical Picture with neurosensorial hearing loss, cerebellar ataxia and pyramidal signs. dural injuries, tumors, traumas and vascular malformations are among the most common causes. Magnetic resonance is the diagnostic test, where the characteristics hypointense lines are seen in areas of pigment deposit. The objective of this study is to emphasize the peculiarities of this disease by describing four cases diagnosed in hospitals in our region.

**Methods:** Review of the medical histories of our patients and literature search about the disease.

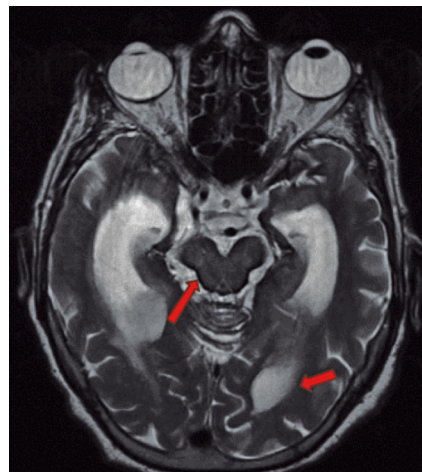
**Results:** 3 of the patients have the typical clinical triad. In 2 of these, rare signs such as hydrocephalus and impaired deep sensitivity were found. The etiology of the chronic bleeding was found in 3 of our cases: post-radiotherapy telangiectasias in case 1, pseudomeningocele in case 2 and arterial aneurysm in the case 4. In case 3 no cause was found. 2 of the patients were anticoagulated, so we thought it might be a risk factor for this disease. The management of patients consisted in the administration of iron chelators in cases 1 and 2, surgery in case 4 and symptomatic treatment in case 3.



Gradient-echo T2 MRI. Case 2. Linear hypointensities surrounding pons, cerebellum and temporal lobes.



Gradient-echo T2 MRI. Case 1. Subependymal hypointense lines.



Gradient-echo T2 MRI. Linear hyperintensity surrounding midbrain and ventriculomegaly.

**Conclusion:** Superficial siderosis is a rare entity to be considered in the differential diagnosis of patients with progressive neurological symptoms, mainly when hearing loss and ataxia are present.

**Disclosure:** Nothing to disclose

## EPO2067

**Eye tracking as a potential tool to evaluate treatment efficacy in acute ischemic stroke clinical trials**

D.F. Muresanu<sup>1</sup>, A. Rufa<sup>2</sup>, D. Zanca<sup>2</sup>, O. Verisezan Rosu<sup>3</sup>, S. Strilciuc<sup>3</sup>, A. Federico<sup>4</sup>

<sup>1</sup>Neurosciences, "Iuliu Hatieganu" University of Medicine and Pharmacy, Cluj, Romania, <sup>2</sup>Neurosense Lab, DSMCN, University of Siena, Siena, Italy, <sup>3</sup>Neurosciences, "RoNeuro" Institute for Neurological Research and Diagnostic, Cluj, Romania, <sup>4</sup>Clinical Neurology and Neurometabolic Diseases, University of Siena, Siena, Italy

**Background and aims:** N-PEP-12 is peptide-based dietary supplement with neuroprotective and pro-cognitive effects, as described by several experimental studies. We used eye movement tracking latency, an evidence-based indicator for cognitive status, to explore the efficacy of N-PEP-12 supplementation for 90 days in patients with acute ischemic stroke.

**Methods:** Eye movements of patients with supratentorial, radiologically confirmed ischemic stroke were measured using a standardized vertical saccades test captured with a Tobii Pro TX300 eye tracking device at 30, and 101 days after patient recruitment (n=121). After artifact and outlier removal, valid saccades were aggregated by individual examination to explore group differences in baseline change vertical saccadic eye movement latency (VSEML) between N-PEP-12 and placebo populations, using a mean difference parametric hypothesis (independent samples t-test), in accordance with sample distributions and other assumptions.

**Results:** A statistically significant difference in baseline change VSEML between N-PEP-12 and control groups were observed at day 101 ( $F=4.719$ ,  $p=0.038$ ).

**Conclusion:** N-PEP-12 may have a favorable effect on patients after acute ischemic stroke eye tracking parameters. Vertical latency should be assessed in conjunction with other eye tracking indicators such as velocity and gain to provide a multidimensional snapshot of the intervention's potential to improve acute ischemic stroke outcomes.

**Disclosure:** Nothing to disclose

## EPO2068

**Evaluation of cognitive impairment with P300 evoked potential method in patients with cerebrovascular impairment and type 2 diabetes**

A. Naminov, P. Fedin, A. Kornilova, M. Tanashyan  
Moscow, Russian Federation

**Background and aims:** Type 2 diabetes mellitus (T2DM) is an established risk factor for cognitive deficit. There are several studies indicating that cognitive impairment in T2DM patients with cerebrovascular diseases can be developed on the earlier stages of the disease. P300 evoked potential is one of the most promising methods of assessing cognitive dysfunction.

**Methods:** In a non-randomized controlled study we investigated 52 patients with chronic cerebrovascular diseases being main criterion for inclusion. The baseline characteristics of the patients were balanced. In the main group were 23 patients with T2DM and in the control group were 29 without T2DM. 12 patients from the main group and 16 from the control group were with mild cognitive impairment (MCI). We confirmed MCI with neuropsychological assessment tests. All patients were examined with P300 evoked potentials. The amplitude and latency of P300 waves were the main target of this study.

**Results:** Of the all patients enrolled latency in patients form both groups with MCI was statistically longer (372ms average versus 389ms average) while the amplitude was lower (8.7 average versus 10.6 average). In the main group six patients with T2DM without confirmed MCI were noted; they had lowered amplitude and longer latency compared to the patients from the control group.

**Conclusion:** In the patients with T2DM P300 evokes potential method can be used to easily and safely detect cognitive dysfunction on the onset of the clinical course. Further studies required to determine reliability of this method.

**Disclosure:** Nothing to disclose



## EPO2069

### Concomitance of subdural thoracic spinal hematoma and diffuse subarachnoid hemorrhage in the neuroaxis simulating acute myocardial infarction: a Case Report

A.L. Navarrete Fernandez<sup>1</sup>,

A. Augusto Viana Oliveira E Sousa<sup>2</sup>, B. Pereira Braga<sup>2</sup>,

C. Callegari Piccinin<sup>2</sup>, F. Buchdid Cardoso<sup>2</sup>,

F. Franco Da Graça<sup>2</sup>, L. Valler<sup>4</sup>, M. Almeida Vidal<sup>2</sup>,

P. Pavan<sup>2</sup>, P. Afonso Mei<sup>2</sup>, T. Alexandre Yasuda<sup>2</sup>,

V. Hachiman<sup>2</sup>

<sup>1</sup>São Leopoldo Mandic, Campinas, Brazil, <sup>2</sup>Centro Médico de Campinas, Campinas, Brazil

**Background and aims:** Spinal subdural hemorrhages (SDHs) are rare, accounting for 4.1% of all spinal hematomas. Simultaneous SDH and subarachnoid hemorrhage (SAH) have been reported in only a few cases. We present a case of this instance, simulating an acute myocardial infarction (AMI).

**Methods:** 67-year-old male, hypertensive, dyslipidemic, with mild chronic renal impairment (CRI), in use of apixaban for atrial fibrillation, was admitted for retrosternal pain. ECG demonstrated an increase of the ST segment and slight elevation of serum troponin. Later, he showed lacunar amnesia, lasting for about 4 hours, which later improved. Brain MRI showed hypersignal in DWI in the parahippocampal regions. Serial test of myocardial necrosis markers did not displayed a typical behaviour of AMI, being the increase of troponin attributed to CRI. 2 days later, patient presented paraplegia and areflexia of the lower limbs, with sensory loss below T6 level. MRI showed a subdural hematoma at T6, with spinal compression, as well as a diffuse subarachnoid hemorrhage in the neuroaxis, reaching the encephalon, of presumed origin at the same site of the SDH. The hematoma was drained by the neurosurgical team and the patient underwent corticotherapy, with partial improvement. Angiography revealed a paravertebral venous ingurgitation, which could be caused either by extensive hemangioma or paravertebral arteriovenous fistula. The patient remained restricted to bed, in need of intermittent vesical relief probing.

**Results:** Intramedullary bleeding in concomitance with subdural and subarachnoid hemorrhage simulated an AMI.

**Conclusion:** Intramedullary bleedings in concomitance with subdural and subarachnoid hemorrhage should be considered as differential diagnosis of thoracic pain.

**Disclosure:** Nothing to disclose

## EPO2070

### Clinical and neuroimaging differences in lacunar ischemic stroke patients with cerebral amyloid angiopathy and hypertensive cerebral microangiopathy

O. Novosadova, T. Semenova, V. Grigoryeva

Privolzhsky Research Medical University, Nizhny Novgorod, Russian Federation

**Background and aims:** Lacunar ischemic stroke (LS) may be associated not only with hypertensive cerebral microangiopathy (hCMA) but sometimes with cerebral amyloid angiopathy (CAA). The secondary stroke prevention for patients with combination of hCMA and CAA (hCMA+CAA) differs from that in isolated hCMA, thus the intravital diagnosis of probable CAA is extremely important.

The aim of the study was to compare clinical and neuroimaging features in LS patients with hCMA+CAA and hCMA.

**Methods:** 47 patients (aged 65.6±6.3 years) with 1st-ever acute LS were examined by the Montreal Cognitive Assessment scale, Frontal Assessment Battery and Fazekas scale. The diagnosis of CAA was based on the Boston criteria, hCMA was diagnosed according to the Standards for Reporting Vascular changes on neuroimaging. In all cases CAA was associated with hCMA.

**Results:** The patients were divided into 2 groups: 1) with hCMA+CAA (12 patients); 2) with isolated hCMA (35 patients). There was no difference between the groups by age, sex, comorbidities, lesion site and severity of acute LS. Fazekas grade 3 was significantly more often in group 1 (83.3%) than in group 2 (11.2%, p<0.001). Cognitive dysfunction including executive disorders in group 1 were significantly more pronounced than in group 2 (Mann-Whitney U Test = 69.0, p<0.001 and U = 14.5, p<0.001).

**Conclusion:** Stroke patients with combination of probable CAA and hCMA have more severe cognitive impairment and white matter lesion than patients with isolated hCMA. CAA has its own negative effect on the deep white matter of brain.

**Disclosure:** Nothing to disclose

## EPO2071

### Long-term outcome of mechanical thrombectomy for acute ischemic stroke patients on therapeutic anticoagulation

K. Nowak<sup>1</sup>, E. Włodarczyk<sup>2</sup>, J. Derbisz<sup>3</sup>, M. Paykart<sup>4</sup>, J.M. Jagiella<sup>1</sup>, R. Pułyk<sup>5</sup>, P. Brzegowy<sup>6</sup>, B. Łasocho<sup>7</sup>, T. Popiela<sup>8</sup>, A. Slowik<sup>1</sup>

<sup>1</sup>Cracow, Poland, <sup>2</sup>Neurology, University Hospital in Krakow, Cracow, Poland, <sup>3</sup>Department of Neurology, Jagiellonian University, Cracow, Poland, <sup>4</sup>Department of Neurology, The University Hospital in Krakow, Cracow, Poland, <sup>5</sup>Department of Neurology, Jagiellonian University, Cracow, Poland, <sup>6</sup>Department of Radiology, Jagiellonian University, Cracow, Poland, <sup>7</sup>Department of Radiology, University Hospital, Cracow, Poland, <sup>8</sup>Radiology, Jagiellonian University, Cracow, Poland

**Background and aims:** We analyzed long-term outcome as measured as mRS on day 90. in acute ischemic stroke (AIS) patients on therapeutic anticoagulation treated by mechanical thrombectomy (MT). There are limited data on long-term outcome of anticoagulated patients treated by MT.

**Methods:** The study was conducted in 291 AIS patients (49% women, mean age 66±15 years) who underwent MT in Comprehensive Stroke Center in Krakow, Poland. The following data were collected: demographics, stroke risk factors, NIHSS on admission, TICI score after the procedure, hemorrhagic transformation (ECASS-2) on CT 24 hours after stroke, and time lapse between stroke onset and groin puncture (SO-GP). Outcome measure was mRS on the day 90. after stroke onset. Good outcome was defined as mRS≤2.

**Results:** 37 patients (13%) were on therapeutic anticoagulation during procedure: warfin: 14 (37,8%); full dose heparin:5 (13,5%); dabigatran:5 (13,5%) or rivaroxaban:13 (35,0%). Univariate analysis showed that anticoagulated patients were older, had more often ischemic heart disease or atrial fibrillation (p<0,05). They didn't differ in respect to clot location, TICI score after procedure, hemorrhagic transformation on CT or mRS profile on the day 90.

Multivariate analysis showed that older age (OR=0.94;95%CI=0.91-0.97), hemorrhagic transformation (OR= 0.36;0.95%CI=0.20-0.67), SO-GP (OR=0.72;95%CI=0.60-0.87), poor recanalization (OR=0.14;95%CI=0.07-0.29), diabetes mellitus (OR= 0.32;95%CI=0.16-0.64), hypertension (OR=2.35;95%CI=1.11-4.95) affected recovery as measured by mRS 0-2 at day 90.; however therapeutic anticoagulation didn't (OR=0.92;95%CI=0.38-2.21).

**Conclusion:** MT in anticoagulated patients doesn't affect long-term outcome.

**Disclosure:** Nothing to disclose

## Child neurology/developmental neurology; Neuroepidemiology

### EPO2072

#### Mortality rates of hospitalized patients in Neurology: a tertiary hospital experience

B. Baena Alvarez, F. Rodríguez Jorge, R. Sainz Amo, J. Gómez Corral, A. Celdrán de Castro García, A. Alonso Canovas, J. Masjuan  
*Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain*

**Background and aims:** Cerebrovascular disease is the 1st cause of death in Spanish women and the 3rd in general population. Alzheimer and Parkinson's disease are the only causes of death which currently keep increasing in frequency. We aim to study mortality causes of Neurology inpatients.

**Methods:** Descriptive analysis of deceased inpatients in the neurology department of a tertiary hospital from January 2014 to December 2018 including demographic and clinical variables, specifically treatment with anticoagulant drugs.

**Results:** 408 deaths out of 7145 admissions (5.7%) were included, 58.8% women with mean age of 82.3 years (SD 10.4). The most common cause of death was ischemic stroke (56.1%, 27.5% under treatment with acenocumarol and 4.8% with direct oral anticoagulants), followed by haemorrhagic stroke (32.4%, 38.7% under treatment with acenocumarol and 5.3% with direct oral anticoagulants) and status epilepticus (4.2%). Other causes of death (7.4%) were meningoencephalitis (5), amyotrophic lateral sclerosis (4) and Parkinson's disease (3) among others. There was an increase in the age at death (80.1 (SD 9.7) in 2014 vs. 85.2 (SD 8.9) in 2018, as well as in mortality rates (5.7% in 2014, 5% in 2015 and 2016, 5.5% in 2017 to 7.2% in 2018).

**Conclusion:** Ischemic stroke was the most frequent cause of death in our study, in agreement with previous epidemiological studies. The progressive increase of mortality in our study may be related with the parallel increase in age, but more comprehensive prospective studies are warranted.

**Disclosure:** Nothing to disclose

### EPO2073

#### Alzheimer's disease and vascular dementia as main cause of death in a rural southern Italian population: data from the Zabùt Aging Project

L. Cuffaro<sup>1</sup>, E. Amodio<sup>2</sup>, R. Baschi<sup>1</sup>, M. Caccamo<sup>1</sup>, M. Davi<sup>1</sup>, G. La Bianca<sup>1</sup>, V. Restivo<sup>2</sup>, F. Vitale<sup>2</sup>, R. Monastero<sup>1</sup>

<sup>1</sup>*Department of Biomedicine, Neuroscience and advanced Diagnostic, University of Palermo, Palermo, Italy,*

<sup>2</sup>*Department of Sciences for Health Promotion and Mother-Child Care, University of Palermo, Palermo, Italy*

**Background and aims:** To identify the contribution of AD and VA in determining the exitus using population-based data from a cohort study conducted in a rural village in Italy.

**Methods:** This study was carried out using data of the Zabùt Aging Project (ZAP), a comprehensive survey on neuropsychiatric disorders carried out on all subjects aged  $\geq 50$  years living in a rural village in south Italy (n=2,028). Information about deaths in the cohort was obtained from the Sicilian Regional Statistical Office using death certificates. Death causes were coded using the International Classification of Diseases (ICD-9). The risk of dying (mortality risk ratio) was calculated using multivariate Cox (proportional hazards) regression models.

**Results:** 1,957 subjects aged 50 or more years were analyzed in the present study. Of these 613 (31.3%) deceased during the follow-up period (2001-2014), whereas 1,344 (68.7%) withdrew alive. Death was more frequent among men (33.9% vs 29.1%), in patients aged more than 70 years old and in those with less than 10 years of education, and in subjects with dementia. Factors associated with the highest hazard risk of death after multivariate analysis were age (adj-HR=2.49; 95% CI 2.28-2.72), AD (adj-HR= 2.13; 95% CI 1.56-2.89) and VD (adj-HR= 3.55; 95% CI 2.58-4.87).

**Conclusion:** In conclusion, AD and VD significantly increase the risk of mortality at a given age than subjects without dementia; however, death certificate - due to underreporting - can be not considered an accurate public health tools for detecting subjects suffering from dementia.

**Disclosure:** Nothing to disclose

## EPO2074

**Exploring the association between *Helicobacter pylori* and Parkinson's disease**L. Eisenberg<sup>1</sup>, N. Giladi<sup>2</sup>, C. Peretz<sup>1</sup><sup>1</sup>Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel, <sup>2</sup>Tel Aviv Medical Center, Tel Aviv, Israel

**Background and aims:** Epidemiological studies provided controversial results on the association between *H. pylori* infection and the risk for Parkinson's disease (PD). However, some of these studies included only a small number of participants.

**Methods:** In this work we explored this association by a retrospective large-scale cohort of subjects (n=118,531), who underwent 179,060 *H. pylori* breath tests. 3 stratified Cox proportion hazard models were applied to evaluate HR and 95%CI for PD risk associated with *H. pylori* breath test results by sex, socioeconomic status and age groups. A logistic regression was applied to evaluate OR and 95%CI for positive *H. pylori* breath test results among PD patients.

**Results:** The proportion of PD patients who performed breath tests before PD diagnosis was almost 2-fold higher than those who performed the test after PD diagnosis, therefore suggesting an association between *H. pylori* testing and PD. However, men with positive *H. pylori* breath test results were found to be at a significantly lower risk for PD [HR= 0.65 (95% CI 0.48-0.88)]. Furthermore, the risk for a positive *H. pylori* breath test result was significantly lower for PD patients who performed the test either before or after PD diagnosis, as compared to non-PD patients [OR= 0.62 (95% CI 0.46-0.83), OR= 0.46 (95% CI 0.30-0.71) respectively].

**Conclusion:** Our results suggest that *H. pylori*-like symptoms, rather than the *H. pylori* infection itself, are a risk factor for PD. Therefore, we propose that *H. pylori* negative patients, that experience *H. pylori*-like clinical symptoms, should be monitored for early signs of PD development.

**Disclosure:** Nothing to disclose

## EPO2075

**Analysis of interconsultations to a secondary-level hospital neurology service**

M. Martínez Zarco, E. Marín Conesa,

I. Pellicer Espinosa, E. Gómez López  
Neurology, Reina Sofía General University Hospital, Murcia, Spain

**Background and aims:** Intrahospital consultations (IC) are a very important part on the daily care activity of a hospital medical service. The objective of this study is to know the characteristics of the IC made to a secondary-level hospital Neurology Service (NS), such as who are the services that are most consultant ones and for what reasons.

**Methods:** Retrospective descriptive study of the IC performed to the Reina Sofía General University Hospital Neurology Service during a 5 month period (August-December, 2018).

**Results:** 73 patients were included (mean age 65.99, men 54.8%, women 45.2%). There was an average of 17.6 days of admission. Most demanding services: Internal Medicine 35.6%, Cardiology 17.8%, Traumatology 9.6% and General and Digestive Surgery 8.2%. IC reasons: cognitive disorders 23.3%, neurological focus on limbs (excluding hemiparesis or hemihypoesthesias) 13.7% and movement disorders 12.3%. IC objective: diagnosis 65.3% and treatment 34.2%. 12.3% of the patients died during admission or in less than a month after discharge.

**Conclusion:** Comparing with other hospitals that count on with a neurologist on call, most ICs do not perform urgent neurological pathology, probably due to this reason (the urgent pathology is solved by other doctors on call). Taking into account this fact, we see the most interconsultant service was Internal Medicine (IM), probably because it is the service with more beds available, being the most frequent reason for admission in IM the infectious pathology, motivating the interconsultation for cognitive disorders in a greater number of cases.

**Disclosure:** Nothing to disclose

## EPO2076

**Hospitalizations for acute confusional syndrome: from emergencies to the neurology service**

M. Martínez Zarco, I. Pellicer Espinosa, E. Marin Conesa, E. Gómez López  
*Neurology, University General Hospital Reina Sofia, Murcia, Spain*

**Background and aims:** Acute confusional syndrome (ACS) is the presentation of serious pathologies, requiring an etiological diagnosis with high resource consumption. The objective of this study is to know the characteristics, studies and imaging tests and final diagnosis of patients admitted by ACS in Neurology.

**Methods:** Descriptive retrospective study of hospitalizations due to SCA from the Emergencies Service (ES) to the Neurology Service of the General University Hospital Reina Sofia during a 5 years period (2014-2018).

**Results:** 44 patients were included (Age: Median 77.5 years, Men: 63.6%; Women 36.4%) whose diagnosis at hospitalization was ACS. The prevalence of cardiovascular risk factors 61.4%, toxic consumption 13.6%, cerebrovascular disease 27.3%, cognitive impairment 25%, psychiatric pathology 22.7%, chronic treatment associated with ACS 34.1% and infectious focus 20.5% was collected. 86.4% of the patients presented disorientation, and 45.5% psychomotor agitation. 90.7% of CT performed on ES were not pathological. 56.8% of ACS were due to primary neurological disease; infectious (non-CNS) 25%; Others: 38.6%, and 11.4% unknown. Multifactorial origin: 25%.

**Conclusion:** Our sample is aged and pluripathological, so the etiological diagnosis is complex. However, in 55.6% of patients with an infectious focus identified on ES (not CNS), ACS was attributed to this infection, as in 23.5% of toxic-metabolic pathology already identified in ES, so some hospitalizations could have been redirected. A factor that explains this fact is the absence of a neurologist on call, making it difficult to identify neurological pathology on the ES.

**Disclosure:** Nothing to disclose

## EPO2077

**The role of vascular risk factors and determination of vascular remodeling parameters in patients with acute lymphoblastic leukemia**

M. Militaru<sup>1</sup>, S. Iurciuc<sup>1</sup>, V. Turi<sup>2</sup>, A. Cornea<sup>2</sup>, M.A. Simu<sup>1</sup>, A.G. Militaru<sup>1</sup>

<sup>1</sup>University of Medicine and Pharmacy Victor Babes Timisoara, Timisoara, Romania, <sup>2</sup>University of Medicine and Pharmacy Victor Babes Timisoara, Timisoara, Romania

**Background and aims:** The aim of this study was to assess if there is an impact of vascular risk factors (VRFs) in patients with acute lymphoblastic leukemia (ALL) on vascular remodeling parameters before and after 1 month of chemotherapy treatment measuring the Intima-Media-Thickness (IMT) using Extracranial-Doppler (ECD), ankle-brachial index (ABI), arterial stiffness aortic pulse wave velocity (PVW) and arterial age.

**Methods:** We enrolled 52 patients with ALL aged between 19-82 scheduled for 1 cycle of chemotherapy treatment. The ECD and evaluation of systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate (HR), vascular remodeling parameters were performed prior and 1 month after the treatment and correlated with VRFs.

**Results:** Out of the 52 study patients, 22 (42.51%) were with VRFs: 5 (9.61%) patients had hypertension and diabetes mellitus, 12 (23.07%) had hypertension and smokers. HR (b/min) significantly increased from 79.09±16.82 to 85.71±14.48.29 (p<0.001). IMT (mm) significantly increased from 0.78±0.20 to 0.83±0.18 (p<0.001) in the left carotid artery. ABI (%) significantly decreased from 1.11±0.15 to 1.10±0.10 (p<0.05) on the left side. PVW (m/s) and the arterial age significantly increased (p<0.001) after chemotherapy treatment with slightly worse values in hypertensive and dyslipidemia patients.

**Conclusion:** It is recommended to identify the VRFs, to evaluate the carotid artery with ECD and to calculate the vascular remodeling parameters for patients with ALL before, during and after the chemotherapy treatment. Where it is possible, in order to prevent the occurrence of vascular complications, it is very important the correction of the VRFs for the strategy of adherence to cytostatic treatment.

**Disclosure:** Nothing to disclose

## EPO2078

### Recovery of consciousness in pediatric disorders of consciousness: long-term outcomes and predictors

C. Colomer<sup>1</sup>, E. Noe<sup>1</sup>, R. Llorens<sup>2</sup>, J. Ferri<sup>1</sup>

<sup>1</sup>NEURORHB. Servicio de Neurorehabilitación de Hospitales Vithas, Valencia, Spain, <sup>2</sup>Neurorehabilitation and Brain Research Group, Universitat Politècnica de València, Valencia, Spain

**Background and aims:** 1st, to determine the long-term outcome of a pediatric sample with disorders of consciousness due to a severe acquired brain injury with the Coma Recovery Scale-Revised (CRS-R); and second, to describe the most frequent items of this scale that determine recovery of consciousness.

**Methods:** 21 children from 2 to 16 years old who were admitted to the Neurorehabilitation Unit of Vithas Hospitals participated in the study. Participants had a mean age of 9.4±4.7 years old. 7 of them had suffered a traumatic brain injury and 14 a non-traumatic brain injury. All subjects were included in a personalized multidisciplinary rehabilitation program. Participants were assessed using the CRS-R at admission and weekly during the 1st year after the injury or until recovery of consciousness.

**Results:** At admission, 8 children (42.9%) were in an Unresponsive Wakefulness Syndrome (UWS) state, nine children (38.1%) in a Minimally Conscious State minus (MCS-), and four children (19%) in a Minimally Conscious State plus (MCS+). One participant diagnosed as UWS, and ten participants diagnosed as either MCS+ or MCS- at admission, regained consciousness. The most frequent feature of recovery of consciousness was functional communication, alone (n=5) or associated with functional object use (n=4). Most participants (72.7%) regained consciousness during the 1st 6 months after the injury. Time since injury and initial CRS-R scores were found to be predictors of outcome.

**Conclusion:** Most frequent feature of recovery of consciousness was functional communication. Best predictors of recovery included time since injury and CRS-R score at baseline.

**Disclosure:** This study was funded by Conselleria de Educació, Cultura y Deporte of Generalitat Valenciana of Spain (Project SEJI/2019/017) and Universitat Politècnica de València (Grant PAID-10-18).

**Table 1: Correlation between risk factors, ASPECTS and stroke outcome after 3 months**

Variable	All patients	MRS 0-2 favorable outcomes	MRS 3-6 poor outcomes	P Value
Number	150	95 (63.3%)	55 (33.7%)	0.05
Age (years)	64.0 ±11.5	59.11 ±7.45	68.7 ±6.98	0.001
Male	79 (52.7%)	49 (51.5%)	30(54.5%)	0.725
Hypertension	102 (68%)	54(56.8%)	48(87.3%)	0.005
DM	39 (26%)	23(24.2%)	16(29.1%)	0.511
Smoking	60 (40%)	37(38.9%)	23(41.8%)	0.729
Hyperlipidemia	22 (14.6%)	13(13.7%)	9(16.4%)	0.654
AF	28 (18.6%)	17(17.9%)	11(20%)	0.749
IHD	15 (10%)	10 (10.5%)	5 (9.1%)	0.778
NIHSS on admission	12.9 ± 7	10.97 ± 4.64	18.92 ± 6.32	0.001
ASPECTS	8.23 ± 1.87	8.23 ± 1.87	4.96 ± 2.56	0.001

## EPO2079

**Long-term effects of prenatal stress on synaptic proteins and motor coordination in the rat cerebellum**J. Pascual<sup>1</sup>, M. Valencia<sup>2</sup><sup>1</sup>Valparaíso, Chile, <sup>2</sup>Kinesiology, Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile

**Background and aims:** Prenatal stress and/or in utero exposure to elevated levels of glucocorticoids (GCs) can adversely affect

the cerebellar maturation and motor development in animal models. However, the precise mechanism by which GCs exposure impairs synaptic protein expression is unknown. Therefore, the purpose of this study was to investigate the effect of prenatal exposure to a clinical dose of synthetic GCs on the cerebellar pre- and postsynaptic structural proteins, whose synchronized synaptic activity is crucial for motor coordination.

**Methods:** 8 pregnant rats were randomly classified into 2 experimental groups: control (CON) and betamethasone (BET). Mothers in the BET group were subcutaneously administered 2 injections of BET (0.17mg/kg, separated by an 8h interval at gestational day 20, G20). The CON mothers were given an equal volume (1ml) of saline. Progeny of CON and BET mothers were evaluated for motor coordination and cerebellar content of synaptic proteins synaptophysin (SYN) and postsynaptic density-95 (PSD-95).

**Results:** Rats prenatally treated with BET exhibited underexpression of synaptophysin accompanied by motor coordination impairments. However, the PSD-95 remains unchanged.

**Conclusion:** In conclusion, the current data confirm and extend our previous histological observations that prenatal stress induced by exogenous GCs alters the expression of structural proteins (mainly synaptophysin) associated with mild motor coordination impairments.

**Disclosure:** Nothing to disclose

## EPO2080

**Metabolic ataxia linked to new mutation in L2HGDH gene**A. Potic<sup>1</sup>, E. Salsano<sup>2</sup>, C. Gellera<sup>2</sup>, B. Castellotti<sup>2</sup>, F. Taroni<sup>2</sup><sup>1</sup>Belgrade, Serbia, <sup>2</sup>Milan, Italy

**Background and aims:** L-2-hydroxyglutaric aciduria (L2HGA) is a rare neurometabolic disorder caused by homozygous or compound heterozygous mutations in L2HGDH gene. The resultant abnormal metabolism of L-2-hydroxyglutaric acid leads to the accumulation of L-2-hydroxy-glutarate which has a toxic effect on central nervous system. Clinical presentation varies and may include: psychomotor delay, cerebellar, pyramidal and extrapyramidal signs, macrocrania, seizures. Brain magnetic resonance imaging (MRI) inevitably points to a leukoencephalopathy. We report a novel mutation in L2HGDH gene and the phenotype in this second genetically proven patient with L2HGA from Serbia.

**Methods:** A 6-year-old boy was referred to neurologists with a history of slowly progressive cerebellar ataxia which was firstly observed at 2 years of age. No other complaints existed upon admission. The key investigations undertaken were brain MRI and metabolic screening. Genetic analysis followed afterwards.

**Results:** Apart from the predominant cerebellar signs, neurologic exams detected also mild bilateral pyramidal signs and a minor intellectual disability. Brain MRI showed diffuse supratentorial white matter T2-hyperintensity along with altered signal of nuclei dentati and putamina. Metabolic study showed increased urinary L-2-hydroxyglutaric acid values which led to the diagnosis of L-2-hydroxyglutaric aciduria. Genetic analysis confirmed the diagnosis and revealed that the patient was a compound heterozygote for a known (c.530\_533delinsATT) and a novel (c.404G>A) pathogenic mutation in L2HGDH gene. The patient was put on high-dose riboflavin with a good response.

**Conclusion:** L-2-hydroxyglutaric aciduria should be timely recognised for the proper treatment, genetic counseling, and the possibility of accompanied brain malignancies in this disorder.

**Disclosure:** Nothing to disclose

## EPO2081

**Comparison of comorbidities in adult patients with epilepsy versus general population of Moscow**

F. Rider<sup>1</sup>, Y. Solomatina<sup>1</sup>, A. Hauser<sup>2</sup>, A. Yakovlev<sup>3</sup>, A. Guekht<sup>4</sup>

<sup>1</sup>Moscow Research and Clinical Center for Neuropsychiatry of the Healthcare Department of Moscow, Moscow, Russian Federation, <sup>2</sup>Columbia University, New York, USA, <sup>3</sup>Institute of Higher Nervous Activity and Neurophysiology, Moscow, Russian Federation, <sup>4</sup>Moscow Research and Clinical Center for Neuropsychiatry\Department of Neurology, Neurosurgery and Medical Genetics, Pirogov Russian National Research Medical University, Moscow, Russian Federation

**Background and aims:** The high prevalence of comorbid conditions in people with epilepsy (PWE) is well known. In population based study, we compared prevalence of somatic comorbidities in adult PWE in Moscow to age and gender matched controls.

**Methods:** Case-control study (1:3 match) of 1317 (671 female, 646 male) adult PWE and age- and gender-matched controls seen in the same outpatient clinics and diagnosed with an acute upper respiratory infection (ICD 10J00-J06) in 2018. Data source was from the “Unified medical information analytical system” of Moscow. Frequency of specific comorbid groups was compared between PWE and controls. Pearson’s chi-squared test was used.

**Results:** The mean number of comorbidities was significantly higher in PWE versus controls in most age groups ( $p < 0.05$ ). Cerebrovascular disease was more prevalent in PWE 51 years and older ( $p < 0.05$ ), ulcers and liver diseases – in PWE over 41 years old ( $p < 0.05$ ). Differences in heart disease prevalence, especially the prevalence of arterial hypertension were significant only in limited age groups. Allergies were more common in PWE in most age groups ( $p < 0.05$ ). The prevalence of official disability status was higher in PWE ( $p = 0.0000$ ).

**Conclusion:** The mean number of comorbidities was higher in adult PWE versus controls in Moscow. The prevalence of cerebrovascular disease, allergies, and ulcers and liver diseases, were higher in PWE, especially in older age groups. The higher prevalence of official disability status in PWE could be explained by frequent seizures and comorbidities, but social reasons as well. The high number of comorbidities should be taken into consideration in the management of PWE.

**Disclosure:** Nothing to disclose

## EPO2082

**Arachnoid cyst management in child neurology**

N. Samochernykh<sup>1</sup>, G. Odintsova<sup>2</sup>, K. Samochernykh<sup>1</sup>  
<sup>1</sup>Child neurosurgery, Almazov National Medical Researcher Center, Saint-Petersburg, Russian Federation, <sup>2</sup>Epileptology, Almazov National Medical Researcher Center, Saint-Petersburg, Russian Federation

**Purpose:** To develop the concept of the personalized neurological diagnostics and neurosurgery of the intracranial arachnoid cysts (IAC) in children

**Methods:** Results of diagnostic and treatment of 804 children aged 1-17y.o. were analyzed in 2 groups: with 1gr.-hydrocephaly, 2gr.- intracranial arachnoid cysts. The most part (57.5%) were in the age up to 3 years, the most frequent - till 1 year. The clinic, disease dynamics, outcome of treatment IAC and monitoring of the amplitude-frequency characteristics of liquid pressure fluctuation, the reserved subdural volume, deformations of a brain and ventricles, researches of biomechanical properties, pressure were carried out

**Results:** There were 116 children with IAC in 2gr. Hypertension syndrome (47.4%), focal symptoms of damage of the nervous system (52.5%) and remitting type (86.2%) were typical for children with IAC. The structure and expressiveness of manifestations IAC depended from the volume of local congestion of liquid, craniocerebral disproportion. The main directions of preoperative diagnostics were: the assessment of expressiveness and clinical manifestations, morphometry and biomechanical properties. Unsatisfactory results were caused by permanent resorption frustration in 19.8 %. Informative criteria of an outcome were: the age, anatomic-topographical features, dissociation level, cavities deformation expressiveness and forecast of probable postoperative complications.

**Conclusion:** Priority methods directed to elimination of the prime cause of liquor current violation and deformations of the brain should be used in the management of the intracranial arachnoid cysts in children.

**Disclosure:** Nothing to disclose



## EPO2083

### Evaluation of Parent Support Program on Attention-Deficit/Hyperactivity Disorder Symptoms in Young Children: a randomized controlled trial

N. Sharma<sup>1</sup>, S. Sharma<sup>2</sup>, D. Singh<sup>2</sup>, N. Krishnamurthy<sup>3</sup>  
<sup>1</sup>Aarogyam, Leicester, United Kingdom, <sup>2</sup>NMP Medical Research Institute, Jaipur, India, <sup>3</sup>Balavikasa, Bangalore, India

**Background and aims:** Attention Deficit Hyperactivity Disorder (ADHD) is a chronic condition affecting millions of children worldwide. There has been no cure but with medication and behavioural management, symptoms can be managed with great effect. Previous studies explored the effect of parent training intervention in children aged 5 and 8 years old and found beneficial effects in children and parents.

**Methods:** Present study evaluated parent support program (L.E.A.D) in ADHD-risk children. 75 children aged between 8 to 12 years old were having ADHD symptoms were recruited from community clinic. Parents were enrolled in support groups where they were skilled to manage their children's challenging behaviour. Intervention consisted of 60mins group session followed by parenting one to one support. Children were assessed before and after the 3 months of intervention. Outcome measures were parent ratings of ADHD symptoms, behavior, mood, attitude and understanding toward peers.

**Results:** Post data included seventy parents. AT the end of intervention, parents reported significant decrease in ADHD symptoms:  $p < 0.001$ ; oppositional symptoms:  $p < 0.001$ ; mood symptoms;  $p < 0.01$ . Parents reported better behavior towards peers but that did not reach significance levels.

**Conclusion:** To our knowledge, this is the 1st randomized trial to address parent support intervention for an ADHD-risk sample. This study provides significant evidence on the beneficial effect of parent support program on at-risk ADHD Children.

**Disclosure:** Nothing to disclose

## EPO2084

### Seroprevalence of Tick-Borne Encephalitis Virus in Agricultural Population on Jeju Island, South Korea

J. Shin<sup>1</sup>, J.R. Yoo<sup>2</sup>, S.W. Song<sup>3</sup>, J.-H. Oh<sup>1</sup>

<sup>1</sup>Departement of Neurology, Jeju National University College/School of Medicine, Jeju, Korea, Republic of,

<sup>2</sup>Department of Internal Medicine, Jeju National University College/School of Medicine, Jeju, Korea, Republic of,

<sup>3</sup>Department of Emergency Medicine, Jeju National University College/School of Medicine, Jeju, Korea, Republic of

**Background and aims:** Tick-borne encephalitis virus (TBEV), which is endemic in Europe and Northeast Asia, causes tick-borne encephalitis (TBE). Although there are some reports for TBE from China and Japan, it has not yet been reported in South Korea. We investigated seroprevalence of TBEV among the agricultural population on Jeju Island, South Korea, where tick-borne disease is common.

**Methods:** A Serosurvey was conducted for the agricultural population living in rural areas between January 2015 and December 2018. 10 rural villages were chosen based on the type of farming practiced and the distance from urban areas. Of the 500 participants, 423 agreed to participate in the research, 321 of which were enrolled in the study. Serum samples were tested for TBEV IgM and IgG using a enzyme-linked immunosorbent assay.

**Results:** Of the 313 participants, 4 (1.3%) were positive for anti-TBEV IgG, while 2 (0.63%) were positive for anti-TBEV IgM. None of the seropositive participants reported having typical manifestations of TBE or a history of travel to a TBEV-endemic area, within the 3 years before sample collection. Neither of the IgM positive participants had fever in the 2 weeks preceding serum sampling. There was no particular pattern in residential areas of seropositive participants.

**Conclusion:** This is the 1st study of TBEV infection in South Korea. Even though the seroprevalence in the study population was lower than that reported in countries in Far-East Asia, the results confirm the possibility of TBE among people in South Korea who have contact with ticks.

**Disclosure:** Nothing to disclose

## EPO2085

**Early parent-child interaction and child temperament features as predictors of self-direction skills formation at the age of 24 months**

V. Shirokov<sup>1</sup>, M. Lavrova<sup>2</sup>, A. Borbunov<sup>3</sup>,  
E. Suleymanova<sup>4</sup>, O. Lvova<sup>5</sup>

<sup>1</sup>Medical Research Center for Prophylaxis and Health Protection in Industrial Workers, Yekaterinburg, Russian Federation, <sup>2</sup>Ural Federal University, Yekaterinburg, Russian Federation, <sup>3</sup>N.N. Krasovskii Institute of Mathematics and Mechanics of the Ural Branch of the Russian Academy of Sciences, Yekaterinburg, Russian Federation, <sup>4</sup>Laboratory of Brain and Neurocognitive Development, Ural Federal University, Yekaterinburg, Russian Federation, <sup>5</sup>Laboratory of Neurotechnology, Ural Federal University, Yekaterinburg, Russian Federation

**Background and aims:** The system of regulation of activity is a temporary functional structure providing selective, coordinated and purposeful flow of sensory-perceptual, intellectual, mnemonic, motor, and speech processes to achieve arbitrarily selected individual specific tasks. The research aim was to assess the degree of influence of temperament and features of early parent-child interaction on the regulatory functions in children at the 24-month stage.

**Methods:** 13 dyads of healthy, typically developed full-term infants (6 boys) were assessed at 5, 10, 14, 24 months age - longitudinal study design. Adaptive Behavior Scale (from Bayley-III, certified specialist) was used for self-direction skills assessment. The Revised Infants Behavior Questionnaire (IBQ-r) was filled by parents for evaluate the child temperament. Parent-child interaction Scale (PCI) was evaluated through video analysis (certified specialists).

All parents signed informed consent form. One-tailed Pearson correlation was measured (SPSS Statistics).

**Results:** Self-direction (the Bayley-III) in children at 24 months age didn't significantly correlate with either 5-month age super-factor on IBQ-r or parent features of interaction (PCI). There was significant correlation with parent Indirectivity (PCI) at the 10-month age ( $r_{xy}=0.45$ ;  $p=0.05$ ) and significant negative correlation with super-factor on IBQ-r "Negative emotionality" at the 14-month babies ( $r_{xy}=-0.5$ ;  $p=0.04$ ).

**Conclusion:** Self-regulation is a systematic integrative skill which includes cognitive (speed of information processing, goal setting, working memory, executive control, switching) and emotional (self-checking) components, which develops from birth and hard to be but must be assessed through the early stage of life with the help of complex approach.

**Disclosure:** The research was supported by the grant of the Russian Science Foundation 20-18-00343

## EPO2086

**Rare neurological diseases in a tertiary referral center in northern Greece**

S. Kitmeridou, N. Smyrni, K. Migkos, S. Kallivoulos, S.-A. Syntila, T. Stardeli, M. Karatzikou, P. Fotiadis, M. Dimitriou, A.-N. Terzakis, M. Kaouna, V. Giantzi, T. Afrantou, D. Parisi, T. Karapanagiotidis, P. Ioannidis, N. Grigoriadis

2nd Department of Neurology, AHEPA University Hospital, Aristotle University of Thessaloniki, Thessaloniki, Greece

**Background and aims:** Rare diseases affect a small number of people compared to the general population and can manifest symptoms in multiple organs, including the central and peripheral nervous system. In Europe, a disease is considered to be rare when it affects 1 person per 2000. The aim of this study is to present the 5 year experience acquired in the neurological department of a tertiary referral hospital in northern Greece.

**Methods:** Data from consecutive patients hospitalized in the 2nd Neurology Department of AHEPA University Hospital from January 2015 to December 2019 were assessed in order to study demographic features of patients with rare neurological diseases in northern Greece.

**Results:** From the total of 7842 admissions in the 2nd Neurology Department of AHEPA University Hospital during the study period (2015-2019), 263 patients were diagnosed with a rare neurological disease, with a ratio of almost 1:1 between male and female patients (m:133/f:130). 35/263 (13.3%) were diagnosed with Neuromuscular diseases, 13/263 (4.9%) were diagnosed with Cerebrovascular diseases, 3/263 (1.2%) were diagnosed with Metabolic disorders, 28/263 (10.7%) were diagnosed with Neuroimmune diseases, 4/263 (1.5%) were diagnosed with Neurocutaneous diseases, 166/263 (63.1%) were diagnosed with Neurodegenerative diseases and 14/263 (5.3%) were diagnosed with other rare clinical entities, including several congenital syndromes.

**Conclusion:** Rare diseases represent a global public health problem due to multiple hospitalizations during a long diagnostic journey and little chance of specific treatment options. We suggest that rare disease registries could play a crucial role towards the early diagnosis and appropriate management of these clinical entities.

**Disclosure:** Nothing to disclose

## EPO2087

**The prevalence of psychiatric symptoms before the diagnosis of Parkinson's disease**

S. Szatmári<sup>1</sup>, F. Oberfrank<sup>2</sup>, A. Takáts<sup>1</sup>, A. Ajtay<sup>3</sup>,  
D. Bereczki<sup>1</sup>

<sup>1</sup>Neurology, Semmelweis University, Budapest, Hungary,

<sup>2</sup>Institute of Experimental Medicine, Hungarian Academy of Sciences, Budapest, Hungary, <sup>3</sup>Department of Neurology, Semmelweis University, Budapest, Hungary

**Background and aims:** Psychiatric symptoms (PS) can be non-motor features in Parkinson's disease (PD). Our objective was to explore retrospectively the prevalence of PS before the first diagnosis of PD.

**Methods:** In the framework of the Hungarian Brain Research Program we created a database from medical and medication reports submitted for reimbursement purposes to the National Health Insurance Fund in Hungary, a country with 10 million inhabitants and a single payer health insurance system. We used record linkage to evaluate the prevalence of PS before the diagnosis of PD and compared that with patients with ischemic cerebrovascular lesion (ICL) in the period between 2004-2016 using ICD-10 codes of G20 for PD, I63-64 for ICL and F00-F99 for PS. We included only those PD patients who got their G20 diagnosis in at least 2 different calendar years.

**Results:** There were 75,723 patients with PD and 783,843 patients with ICL. Of the PD patients 36.6% whereas of those with ICL 29.7% had a psychiatric diagnosis before the first appearance of PD or ICL ( $p < 0.001$ ). The higher rate of PS in PD compared to ICL remained significant after controlling for age and gender in logistic regression analysis. The difference between PD and ICL was significant for Mood disorders (F30-F39), Organic, including symptomatic, mental disorders (F00-F09), Neurotic, stress-related and somatoform disorders (F40-F48) and Schizophrenia, schizotypal and delusional disorders (F20-F29) diagnosis categories.

**Conclusion:** The higher rate of psychiatric morbidity in the premotor phase of PD may reflect neurotransmitter changes in the early phase of PD.

**Disclosure:** Nothing to disclose

## Clinical neurophysiology

## EPO2088

**Estimation Of Attention Deficit And Hyperactivity Disorder (ADHD) With Artificial Neural Networks Using EEG Signals**

M. Başaran<sup>1</sup>, M. Tosun<sup>1</sup>, S. Canbaz Kabay<sup>2</sup>, G. Akdag<sup>2</sup>  
<sup>1</sup>Electrical Electronics Engineering, Kutahya Dumlupınar University, Faculty of Simav Technology, Kütahya, Turkey,  
<sup>2</sup>Neurology, Kutahya University of Health Sciences Faculty of Medicine, Kütahya, Turkey

**Background and aims:** Attention deficit and hyperactivity disorder (ADHD) is one of the most common diseases in the world. Several studies have been conducted on the use of electroencephalogram (EEG) signals in the diagnosis of this disease. Although a certain classification success has been achieved with the different methods applied in these studies, new studies are needed to achieve higher classification success.

**Methods:** In this study, retrospective records of 9 individuals diagnosed with ADHD and 10 healthy individuals were used. 4 of the patients with ADHD were female and 5 were male. 6 of the healthy individuals were female and 4 were male. EEG signals were recorded from individuals at 500Hz sampling frequency with 16 channel EEG device according to 17 different recording conditions. EEG data from 16 channels were divided into 5 and 10 second sections.

**Results:** Power spectral density (PSD) values of 1-49Hz frequencies were calculated by applying Welch method to the average EEG segments. These calculated features were applied to the Feed Forward Back Propagated Artificial Neural Network (FFBPNN) and Self Organizing Maps (SOM) network.

**Conclusion:** The accuracy and classification success of the classifiers were analyzed. According to the results of the analysis, the success rate of SOM network was calculated as 70% and the success rate of FFBPNN model was 89%. Accuracy from the FFBPNN model can support specialists in the diagnosis of ADHD disease.

**Disclosure:** Nothing to disclose

## EPO2089

**The relay race of the brain: characteristics of changing electroencephalographic peak alpha frequency in normal infants**

D. Chegodaev<sup>1</sup>, M. Forghani<sup>2</sup>, P. Pavlova<sup>1</sup>, O. Lvova<sup>3</sup>, T. Balueva<sup>4</sup>

<sup>1</sup>Laboratory of Brain and Neurocognitive Development, Ural Federal University, Yekaterinburg, Russian Federation,  
<sup>2</sup>Laboratory of Combinatorial Algebra, Ural Federal University, Yekaterinburg, Russian Federation,  
<sup>3</sup>Laboratory of Neurotechnology, Ural Federal University, Yekaterinburg, Russian Federation,  
<sup>4</sup>Neurological Department, City Clinical Hospital 23, Yekaterinburg, Russian Federation

**Background and aims:** Alpha peak frequency is defined as the maximum power value in the EEG alpha/mu frequency spectrum (5-9Hz in infants). It has been previously reported that alpha peak frequency is characterized by significant interindividual differences and shift with age. Several studies identified mu (5-9Hz) peaks frequency during the first year of life: 5.4±0.8Hz at 6 months (Nyström P. et al., 2008), 7.03±0.47Hz at 8 months and 7.42±0.46Hz at 11 months (Stroganova T.A. et al., 1999); 7.5Hz at 12 months (Thorpe S.J. et al., 2016).

This study is attempt to confirm hypothesis that alpha peaks are not disappear with age, but become less prominent (subdominant). Moreover, apparently, alpha peaks are pre-existing (i.e. can be identified before become maximal).

**Methods:** Cross-sectional study. The EEG was recorded with a 128-channel EGI system referenced to vertex in 2 groups: 16 normal infants (mean chronological age (ma)=5.7±0.17 months), 15 other normal infants (ma=10.67±0.33 months). Power spectral density was estimated over the sensorimotor area (electrodes: 35, 41, 36, 30, 37, 7, 31, 55, 106, 80, 105, 87, 104, 103, 110) for each recording by Welch's method (Hanning window, size – 8s, overlap 50%) in 10-second fragment of resting EEG.

**Results:** The identified maximal peaks in younger age group had a mean frequency of 5.6±0.44Hz and 7.3±0.55Hz in the elder group. Subdominant peaks were identified at 7.43±0.23Hz at 5 months, 5.5±0.21Hz at 10 months.

**Conclusion:** To a first approximation, the achieved results have demonstrated validity of hypotheses mentioned above.

**Disclosure:** The reported study was funded by RFBR, project number 18-313-00180

## EPO2090

**Hippocampal sclerosis is not always accompanied by generation of epileptiform activity**

S. Cherenkova<sup>1</sup>, A. Aleksandrov<sup>2</sup>, M. Pavlovskaya<sup>1</sup>, M. Aleksandrov<sup>1</sup>

<sup>1</sup>*Clinical Neurophysiology and Epileptology, Almazov National Medical Research Centre, Saint-Petersburg, Russian Federation*, <sup>2</sup>*Clinical Neurophysiology and Epileptology, First Pavlov State Medical University of St. Petersburg, Saint-Petersburg, Russian Federation*

**Background:** The surgery of structural pharmacoresistant epilepsy is aimed at removing the epileptogenic zone, however, currently there are no methods to determine its reliable localization. There is not always a concordance between all diagnostic methods, in particular, when there are structural changes in hippocampus. Therefore, it is important to determine the epileptogenic zone regardless of etiological factor.

**Aim:** Determine the concordance of epileptiform activity according to electro subcorticography (ESubCoG), and signs of hippocampal sclerosis according to MRI.

**Methods:** 28 patients with structural pharmacoresistant temporal lobe epilepsy were examined. The age of the patients was from 20 to 50 years (mean 35±15). The disease duration ranged from 4 to 38 years (mean 21±17). The standardised examination algorithm included clinical analysis of seizure pattern; intraoperative neurophysiological monitoring, brain MRI according to the epileptological protocol. Various tactics of surgical intervention were used.

**Results:** The patients were divided into 4 groups, according to ESubCoG and MRI results. 1) Patients with both hippocampal sclerosis and epileptiform activity in mesiobasal structures. 2) Patients with hippocampal sclerosis and without epileptiform activity. 3) Patients without MR-signs of hippocampal sclerosis and with epileptiform activity. 4) Patients without both structural changes in hippocampus and epileptiform activity. This retrospective study revealed no correlation between structural changes in hippocampus and epileptiform activity according to electro subcorticography (Chi square=0.016).

**Conclusion:** The hippocampal sclerosis is not always associated with generation of epileptiform activity.

**Disclosure:** Nothing to disclose

## EPO2091

**Electrophysiological characteristics and anatomical differentiation of epileptic and non-epileptic myoclonus.**

M. Abu-Hegazy, A. Elmongui, A. Esmael

*Department of Neurology, Faculty of Medicine, Mansoura University, Egypt, Mansoura, Egypt*

**Background and aims:** This study was conducted on a series of patients with myoclonus to identify the electrophysiological characteristics and the anatomical classification of myoclonus of different causes.

**Methods:** The current study included 50 patients with different types of myoclonus in comparison to 30 control subjects. Electrophysiological study was done for all patients by Somatosensory Evoked Potential (SSEP) and Electroencephalography (EEG) while the control group underwent SSEP. SSEP was studied in the patients and control group by stimulation of right and left median nerves

**Results:** This study included 50 patients with myoclonus of different etiologies with average age 39.30±15.73 and consisted of 23 male and 27 female patients. 29 (58%) of the patients were epileptics, while 21 (42%) were non-epileptics. Patients were classified anatomically into 31 patients with cortical myoclonus (62%), 8 patients with subcortical myoclonus (16%) and 11 patients with cortical-subcortical myoclonus (22%). There were significant statistical differences regarding P24 amplitude, N33 amplitude, P24-N33 peak to peak complex amplitude, with no significant difference in N20 amplitude, N20, P24, N33 latencies regarding all types of myoclonus. PME showed marked giant response, JME showed no enhancement in comparison to controls, secondary myoclonus showed giant response but of less values than PME in comparison to controls.

**Conclusion:** We concluded that myoclonus is a symptom of different origins. Electrophysiological testing is an important tool in the diagnosis and anatomical classification of myoclonus may help in decision-making regarding therapeutic management.

**Disclosure:** Nothing to disclose

## EPO2092

### An examination of EEG findings and associated demographic, radiological, and clinical variables among patients following a first clinical seizure

M. Khalil<sup>1</sup>, B. McNamara<sup>2</sup>

<sup>1</sup>National Research Centre, Cairo, Egypt, <sup>2</sup>Cork, Ireland

**Background:** Epilepsy has a national prevalence rate of 10 per 1,000 people In Ireland, EEG is an essential tool used to diagnose seizure activity.

**Aim:** To examine the outcomes of EEG analyses following the 1st clinical seizure and the effects of time to the study, together with clinical, demographic and radiological variables.

**Methods:** This study examined EEG outcomes among 51 patients presenting to the neurophysiology department at Cork University Hospital following a 1st clinical seizure between January and May 2019 and investigated the effect of time-to follow-up and other demographic, clinical and radiological variables on the presence or absence of abnormal EEG findings in these patients.

**Results:** 29.4% of these patients were found to have an abnormal study. There was a mean of 7.45 days from seizure onset to EEG analysis. 55% of patients who underwent EEG recordings within 36 hours of seizure onset were found to have an abnormal EEG versus 13% of those who had their EEG between 4 and 10 days of seizure onset and 12.5% of those whose EEG was completed over 10 days later. This relationship between time to EEG completion and outcome was statistically significant ( $p=0.006$ ). Females were also significantly more likely than males to have an abnormal EEG ( $p=0.03$ ;  $p=0.033$ ) at univariate and multivariate analysis.

**Conclusion:** This data suggests that early EEG recording following a 1st seizure may significantly improve its diagnostic yield, enables early intervention and reduces the risk of seizure recurrence.

**Disclosure:** Nothing to disclose

## EPO2093

### Carpal tunnel syndrome (CTS) symptoms correlate with strength duration time constant (SDTC)

P. Kokotis<sup>1</sup>, R. Carr<sup>2</sup>, M. Schmelz<sup>2</sup>, A. Bougea<sup>1</sup>, T. Zambelis<sup>1</sup>, N. Karandreas<sup>1</sup>

<sup>1</sup>Neurology, Eginition University Hospital, Athens, Greece, <sup>2</sup>Department of Experimental Pain Research, University of Heidelberg, Mannheim, Germany

**Background and aims:** CTS is the most common entrapment neuropathy of the upper extremities, causing pain, paresthesia, numbness, and weakness in the territory corresponding to the median nerve. Although nerve conduction studies have been proposed for the diagnosis, the electrodiagnostic severity of CTS may not be associated with its clinical severity. The Boston Carpal Tunnel Questionnaire (BCTQ) is an easy, brief self-administered tool for assessing symptom severity and functional status in CTS and recently Greek version has been validated. The aim of our study was to correlate BCTQ with electrodiagnostic measurements including nerve axonal excitability.

**Methods:** BCTQ was administered to 29 consecutive patients referred to our laboratory with symptoms consistent with CTS. All the patients and 19 age matched control subjects underwent motor conduction study and excitability measurements using QTRAC software

**Results:** Only SDTC, a property of the nodal membrane which increases with demyelination, was found to be strongly correlated with the BCTQ score whereas the latency and amplitude of compound muscle action potential (CMAP) were not. The amplitude of CMAP correlated only with the functional status scale of BCTQ.

**Conclusion:** The measurement of SDTC may shed light on axonal properties in CTS patients and could constitute a useful, relatively simple technique in clinical practice.

**Disclosure:** Nothing to disclose

## EPO2094

### Emotional and personality characteristics of patients in the late recovery period of ischemic stroke

E. Kuznetsova, E. Salina  
Saratov, Russian Federation

**Background and aims:** The aim of the research work was to study the emotional and personal characteristics of patients with ischemic stroke.

**Methods:** The work was based on the analysis of the results of examination of 120 working patients with ischemic stroke in the middle cerebral artery. The psychological study included the following tests: subjective asthenia rating scale (MFI-20); Toronto Alexithymic Scale (TAS -26).

**Results:** The dominant types of asthenia (in decreasing order) are physical asthenia, decreased activity, general asthenia, decreased motivation, mental asthenia. It was found that all the examined patients had alexithymic features. It is noteworthy that in patients with speech impairment, the TAS score is significantly higher than in patients with pyramidal symptoms  $-80.3 \pm 4.0$  (severe alexithymia) and  $68.25 \pm 7.13$  points (borderline level), respectively. Moreover, in men with speech disorders, this indicator is  $81.8 \pm 1.92$  points (pronounced alexithymia), while in women it is  $65.5 \pm 6.4$  points (borderline level). A direct strong correlation was also found between the level of anxiety, depression and the level of alexithymia ( $r=1.0$ ).

**Conclusion:** For cerebral infarction of both left- and right-hemisphere localization, the occurrence of not only focal neurological, emotional-volitional disorders, but also an increase in the level of alexithymia, which in turn depends on neurological deficit, is characteristic (higher in patients with speech disorders) and the patient's gender (higher in men). The presence of severe alexithymia in patients with cerebral infarction leads to impaired adequate self-assessment of the physical and mental state, which may complicate the rehabilitation of these patients.

**Disclosure:** Nothing to disclose

## EPO2095

### Electrophysiological correlates of pyramidal signs and clinical motor status: a "real world" TMS study

G. Lanza<sup>1</sup>, V. Puglisi<sup>2</sup>, L. Vinciguerra<sup>2</sup>, F. Fiscaro<sup>3</sup>, C. Vagli<sup>4</sup>, M. Cantone<sup>5</sup>, G. Pennisi<sup>1</sup>, R. Bella<sup>4</sup>, M. Pennisi<sup>3</sup>

<sup>1</sup>Department of Surgery and Medical-Surgical Specialties, University of Catania, Catania, Italy, <sup>2</sup>Department of Neurology, Azienda Socio-Sanitaria Territoriale, Cremona, Italy, <sup>3</sup>Department of Biomedical and Biotechnological Sciences, University of Catania, Catania, Italy, <sup>4</sup>Department of Surgical Sciences and Advanced Technologies, University of Catania, Catania, Italy, <sup>5</sup>Department of Neurology, Sant'Elia Hospital, Caltanissetta, Italy

**Background and aims:** Few non-recent evidences on the transcranial magnetic stimulation (TMS) correlates of pyramidal signs and clinical motor status were reported. We assessed motor evoked potentials (MEPs) in patients with pyramidal signs and motor deficit compared to those with pyramidal signs without clinical weakness.

**Methods:** 43 patients with cervical spondylotic myelopathy were dichotomized in 21 with pyramidal signs and mild motor deficit (Group 1) and 22 with pyramidal signs and normal strength (Group 2), both compared with 33 healthy controls (Group 0). MEPs were recorded through a circular coil on the "hot spot" of the 1st Dorsal Interosseous and Tibialis Anterior (TA) muscle, bilaterally. Central motor conduction time (CMCT) was estimated as the difference between MEP cortical latency and peripheral motor latency by magnetic stimulation. Peak-to-peak MEP amplitude and right-to-left differences were also measured.

**Results:** The 3 groups were matched for age, sex, and height. MEP latency at 4 limbs and CMCT at lower limbs were significantly prolonged in Group 1 with respect to the other 2. Compared to the same groups, MEP amplitude from TA bilaterally was significantly decreased in Group 1 (Table 1 and 2). Unlike motor deficit, pyramidal signs were not significantly and independently associated with any TMS measure, also when age, sex, and height were considered as confounding factors (Table 3).

Table 1. Demographic features and TMS variables of the three groups.

Variable, unit	Group 0 (n = 33)	Group 1 (n = 21)	Group 2 (n = 22)	p value	Post hoc analysis Difference	p value
Age, years	54.00 (32.50)	57.00 (14.00)	49.50 (21.80)	0.250*	NS	NS
Sex, male (%)	18.00 (54.50)	14.00 (66.70)	8.00 (36.40)	0.130†	NS	NS
female (%)	15.00 (45.50)	7.00 (33.30)	14.00 (63.60)			
Height, cm	163.00 (7.80)	165.00 (10.50)	163.00 (7.80)	0.260*	NS	NS
Right FDI Amplitude, mV	7.80 (4.10)	7.80 (6.80)	7.75 (5.90)	0.860*	NS	NS
Right FDI Latency, ms	20.10 (1.90)	21.20 (2.60)	18.75 (2.60)	<b>&lt;0.001*</b>	2 vs 1	<b>0.001</b>
Right FDI CMCT, ms	6.40 (1.80)	6.70 (3.10)	5.90 (1.80)	0.180*	0 vs 1	<b>0.024</b>
Left FDI Amplitude, mV	7.50 (3.80)	6.80 (5.10)	8.25 (4.70)	0.170*	NS	NS
Left FDI Latency, ms	19.80 (1.70)	21.60 (2.10)	18.50 (1.70)	<b>0.010*</b>	2 vs 1	<b>&lt;0.001</b>
Left FDI CMCT, ms	6.20 (0.90)	6.80 (2.80)	6.05 (1.20)	0.390*	NS	NS
Right TA Amplitude, mV	5.20 (3.40)	3.00 (2.60)	5.15 (3.30)	<b>0.004*</b>	1 vs 2	<b>0.029</b>
Right TA Latency, ms	27.20 (2.70)	34.50 (13.60)	25.65 (3.00)	<b>&lt;0.001*</b>	1 vs 0	<b>0.004</b>
Right TA CMCT, ms	14.40 (2.00)	20.50 (10.20)	13.95 (3.20)	<b>&lt;0.001*</b>	2 vs 1	<b>&lt;0.001</b>
Left TA Amplitude, mV	4.60 (2.70)	2.90 (3.20)	5.00 (3.60)	<b>0.005*</b>	1 vs 2	<b>0.023</b>
Left TA Latency, ms	27.40 (3.40)	34.00 (13.00)	25.45 (2.40)	<b>&lt;0.001*</b>	1 vs 0	<b>0.006</b>
Left TA CMCT, ms	14.00 (2.50)	20.70 (12.60)	13.70 (2.60)	<b>&lt;0.001*</b>	2 vs 1	<b>&lt;0.001</b>

Legend: values are expressed as median and interquartile range; n = number of subjects; FDI = First Dorsal Interosseous muscle; TA = Tibialis Anterior muscle; CMCT = central motor conduction time; NS = not significant; \* = Kruskal-Wallis test; † = Chi-Square test; numbers in bold = statistically significant p values.

Table 1

**Table 2.** Intra-group analysis of TMS variables (right vs. left) of the three groups (Mann-Whitney test).

Variable, unit	Group 0 (n = 33), p	Group 1 (n = 21), p	Group 2 (n = 22), p
FDI Amplitude, mV	0.91	0.20	0.75
FDI Latency, ms	0.67	0.73	0.78
FDI CMCT, ms	0.39	0.96	0.95
TA Amplitude, mV	0.56	0.75	0.83
TA Latency, ms	0.95	1.00	0.69
TA CMCT, ms	0.81	0.74	0.73

Legend: n = number of subjects; FDI = First Dorsal Interosseous muscle; TA = Tibialis Anterior muscle; CMCT = central motor conduction time.

Table 2

**Table 3.** Predictors of TMS parameters: (A) Linear regression analysis; (B) Multiple linear regression analysis.

(A) Dependent variable	Predictor	Std beta	p	Adjusted R2
Right FDI MEP Amplitude	Pyramidal signs	-0.04	0.770	0.02
	Motor deficit	-0.05	0.690	
Right FDI MEP Latency	Pyramidal signs	-0.18	0.130	0.21
	Motor deficit	0.56	<0.001	
Right FDI CMCT	Pyramidal signs	-0.07	0.550	0.10
	Motor deficit	0.39	0.003	
Left FDI MEP Amplitude	Pyramidal signs	-0.06	0.630	0.32
	Motor deficit	-0.19	0.146	
Left FDI MEP Latency	Pyramidal signs	-0.16	0.199	0.18
	Motor deficit	0.51	<0.001	
Left FDI CMCT	Pyramidal signs	0.56	0.741	0.10
	Motor deficit	0.62	0.005	
Right TA MEP Amplitude	Pyramidal signs	-0.06	0.610	0.10
	Motor deficit	-0.32	0.015	
Right TA MEP Latency	Pyramidal signs	-0.06	0.530	0.37
	Motor deficit	0.65	<0.001	
Right TA CMCT	Pyramidal signs	0.02	0.850	0.30
	Motor deficit	0.58	<0.001	
Left TA MEP Amplitude	Pyramidal signs	0.35	0.790	0.09
	Motor deficit	-0.38	0.006	
Left TA MEP Latency	Pyramidal signs	-0.04	0.670	0.34
	Motor deficit	0.63	<0.001	
Left TA CMCT	Pyramidal signs	0.006	0.959	0.30
	Motor deficit	0.56	<0.001	

(B) Dependent variable	Predictor	Std beta	p	Adjusted R2
Right FDI MEP Amplitude	Age	-0.26	0.040	0.07
Right FDI MEP Latency	Motor deficit	0.50	<0.001	0.22
Right FDI CMCT	Motor deficit	0.41	0.003	0.07
Left FDI MEP Amplitude	Motor deficit	-0.23	0.090	0.10
	Age	-0.23	0.050	
Left FDI MEP Latency	Motor deficit	0.43	0.001	0.21
Left FDI CMCT	Motor deficit	0.40	0.004	0.08
Right TA MEP Amplitude	Sex	-0.32	0.017	0.18
	Motor deficit	-0.37	0.005	
Right TA MEP Latency	Motor deficit	0.66	<0.001	0.39
	Sex	0.23	0.042	
Right TA CMCT	Motor deficit	0.61	<0.001	0.31
Left TA MEP Amplitude	Motor deficit	-0.38	0.006	0.12
Left TA MEP Latency	Motor deficit	0.63	<0.001	0.36
Left TA CMCT	Motor deficit	0.58	<0.001	0.30

Legend: FDI = First Dorsal Interosseous muscle; TA = Tibialis Anterior muscle; MEP = motor evoked potential; CMCT = central motor conduction time; numbers in bold = statistically significant p values.

Table 3

**Conclusion:** in a “real world” clinical environment, routine MEPs represent an accurate diagnostic test in cervical spondylotic myelopathy patients with even mild motor deficit, whereas clinically isolated pyramidal signs may not be associated, at this stage, with gross TMS changes.  
**Disclosure:** Nothing to disclose

## EPO2097

### Connectivity features of the epileptic systems for multi-focal pharmaco-resistant epilepsy

Y. Marchenko, M. Aleksandrov

Clinical neurophysiology, RNSI named after Prof. A. L. Polenov branch of Almazov National Medical Research Centre, Saint-Petersburg, Russian Federation

**Background and aims:** connectivity features of the epileptic systems for multi-focal pharmaco-resistant epilepsy in surgical treatment

**Methods:** Analysis of the results of examinations and surgical treatments of 117 patients between 2015 and 2018. All patients underwent video-EEG monitoring to determine the epileptogenic zone. 2 or more synchronous and asynchronous foci of epileptiform activity were recorded in 39 patients, in 2 cases with a clinically pharmaco-resistant form of epilepsy, but no reliable data on epileptiform activity was received. For the localization of the epileptogenic zone it was decided to carry out a 2-stage surgical treatment.

**Results:** 5 patients were diagnosed with multi-focal epilepsy. 5 other patients had recorded activity generation in the deep structures of the temporal lobe, as a result of which a decision was made regarding the stereotactic destruction of the amygdalo-hippocampal complex. The remaining patients underwent surgical treatment with resection of the epileptogenic zone. The outcomes of surgical treatment 2 years after surgery: out of the 5 patients who underwent stereotactic destruction of the amygdalo-hippocampal complex in 2 cases diagnosed En (Engel) 1. Out of the 31 patients En 1 and En 2 were diagnosed in 12 patients, 3 patients had no data stated, 1 patient died, 2 patients cannot provide reliable information about availability of seizures, in 13 patients - En 3 and En 4.

**Conclusion:** With surgical treatment of pharmaco-resistant epilepsy in the presence of several foci of epileptiform activity, the removal of the leading foci does not always lead to the elimination of seizures.

**Disclosure:** Nothing to disclose



## EPO2098

### Correlation of pattern reversal and flash visual evoked potentials with optical coherence tomography in patients with optic neuropathy and patients with multiple sclerosis without optic neuropathy.

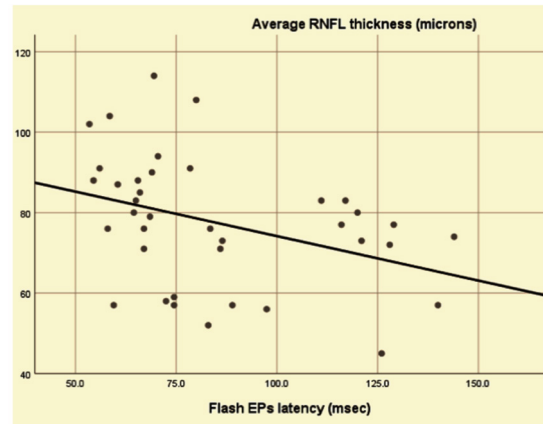
H. Moussa<sup>1</sup>, R. Sawaya<sup>2</sup>, N. El Ayoubi<sup>2</sup>

<sup>1</sup>Neurology, American University Medical Center, Beirut, Lebanon, <sup>2</sup>Beirut, Lebanon

**Background and aims:** This study aims at correlating the physiological and structural variables between the visual evoked potential latencies and retinal layer thickness in eyes with optic neuropathy and multiple sclerosis.

**Methods:** We studied the pattern reversal VEP (PRVEP), flash VEP (fVEP), and optical coherence tomography (OCT) in 42 eyes with optic neuropathy (ON), 28 eyes of patients with multiple sclerosis without ON (MS-nonON), and 34 normal eyes. We correlated the P100 latency of PRVEP, P1 of fVEP, and the peripapillary nerve fiber layer thickness (pRNFL) and ganglion cell inner plexiform layer thickness (GCIPL) of OCT in all subjects.

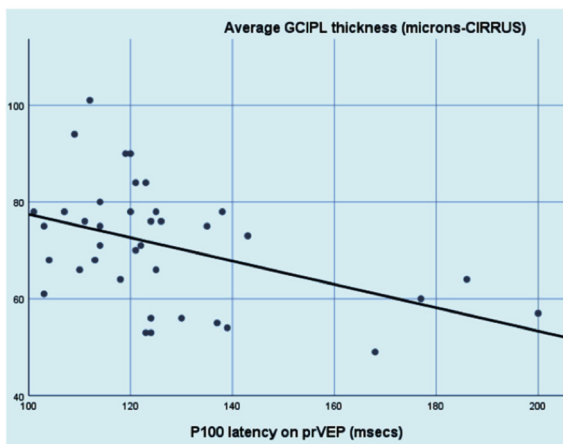
**Results:** The mean P100 PRVEP latency is delayed in patients with ON compared to controls and patients with MS-nonON ( $p < 0.0001$ ). The mean fVEP latency is delayed in patients with ON compared to controls ( $p < 0.0001$ ), but not compared to patients with MS-nonON ( $p = 0.998$ ). The mean pRNFL and mean GCIPL thickness are thinner in patients with ON compared to controls and patients with MS-nonON ( $p = 0.036$  and  $p = 0.001$ ). fVEP correlated negatively with pRNFL thickness ( $p = 0.023$ ), but not with GCIPL thickness in ON. Conversely, PRVEP didn't correlate with pRNFL thickness, but correlated negatively with GCIPL thickness in ON ( $p = 0.006$ ). fVEP and PRVEP did not correlate with pRNFL or GCIPL in MS-nonON or controls.



Correlation of RNFL thickness with flash VEP latencies in optic neuropathy

**Conclusion:** In eyes with ON, VEPs are delayed and OCT measures are decreased in comparison to MS-nonON eyes. fVEP correlated with pRNFL thinning, while PRVEP correlated with GCIPL thinning. Thus, delayed PRVEP indicates pathology in the ganglion cell layer while delayed fVEP reflects pathology in the retinal fiber layer.

**Disclosure:** Nothing to disclose



Correlation of GCIPL thickness with PRVEP latencies in optic neuropathy.

## EPO2099

### Median SEP in acute internal carotid occlusion as predictor of clinical outcome after surgical recanalization.

S. Ostrý<sup>1</sup>, M. Nevsímalova<sup>1</sup>, M. Reiser<sup>1</sup>, M. Nevšímal<sup>2</sup>, J. Fiedler<sup>2</sup>

<sup>1</sup>Dept. of Neurology, Hospital České Budějovice, a.s., České Budějovice, Czech Republic, <sup>2</sup>Dept. of Neurosurgery, Hospital České Budějovice, a.s., České Budějovice, Czech Republic

**Background and aims:** Emergent internal carotid artery (ICA) desobiteration is a feasible procedure, after unsuccessful endovascular treatment (EVT) after acute ischaemic stroke (AIS).

We aimed to evaluate the direct neuronal activity of rolandic cortex as a predictor of clinical outcome.

**Methods:** Prospective enrollment from 05/2013 to 8/2019. Including criteria: AIS<24 hours from onset, extracranial ICA occlusion not feasible for EVT. Excluding: any contraindication to surgical treatment, pre-stroke disability (mRS>2). Median somatosensory evoked potentials (SEP) were obtained bilaterally before surgery. Absolute N20/P25 amplitude (SEP-amp) and side-to-side ratio (SEP-ratio) were evaluated. Abnormal cutoff values for SEP-amp and SEP-ratio were <0.8uV and <0.5 respectively. Clinical performance mRS was evaluated 3 months after stroke.

**Results:** Cohort consisted of 27 patients (25 males (92.6%)) aged from 52 to 88 years, mean 71.3±8.3, median NIHSS 5, interquartile range (4-14). After 3 months functionally independent (mRS 0-2) were 23 (85.2%), remaining 4 were mRS 5-6. Abnormal SEP-amp and SEP ratio were in 5 (18.5%) and 4 (14.8%) cases respectively. Abnormal SEP values were statistically significant SEP-amp: p=0.004, SEP-ratio: p=0.002. None with favourable outcome had abnormal SEP-ratio and vice versa.

**Conclusion:** Direct evidence of neuronal survival in the rolandic cortex in the median SEP seems to be a highly reliable predictor of clinical outcome.

**Disclosure:** Nothing to disclose

## EPO2100

### Diagnostic Criteria of Nonconvulsive Status Epilepticus depend on the duration of the patient's unconscious state

E. Povalyukhina<sup>1</sup>, M. Aleksandrov<sup>1</sup>, A. Ulitin<sup>2</sup>

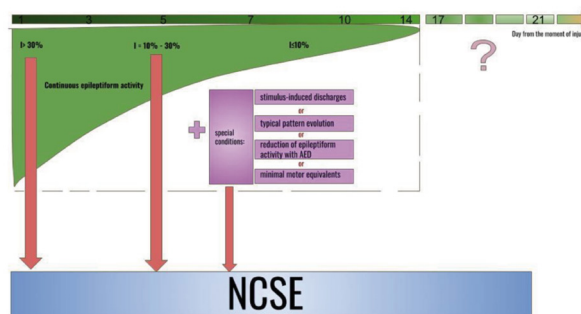
<sup>1</sup>Clinical Neurophysiology and Epileptology, Almazov National Medical Research Centre, Saint-Petersburg, Russian Federation, <sup>2</sup>Neurosurgeon, Almazov National Medical Research Centre, Saint-Petersburg, Russian Federation

**Background and aims:** Non-Convulsive Status Epilepticus (NCSE) is 1 of the variants of a prolonged unconscious state, associated with continuous epileptiform activity on EEG, but without major motor signs. The NCSE complicates the course of severe brain injury and worsens the prognosis for the patient. The existing "Salzburg criteria" are considering clinical and electrophysiological indicators apart from the duration of unconsciousness.

**Methods:** A total of 31 patients with NCSE in severe traumatic brain injury aged 20 to 65 years were examined. EEG registration was carried out on the "Mitsar-EEG-202" complex (LTD "Mitsar", Russian Federation). EEG was performed dynamically at different times from the moment of injury.

**Results:** In those patients who were examined upon 1-4 days from the moment of brain injury, the index of epileptiform activity ranged from 30 to 60%.

For those to whom EEG was performed after 5-10 days, epileptiform activity was registered with an index from 10% to 30%. On EEG performed on days 11-15, epileptiform activity was present with an index of at least 10%.



Modified diagnostic criteria of Non-convulsive status epilepticus

**Conclusion:** The criteria for diagnosing of non-convulsive status epilepticus depend on the duration of the patient's unconscious state since the restoration of brain stem functioning, and also depend on the time elapsed since the moment of brain injury.

**Disclosure:** Nothing to disclose

## EPO2101

**Dropped Head Syndrome: a clinical and electrophysiological study in six patients**

A. Riahi, J. Zaouali, O. Ben Ameer, H. Derbali, M. Mansour, R. Mrissa

*Department of Neurology, Military Hospital of Tunis, Tunis, Tunisia*

**Background and aims:** Dropped head syndrome (DHS) is a rare neurological condition that can be caused by several neuromuscular disorders. The aim of our study is to describe the clinical and electrophysiological characteristics and the underlying etiology in a series of consecutive patients with DHS.

**Methods:** From 2016 to 2019, patients presenting to our neurophysiology unit with DHS were included. Medical history, neurological examination, and electrophysiological investigation and the neostigmine test results were described. The etiological diagnosis of DHS was also specified.

**Results:** 6 patients were included (mean age=68years, sex ratio=2). The mean diagnostic delay was 4.8 months. All the patients reported symptoms fluctuation in time. Neurological examination showed a motor deficit of neck extensor muscles in all cases and half of them presented with proximal weakness of the upper limbs and/or bulbar muscle deficit. Nerve conduction studies were normal in all patients and needle EMG showed a neurogenic pattern in 4 patients and pseudo-myogenic patterns in 1 patient. Repetitive stimulation revealed a decremental response in all patients. The neostigmine test was positive in 3 patients. Final diagnoses were myasthenia gravis (3 patients, 2 with anti-acetylcholine receptors antibodies and 1 with anti-Musk antibodies), amyotrophic lateral sclerosis (2 patients) and type 4 Spinal muscular atrophy (one patient).

**Conclusion:** Accurate etiological diagnosis of DHS requires a thorough clinical and electrophysiological assessment and use of neostigmine test. Our series helped us advancing a diagnostic algorithm of DHS.

**Disclosure:** Nothing to disclose

## EPO2102

**Nerve conduction and Vitamin B12 alteration in Type 2 diabetics on metformin**

D. Thakur<sup>1</sup>, N. Limbu<sup>1</sup>, B.K.L. Das<sup>2</sup>, R. Maskey<sup>3</sup>

<sup>1</sup>B. P. Koirala Institute of Health Sciences, Dharan, Nepal,

<sup>2</sup>Biochemistry, B. P. Koirala Institute of Health Sciences,

<sup>3</sup>Internal Medicine, B. P. Koirala Institute of Health Sciences, Dharan, Nepal

**Introduction:** Metformin, an oral hypoglycemic agent is the 1st line treatment in patients with T2DM, as approved by US Food and Drug Administration (FDA) in 1994. However, the use of metformin is associated with malabsorption of vitamin B12, which may lead to detrimental effects on peripheral nerves. Our study aimed to compare the peripheral nerve conduction study (NCS) parameters with serum vitamin B12 levels in T2DM (on metformin and non- metformin therapy) and control.

**Methods:** This comparative cross-sectional study enrolled type 2 diabetic patients on metformin therapy for more than 6 months (Group A, n=30), type 2 diabetics on non-metformin therapy (Group B, n=11) and healthy controls (Group C, n=30). NCS parameters of median, tibial, common peroneal & sural nerves, serum glucose and serum vitamin B12 levels were measured. One way ANOVA (post hoc: Tukey) test was used to compare the variables using SPSS. 22.0.

**Results:** Group A had reduced vitamin B12 levels as compared to Group B [194.03 (164.86-223.53) vs. 297.82 (258.99-363.00), p=0.001] and Group C [194.03 (164.86-223.53) vs. 287.50 (204.25-351.50), p=0.001]. NCS parameters of median, tibial and sural nerves showed more demyelinating type effects in Group A. Motor and sensory nerve latencies as well as amplitudes were significantly longer and lower respectively in Group A.

**Conclusion:** Long term metformin therapy in diabetic is associated with significant vitamin B12 depletion, leading to alteration in motor and sensory NCS parameters. Thus we recommend regular vitamin B12 screening and oral or parenteral vitamin B12 supplementation to the diabetic on metformin therapy.

**Disclosure:** Nothing to disclose

### EPO2103

## Surface Electromyography as a Tool for Evaluation of the Association Between m.Masseter and m.Temporalis Activity and the Variables of Craniofacial Morphology

D. Tsakova<sup>1</sup>, V. Bogdanov<sup>2</sup>, D. Kolev<sup>3</sup>, G. Popov<sup>4</sup>, K. Genov<sup>5</sup>

<sup>1</sup>Consulting & Diagnostic Department, Military Medical Academy, Sofia, Bulgaria, <sup>2</sup>Department of Orthodontics, Medical University – Sofia, Sofia, Bulgaria, <sup>3</sup>Clinic of neurology, Military Medical Academy, Sofia, Bulgaria, <sup>4</sup>Department of Infectious Diseases, Military Medical Academy, Sofia, Bulgaria, <sup>5</sup>Clinic of neurology, Second City hospital, Sofia, Bulgaria

**Background and aims:** The function of the masticatory muscle has a considerable influence on craniofacial morphology. And craniofacial morphology is related with biting force and resting activity of the masticatory muscles. The knowledge of surface electromyography (sEMG) and the rapid growth of the numbers of applications underlines the high potential of this technique. The aim of the study was to evaluate the correlation between vertical facial patterns, cephalometric indices and EMG activity of the masticatory muscles.

**Methods:** 3 groups of patients were included in the study. Group 1e (N=15) consisted of hypodivergent type patients; group 2 (N=22) consisted of normodivergent type and group 3 (N=24) - hyperdivergent type patients. The age of the patients is between 14 to 23 years old. All the patients have lateral cephalometry, study models and EMG evaluation of the anterior m. temporalis and m. masseter at rest and during maximal voluntary clench. Statistical analysis was performed by SPSS 10.0

**Results:** The study found statistically significant differences between the 3 groups in the activity of m.Masseter dex. (p<0.05). The significant difference between the 1st and 2nd group was detected in the absolute value average of m.Temporalis activity.

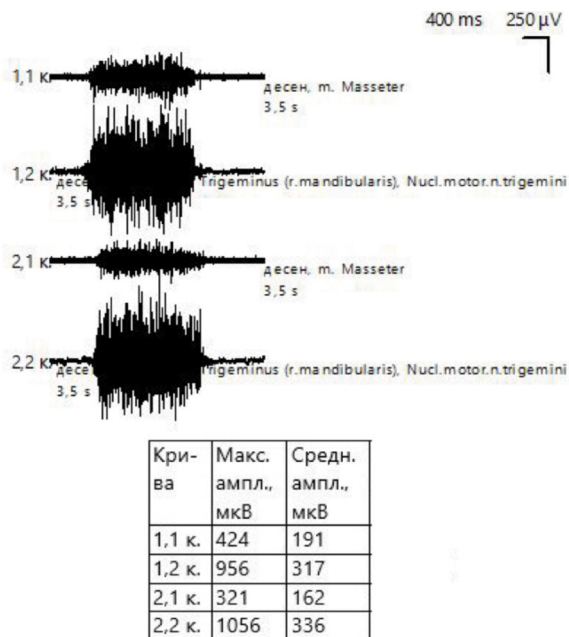


Fig.1: EMG activity during maximal dental clenching from Masseter and Temporalis muscle.

**Conclusion:** This study underlines the high potential of sEMG as a useful, non-invasive tool for the assessment of the activity of the masticatory muscles and to evaluate the effect of therapeutic resources in neurologic and orthodontic practice. Further studies on a larger group of patients will better clarify the interrelations between the cephalometric variables and EMG activity.

**Disclosure:** Nothing to disclose

## EPO2104

**The correlation between EEG and prognosis in patients treated with ECMO**

T.-W. Yang<sup>1</sup>, H. Jeong<sup>2</sup>, S. Jung<sup>1</sup>, E.B. Cho<sup>1</sup>, C. Yoon<sup>1</sup>, S.J. Kim<sup>2</sup>, K.-J. Park<sup>1</sup>

<sup>1</sup>Neurology, Gyeongsang National University Changwon Hospital, Gyeongsang National University College of Medicine, Changwon, Korea, Republic of, <sup>2</sup>Neurology, Gyeongsang National University Changwon Hospital, Changwon, Korea, Republic of

**Background and aims:** Early prediction of prognosis in the patients receiving treatment using extracorporeal membrane oxygenation (ECMO) is difficult. Electroencephalography (EEG) is widely used to evaluate neurological outcomes. The purpose of this study is to identify the reliable factors for predicting the neurological prognosis using a single routine EEG performed within 48 hours after ECMO initiation.

**Methods:** Routine EEG was performed within 48 hours after ECMO initiation in patients treated with ECMO and was interpreted according to the standardized EEG-terminology proposed by the American Clinical Neurophysiology Society. EEGs were classified into highly malignant (suppression, suppression with periodic discharges, burst-suppression), malignant (periodic or rhythmic patterns, pathological or nonreactive background), and benign EEG (absence of malignant features). Poor outcome was defined as best Cerebral Performance Category score 3–5.

**Results:** A total 18 patients were included. The median time from ECMO initiation to EEG was 1189.5 minutes. Five patients had a highly malignant EEG and all had a poor outcome (specificity 100%, sensitivity 50%). Any malignant EEG pattern had a low sensitivity (40%) and low specificity (37.5%) to predict poor prognosis. 4 patients had a benign pattern, 3 of whom had good prognosis.

**Conclusion:** Highly malignant EEG which conducted ECMO initiation reliably predicted poor outcome in half of patients without false predictions. This is significant because the specificity is very high even though the EEG was performed within 48 hours. The results of this study may help predict poor prognosis early in the course of treatment in patients treated with ECMO.

**Disclosure:** Nothing to disclose

## Cognitive neurology/neuropsychology 1

## EPO2105

**Cambridge Automated Neuropsychological Test Battery (CANTAB) in midlife adults: Cognitive Performance and Neuroimaging**

K. Chompalov, K. Bahchevanov, P. Atanassova  
Neurology, Medical University of Plovdiv, Plovdiv, Bulgaria

**Background and aims:** The aim of the study is to investigate the cognitive performance of middle-aged adults that have some MRI or Doppler sonography findings.

**Methods:** We examined 98 healthy adults (38 men and 60 women) with normal daily functioning between the ages of 45-55 years (mean age  $50.37 \pm 3.24$ ). The subjects were selected according to the authors' inclusion criteria. After testing with the computer neuropsychological system CANTAB Eclipse participants went through MRI and Doppler sonography examination. A comparison between groups with and without findings from MRI or Doppler Sonography was conducted according to results from the CANTAB (statistical product SPSS 17).

**Results:** Our study found that participants without Doppler Sonography pathological findings show better result than those with Doppler Sonography findings in relation to the CANTAB subtest outcome measure SOC (Stockings of Cambridge) - mean initial thinking time 5 moves ( $p < 0.05$ ). There was no statistically significant difference between groups with and without findings from MRI.

**Conclusion:** Established results demonstrate that the CANTAB outcome measure of subtest SOC suppose the presence of "asymptomatic" neuroimaging findings. Our study underlines the importance of computerized neuropsychological methods for screening cognitive impairment due to subclinical cerebrovascular disease in the middle adulthood.

**Disclosure:** This study was supported by the University Grant Project NO 13/2014, Medical University, Plovdiv, Bulgaria.

## EPO2106

**The Brief Evaluation of Receptive Aphasia test for the detection of language impairment in severely brain-injured patients**

C. Aubinet<sup>1</sup>, C. Chatelle<sup>1</sup>, S. Gillet<sup>2</sup>, N. Lejeune<sup>3</sup>,  
H. Cassol<sup>4</sup>, S. Laureys<sup>1</sup>, S. Majerus<sup>5</sup>

<sup>1</sup>Liege, Belgium, <sup>2</sup>PsyNCog, ULiège, Liege, Belgium, <sup>3</sup>Centre Neurologique William Lennox, Université Catholique de Louvain, Brussels, Belgium, <sup>4</sup>Giga Consciousness, ULiege, Liege, Belgium, <sup>5</sup>Departement of Psychology, Cognition and Behaviour, University of Liège, Liege, Belgium

**Background and aims:** The presence of language deficits may lead to an underestimation of consciousness level in brain-injured patients. At the same time, the assessment of language in patients with disorders of consciousness (DoC) is prevented by their limited behavioral responses. We present a new language comprehension assessment tool based on visual fixation of images for DoC patients.

**Methods:** The Brief Evaluation of Receptive Aphasia (BERA) assesses receptive phonological, semantic and morphosyntactic abilities. The BERA as well as the Language Screening Test (LAST) were 1<sup>st</sup> administered to 52 aphasic conscious (AC) patients on 2 consecutive days in order to determine its validity and reliability. Next, this new tool was administered to 4 post-comatose patients, who were also examined by means of the Coma Recovery Scale-Revised (CRS-R), positron emission tomography and structural magnetic resonance imaging.

**Results:** In AC patients, the BERA showed satisfactory intra- and inter-rater reliability, internal and concurrent validity with the LAST. In DoC patients, the BERA scores suggested the presence of selective receptive difficulties for phonological, semantic and particularly morphosyntactic abilities. These results were in line with their functional and structural neuroimaging data.

**Conclusion:** The BERA may complement the widely used CRS-R when assessing and diagnosing DoC patients by providing a more systematic and detailed characterization of language abilities in these severely brain-injured patients.

**Disclosure:** Nothing to disclose

# EPO2107

## Autoimmune encephalitis associated with anti adenylate kinase 5 (Anti-AK5) antibodies manifesting as subacute semantic and episodic memory loss : a case report

A. Baba<sup>1</sup>, C. Vialatte de Pémille<sup>1</sup>, J. Lagarde<sup>2</sup>, J. Honnorat<sup>3</sup>, M. Zuber<sup>1</sup>

<sup>1</sup>Neurology, Saint Joseph Hospital, Paris, France, <sup>2</sup>Unit of Neurology of Memory and Language, Sainte Anne Hospital, Paris, France, <sup>3</sup>Neuro-oncology, Hospices Civils of Lyon, Lyons, France

**Background and aims:** To present a patient with anti-AK5 autoimmune encephalitis admitted for subacute memory disorders associating episodic and semantic involvements and to compare this case with others in literature

**Methods:** We report the case of a 64-year-old man admitted for a few weeks progressing memory disorder associated with asthenia and anorexia. There were no history of seizure, abnormal behavior or psychiatric signs. Brain magnetic resonance image (MRI, figure 1) showed bilateral temporal lobe FLAIR (Fluid Attenuated Inversion Recovery) hypersignal. Cerebrospinal fluid (CSF) showed a moderate pleocytosis (15 cells per mm<sup>3</sup>) with high protein level (0.67g/L). Electroencephalography (EEG) was normal. Neuropsychological tests found memory disorders with episodic disorders depicted as very low score at free recalls with no normalization of cued recalls and semantic disorders, depicted with semantic paraphasia on oral naming test, low score on word definitions, reversal scores on phonemic and semantic verbal fluences (Table 1). Anti-AK5 were found in the CSF. Despite intensive treatment regimen associating RITUXIMAB and CYCLOPHOSPHAMIDE, clinical prognosis remained poor and MRI evolved towards hippocampal atrophy.

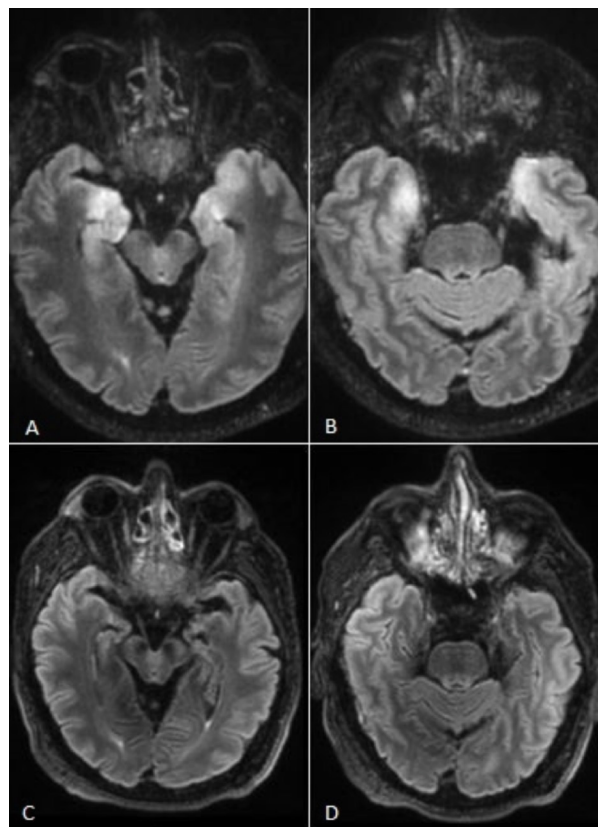


Figure 1 : Axial FLAIR MRI Sequences. At the diagnosis, bilateral temporal hypersignal (A,B). After one year of immunotherapy, bilateral temporal atrophy but no abnormal signal (C,D)

**Results:** We describe here a clear semantic involvement in limbic encephalitis associated with anti-AK5 antibodies. As previously reported, episodic memory loss, MRI and CSF abnormalities, poor prognosis were also found.

**Conclusion:** We present a case of autoimmune encephalitis associated with anti-AK5 antibodies with unexpected semantic involvement. This rare diagnosis should not be ignored in patients with subacute memory disorders, MRI abnormalities in temporal lobes especially if there is not history of seizure.

**Disclosure:** Nothing to disclose

		At the diagnosis	At 6 months
Global cognitive test	Mini Mental State Examination	26/30	24/30
Attention/Working Memory	Spatial span forward	6	-
	Digit span forward	7	-
Executive function	Verbal Fluency Test	Animals	15
		Phonemic Fluency (« P »)	18
	Trail Making Test	A (seconds)	25
		B (seconds)	54
	B (errors)	0	
	B-A (seconds)	29	
Verbal episodic memory Free and cued recall test 16-items	Immediate cued recall		13/16
		Free recall 1	1
		Free recall 2	0
		Free recall 3	NA
		Total free recall	1
		Total recall 1	1
	Total recall 2	1	
	Total recall 3	NA	
	Total recall	2	
Rey Complex Figure Test	Copy (36)	36	36 (Rey/Taylor)
	Delayed recall (36)	4	-
a	BECS-GRECO Semantic Battery	Oral Naming test (40)	39
		Semantic paraphasia	5
		Phonemic paraphasia	0
		Word definition (4)	3
		Denomination 80 : 77/80	-

Table 1 : Neuropsychological test at the diagnosis and after 6 months of treatment (NA : Not Answered)

## EPO2108

**TMA-93 (Binding by images): Normative data from elderly spanish people**

E. Franco-Macías<sup>1</sup>, L. Ainz-Gomez<sup>2</sup>, A. Luque-Tirado<sup>3</sup>, C. Méndez Del Barrio<sup>4</sup>, S. Rodrigo-Herrero<sup>2</sup>, D. Maillat<sup>5</sup>, M. Bernal Sánchez-Arjona<sup>1</sup>

<sup>1</sup>Seville, Spain, <sup>2</sup>Neurology, Hospital Virgen del Rocío, Seville, Spain, <sup>3</sup>Memory Disorders Unit, Department of Neurology, University Hospital Virgen del Rocío, Seville, Spain, <sup>4</sup>Neurología, Hospital Juan Ramón Jiménez, Huelva, Spain, <sup>5</sup>Neurologia, Assistance Publique des Hôpitaux de Paris (AP-HP), Bobigny, France

**Background and aims:** The Memory Associative Test of the district of Seine-Saint-Denis (TMA-93), a new test of episodic memory, examines binding (associative learning) by images, an advantage for the less-educated. The aim was to extend the Spanish normative study for the test to people aged 75 and over.

**Methods:** A cross-sectional normative study. Partners of patients who attended the Outpatient Clinic were systematically recruited if they are eligible: age $\geq$ 75, no memory complaints, and a total score $\geq$ 10th percentile on Phototest. Age (4 ranges: 75-77, 78-80, 81-83,  $\geq$ 84 years), gender, and educational attainment (incomplete primary studies, only primary studies completed, and higher than primary studies) were considered as sociodemographic variables. TMA-93 was administered and the total score was registered. A stratified analysis by sociodemographic variables with significant influence on total TMA-93 score was undertaken.

**Results:** 354 participants were included (age=78.7 $\pm$ 3.4 years, range=75-93; 44.6 % females; 39%, incomplete primary studies). Total score on TMA-93 showed a non-normal, left asymmetric, and leptokurtic distribution (median=28, IQR=24-30, range=5-30). There were significant differences on TMA-93 total scores only by educational attainment (p<0,001). Scores for 10th percentile varied from 19 out of 30 in the less-educated group to 24 out of 30 in the more-educated group.

**Conclusion:** This extension of the Spanish normative study for the TMA-93 shows that binding in Spanish elders mainly depends on the educational attainment.

**Disclosure:** This work was supported by Hoffmann-La Roche.

## EPO2109

**The assessment of cognitive disorders post stroke at Romanian elderly - pilot study**

A. Capisizu, S.M. Aurelian, A. Zamfirescu, R. Mihalache  
Clinic of Geriatric, University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania

**Background and aims:** The incidence of stroke varies from country to country. In Romania, there are approximately 300 new cases/100,000 inhabitants, compared to a European average of almost 200 strokes/100,000 inhabitants. 20% of those who survive have a continuous cognitive deterioration. Prevalence of dementia highest in months following stroke (3%/year) being bigger than without stroke. Age, education or cardiovascular factors can be risk post-stroke cognitive impairment

**Methods:** 1 year retrospective study in 220 in-patients after 6 months from stroke; 64% men; mean age 70.58y $\pm$ 10.504, from Sf. Luca Geriatrics Hospital, Bucharest. We assessed: incidence of stroke by age, education; incidence of vascular factors (hypertension, atrial fibrillation, previous stroke, diabetes mellitus, dyslipidemia); functional capacity using the standardized daily instrumental activity (IADL) scale; cognitive disorder using standardized Mini-Mental State Examination (MMSE) and Geriatric Depression (GDS) Scales. Descriptive analysis by SPSS 12 statistical tools.

**Results:** 90.90% had high degree of disability by IADLscale; 82% have moderate cognitive dysfunction by MMSE (10-20 points); 84% have depressive disorder by GDS (7-15 points). Relationship of risk post-stroke cognitive impairment by age: 74.54% patients were in old age group (76-85y) (p<0.003), from which 61% are men; education: 59% of patients had elementary studies (p<0.005); vascular factors: recurrent stroke (31.81%) (p<0.001), hypertension and dyslipidemia (22.72%) (p<0.006), atrial fibrillation (15.90%) (p<0.001), diabetes mellitus (9.09%) (p<0.124).

**Conclusion:** The most vulnerable patients for dementia post stroke are elderly more 75 years old, men prevalent, with low level of education and with several vascular risk factors. A management of cognitive disorders post stroke is focused on prevention: cognitive training and monitoring risk factors. Brain reserve can protect against cognitive deterioration by leisure activities, social interactions and education, before early 60th ages.

**Disclosure:** Nothing to disclose



## EPO2110

## Memory self-appraisal and cognitive outcomes in a memory clinic sample

F. Carneiro<sup>1</sup>, C. Caetano<sup>2</sup>, A. Silvestre<sup>1</sup>, C. Guarda<sup>1</sup><sup>1</sup>Neurology, Hospital Garcia de Orta, Almada, Portugal,<sup>2</sup>Psychology, Faculty of Human Sciences of the Catholic University of Portugal, Lisbon, Portugal

**Background and aims:** Subjective cognitive decline (SCD) and mild cognitive impairment (MCI) are early indicators of neurodegeneration. The feeling of worse performance than others correlates with amyloid deposition. We evaluated if SCD and MCI patients referring worse performance than others (SCD+ and MCI+) had more conversion to dementia.

**Methods:** Retrospective study including patients with memory complaints without impaired activities of daily living and with follow-up >6 months. Objective cognitive impairment was defined as a score <1.5SD for age and education in Addenbrooke Cognitive Examination (ACE)/MMSE (patients ≤ 1 year of education) and a SCD and MCI group were created. Memory self-appraisal was assessed by the Geriatric Depression Scale (GDS-15) question: “Do you feel you have more memory problems than most?” and, removing this question, a modified GDS cut-off >4 was established.

**Results:** Of 174 patients, 83 were included. 29 patients (34.9%) had SCD and 54 (65.1%) MCI. SCD+ and MCI+ groups had comparable demographics and cognitive performance at baseline to SCD and MCI, respectively, but were more frequently depressed (71.4% vs 20.0%; 52.6% vs 0). SCD+, but not MCI+, showed higher dementia conversion rate (64.3% vs 26.7%). MCI+ patients had less vascular risk factors (median 2 vs 3). Tables 1 and 2 display further data on SCD+ vs SCD and MCI+ vs MCD groups.

	SCD (n=15)	SCD+ (n=14)	p
Age in years, mean ± SD	76.00±6.98	75.92±7.35	0.832
Male/female gender, n (%)	9/6 (60.0/40.0)	5/9 (35.7/64.3)	0.191
Additional SCD+ features, median (range) <sup>1</sup>	2 (0 – 2)	2 (1 – 2)	1.000
Education in years, median (range)	4 (0 – 16)	4 (4 – 9)	0.780
Number of vascular risk factors, median (range)	3 (0 – 5)	3 (0 – 4)	0.451
ACE-R total score (0-100), mean ± SD	66.93 ± 11.59	70.79 ± 6.86	0.290
ACE-R memory subscore (0-26), mean ± SD	14.50 ± 3.25	13.93 ± 2.52	0.603
MMSE score, mean ± SD	23.86 ± 3.16	23.53 ± 3.60	0.799
Conversion to dementia, n (%)	4 (26.7)	9 (64.3)	0.042*
Time to conversion in months, median (range)	31 (8 - 55)	30.5 (4- 84)	0.940
GDS total score (0-14), median (range)	3 (0 – 11)	6 (2 – 11)	0.014*
GDS>4, n (%)	3 (20.0)	10 (71.4)	0.005*
FBI total score (0-72), median (range)	6 (0 – 35)	8 (0 - 19)	0.224

Table 1. Demographic, clinical and neuropsychological characteristics of patients with SCD and SCD+. Patients were defined as SCD+ if they reported worse memory than most and as SCD otherwise. 1 - Additional features include: age at SCD onset >60 years and cognitive complaints for <5 years. \* p< 0.05

	MCI (n=16)	MCI+ (n=38)	p
Age in years, mean ± SD	73.12 ± 6.08	74.15 ± 4.93	0.515
Male/female gender, n (%)	8/8 (50.0/50.0)	15/23 (39.5/60.0)	0.475
Additional SCD+ features, median (range) <sup>1</sup>	2 (0 – 2)	2 (0 – 2)	0.768
Education in years, median (range)	4 (0 – 10)	4 (0 – 16)	0.585
Number of vascular risk factors, median (range)	3 (1 – 4)	2 (1 – 5)	0.038*
ACE-R total score (0-100), mean ± SD	53.20 ± 13.22	52.89 ± 12.11	0.936
ACE-R memory subscore (0-26), mean ± SD	11.93 ± 3.10	10.24 ± 3.55	0.114
MMSE score, mean ± SD	19.06 ± 4.96	19.37 ± 3.69	0.803
Conversion to dementia, n (%)	11 (68.8)	18 (47.4)	0.150
Time to conversion in months, median (range)	19 (18 - 43)	20 (7 - 69)	0.796
GDS total score (0-14), median (range)	1 (0 – 4)	5 (0 – 11)	<0,001*
GDS>4, n (%)	0	20 (52.6%)	<0,001*
FBI total score (0-72), median (range)	9.5 (1 – 25)	7 (0 - 37)	0.181

Table 2. Demographic, clinical and neuropsychological characteristics of patients with MCI and MCI+. Patients were defined as MCI+ if they reported worse memory than most and as MCI otherwise. 1 - Additional features include: age at SCD onset > 60 years and cognitive complaints for <5 years. \* p<0.05

**Conclusion:** Worse memory self-appraisal showed higher dementia conversion in SCD but not MCI, where an opposite trend exists. In both groups, depression was more common in patients with worse self-appraisal, highlighting the complex interplay of mood, subjective and objective cognition.

**Disclosure:** Nothing to disclose

## EPO2111

**The Time-Traveler: Post-Surgical Charles Bonnet Syndrome**

A. Ferreira<sup>1</sup>, V. Carvalho<sup>2</sup>, P. Valente Aguiar<sup>3</sup>, P. Coelho<sup>2</sup>, B. Carvalho<sup>4</sup>

<sup>1</sup>Neurology, Hospital Pedro Hispano, Matosinhos, Porto, Portugal, <sup>2</sup>Neurology, Hospital Pedro Hispano, Matosinhos, Portugal, <sup>3</sup>Neurosurgery, São João Hospital, Porto, Portugal, <sup>4</sup>Neurosurgery, Hospital São João, São João Hospital Centre, Porto, Portugal

**Background and aims:** Visual hallucinations may arise from various brain disorders, such as migraine, epilepsy, neurodegenerative diseases or cerebrovascular disease. In the vast majority of cases, if visual hallucinations are complex in nature, the parieto-occipital or the temporo-occipital cortical transitions are involved. However, lesions at any point of the optic pathways, causing a partial or complete loss of vision, can induce Charles Bonnet Syndrome (CBS).

**Methods:** Clinical case study.

**Results:** A 62-year-old man was admitted to a Neurosurgery Center for elective removal of a right occipital metastasis. After surgery, the patient had complex visual hallucinations limited to the left visual hemifield. When looking at the street he saw old green colored cars, such as Citroën DS, Volkswagen Beetle or Renault 4L, where he knew modern cars of different colors were. In the place of the normal buildings, he saw old brick walled buildings, also green colored. He also saw puddles of water on the floor. The patient had self-criticism, recognizing the unrealistic nature of the hallucinations. Neurological examination showed no visual field defects and partial achromatopsia for blue and green in the left visual hemifield. One month after the surgery, the patient's hallucinations were only of puddles of water on the floor.

**Conclusion:** CBS exists when complex visual hallucinations arise from visual deficits, and it is characterized by self-criticism of the situation. In this case, the authors assume that given the location of the lesion in the association visual cortex, the patient hallucinates only objects he cannot interpret and colors he cannot see.

**Disclosure:** Nothing to disclose

## EPO2112

**Impact of different neuropsychological definitions for cognitive impairment after stroke**

X. Chen<sup>1</sup>, Y. Han<sup>2</sup>, J. Zhou<sup>1</sup>, M. Ma<sup>2</sup>, X. Liu<sup>2</sup>

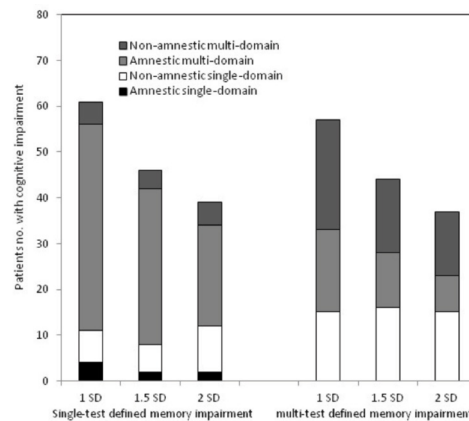
<sup>1</sup>Neurology, Nanjing First Hospital, Nanjing, China,

<sup>2</sup>Neurology, Jinling Hospital, Nanjing, China

**Background and aims:** Based on different neuropsychological definitions, the rate of cognitive impairment after stroke was analyzed, and the cut-offs for cognitive screening scales were investigated.

**Methods:** Hospital-based stroke patients underwent a comprehensive neuropsychological assessment. The rate of cognitive impairment was estimated using thresholds of 1, 1.5, or 2 standard deviations below the normal control, and impairment of a certain cognitive domain defined by a single or multiple tests. Meanwhile, the effectiveness of cognitive screening through face-to-face assessment using the Mini Mental State Examination (MMSE) and the Montreal Cognitive Assessment Scale (MoCA), and telephone assessment using a 5-min NINDS-Canadian Stroke Network (NINDS-CSN) scale and a 6-item screener (SIS), were both tested under different definitions, with the optimal cut-off selected based on the highest Youden index.

**Results:** In stroke patients, the rate of cognitive impairment ranged from 46.3% to 76.3% upon different definitions. The face-to-face MoCA was more consistent with comprehensive cognitive assessment compared to MMSE. The optimal cut-off of cognitive impairment was MMSE $\leq$ 27 and MoCA $\leq$ 19. For the telephone tests, the 5-min NINDS-CSN assessment was more reliable, and the optimal cut-off was  $\leq$ 23, while for SIS $\leq$ 4.



Number of patients with cognitive impairment according to different neuropsychological definitions

**Conclusion:** The rate of cognitive impairment in stroke patients can vary by 1.6 times for different neuropsychological definitions. The face-to-face MMSE and MoCA, together with the telephone assessment of NINDS-CSN 5-min protocol and SIS, were simple and effective cognitive screening tools. The corresponding threshold values for cognitive impairment were 27 points, 19 points, 23 points and 4 points.

**Disclosure:** Nothing to disclose

## EPO2113

## Perceived cognitive deficits in Wilson's disease and different types of multiple sclerosis course

M.Y. Chernenko<sup>1</sup>, I.M. Nikishkova<sup>1</sup>, D.O. Kutikov<sup>1</sup>,  
O.Y. Kutikov<sup>1</sup>, I.K. Voloshyn-Gaponov<sup>1</sup>, V.I. Vovk<sup>2</sup>

<sup>1</sup>Institute of Neurology, Psychiatry and Narcology of the NAMS of Ukraine, Kharkiv, Ukraine, <sup>2</sup>V. N. Karazin Kharkiv National University, Kharkiv, Ukraine

**Background and aims:** The quality of self-evaluation of cognitive conditions by patients with multiple sclerosis (MS) depends on the disease course and the presence of comorbid conditions, such as depression, fatigue, pain, sleep problems. A determination of the role of these factors in a subjective evaluation of cognitive deficits by patients with MS is still relevant.

**Methods:** Cognitive functions, levels of fatigue, depression, pain, sleep/wake disturbances, and perceived cognitive deficits were assessed (Figure 1) in 14 patients with relapsing-remitting MS (RRMS), 6 patients with secondary progressive MS (SPMS) and 8 patients with Wilson's disease (WD).

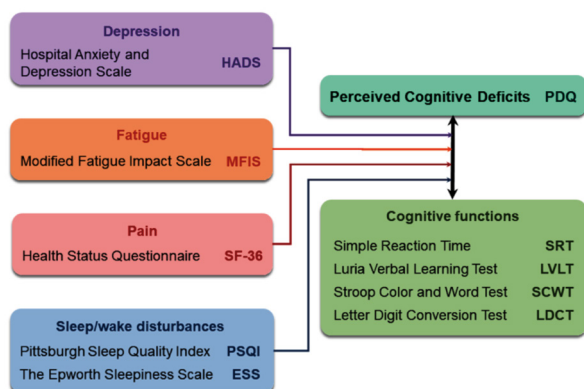


Figure 1. Methods of assessment

**Results:** Relationships between PDQ score and results of the cognitive tests were not found in patients with RRMS (Figure 2). Patients with WD underestimated their speed of test performance and overestimates their efficiency of performance of these tests. Only patients with SPMS had a subjective evaluation of cognitive functions, which corresponded to an objective one. These patients also showed differences on a level of association of PDQ scores with scores of other scales, beside HADS, which was similar to such in patients with RRRS. Along with this, patients with RRRS and WD, on the contrary, differed only on a level of connection between PDQ and HADS scores.

	MFIS	HADS	PSQI	ESS	SF-36 BP	SRT	LDCT 90	LDCT ES	SCWT IC	LVL
WD	0,62	0,15	0,37	0,73	-0,82	-0,34	-0,02	-0,47	0,65	0,42
RRMS	0,78	0,58	0,41	0,80	-0,40	0,12	0,13	-0,08	0,43	-0,16
SPMS	-0,59	0,55	0,82	0,12	0,14	0,58	-0,87	0,85	-0,44	-0,52

WD – Wilson's disease; RRMS – relapsing-remitting MS; SPMS – secondary progressive MS; MFIS – Modified Fatigue Impact Scale; HADS – Hospital Anxiety and Depression Scale; PSQI – Pittsburgh Sleep Quality Index; ESS – The Epworth Sleepiness Scale; SF-36 BP – Health Status Questionnaire Bodily Pain Scale; SRT – Simple Reaction Time; LDCT 90 – Letter Digit Conversion Test encoded symbols per 90 seconds; LDCT ES – Letter Digit Conversion Test encoding speed; SCWT IC – Stroop Color and Word Test interference coefficient; LVL – Luria Verbal Learning Test

Figure 2. Heatmap of relationships between Perceived Deficits Questionnaire (PDQ) score and cognitive functions, levels of fatigue, depression, pain and sleep/wake disturbances in WD and different types of MS course

**Conclusion:** A stability of clinical symptoms progression enabled patients to identify fatigue within a subjective evaluation of their cognitive abilities. In patients with RRMS, the main contributor to discrepancy between subjective and objective evaluation of cognitive functions was a perceived fatigue; daytime sleepiness and the pain level also played their roles.

**Disclosure:** Nothing to disclose

## EPO2114

**Proper names anomia after thalamic ischemic lesion**

F. Dourado Sotero, P. Nascimento Alves, I. Pavão Martins  
*Lisbon, Portugal*

**Background and aims:** Proper names anomia is a specific naming impairment and may involve different categories, including people or places. Although the role of thalamus in naming remains poorly understood, it is thought to modulate cortical regions involved in naming.

**Methods:** We report a case of proper names anomia.

**Results:** A 51-year-old man, right-handed, was admitted to the emergency department due to sudden loss of consciousness and left hemiparesis 2 hours before. Neurological examination disclosed drowsiness, left central facial palsy, dysarthria, and left hemiplegia (NIHSS 14). CT showed no acute ischemic lesions and angioCT was normal. He was treated with IV-rtPA and neurological improvement was observed (NIHSS 3). Brain-MRI showed bilateral anterior thalamic ischemic lesions and aetiological investigation revealed a patent foramen ovale. During hospitalization, he had cognitive complaints of difficulty in remember recent events. Neuropsychological assessment documented an amnesic syndrome, typically associated with lesions in this topography, but also revealed a severe impairment in retrieving names of famous people. This deficit was present both with visual (photo) and oral (description) presentations. He had no impairment in face recognition, being able to provide information about the people he could not name. Naming was partially facilitated by phonological and semantic cues. The capacity to name other semantic categories, including places, was intact. He had a good clinical improvement, with partial recovery at discharge.

**Conclusion:** This is a case of specific proper name anomia following an anterior thalamic lesion. Naming deficits improved with phonological and semantic clues, suggesting a putative facilitation of abnormal cortical activation after thalamic lesion.

**Disclosure:** Nothing to disclose

## EPO2115

**Rapidly progressive posterior cortical atrophy: a case report**

P. Faustino<sup>1</sup>, A. Jorge<sup>1</sup>, J. Sousa<sup>1</sup>, C. Bento<sup>1</sup>, I. Baldeiras<sup>2</sup>,  
J. Lemos<sup>1</sup>, A. Morgadinho<sup>1</sup>

<sup>1</sup>Neurology, Coimbra University and Hospital Center, Coimbra, Portugal, <sup>2</sup>Neurochemistry laboratory, Coimbra University and Hospital Center, Coimbra, Portugal

**Background and aims:** Posterior cortical atrophy (PCA) is a rare neurodegenerative disorder characterised by progressive impairment of cortical visual function. In most cases, the underlying pathology is Alzheimer's disease. However, other aetiologies are possible, such as prion disease (PCA-prion). We describe a patient with rapidly progressive PCA, with a diagnosis of probable PCA-prion.

**Methods:** Case report

**Results:** A 69-year-old female patient presented with a 2-month progressive visuospatial impairment, without significant memory decline. Neuropsychological assessment showed Balint syndrome, visual perception errors (macropsia), visual and tactile agnosia, visual perseveration and dressing apraxia. She later developed asymmetrical left-sided negative myoclonus and an alien limb phenomenon. Brain MRI, performed early in the course of the disease, was normal. Cerebrospinal fluid biomarkers revealed increased tau-protein levels (3180pg/mL) with normal phosphorylated tau and beta-amyloid values. Protein 14.3.3 had a weak positive result. The electroencephalographic pattern evolved from occipitoparietal slowing with right fronto-central epileptic discharges to focal status epilepticus, and later to generalized periodic triphasic sharp-wave pattern. 18F-FDG PET revealed a right frontal, parietal and occipital hypometabolism. 11C-PiB PET was normal. The patient had a rapid functional decline, achieving an akinetic mutism state and died within 3 months from symptom onset. According to Kropp's adapted criteria, a diagnosis of probable Heidenhain variant of Creutzfeldt-Jakob disease was made. We await brain pathological studies for a definite diagnosis.

**Conclusion:** PCA identification and diagnostic work-up are complex and require significant clinical training. We presented a case of a rare aetiology for an uncommon clinical entity.

**Disclosure:** Nothing to disclose

## EPO2116

**Timely detection of Neurocognitive disorders in primary care thanks to General Practitioner and Nurse Cooperation**

B. Fougere<sup>1</sup>, A. Mailliet<sup>2</sup>, A. Leperre Desplanques<sup>2</sup>, L. Cartz Piver<sup>3</sup>, N. Vanacore<sup>4</sup>, L. Traykov<sup>5</sup>, P. Krolak Salmon<sup>2</sup>

<sup>1</sup>Division of Geriatric Medicine, Tours University Hospital, Tours, France, <sup>2</sup>Clinical and Research Memory Centre, Lyon Institute for Elderly, Lyon University Hospital, Lyons, France, <sup>3</sup>Limoges, France, <sup>4</sup>National Center for Disease Prevention and Health Promotion, National Institute of Health, Rome, Italy, <sup>5</sup>Sofia, Bulgaria

**Background and aims:** In Europe, there is a lack of detection of Neurocognitive disorders (NCD) by General Practitioners (GP), due to time constraints and unawareness of current assessment guidelines and tools. Collaboration between GPs and nurses may improve management of NCD in clinical practice.

**Methods:** During the “Act on Dementia” European Joint Action, GP-Nurse collaborations were implemented in France (Lyon), Italy (Modena) and Bulgaria (Sofia). Common detection tools were used in Bulgaria and France (DLA, DLA-I, MMSE, Mini-GDS and NPI); GP-COG was also used in Italy and France. In Bulgaria, 19 subjects were assessed by GPs alone and 12 subjects by a GP-nurse team. In Italy, 16 subjects were assessed by nurses and 9 were also assessed independently by GPs. In France, 1 nurse assessed 15 subjects referred by 14 GPs.

**Results:** Assessed patients did not differ in age. Cognitive complaint occurred since less than 2 years (n= 6) or 2-5 years (n=24). Reduced daily-life activities occurred in 40 patients. Evaluation showed significant differences of DLA (p=0.03), Mini-GDS (p=0.015) and NPI (p=0.001). There were no significant differences in GP-COG scores between France and Italy, nor in GP-COG scores collected by nurses and by GPs. Half of patients assessed were referred for additional testing. The patients were satisfied with this management model.

**Conclusion:** This pilot showed the feasibility of the GP/nurse cooperation to detect and manage cognitive impairment in daily clinical practice. All primary care health professionals should be involved to provide early/timely NCD management.

**Disclosure:** Nothing to disclose

## EPO2117

**Cerebellar cognitive affective syndrome (CCAS), Schmahmann’s syndrome, as the only sequel of an infarction in the territory of the superior cerebellar artery (ASC)**

A. Franco Salinas<sup>1</sup>, A. Hernandez<sup>2</sup>, A. Camacho<sup>1</sup>, L. Ruiz-Escribano Menchén<sup>1</sup>, F.J. Villanueva Ruiz<sup>1</sup>, L. Quirós<sup>2</sup>, J.J. Muñoz-Torrero Rodríguez<sup>2</sup>, E. García Perez<sup>3</sup>

<sup>1</sup>Ciudad Real, Spain, <sup>2</sup>Neurology, University General Hospital of Ciudad Real, Ciudad Real, Spain, <sup>3</sup>HGUCR, Ciudad Real, Spain

**Background and aims:** For years the cerebellum has been regarded as engaged only in motor control. Current evidences support that posterior lobe lesions result in the CCAS. We describe a patient with cognitive impairment and affective component, secondary to ischemic infarction in the territory of the ASC.

**Methods:** A 45-year-old patient suffered a stroke in the ASC territory, without motor or sensory sequelae. In the following months, he presents progressive cognitive deterioration with psycho-behavioural alterations with irritability, agitation, aggressiveness and affective symptoms.

**Results:** Cerebral CT scan and MRI showed chronic infarction with a malacic area in the left ASC territory. The psychometric assessment evidenced a multidomain cognitive impairment with mnemonic predominance, with alterations in working memory, as well as in the speed of processing, selective and alternating attention, visuo-constructive and executive functions.

**Conclusion:** The cerebellar posterior lobe is linked to association areas of the cerebral cortex concerned with higher order behaviour. The CCAS is postulated as a symptomatic complex produced by the alteration in association networks between the cerebellum and mainly frontoparietal and limbic systems. The CCAS hallmark features include personality change and deficits in executive function, visual spatial processing, linguistic skills, social cognition and regulation of affect. We must be attentive to the appearance of cognitive clinic in patients with cerebellar damage, especially that involving posterior lobes. The current understanding of the cerebellum leads to the recognition of motor, vestibular and cognitive-affective syndromes. Knowledge of the so-called cognitive or limbic cerebellum has a direct impact on patient care and provides opportunities for new therapies.

**Disclosure:** Nothing to disclose

## EPO2118

**Cognitive impairment in very early stage of multiple sclerosis: reason for early aggressive therapy?**

D. Kasatkin, S. Molchanova, N. Spirin  
*Neurology, Yaroslavl State Medical University, Yaroslavl, Russian Federation*

**Background and aims:** Cognitive impairment (CI) is a frequent symptom of multiple sclerosis (MS), which is a significant factor in reducing the quality of life of patients from the very early period of disease. Aim was to assess frequency and severity of CI in early diagnosis group (McDonald, 2010), the relationship between CI, demographic factors and features of disease.

**Methods:** 67 MS patients (44 females), relapsing-remitting, remission, age – 38.4 [Q1:Q3=24.5:41.2], disease duration – 70.2 months [56.2:84.3]. Methods - Beck Scale, SDMT, PASAT, MoCA. Inclusion: 1) Diagnosis according McDonald 2010 criteria; 2) duration of disease <8 years; 3) EDSS<5.0. Exclusion: 1) inability to complete test; 2) taking medications that affect mental functions, 3) severe depression; 4) severe comorbidity. Statistical analysis – R Spearman, Chi-square, ROC.

**Results:** In 71% of cases CI was determined: 18.2% - severe CI, 12.1% - moderate CI, 40.6% - mild CI. Frequency and severity of CI significantly increase by the age ( $R=0.40$ ,  $p=0.001$ ). CI for women was more common than men (74% vs 65%). SDMT strongly correlate with EDSS score ( $R=-0.47$ ,  $p<0.001$ ), but not with duration of disease ( $R=-0.14$ , n/s). SDMT (sensitivity 78% and specificity 82%) was more sensible to detect mild and moderate CI than PASAT and MoCA.

**Conclusion:** High prevalence of mild and moderate CI on early stage of the disease with most sensible diagnostic criteria in patient with young age was detected. Decline the cognitive function could influent the quality of life and reflect the reducing functional reserve of the brain. Thus, it may be reason of early high aggressive therapy of main disease.

**Disclosure:** Nothing to disclose

## EPO2119

**Features of indicators of serum immunoreactive antibodies to neuromediator receptors and their influence on the development of cognitive disorders in neurospid**

S. Kuranbaeva, G. Rakhimbaeva, S. Kalandarova, N. Atabekov, N. Avazova  
*Neurology, Tashkent Medical Academy, Tashkent, Uzbekistan*

**Background and aims:** To examine AAT indicators for NF200, GFAP, S100 and their effect on the cognitive functions of HIV-infected patients.

**Methods:** Level of autoantibodies to neurotropic proteins was determined in the blood serum of 90 patients with HIV infection. The average age of patients was  $38.9\pm 1.2$  years, of which 44.4% (44) were women, 55.6% (55) were men. Patients were divided into 2 groups: 25 patients without and 74 patients with certain disorders in the NS. We used ELI-N-Test solid-phase enzyme-linked immunosorbent assay among 70 HIV patients and 16 clinically healthy individuals (control group).

**Results:** In patients with NS disorders due to HIV, this indicator of AAT to S100 exceeded the standard values by an average of 1.9 times ( $p<0.01$ ), and in patients without NS disorders - 1.6 times ( $p<0.05$ ). Analysis of the AAT level for NF200 protein also showed a significant increase in HIV patients (on average 1.7 times with disorders of NS and 1.3 times without,  $p<0.05$ ). In HIV patients with and without disorders, a significant increase in GFAP was found in groups with NS disorders by an average of 1.8 times, and without NS disorders by 1.6 times ( $p<0.05$ ).

**Conclusion:** The data obtained as a result of the study indicate circulating AAT to neurotropic proteins and neurotransmitter receptors in the blood serum of HIV-infected patients can be used as additional prognostic “immuno-biochemical” criteria for the disease and the effectiveness of treatment.

**Disclosure:** Nothing to disclose

## Critical care; Neurotraumatology

## EPO2120

**CAPTAIN-PH: A multicenter, single-blind, multicomponent intervention in TBI in the Philippines**

J. Dominguez<sup>1</sup>, R. Casis<sup>2</sup>, L.L. Lucena<sup>3</sup>, J.R. Soriano<sup>2</sup>, D. Muresanu<sup>4</sup>

<sup>1</sup>Institute for Neuroscience, St. Luke's Medical Center, Quezon City, Philippines, <sup>2</sup>Institute for Neuroscience, St. Luke's Medical Center, QUEZON CITY, Philippines, <sup>3</sup>Dept. of Surgery, Bicol Regional Teaching and Training Hospital, Legaspi, Philippines, <sup>4</sup>Department of Neurosciences, Luliu Hatieganu University of Medicine and Pharmacy, Cluj, Romania

**Background and aims:** The CAPTAIN trials have demonstrated the benefit of Cerebrolysin in moderate to severe traumatic brain injury (TBI) in global outcomes and attention and executive function. In the Philippine ecosystem of care, healthcare is minimally socialized and largely out of pocket, and access to care and care practices vary in regions. The challenge of prompt medical care in TBI is also a stark reality in the Philippines due to unpredictable traffic situations and un-systematized patient transfer during emergencies. Therefore, replicating CAPTAIN II is difficult in the local situation. This investigator-initiated project aimed to adapt CAPTAIN II but make a protocol feasible in the real-world setting in the Philippines (CAPTAIN-PH).

**Methods:** The original version of CAPTAIN II was reviewed and adapted by a multi-disciplinary team comprised of the neurosurgeons and neurologist who know the protocol from their orientation in previous CAPTAIN trial. The team represents private and public hospital settings. Dafin Muresanu (P.I., CAPTAIN II) was advisory. The team identified necessary adaptations to be introduced in CAPTAIN-PH.

**Results:** Adaptations in CAPTAIN-PH are: 1) time to needle was adjusted from 4 to 24 hours to allow for qualified patients delayed in traffic; 2) multicenter single-blind (outcomes assessor) design; 3) at least 2 of 3 infusions will be allowed 4) use of multicomponent intervention (Cerebrolysin plus Cognitive Rehabilitation); and 5) addition of optional resting state and cognitive task-based magnetic resonance imaging (MRI) as exploratory outcomes.

**Conclusion:** CAPTAIN-PH is a multicenter, single-blind, multicomponent TBI intervention (Cerebrolysin and Cognitive Rehabilitation) designed for the real-world situation in the Philippines.

**Disclosure:** Nothing to disclose

## EPO2121

**Stress glycemia in patients with ischemic stroke.**

N. Dovbysh<sup>1</sup>, G. Alexey<sup>2</sup>

<sup>1</sup>Krasnoyarsk, Russian Federation, <sup>2</sup>Krasnoyarsk medical school, Krasnoyarsk, Russian Federation

**Background and aims:** The development of hyperglycemia is one of manifestations of severity of critical state. To assess the incidence of 1 and 2 types of diabetes mellitus and frequency of development of stress hyperglycemia in IS patients.

**Methods:** A prospective observational study was conducted in 88 IS patients admitted to the NICU. The patients were divided into 2 groups: 1 - 78 surviving patients and 2 - 10 died. Age in 1 group was 66.1±10.9 years and 2 group 71.5±14.8 (p≤0.05). Patients were assessed the presence and type of diabetes mellitus, level of glycemia determined in 1st, 3rd and 5th day. Control of blood sugar was carried out at least 6 times a day with correction by introduction of Insulin.

**Results:** Patients of the 1st group had a history of diabetes of type 2 in 18 patients (23%), there was no data for 1 type. In the 2nd group was not history of diabetes 1 and 2 type (p≤0.05). The values of blood sugar at the study stages are presented in the table. The patients in 2 group had a statistically significant higher level of blood sugar at all stages of the study compared with patients in 1 group, although there were no patients who had a history of diabetes.

Table 1  
Blood sugar level, mmol/l, M [25%; 75%]

	Ambulance	1day	3 day	5 day
1 group	8.3 [4.1; 10.3]	4.1 [3.9; 5.1]	5.1 [4.8; 5.6]	5.2 [4.8; 6.8]
2 group	10.2 [5.8; 12.1]	5.3 [4.5; 7.4]	7.6 [5.9; 9.1]	7.7 [6.1; 9.5]
p	≤0.05	≤0.05	≤0.05	≤0.05

Blood sugar level, mmol/l, M [25%; 75%]

**Conclusion:** Development of stress hyperglycemia is typical for patients with severe stroke but we did not find the effect of having a history of diabetes mellitus on outcome of disease.

**Disclosure:** Nothing to disclose

## EPO2122

**Results of plasmapheresis treatment due to neurological disease in a hospital-based series**

C. Figueiredo<sup>1</sup>, A. Gaspar<sup>2</sup>, S. Cruz<sup>1</sup>, L. Leitão<sup>1</sup>, M. Santos<sup>1</sup>, C. Costa<sup>1</sup>

<sup>1</sup>Neurology, Hospital Prof. Fernando da Fonseca, Amadora, Portugal, <sup>2</sup>Nephrology, Hospital Prof. Dr. Fernando Fonseca, Amadora, Portugal

**Background and aims:** Plasmapheresis is an extracorporeal plasma filtration method that aims to remove immunoglobulins and pro-inflammatory factors. Several studies show a similar efficacy when compared with other acute-phase treatments in varied immune-mediated diseases. However, it is often not used due to low availability and fear of adverse events. The most common complications are related to vascular access and hydro electrolytic disturbances.

We aim to characterize the patients that underwent plasmapheresis due to neurological disease, the frequency and severity of adverse events, and the functional impact of treatment.

**Methods:** Retrospective, observational study, including all patients that underwent plasmapheresis due to neurological disease between January 2014 and August 2019. Adverse events were graded according to their severity. The treatment outcomes were evaluated with appropriate scales for each disease.

**Results:** We analyzed 28 treatments (average 6 cycles/treatment), corresponding to 23 patients. The main indications were: CNS demyelinating disease (N=11), myasthenia gravis (N=8), and inflammatory polyneuropathy (N=4). A total of 53 adverse events were registered. The most common were fibrinogen deficiency (N=12), catheter-related infection (N=11), arterial hypotension (N=7), and electrolytic imbalance (N=6). While most were not serious, two severe adverse events were identified (acute pulmonary edema). No deaths related to adverse events occurred. 6 treatments were suspended due to complications. Most patients (70%) had a functional benefit from the treatment.

**Conclusion:** Although the adverse events were frequent, most are mild, with minimal intervention required. In patients without the desired initial response, plasmapheresis may be useful in achieving a better clinical outcome.

**Disclosure:** Nothing to disclose

## EPO2123

**Tapia's Syndrome – is the mechanism neuropraxia from intubation or is it more complex?**

J. Hutchinson<sup>1</sup>, B.K. Macdonald<sup>2</sup>

<sup>1</sup>Neurology and Stroke, St. George's Hospital, London, United Kingdom, <sup>2</sup>Neurology, St. George's Hospital, London, United Kingdom

**Background and aims:** An otherwise well 23-year-old lady had a septorhinoplasty with bilateral implants under general anaesthesia for nasal blockage and right sided nasal deviation unresponsive to conservative therapy.

The operation was successful but 6 hours later the left side of her tongue felt odd, she had dysphonia and 'it felt funny to swallow'. She had deviation of the tongue to the left on protrusion; was unable to move the tongue quickly from side to side; and had altered sensation of the left side of the tongue. There was no obvious tongue swelling or haematoma and no weakness or numbness in the face or limbs. Naso-endoscopy confirmed a left vocal cord paralysis.

**Methods:** This was recognised as a left sided hypoglossal and vagal nerve palsy. The ENT and anaesthetic teams, felt that it might have been due to over-packing of the throat causing compression and neuropraxia.

This case will be discussed with reference to both the 1st described and more recent case reports of Tapia's syndrome along with the hypothesised mechanisms of injury. Tapia's syndrome is a thought to be due to pressure during intubation but most case reports follow surgeries with hammering and other sudden applications of force, rather than in emergency situations which would be expected to have more problems resulting from intubation.

**Results:** The patient was admitted for observation, and dexamethasone. Her symptoms substantially improved after 5 days. Later neurophysiological studies didn't find any abnormalities.

**Conclusion:** It seems important that those who resuscitate patients are aware of this potential complication.

**Disclosure:** Nothing to disclose



## EPO2124

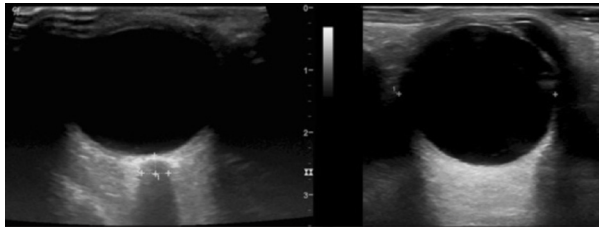
## ONSD/ETD as a prognostic ratio of intracranial hypertension in traumatic brain injury patients in the emergency department

A. Ibadi

Emergency, <sup>1</sup>Secours Populaire Libanais Hospital- Najdeh Hospital, Nabatieh, Lebanon

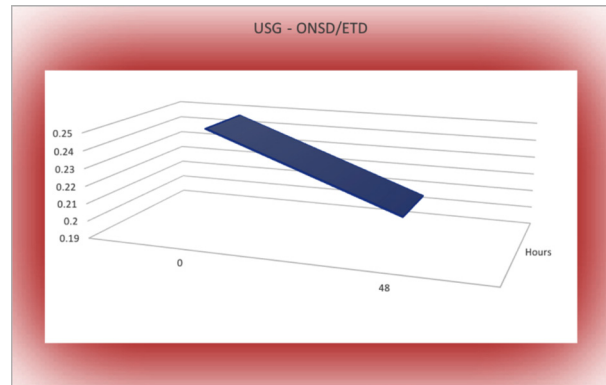
**Background and aims:** Our objective is to determine the ultrasonographic measurement ratio (ONSD/ETD) can accurately predict the computed tomography findings as a marker for evaluation and prognostication of intracranial pressure in traumatic brain injury.

**Methods:** We conducted a prospective, blinded observational study of seventy adult patients at the Department of Emergency Medicine between (2017-2018) having moderate to severe TBI and GCS <8. Using a 7.5 MHZ ultrasonographic probe on the closed eyelids, the eyeball transverse diameter(ETD) and optic nerve sheath diameter(ONSD) were performed bilaterally at the ED and after 48 hours of admission, following a 20% Mannitol infusion. ONSD/ETD ratio was calculated. Cranial CT findings (acc. to Marshall Classification) suggestive of elevated intracranial pressure were used to evaluate optic nerve sheath diameter accuracy.

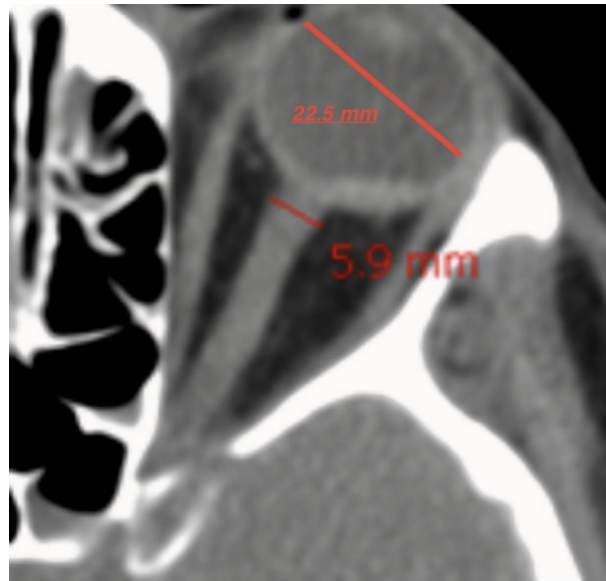


ONSD and ETD measurement

**Results:** USG-ONSD was greater than 5.7mm and decreased after mannitol infusion from 6.3 (6.1–6.7) to 5.2mm (5.5–6.3) ( $p=0.0007$ ). ONSD/ETD has dropped from 0.25 till 0.21 (0.18-0.18). Median and Mean ETD was 22.85mm and  $22.91 \pm 0.93$ mm. Enlarged right/left CT-ONSDs were  $6.5 \pm 1.5/6.4 \pm 1.3$ mm at 3mm and  $6.6 \pm 0.8/6.6 \pm 0.6$ mm at 8-10mm from the globe (cut-off value > 5.5mm). ONSD/ETD ratio was  $0.29 \pm 0.05$  compared with  $0.19 \pm 0.02$  in healthy adults ( $P < 0.01$ ). The sensitivity of ultrasonography for detection of any traumatic intracranial injury found by CT was 85% (95% CI 60% to 97%) and specificity was 75% (95 %CI 59% to 86%).



ONSD/ETD analysis



ONSD/ETD ( CT) measure

**Conclusion:** ONSD/ETD has potential as a sensitive screening test for elevated intracranial pressure in traumatic brain injury.

**Disclosure:** Nothing to disclose

## EPO2125

### Comparing efficacy of pedicle screw fixation methods for treating thoracolumbar burst fractures with neurological deficit

S. Likhachev<sup>1</sup>, V. Zaretskov<sup>1</sup>, V. Ostrovskij<sup>1</sup>, V. Arsenievich<sup>1</sup>, A. Shulga<sup>1</sup>, E. Salina<sup>2</sup>  
<sup>1</sup>Research Institute of Traumatology, Orthopedics and Neurosurgery of the Ministry of Health of Russian Federation, Saratov, Russian Federation, <sup>2</sup>Saratov, Russian Federation

**Background and aims:** Short-segment posterior fixation (SSPF) is the most common method for treating thoracolumbar burst fractures (TLBF). Posterior short-segment fixation including the fractured vertebra (PSFFV) is a means of pedicle screw fixation failure prevention. This study presents the comparison of outcomes of SSPF and PSFFV for TLBFs with neurological deficit.

**Methods:** 69 patients aged 37±19 years with TLBFs. The neurological deficit was found in all patients and classified on ASIA scale (B – 15, C – 32, D – 22). Pain severity was 7.3±0.5 points on VAS10. CA before surgery was 16.7±5.10. The canal compromise was 50±12%. SSPF was performed on group 1 (n=35) and PSFFV on group 2 (n=34). No statistical differences in age, height, weight, type or injury level as well as the severity of canal compromise or neurological deficit were observed (p>0.05). Outcomes were registered on post-surgery day 7, in 6 and 12 months.

**Results:** The regress of neurological deficit in 7 days was identical in both groups (p>0.05), and in 6 and 12 months it was higher in group 2 (p=0.04). There were no differences in CA and canal compromise correction in 7 days in both groups (p>0.05), but in 6 and 12 months the results in group 2 showed better stability (p=0.02) suggesting that using PSFFV facilitates stabilization for long-term outcomes.

**Conclusion:** PSFFV is efficient for treating TLBFs with neurological deficit.

**Disclosure:** Nothing to disclose

## EPO2126

### Observational study of infectious complications in a Neurological Intensive Care Unit

I. Maestrini<sup>1</sup>, A. Tahoun<sup>2</sup>, G. Giuliani<sup>2</sup>, A. Marta<sup>2</sup>, M.R. Ciardi<sup>3</sup>, V. Di Piero<sup>1</sup>  
<sup>1</sup>Rome, Italy, <sup>2</sup>Department of Human Neurosciences, 'Sapienza' University of Rome, Rome, Italy, Rome, Italy, <sup>3</sup>Department of Public Health and Infectious Diseases, 'Sapienza' University of Rome, Rome, Italy, Rome, Italy

**Background and aims:** Infections in patients admitted to the neurological intensive care unit (NeuroICU) require often an empirical, prolonged and combination antibiotic therapy due to the initial uncertainty of the etiological diagnosis and/or the frequent multi-drug resistance (MDR) of causal bacteria. Since the duration of infections and antibiotic therapy can affect the mortality and disability of patients in NeuroICU, we investigated the role of infections and duration of subsequent antibiotic therapy on the patients' outcome and on bacterial MDR infections occurrence.

**Methods:** 120 patients (mean age 67.4±18.7 yrs) were admitted to our NeuroICU between June 2017 and June 2018. Clinical, biological and infection-related data during entire hospitalization were collected. Good outcome was defined a modified Rankin Scale score 0-2 at discharge.

**Results:** About 40% of patients developed infections during hospitalization. Infections were associated with a lower probability of good outcome (OR 0.01, 95% CI 0.00-0.26) and a tendency towards greater mortality (OR 8.37, 95% CI 0.97-73.32). Longer duration of antibiotic therapy was associated with a greater probability of good outcome (OR 1.11, 95% CI 1.02-1.22) without modifying mortality. MDR agent infections (25.5% of all infections) were more frequent in patients with longer antibiotic therapy and hospitalization as well as in those with medical devices.

**Conclusion:** On the 1 hand a longer duration of antibiotic therapy is associated with a better outcome, while on the other it is more frequent in patients with MDR infections. Further studies are needed to define a safety cut-off for antibiotic therapy duration in this setting.

**Disclosure:** Nothing to disclose

## EPO2127

### Reversible Locked-in Syndrome After a Voluminous Hematoma in The Posterior Fossa

A.L. Navarrete Fernandez<sup>1</sup>,

A. Augusto Viana Oliveira E Sousa<sup>2</sup>, B. Pereira Braga<sup>2</sup>,  
C. Callegari Piccinin<sup>2</sup>, F. Buchdid Cardoso<sup>2</sup>,  
F. Franco Da Graça<sup>2</sup>, L. Valler<sup>2</sup>, M. Almeida Vidal<sup>2</sup>,  
P. Pavan<sup>2</sup>, T. Alexandre Yasuda<sup>2</sup>, V. Hachiman<sup>2</sup>,  
P. Afonso Mei<sup>2</sup>

<sup>1</sup>São Leopoldo Mandic, Campinas, Brazil, <sup>2</sup>Centro Médico de Campinas, Campinas, Brazil

**Background and aims:** The locked-in syndrome (LIS) is a state characterized by tetraplegia, anarthria and preservation of the level of consciousness, besides a certain ocular movement through which the patient communicates. We present a case of a woman with quadriplegia and bulbar palsy after suffering a large haemorrhagic stroke in the posterior fossa, and a diagnosis of locked-in syndrome was established.

**Methods:** Woman, 61-year-old, admitted with thunderclap headache and rapid deterioration of the sensorium. CT scan revealed a voluminous hematoma in the posterior fossa, caused by warfarin intoxication (she had atrial fibrillation, novel anticoagulants were ruled out due to metallic mitral valve). After surgical decompression, she displayed quadriplegia and bulbar palsy, maintaining some extrinsic ocular movements. Conscience was spared - she blinked to answer questions of “yes” and “no”. Presented no respiratory drive, being intubated, later evolving to tracheostomy. CT reading was unclear due to artefacts, and MRI was opted out due to clinical instability and some concern of disturbance of the cardiac valve. After a few weeks, she partially recovered some body movements and the bulbar muscles strength, maintaining dysarthria. MRI, then performed, showed no lesions in the brainstem, except for sequels in the void hematoma area, in the left cerebellar hemisphere.

**Results:** LIS was caused by the hematoma compression and the subsequent effect of post-manipulation edema.

**Conclusion:** The compression by the hematoma and subsequently effect of post-manipulation edema might have caused a neuropraxia of the motor pathways, causing a reversible locked-in syndrome.

**Disclosure:** Nothing to disclose

## EPO2128

### The use of Medical grade cannabis in Italy

C. Pane, S. De Pietro, M. Caterino, A. Trinchillo,  
G. De Michele, A. Carotenuto, V. Bresci Morra, A. Filla,  
F. Sacca'

Department of Neuroscience, Reproductive Science and Dentistry University “Federico II”, Naples, Italy

**Background and aims:** In Italy, Medical Grade Cannabis (MGC) can be prescribed for different medical conditions, whenever standard and approved therapies have failed, or caused non-tolerable side effects.

Here we describe our 5-year clinical experience in the management and prescription of MGC.

**Methods:** This is a retrospective observational study. MGC was prepared according to Italian laws and administered as either an olive oil extract (OOE), or as an oral non activated form. Cannabis was prescribed as either Bedrocan (22% THC, <1% CBD), Bediol (6.5% THC, 8% CBD), or Bedrolite (0.4% THC, 9% CBD). Responders were classified as patients showing  $\geq 20\%$  reduction in the Numeric Rating Scale (NRS).

**Results:** We treated 111 patients (63% female; mean age 47.4 years). Median FU for responders was 19 months. Prescription indications are reported in Figure 1. 70% of patients were treated with Bedrocan, 10.8% with Bediol, and 2.7% with Bedrolite. 57% of patients responded to MGC, whereas 43% dropped out for lack of response. Mean baseline NRS was  $8.12 \pm 1.6$  and decreased at FU to  $5.27 \pm 2.4$  ( $p < 0.001$ ; Figure 2). Patients receiving MGC for pain showed the best effect with -3.3 points NRS reduction. Patients with baseline NRS  $> 8$  had a higher therapy persistence (HR=0.19;  $p < 0.001$ ; Figure 3), and higher response to (OR= 4.8;  $p = 0.001$ ). MGC was overall safe and well tolerated.

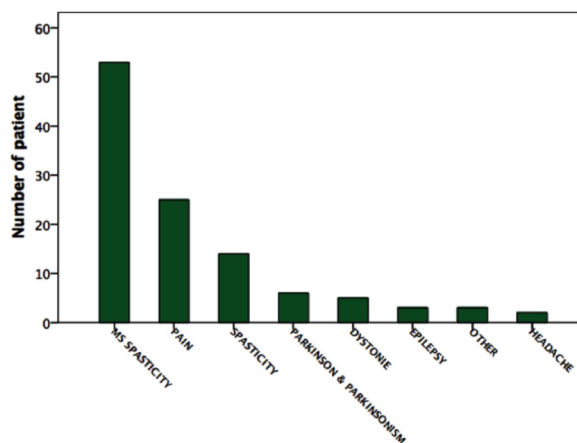


Figure 1. Prescription indications

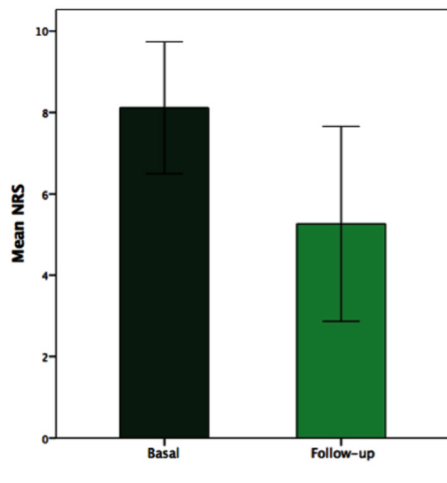


Figure 2. NRS at baseline and FU

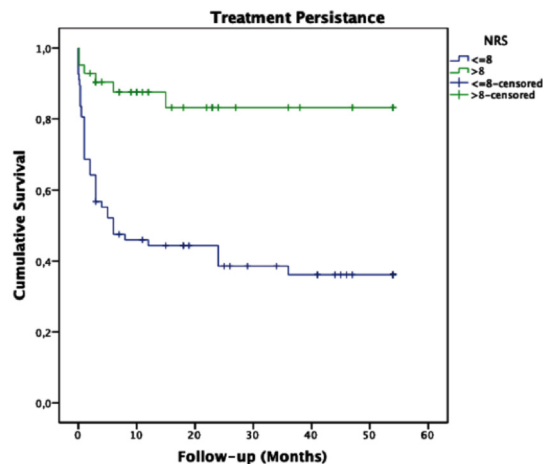


Figure 3. Therapy persistence

**Conclusion:** Our experience shows that MGC can be successfully used in a neurological setting and that it is safe and well tolerated. Patients with higher NRS had a higher response probability and treatment persistence.

**Disclosure:** Nothing to disclose

## EPO2129

### Correlation of clinical symptoms and neuroimaging indicators in aggressive vertebral hemangiomas.

E. Salina<sup>1</sup>, S. Likhachev<sup>2</sup>, V. Zaretskov<sup>2</sup>, V. Arsenievich<sup>2</sup>, S. Mizyurov<sup>2</sup>, E. Kuznetsova<sup>3</sup>, N. Kaibekova<sup>4</sup>

<sup>1</sup>Neurology, Saratov State Medical University, Saratov, Russian Federation, <sup>2</sup>Research Institute of Traumatology, Orthopedics and Neurosurgery of the Ministry of Health of Russian Federation, Saratov, Russian Federation, <sup>3</sup>Saratov, Russian Federation, <sup>4</sup>Saratov State Medical University, Saratov, Russian Federation

**Background and aims:** Aggressive hemangiomas of the vertebrae are characterized by a complex of neurological and radiological changes.

**Methods:** 42 patients with an average age of 41±1.8 years with aggressive hemangiomas of the vertebrae were examined. Conducted: pain assessment on a visual analogue scale (VAS), on a scale of DN4, neurological status, level of anxiety and depression on a scale of HADS, CT of the vertebrae, calculation of possible changes in vertebral support using a computer program.

**Results:** All patients had chronic local pain syndrome on average about 2 years. On the VAS scale, an average of 5.6 points, on the DN4 scale, an average of 6.3 points. Patients with hemangiomas occupying more than 80% of the vertebral body according to the VAS scale had 1.7 points. Objectively: muscle-tonic syndrome (85.7%), radicular disorders (57.1%), dysfunction of the pelvic organs (42.8%), chronic venous insufficiency (76.1%), autonomic, trophic disorders of the lower extremities (69%). According to the HADS scale, moderate anxiety in 83.3% of patients, depression in 11.9% of cases. It was found that the likelihood of a decrease in support ability by more than 50% correlated with the localization of hemangiomas at the level of Th12 and L1 vertebrae, by 30% at the level of L3-L5 vertebrae.

**Conclusion:** Aggressive hemangiomas of the vertebra are accompanied by chronic local pain, with an increase in the size of the hemangioma, severe pain decreases, there is also a neurological deficit, changes in the morphometric parameters of the vertebral body, which increases the risk of a pathological fracture.

**Disclosure:** Nothing to disclose

## EPO2130

**Diffuse brain edema as a result of generalized seizures caused by acute hyperglycemia, from new introduced olanzapine therapy**V. Shala<sup>1</sup>, F. Jashari<sup>2</sup><sup>1</sup>Peja, <sup>2</sup>Prishtina, Albania

**Background and aims:** Olanzapine can cause both generalized seizures and hyperglycemia. Aim of this paper is to present a case with transient diffuse brain edema, after taking olanzapine tablet, as a result of seizures induced by high level of blood sugar.

**Methods:** 57-year-old female patient without consciousness and with serial generalized seizures was admitted to the neurology intensive care unit. Glasgow Coma Scale scored 7 points. Heteroanamnesis revealed that the patient was chronically suffering from depressive psychosis, and olanzapine was newly introduced in the treatment scheme. The condition was developed within short period, with dramatic manifestation.

**Results:** CT scan displayed diffuse brain edema. Lab values indicated a post-generalized seizure activity and hyperglycemic state. The health status has been improved within 48 hours. The main treatment included anti edematous, Ringer's solution, anti-diabetic and anti-epileptic medications.

**Conclusion:** This case report warns medical professionals regarding adverse effects olanzapine can induce, including hyperglycemia, seizures, ultimately diffuse brain edema. Based on the fact brought above, it is of crucial importance to take a detailed history from family members, because an early and correct diagnosis can save lives.

**Disclosure:** Nothing to disclose

## EPO2131

**Secondary traumatic brain injury in rats: Evolution of damage in the neocortex and hippocampus during acute period**

N. Shirobokova, I. Komoltsev, M. Novikova, N. Gulyaeva

*Dept. of Functional Biochemistry of the Nervous System, Institute of Higher Nervous Activity and Neurophysiology, RAS, Moscow, Russian Federation*

**Background and aims:** Traumatic brain injury (TBI) induces damage both in the neocortex (primary lesion) and hippocampus (distant lesion). Morphological changes develop gradually and represent secondary mechanisms of damage. The purpose of the study was to assess evolution of morphological damage in the neocortex and hippocampus and its behavioral correlates during acute period of TBI in rats.

**Methods:** The experiment was performed on 48 adult male Wistar rats. TBI was modeled using lateral fluid percussion in the right sensorimotor cortex. Rats were sacrificed on day 3 after TBI, or on day 7, after behavioral assessment in open field and elevated-plus maze tests. Cortical damage was estimated with semiquantitative analysis of Nissl stained sections using unfolded maps. Pro-inflammatory microglial activation was assessed using anti-IBA staining.

**Results:** Gliosis and necrosis developed in functional neocortical areas: primary somatosensory, parietal, secondary auditory and secondary visual ones. The degree of neocortical damage increased from day 3 to 7. Microglial activation was seen only in CA3 area of the ipsilateral hippocampus on day 3 after TBI, while on day 7 it was also seen in dentate gyrus (DG) in the ipsilateral and contralateral hippocampus. Morphological changes were accompanied by behavioral abnormalities in both tests.

**Conclusion:** Secondary damage in acute period of TBI develops in cortex (enlarging necrotic changes in primary and secondary sensory area) and hippocampus (evolving microglial activation in ipsilateral CA3 and bilaterally in DG). The behavioral changes in rats in acute TBI period may result from sensory deficit in rats.

**Disclosure:** Supported by RFBR, grant №19-015-00258

## EPO2132

**Late sequelae of TBI in rats: Anxiety and hippocampal sclerosis**

A. Volkova, I. Komoltsev, M. Novikova, N. Gulyaeva  
*Dept. of Functional Biochemistry of the Nervous System,  
 Institute of Higher Nervous Activity and Neurophysiology,  
 RAS, Moscow, Russian Federation*

**Background and aims:** Traumatic brain injury (TBI) is a serious risk factor for neurological and psychiatric disturbances in late period of trauma, including depressive/anxiety and cognitive disorders. Distant chronic neuroinflammation, neuronal loss and gliosis in the hippocampus may explain cognitive deficits and emotional disturbances in late period of TBI.

**Methods:** The study was performed on 20 male Wistar rats aged 6 months, sham and TBI groups. TBI was modeled using lateral fluid percussion in the right sensorimotor cortex. Anxiety behavior was assessed in the elevated plus maze, open field and forced swim tests 1 week before and 6 months after TBI. Morphological changes were evaluated by Nissl and GFAP staining.

**Results:** Morphological findings both in TBI and sham rats included astrogliosis in the hippocampus (DG and CA3), notably asymmetrical and much more pronounced in TBI group. TBI induced ipsilateral thinning of pyramidal layer (pl) in CA3 which correlated with astrogliosis. Dispersion in CA3pl was noticed in 11 rats in both groups. 6 months after TBI all rats showed lower activity and signs of anxiety behavior, more significant in TBI group.

**Conclusion:** 6 months after TBI rats showed asymmetrical hippocampal astrogliosis with neuronal loss in CA3pl. These changes are similar to human hippocampal sclerosis type 3. All rats demonstrated anxiety behavior, significant more expressed after TBI. The results show the validity of the TBI model to study mechanisms of late posttraumatic pathology.

**Disclosure:** Supported by RFBR, grant №19-015-00258

## EPO2133

**Case Series: Sensorineural Anosmia Post-Traumatic Brain Injury**

M. Witjaksono<sup>1</sup>, P. Prawiroharjo<sup>1</sup>, F. Endiyarti<sup>2</sup>  
<sup>1</sup>*Neurology, University of Indonesia - Cipto Mangunkusumo Referral Hospital, Jakarta, Indonesia,* <sup>2</sup>*Ear, Nose, and Throat Clinic (ENT), University of Indonesia - Cipto Mangunkusumo Referral Hospital, Jakarta Pusat, Indonesia*

**Background and aims:** Olfactory dysfunction (OD) is common after traumatic brain injury (TBI). Its incidence ranges from 4-60%, yet it is often undiagnosed, usually recognized later, impacting quality of life. Mechanisms underlying post traumatic OD includes sinonasal tract disruption, direct shearing or stretching of olfactory nerve fibers, and focal contusion of olfactory bulb or cortex, causing conductive or sensorineural OD. We present three cases of patients who sustained motor-vehicle accidents with signs and symptoms of OD.

**Methods:** The cases are adult-aged males sustaining moderate brain injuries from motorcycle collisions. Each had good cognitive functions therefore was evaluated. Olfactory function was tested using nasoendoscopy, Sniffin' Sticks test (SST) and intravenous olfactory (IVO) test, correlating the results with clinical manifestation and head computed tomography (CT) to interpret the biomechanism of injury.

**Results:** Case 1: examined on day-22, had nasal bone fracture, frontal lobe fracture and contusion. Case 2: examined on day-16, had frontal lobe fracture and contusion, temporal lobe epidural hematoma (EDH). Case 3: examined on day-16, had nasal and frontal bone fractures, frontal lobe EDH and intracerebral hemorrhage (ICH), temporal lobe ICH. All 3 cases had low SST score, undetectable IVO and was assessed as sensorineural anosmia.

**Conclusion:** The cases presented shows that post traumatic OD can be recognized and should be detected not long after the onset of injury. The biomechanism and location of lesion in the brain, as well as other structures of the head correlates with the risk of OD. Most head injuries cause severe damage to the olfactory pathways therefore causes sensorineural anosmia.

**Disclosure:** Nothing to disclose

## Epilepsy 3

### EPO2134

#### Gender effect on Juvenile Myoclonic Epilepsy

G. Maira<sup>1</sup>, L. Giuliano<sup>1</sup>, G. Mainieri<sup>1</sup>, G. Battaglia<sup>2</sup>, A. Guccione<sup>2</sup>, V. Sofia<sup>1</sup>, M. Zappia<sup>1</sup>

<sup>1</sup>Department of Medical and Surgical Sciences and Advanced Technologies "G.F. Ingrassia", University of Catania, Catania, Italy, <sup>2</sup>Department of Medical and Surgical Sciences and Advanced Technologies "G.F. Ingrassia", Neuroscience section, University of Catania, Catania, Italy

**Background and aims:** Juvenile myoclonic epilepsy (JME) is a widely recognized, presumed genetic, electroclinical generalized epilepsy syndrome. Previous studies evaluated electroclinical prognostic factors with controversial results and only few studies addressed the influence of sex in the long-term prognosis. Objective of the study was to evaluate the long-term outcome in a group of patients and to assess the presence of prognostic factors which could be linked to sex.

**Methods:** We retrospectively selected a group of patients with JME evaluated in our epilepsy center with at least 5 years of follow-up. We considered the clinical and EEG features at the 1st (T1) and the last follow-up (T2) visit. Seizure-freedom was defined as the absence of any type of seizure for at least 2 years. Patients were stratified into two groups according to sex.

**Results:** 105 patients with JME were included (67 females [63.8%]; mean age 36.6±9.4). The mean age of seizures onset was 14.2±3.9 years. The mean disease duration was 18.9±9.1 years with a mean follow-up time of 13.1±6.0 years. At the last follow-up, 21 males (55.3%) and 33 females (49.2%) were seizure free with a mean time to reach seizure-freedom of 19±8.7 years for males and 17.3±9.7 years for females, with no significant differences. Negative prognostic factors were weekly seizures and arms myoclonia at onset in males, absences and lower age at onset in females.

**Conclusion:** The results of our study reveal that some prognostic factors are sex-specific in JME.

**Disclosure:** Nothing to disclose

### EPO2135

#### Severity and stability of drug resistant focal epilepsy

S. Malyshev, T. Alekseeva

Almazov National Medical Research Centre, Saint Petersburg, Russian Federation

**Background and aims:** A proportion of patients with drug resistant epilepsy (DRE) experience long (>1 year) periods of seizure freedom (PoSF). This may reflect comparatively lower intrinsic severity of the disease.

**Methods:** The study included 104 patients with focal DRE referred to a epilepsy surgery center. The history was analyzed basing on patients' recollection and previous medical records. In order to assess current disease severity, QOLIE-31, LSSS and NNDI-E questionnaire were used. For the statistical analysis we used the Mann-Whitney test.

**Results:** PoSFs were observed in 27% (28/104) of the studied patients. Duration of PoSFs varied from 1 to 12 years. In three cases (11%) the patients took no antiepileptic drugs during the PoSF. One patient (3%) had a PoSF twice. There were no statistically significant differences between the patients with and without history of PoSF in terms of current disease severity ( $p>0.05$ ). Patients who had no seizures during one month before the assessment had lower NNDI-E scores (9.2 (6.0–12.0) vs. 12.6 (6.0–21.0),  $p<0.01$ ) and, surprisingly, lower cognitive functioning score in the QOLIE-31 (11.8 (0–27.0) vs. (15.7 (0–27.0),  $p=0.04$ ) than patients with uncontrolled seizures.

**Conclusion:** Drug resistance in focal epilepsy may be remittent in 27% of the cases. The history of periods of seizure freedom seems to have no influence on overall disease severity. In contrast, the presence of ongoing seizures affect cognitive functioning and emotional well-being.

**Disclosure:** Nothing to disclose

## EPO2136

**Cognitive functions in children with temporal and frontal epilepsy**

M. Domańska, M. Mazurkiewicz-Beldzińska, M. Zawadzka, M. Szmuda, E. Trybała, A. Lemska, S. Modrzejewska

*Medical University of Gdańsk, Gdańsk, Poland*

**Background and aims:** Frontal Lobe Epilepsy (FLE) and Temporal Lobe Epilepsy (TLE) are the 2 most frequent types of localization – related epilepsies and they are connected with difficulties in cognitive functioning. The main aim of conducted study was to compare cognitive functioning among children with newly diagnosed FLE or TLE at the beginning of the disease and during its course and to compare them with control group.

**Methods:** Study included 39 patients with newly diagnosed TLE and 24 with FLE and 24 healthy children. Neuropsychological examination was carried out in the moment of diagnosis and after 2 or 3 years from the diagnosis, by using validated and standardized to the patient's age diagnostic tools.

**Results:** In children with focal epilepsy accomplished worse results in most of the tasks compared to the control group already in the 1st examination. Patients with FLE presented difficulties in memorizing verbal and visual material, attention, and in learning new information. Patients with TLE had difficulties in tasks engaging verbal and non-verbal memory and attention. In long – term analysis group of patients with FLE presented more severe cognitive impairment comparing with other groups. Despite similar tendencies among children with TLE, in group of patients with FLE significant worse results in tasks engaging verbal memory and attention were observed.

**Conclusion:** Conducting full assessment of cognitive functioning in children suffering from epilepsy is essential not only at the moment of making diagnosis but also during the disease due to introduce, as quick as possible, individual system of support.

**Disclosure:** Nothing to disclose

## EPO2137

**Surgical outcomes in patients with Refractory Epilepsy after CNS infection**

B. Meira<sup>1</sup>, F. Sá<sup>1</sup>, A. Santos<sup>2</sup>, N.M.M. Canas<sup>3</sup>, P. Cabral<sup>1</sup>, S.G. Refractory Epilepsy<sup>1</sup>

<sup>1</sup>Neurology, Hospital Egas Moniz - CHLO, Lisbon, Portugal,

<sup>2</sup>Neurosurgery, Hospital Egas Moniz - CHLO, Lisbon,

Portugal, <sup>3</sup>Neurology, Hospital Beatriz Angelo, Loures, Portugal

**Background and aims:** Epilepsy is a frequent complication of CNS infections. Analysis of the subset of post-CNS infection refractory epilepsy cases in surgical series is scarce. We aim to characterize this subgroup and compare surgical outcomes with other etiologies.

**Methods:** Retrospective review clinical, imaging and EEG data of adult patients evaluated on our Reference Centre for Refractory Epilepsy since 2006.

**Results:** Out of 312 patients evaluated, 38 had past history of CNS infection. After pre-surgical evaluation 23 were surgically treated (9 prior meningitis/14 prior encephalitis). Most patients had seizures in the acute phase (94%) and encephalitic patients had seldom “silent period”. Comparing with patients surgically treated without past infection (n=89): more patients had focal sensory seizure (17% vs 5%) and focal cognitive seizure (22% vs 14%, p-value=0.745); 35% patients had normal brain MRI (vs 10%, p-value=0.001) and 9 had hippocampal sclerosis; on video-EEG monitoring, 29% had focal interictal discharges (vs 59%, p-value=0.016), 48% a focal ictal onset (vs 79%, p-value=0.000) with temporal onset in 75% (vs 78%); 2 patients had invasive-EEG recordings. Resective surgery was performed in 19 patients (83% vs 92%) and VNS in 4 (17% vs 8%, p-value=0.082). Only 6 patients achieved Engel Ia (33% vs 57%, p-value=0.007) and 1 patient didn't improve. Logistic regression showed that younger age at occurrence of meningitis and clear latency period were related with favorable surgical outcome.

**Conclusion:** As previously reported, our series demonstrated that patients with epilepsy following CNS infection may be good candidates for surgical treatment, although with less favorable outcomes.

**Disclosure:** Nothing to disclose



## EPO2138

**Transcranial magnetic stimulation as a tool for the evaluation of neuromodulatory effects of transcutaneous vagus nerve stimulation**

A. Mertens, S. Carrette, E. Lescauwaet, K. Vonck, P. Boon

*Department of Neurology, Ghent University Hospital, Ghent, Belgium*

**Background and aims:** The combination of transcranial magnetic stimulation and electromyography (TMS-EMG) allows to study the modulation of motor-evoked potentials (MEPs). As MEPs reflect the excitability of the entire corticospinal pathway, they are subject to cortical, subcortical and spinal modulation. The combination of TMS and electroencephalography (TMS-EEG) allows a direct read-out of cortical reactivity by means of TMS evoked potentials (TEPs), avoiding this interference. As MEPs and TEPs are reproducible within subjects, they may be useful to study neuromodulatory interventions, like transcutaneous auricular vagus nerve stimulation (tVNS).

**Methods:** In this prospective cross-over study, 15 healthy male subjects underwent 2 sessions, at least one week apart. During each session, tVNS or sham stimulation was delivered at the maximum tolerated amplitude during one hour. MEPS and TEPs were measured over the right primary motor cortex before and after the intervention. For these measurements, 120 single TMS pulses, 120 paired TMS pulses with an interstimulus interval of 3ms and 120 paired TMS pulses with an interstimulus interval of 100ms were delivered over the motor hotspot.

**Results:** MEPs and TEPs were compared at the single subject level before and after each neuromodulatory intervention. Preliminary results show no statistically significant difference in mean MEP morphology after real tVNS compared to sham stimulation. TMS-EEG data analysis is still ongoing.

**Conclusion:** In contrast to previous research, our preliminary results show that active tVNS, as compared to sham stimulation, was not able to modify excitability measured by TMS-EMG. The analysis of the neuromodulatory effect of tVNS on TMS-EEG is currently ongoing.

**Disclosure:** Nothing to disclose

## EPO2139

**Role Of Vascular Endothelial Growth Factor in Arteriovenous Malformation Associated-Seizures**

W. Mustafa, A. Gaber, E. El Menshawi  
*Neurology, Mansoura University Hospital, Mansoura, Dakahliya, Egypt*

**Purpose:** This study was designed to evaluate the role of vascular endothelial growth factor in AVM associated seizures

**Methods:** A case-control study conducted on 40 patients subdivided into 3 groups on Mansoura university hospital. The patients subdivided into 3 groups: 10 patients: AVM with seizures. 16 patients: AVM without seizures. 14 patients (control): patient without AVM. Plasma samples were collected from 40 patients to detect the basal level of VEGF. The serum samples were immediately centrifuged and frozen at -80 C, VEGF were measured by commercially available ELISA (double-antibody sandwich enzyme linked Immunosorbent Assay) kits (Human vascular endothelial cell growth factor ELISA Kit, SUNRED Biological Technology) Data were fed to the computer and analyzed using IBM SPSS software package version 22.0. Significance of the obtained results was judged at the 0.05 level.

**Results:** There was statistically significant higher mean of VEGF among AVM cases in comparison to control group, also the VEGF mean value was statistically significant higher among epileptic cases than cases without epilepsy

**Conclusion:** Our results confirmed the role of VEGF in both AVM and epilepsy and it may be used in future as a reliable and valid predictor. Regarding the debate of the role of VEGF in epilepsy, whether if it's a neuroprotective or it's epileptogenic, our study tilting the balance heavily in favour of the epileptogenic effect of VEGF. This study not only gives a hope for using VEGF as a predictor tool in AVM and epilepsy but also VEGF may have a role in future treatment.

**Disclosure:** Nothing to disclose

## EPO2140

**The effect of additional antiepileptic drugs for epilepsy in glucose transporter 1 deficiency syndrome**

S. Nabatame, M. Shima, R. Nakai, R. Kuwayama, J. Tanigawa, K. Tominaga, K. Kagitani-Shimono, K. Ozono

*Pediatrics, Osaka University, Suita, Japan*

**Background and aims:** Glucose transporter 1 deficiency syndrome (GLUT1DS) leads to cerebral energy failure and causes refractory epilepsy, intellectual disability and several complex movement disorders. Although the ketogenic diet (KD) is the only effective treatment, it does not effective for some patients. We studied the efficacy of KD and additional antiepileptic drugs for epilepsy in GLUT1DS.

**Methods:** We retrospectively reviewed the medical records of GLUT1DS patients who visited our hospital from 2004 to 2019. The diagnosis was confirmed by genetic analysis of the SLC2A1 gene or the erythrocyte glucose uptake test.

**Results:** The study enrolled 43 patients (19 males and 24 females; age range: 1–53 years [median: 14 years]), and 39 (91%) patients had epilepsy. The seizure types were generalised tonic-clonic (23, 53%), focal tonic (25, 58%), focal clonic (19, 44%), focal impaired consciousness (25, 58%), focal to bilateral tonic-clonic (24, 56%), absence (23, 53%) and infantile spasms (1, 2%). The KD was introduced in 38 (88%) patients. The average age at diet initiation was 6 years, and the average diet duration was 7 years. 2 patients dropped out owing to refusal. Convulsive seizures and absence were eliminated by KD alone in 9 (26%) and 8 (35%) patients, respectively, and antiepileptic drugs along with KD in 1 (3%) and 4 (17%) patients, respectively. Valproate, lamotrigine, levetiracetam and nitrazepam were sometimes effective to reduce seizure frequency after KD introduction.

**Conclusion:** Our findings indicate the efficacy of the KD and show that appropriate addition of antiepileptic drugs is sometimes efficacious for seizure control.

**Disclosure:** Nothing to disclose

## EPO2141

**Incidence of post-stroke epilepsy in Umbria: population study based on administrative regional health data**

E. Nardi Cesarini<sup>1</sup>, P. Eusebi<sup>2</sup>, M. Romoli<sup>1</sup>, P. Casucci<sup>2</sup>, M. De Giorgi<sup>2</sup>, D. Franchini<sup>2</sup>, C. Calvello<sup>1</sup>, P. Calabresi<sup>3</sup>, L. Parnetti<sup>1</sup>, C. Costa<sup>1</sup>

<sup>1</sup>*Department of Medicine, University of Perugia, S.M.*

*Misericordia Hospital, Neurological Clinic, Perugia, Italy,*

<sup>2</sup>*Regional Health Authority of Umbria, Health ICT Service,*

*Perugia, Italy,* <sup>3</sup>*Department of Neuroscience, Fondazione*

*Policlinico Universitario Agostino Gemelli IRCCS,*

*Policlinico Gemelli, Catholic University, Neurological*

*Clinic, Rome, Italy*

**Background and aims:** Depending on the underlying cerebrovascular disease, 3–30% of patients who have had a stroke develop post-stroke epilepsy (PSE). According to the present ILAE definition, a single late seizure (>7 days) after stroke qualifies as structural epilepsy (PSE). This project aims to estimate the incidence of PSE in Umbria using administrative healthcare data.

**Methods:** In this retrospective study, population consists of all patients with a hospitalization due to acute stroke (ischaemic and haemorrhagic) in Umbria between 2013 and 2017. Patients with strokes were identified in the administrative databases using ICD-9-CM codes. Post-stroke epilepsy was identified with the prescription of at least one EEG and one or more AEDs seven days after stroke, according to Franchi and colleagues.

**Results:** During the study period, 9465 incident cases of acute stroke were identified. Most of our cerebrovascular events were ischaemic strokes (n=6642, 80.2%). Following these patients until 2018, 228 people presented PSE (56.1% males/ 43.9% females; median age 67 years). Multivariable Cox regression showed that onset of PSE was associated with intracerebral and subarachnoid haemorrhagic stroke, younger age and longer duration of hospital stay. Levetiracetam was the most commonly prescribed AED (56.6%) for the management of PSE. Diabetes, hypertension and heart failure were not associated with PSE in the multivariable model.

**Conclusion:** This is the 1st study of incidence of epilepsy after stroke using administrative healthcare data in Italy. The data collected showed that PSE was associated with haemorrhagic strokes and younger age, as reported in previous studies and hospital stay

**Disclosure:** Nothing to disclose

## EPO2142

**Epilepsy and women: reproduction**

G. Odintsova, A. Chugunova  
*Epileptology, Almazov National medical researcher center,  
 Saint Petersburg, Russian Federation*

**Background and aims:** Epilepsy is one of the widespread diseases.

**Purpose:** To research reproductive indicators in women with epilepsy (WWE).

**Methods:** 155 WWE aged 18-45y.o. were included in the prospective observational research of antiepileptic drugs (AEDs) reproductive side effects. Reproductive strategy (RS), endocrine complication (REC), the fertility rate (FR) were compared into 3 groups: 1gr. - AEDs monotherapy, 2gr. - polytherapy, 3gr. - without AEDs.

**Results:** 1gr. - 68 (44%), 2gr. - 67 (43%), 3 gr. - 20 patients (13%). The average age was 25y.o. with the prevalence of patients in optimal reproductive age (20-30y.o.) 62%. 47% of women were married, 31% had children without differences in groups. Women planning pregnancies were 45%. The majority of patients interviewed in 2012 planned to have one child, in 2017 - 2 children. New RS was early repeated pregnancies. RS "without children" remained the actual problem among patients in late reproductive age. The common frequency of REC - 53%, due to AEDs side effects -40%. Polytherapy enlarged REC frequency in comparison with 1gr - 30%, 3gr - 10% and made 60% ( $p < 0,001$ ). The fertility rate was 0,3 in the cohort. New generation AEDs (perampanel, brivaracetam) allowed achieving remission at first and second polytherapy. The fertility rate among women with epilepsy was lower optimal due to medical and social reasons. The reproductive strategy was changing at the present time. It is necessary to use an integrated approach to women with epilepsy.

**Conclusion:** The reported study was funded by RFFR according to the research project № 18-013-00222

**Disclosure:** The reported study was funded by RFFR according to the research project № 18-013-00222

## EPO2143

**Real-world experience with perampanel at low doses in a secondary center**

G. Ogando, S. Gómez Enjuto, J. Lapeña Motilva,  
 V. Hernando Requejo, C. Cemillán Fernández,  
 N. Huertas Gonzalez  
*Neurology, Hospital Universitario Severo Ochoa, Leganes,  
 Spain*

**Background and aims:** Our aim is to review the efficacy and tolerability of perampanel at 4mg dose after at least 6 months of use.

**Methods:** We carried out a retrospective 5-year review of all patients receiving perampanel in our center.

**Results:** A total of 22 patients received perampanel at a dose of 4mg. The mean age was 48 (25-78) years, 50% being males. 7 had a diagnosis of idiopathic generalized epilepsy, 14 of focal-onset epilepsy, and 1 remains undetermined. The mean previous antiepileptic drugs (AEDs) used were 4 (2-7). 2 patients were in monotherapy (9%), 7 in double therapy (32%), 8 in triple therapy (37%), and 5 (22%) had more than 3 other AEDs. The mean time of use of treatment was 18 months (6-39 months). 13 (60%) patients continue treatment at the time of last follow up. The mean seizure reduction rate was 36,4%, with 6 (27%) patients free of seizures. 10 patients presented adverse effects (AEs). The most common were behavioural changes (4), followed by somnolence (2) and dizziness (2). None showed suicidal thoughts, and only 4 (18%) had to discontinue treatment due to AEs.

**Conclusion:** Perampanel is an effective AED with good response and retention rates at a dose of 4mg. The occurrence of AEs is usually well tolerated, and the number of serious AEs that require suspension of the treatment is within reasonable margins. No patients presented suicidal thoughts reaching the 4mg dose, which favours the use of this drug at low doses, while maintaining good efficacy and tolerability.

**Disclosure:** Nothing to disclose

## EPO2144

**Music and seizures: does it change something after glioma surgery?**

G. Pauletto<sup>1</sup>, T. Ius<sup>2</sup>, A. Nilo<sup>3</sup>, B. Tomasino<sup>4</sup>, C. Lettieri<sup>1</sup>, L. Verriello<sup>1</sup>, M. Valente<sup>3</sup>, G.L. Gigli<sup>3</sup>

<sup>1</sup>Department of Neurosciences, Neurology Unit, Udine, Italy,

<sup>2</sup>Department of Neurosciences, Neurosurgery Unit, Udine,

Italy, <sup>3</sup>Neurology Unit, University of Udine, Udine, Italy,

<sup>4</sup>IRCSS - E. Medea, Udine, Italy

**Background and aims:** Association between music and seizures is complex and intriguing. Musical processing within the human brain recruits a network involving many cortical areas that could be activated as part of temporal lobe seizure. Changing in music perceptions and emotions have been described during epilepsy surgery, but less is known regarding the same aspects in case of surgery for primary brain tumours (PBTs). We reported our monocentric experience, in a cohort of patients with PBTs and seizures characterised by auditory hallucinations.

**Methods:** Retrospective analysis of 155 patients affected by PBTs and tumour-related epilepsy, surgically treated in our Department, between 2007 and 2017. Inclusion criteria were: tumour-related epilepsy with auditory hallucinations or sound misperception; 1st diagnosis of brain tumour; no previous chemotherapy or radiotherapy; 18 months follow-up.

**Results:** Among 155 patients, 13 (7 males and 6 females, mean age: 50 years) were enrolled. They all presented seizures with musical hallucination or sound misperception and underwent surgery for gliomas located within the temporal lobe (10/13) and the insula (3/13). After surgery, 8/13 were in Engel class Ia; 5/13 presented new emotional reaction to music, described as increased sensitivity to high pitch and loud music. 2 subjects, both with musical education, developed musicophilia. No relations with seizure outcome, tumour histology and extent of resection were observed, while there was a statistically significant relation with pre-operative seizure frequency ( $p=0.002$ ) and EEG/electrocorticographic epileptic pattern ( $p=0.001$ ).

**Conclusion:** Assessment of music perception and emotions should be considered in glioma surgery and post-operative changing should be screened.

**Disclosure:** Nothing to disclose

## EPO2145

**Fitting in: seizure presentations over 12 months**

S. Rafee, A. O'shea, C. Flynn, N. Tubridy

Neurology, St Vincent's Hospital, Dublin, Ireland

**Background and aims:** With an estimated 37000 people live in Ireland with a diagnosis of epilepsy, seizures are a common presentation to emergency departments. Symptomatic seizures, secondary to acute medical or surgical illness, alcohol and drug intoxication, further compounds the situation. Diagnosing, identifying triggers and management of these patients often requires neurology input. A previous study performed at our institution showed that 28% of referrals to neurology services were for seizures. We aimed to analyse all seizure presentation over a 12 month period and to identify triggers, their inpatient course and management.

**Methods:** We conducted a retrospective review of all seizure related admissions between January 1st 2018 and December 31st 2018. Seizures were identified based on based on ICD coding criteria for seizures and convulsions. Non epileptic seizures and alternative aetiologies were excluded. Data was analysed on demographics, background, length of stay, triggers, EEG and referral to neurology.

**Results:** 304 patients were enrolled with an age range of 15-95 years. 53% were male. 27% presented as a 1st onset unprovoked seizure. 22% had a diagnosis of epilepsy. 7% had more than 1 seizure related admission. Neurologist department was consulted on 62%. 55% had an EEG, with 3 having seizures captured. Alcohol was the most obvious trigger (10%). Drugs, stroke, and medication non-compliance were also identified.

**Conclusion:** Seizures only comprise a significant proportion of patients presenting to emergency services. Early intervention from neurologists can guide investigations and treatment. Improving outpatient resources and providing nurse led services can help in reducing seizure presentations.

**Disclosure:** Nothing to disclose

## EPO2146

### Clinical, behavioral and sociodemographic profile of non-psychotic patients with epilepsy and suicidal ideation

F. Rider, G. Kustov, M. Zinchuk, N. Voynova,  
D. Zhuravlev, A. Yakovlev, A. Guekht  
*Moscow Research and Clinical Center for Neuropsychiatry,  
Moscow, Russian Federation*

**Background and aims:** People with epilepsy (PWE) have a higher risk of suicidal ideation (SI) and attempts (SA) than the general population. At the same time, for PWE there is a knowledge gap on prevalence of variables that were found to be associated with increased risk of suicide in general population. We aimed to identify variables that may be associated with epilepsy in patients with non-psychotic mental disorders (NPMD) and SI.

**Methods:** The study was a case-control: 40 PWE with NPMD and SI were compared to similar patient without epilepsy 1:2. Patients underwent a psychiatric examination and self-injurious thoughts and behaviors interview. Information on demographic, biographical, clinical, and behavioral features was collected. Mann-Whitney and Pearson's chi-squared were used.

**Results:** There were no differences between groups in terms of gender identity, education, marital status, family history of mental disorders and suicidal behavior, history of physical violence, bullying, sexual behavior, drugs use experience, smoking, eating disorders, piercing, tattoos, severe body modifications (al:p>0.05). Significantly lower number of PWE had a history of sexual abuse (10/40vs36/80;  $\chi^2=4.51$ , p=0.03) and homosexual experience (5/40vs23/80;  $\chi^2=3.93$ , p=0.04). Regarding suicide plan, SA, non-suicidal self-injury (NSSI), age at onset of SI, first SA and first NSSI as well as number of SA no differences were found between groups (al:p>0.05). Suicide gestures were significantly less prevalent in PWE (4/40vs32/80;  $\chi^2=11.42$ , p<0.001).

**Conclusion:** Patients with NPMD share many common features for suicide, but a history of sexual abuse and homosexual experience as well as suicide gestures are less prevalent in PWE.

**Disclosure:** Nothing to disclose

## EPO2147

### Alteration of brain oxygen metabolism triggered by the interictal epileptiform discharges (IEDs) in patient with primary generalized (PGE) epilepsies. Assessment of Blood Oxygenation Level Dependent (BOLD) signal changes - EEG-fMRI preliminary study

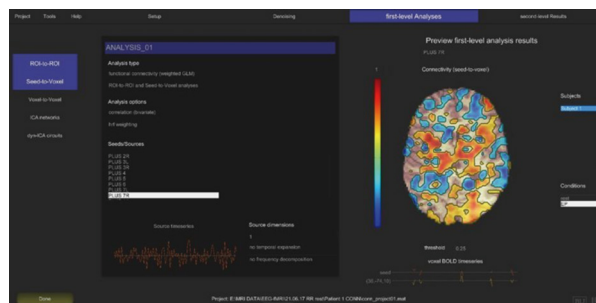
R. Rola<sup>1</sup>, N. Hryniewicz<sup>2</sup>, D. Ryglewicz<sup>1</sup>,  
E. Piatkowska-Janko<sup>3</sup>, P. Bogorodzki<sup>3</sup>

<sup>1</sup>Military Institute of Aviation Medicine, Warsaw, Poland,  
<sup>2</sup>CNS Lab of the Nalecz Institute of Biocybernetics and Biomedical Engineering, Warsaw, Poland, <sup>3</sup>The Institute of Radioelectronics and Multimedia Technology, WEITI, PW, Warsaw, Poland

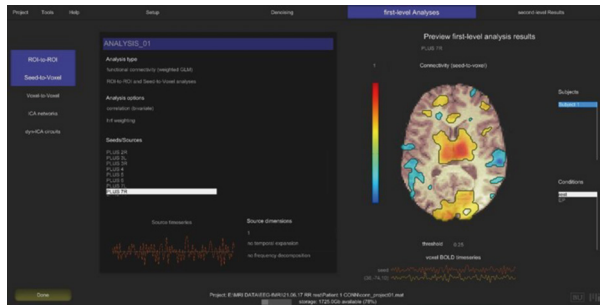
**Background and aims:** IEDs are the phenomena that occur in patients with PGE without evident clinical manifestations. Little is known about its pathophysiological importance. There are no conclusive data on how much IEDs may affect brain metabolism and whether or not they require more intensive antiepileptic treatment. We hypothesize that IEDs may influence brain metabolism in epileptic foci and in distant brain regions and affect resting brain functional network connectivity (FNC).

**Methods:** We have analyzed 5 patients with PGE. Simultaneous EEG and fMRI recordings were used to evaluate BOLD signal changes during IED's. For each patient three 10 min resting state runs were acquired with 3T GE Discovery MR750w scanner and 64-channel Neuroscan EEG. IEDs events were detected by neurophysiologist from EEG recordings and subsequently used as an event onset times in General Linear Model (GLM) in fMRI analysis. Additionally FNC with thalamus was calculated with CONN toolbox between rest and IEDs condition.

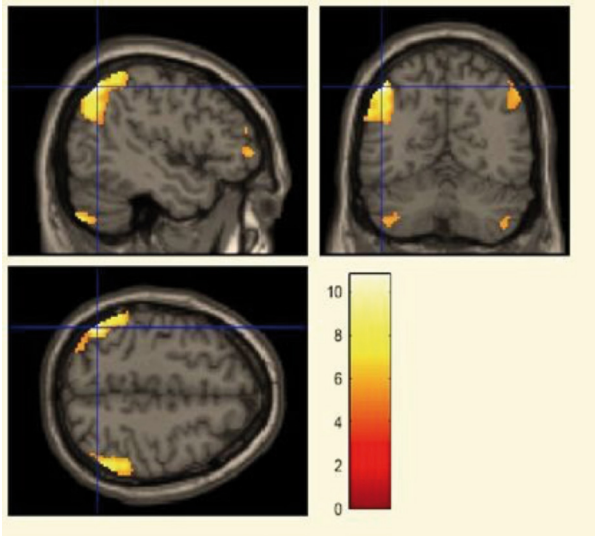
**Results:** In patients with PGE during IED's we identified regions (parietooccipital junctions and cerebellum) of significant reduction of BOLD signal that may be secondary to the hypoperfusion or metabolism reduction. The analysis of FNC revealed significant disturbances between thalamus and visual and frontal cortex connectivity resulting in negative correlation of the thalamus activity and frontal regions and loss of correlation with visual cortex.



Functional network connectivity of thalamus and other brain regions during IEDs



Functional network connectivity of thalamus in resting condition



Regions of negative BOLD signal during IEDs

**Conclusion:** During repetitive IEDs some brain regions have altered oxygen metabolism and brain resting mode connectivity is disturbed. These changes may contribute to long term complication of epilepsy such as cognitive function decline and attention deficits.

**Disclosure:** Nothing to disclose

## EPO2148

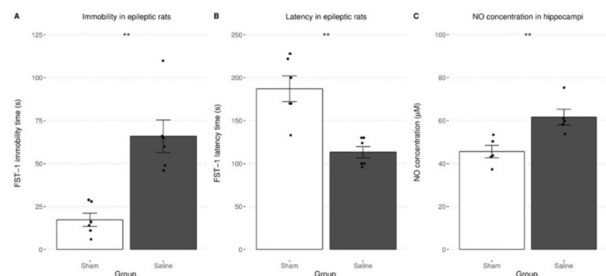
### Overcoming Resistance to Fluoxetine in a Rat Model of Epilepsy-associated Depression by Suppression of Neuronal Nitric Oxide Synthase (nNOS)

M.A. Sadeghi, S. Hemmati, H. Yousefi-Manesh, S. Mohammadi, A. Dehpour  
Tehran University of medical sciences, Tehran, Iran, Islamic Republic of

**Background and aims:** Depression is the most frequent psychiatric comorbidity of epilepsy. Increased nitric oxide (NO) levels in the hippocampi of epileptic rats has been linked to neuronal cell damage, possibly leading to the development of depressive symptoms. Unfortunately, epilepsy-associated depression is commonly resistant to conventional SSRI treatments. Therefore, we hypothesized that inhibition of the nitrergic system may augment the treatment efficacy of such SSRIs.

**Methods:** Epilepsy was induced in rats using the pilocarpine status epilepticus (SE) model. 45 days after SE induction, development of depression was verified by measurement of latency and immobility times in the forced swim test (FST-1). Following verification, the animals underwent a 10-day treatment regimen of either chronic fluoxetine (Flxc) or saline, followed by a second FST (FST-2) on the 10th day. A single dose of one of the following treatments was also administered 30 minutes prior to FST-2: acute fluoxetine (Flxa), 7-NI, Flxa + 7-NI, or saline. The effectiveness of treatment types was assessed using 2-way ANCOVA. Furthermore, the hippocampi were extracted following FST-2 for molecular analysis.

**Results:** NO concentrations were increased in the hippocampi of post-SE rats concurrently with the presentation of depressive symptoms. Of all the single and combination therapies, only Flxc+7-NI treatment significantly reversed depressive behaviors in FST-2 in post-SE rats. This improvement corresponded to increased expression of cFOS and BDNF mRNAs in the hippocampi.



Evaluating depression in post-SE rats (Saline) compared to the pilocarpine-naïve rats (Sham) in FST-1. (A & B) Immobility times were increased and latency to 1st immobility times were decreased in the Saline group. (C) NO concentrations in hippocampal tissue were increased in the Saline group.

## EPO2149

### Analysis of Patients with Nonconvulsive Status Epilepticus required videoEEG monitoring in the Intensive care Unit

I. Šarbochová<sup>1</sup>, P. Fábera<sup>2</sup>, A. Tomek<sup>1</sup>, P. Marusic<sup>1</sup>  
<sup>1</sup>Prague, Czech Republic, <sup>2</sup>Neurology, 2<sup>nd</sup> Faculty of Medicine Charles University, Prague, Czech Republic

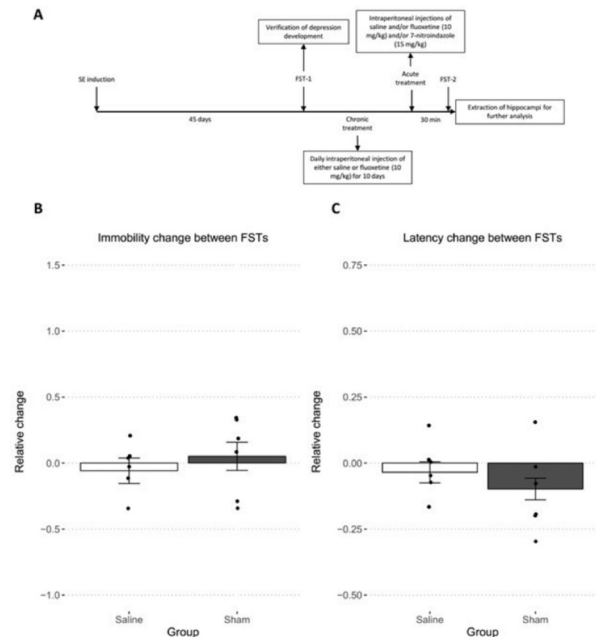
**Background and aims:** Nonconvulsive status epilepticus (NCSE) is diagnosed in critically ill patients with increasing frequency. NCSE can lead to neuronal damage and is associated with neurological deterioration and increased morbidity and mortality, especially with delayed treatment. Our study aimed to evaluate the clinical predictors of poor clinical outcome in NCSE patients.

**Methods:** Retrospective monocentric analysis of patients with NCSE with prolonged continuous VideoEEG monitoring treated at comprehensive stroke centre intensive care unit from January 2013 to June 2019. Analysed parameters were categorised by phenomenology, treatment, EEG patterns, NIHSS, age, medical history, morbidity, trigger and acute and chronic lesion. All analysed patients met Salzburg consensus criteria for NCSE. Favourable functional outcome at discharge was defined as mRS 0-2, poor outcome as mRS 3-6.

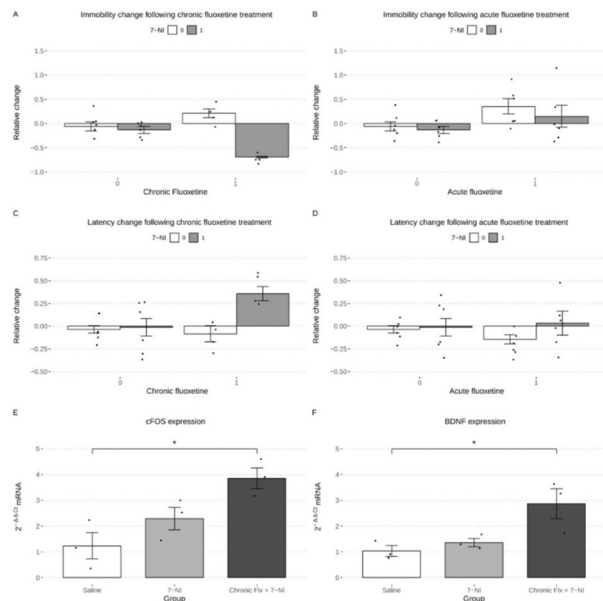
**Results:** 46 patients, 21 (45.7%) men, mean age 63.9 years were included. Mean NIHSS on admission was 9.7, duration of NCSE was 13.6 days, time of hospitalisation was 25 days. Good outcome at discharge occurred in 14 (30.5%) patients. Poor outcome was 32 (69.5%) including 13 (22.2%) deaths. All patients with positive symptoms (e.g. rhythmic twitching of one or more muscle groups, tonic eye deviation, hippus or nystagmoid eye jerking) had poor outcome (p=0.026). Predictors for the poor outcome were atrial fibrillation, ischemic heart disease and history of stroke.

**Conclusion:** The phenomenology of NCSE was demonstrated as the only significant predictor in our cohort. Our findings warrant detailed clinical follow-up of patients with NCSE for subtle signs.

**Disclosure:** Nothing to disclose



Evaluating the possible behavioral effects of the study design in the Sham and Saline groups. (A) The experimental timeline. (B & C) Relative changes in immobility and latency times between FST-1 and FST-2 calculated as (FST-2 – FST-1)/FST-1 following chronic and acute saline treatment. All changes were statistically insignificant.



Assessing the effect of different treatment regimens on post-SE depression. For each treatment, 1 indicates administration and 0 shows no administration. (A - D) Relative changes in immobility and latency times between FST-1 and FST-2. (E - F) BDNF and cFOS mRNA expression in hippocampal tissue.

**Conclusion:** Inhibition of nitric oxide production may be a plausible way of countering resistance to SSRIs in epilepsy-associated, and possibly other types of, depression.

**Disclosure:** Nothing to disclose

## Headache and pain 2

## EPO2150

**Could metabolic syndrome and insulin resistance have a role in frequency and severity of migraine headache attacks?**

M. Hussein<sup>1</sup>, M. Abu Srie<sup>1</sup>, A. Khamis<sup>1</sup>,  
S. Abdel Kareem<sup>2</sup>

<sup>1</sup>Neurology, Beni-suef university, Beni-suef, Egypt, <sup>2</sup>Clinical and chemical pathology, Beni-suef university, Beni-suef, Egypt

**Background and aims:** The relationship between migraine headache and both metabolic syndrome and insulin resistance is still a matter of debate. Controversy exists regarding the presence of specific characteristics for migraine headache in patients with metabolic syndrome or insulin resistance. The aim of this work was to detect the frequency of metabolic syndrome and insulin resistance in patients with migraine headache and to study their impact on frequency and severity of migraine headache attacks.

**Methods:** This is a case-control study that was conducted on 30 patients diagnosed as having migraine headache and 30 healthy controls. History regarding migraine headache characteristics was taken from all included patients. Assessment of migraine was done using Migraine severity scale (MIGSEV) and Headache Impact Test-6 (HIT-6). Fasting blood glucose, fasting insulin level, lipid profile and Homeostatic Model Assessment-Insulin Resistance (HOMA-IR) were measured for all included patients and controls.

**Results:** Patients with migraine headache had significantly higher fasting insulin level (p-value=0.049) and HOMA-IR (p-value=0.01) than controls. The frequency of metabolic syndrome and insulin resistance was higher in migraine patients compared to controls (p-value=0.024, 0.012). There were statistically significant positive correlations between both fasting insulin level and HOMA-IR and frequency of headache attacks/month (p-value <0.001, <0.001), MIGSEV severity grade (P-value=0.003, <0.001), and HIT-6 scale (p-value=0.031, <0.001).

**Conclusion:** The incidence of both metabolic syndrome and insulin resistance is higher in patients with migraine headache than healthy controls, and their presence significantly affect frequency and severity of migraine headache attacks.

**Disclosure:** Nothing to disclose

## EPO2151

**Lower glucose level associated with increased risk for post-dural puncture headache**

J. Hwang

Neurology, Kyungpook National University, Daegu, Korea, Republic of

**Background and aims:** Post-dural puncture headache is the most common significant adverse event following lumbar puncture. In this study, we investigated the possible systemic factors associated with risk for post-dural puncture headache

**Methods:** We consecutively enrolled 969 patients who underwent diagnostic lumbar puncture following a standardized protocol. We compared the clinical and laboratory profiles of the post-dural puncture headache group and the non-headache group. Logistic regression analysis was conducted to identify any independent associations with post-dural puncture headache.

**Results:** A total of 48 patients (5%) reported headache; 12 of these patients (25%) received a therapeutic epidural blood patch (and the remaining 36 patients improved with conservative treatment. After adjusting for other variables, younger age and lower serum glucose levels were independently associated with post-dural puncture headache, whereas other factors showed no statistical significance. Serum glucose levels were persistently lower in all age groups of patients who experienced headache

**Conclusion:** Low glucose levels were inversely associated with risk for post-dural puncture headache. Patients with low serum glucose should be carefully monitored for headache after lumbar puncture.

**Disclosure:** Nothing to disclose



## EPO2152

### Improvements in Headache-related Disability With Fremanezumab in Patients $\geq 60$ Years of Age With Migraine: Pooled Results of 3 Randomised, Double-blind, Placebo-controlled Phase-3 Studies

S. Joshi<sup>1</sup>, J.M. Cohen<sup>2</sup>, X. Ning<sup>2</sup>, V. Ramirez-Campos<sup>2</sup>, L. Janka<sup>2</sup>, M. Ashina<sup>3</sup>

<sup>1</sup>DENT Neurological Institute, Amherst, NY, USA, <sup>2</sup>Teva Branded Pharmaceutical Products R&D, Inc., West Chester, PA, USA, <sup>3</sup>Department of Neurology, Danish Headache Center, Rigshospitalet, Glostrup, Denmark

**Background and aims:** Migraine is one of the leading causes of disability worldwide in patients of all ages. Fremanezumab, a fully-humanised monoclonal antibody (IgG2 $\Delta$ ) that selectively targets calcitonin gene-related peptide (CGRP), has proven efficacy for preventive treatment of migraine in adults. The impact of fremanezumab on headache-related disability in a subgroup of patients  $\geq 60$  years of age was evaluated in this pooled analysis.

**Methods:** This analysis of fremanezumab in patients  $\geq 60$  years of age with episodic migraine (EM) or chronic migraine (CM) included data from three phase-3 trials (HALO EM, HALO CM, FOCUS), in which patients were randomised 1:1:1 to subcutaneous quarterly or monthly fremanezumab or matched monthly placebo over 12 weeks. Improvements in headache-related disability, as measured by reductions from baseline in the 6-item Headache Impact Test (HIT-6) score (FOCUS and HALO CM) or Migraine Disability Assessment (MIDAS) score (FOCUS and HALO EM), during the 12-week double-blind treatment period were evaluated.

**Results:** HIT-6 scores were analysed for 177 patients  $\geq 60$  years of age and MIDAS scores were analysed for 162 patients  $\geq 60$  years of age. Baseline HIT-6 and MIDAS scores were similar across treatment groups (Table). Reductions from baseline in the HIT-6 and MIDAS scores over 12 weeks of treatment were greater with both fremanezumab dosing regimens versus placebo, with significant differences for monthly fremanezumab versus placebo ( $p < 0.01$ ; Table).

**Conclusion:** Pooled data from three phase-3 trials demonstrate that fremanezumab treatment over 12 weeks improved headache-related disability in patients  $\geq 60$  years of age with EM or CM.

## EPO2153

### Comparison of Magnesium, Sodium Valproate, and concurrent Magnesium-Sodium Valproate therapy in prevention of migraine headache: a randomized, double-blind study

E. Sharifipour, S. Khani

Neurology, Neuroscience Research Center of Qom University of Medical sciences, Qom, Iran, Islamic Republic of

**Background and aims:** This study is aimed to access the efficacy of combination magnesium - sodium valproate compares with either magnesium or sodium valproate alone for migraine prophylaxis.

**Methods:** In a randomized, double-blind, clinical trial, 222 migraine patients aged 18-65 years were randomly assigned sodium valproate (A group, n= 82), magnesium- sodium valproate (B group, n= 70), or magnesium (C group, n=70). The characteristic of migraine headache (severity, frequency, number of attacks, duration of the attack and the number of painkillers taken per month were recorded monthly in each visit. MIDAS and HIT-6 scores were recorded at baseline and after 3 months of treatment in each group. Within and between-group analyses were done in this study.

**Results:** A significant reduction in all migraine characteristics in all groups ( $p < 0.05$ ). Intragroup data analysis indicated there was no statistically significant difference in headache frequency between A and B group but three other parameters show a significant reduction in B compared with A ( $p \leq 0.001$ ). Conversely, the C group cannot effectively reduce measured parameters in the patient as compared to A and B groups ( $p \leq 0.001$ ). MIDAS and HIT-6 scores were significantly lower in all treatment groups in comparison with baseline ( $p < 0.05$ ). Also, MIDAS and HIT scores were diminished similarly in the A and B group and they have a significant difference with the C group ( $p < 0.05$ ).

**Conclusion:** This study demonstrates that magnesium could enhance anti-migraine properties of sodium valproate in combination therapy and reduced the valproate dose required for migraine prophylaxis.

**Disclosure:** Nothing to disclose

Table. BL Scores and Changes From BL in Headache-related Disability Scores in Patients  $\geq 60$  Years of Age During 12 Weeks of Double-blind Treatment

	Placebo (n=57)	Quarterly fremanezumab (n=61)	Monthly fremanezumab (n=59)
<b>HIT-6</b>			
BL score, mean (SD)	63.3 (5.46)	62.9 (5.11)	63.1 (5.20)
Change from BL, LSM (SE)	-2.7 (0.92)	-4.3 (0.89)	-6.8 (0.94)
Change from BL, LSMD (SE) versus placebo	—	-1.6 (1.15)	-4.2 (1.17)*
<b>MIDAS</b>			
BL score, mean (SD)	43.2 (44.92)	52.0 (41.58)	40.9 (42.16)
Change from BL, LSM (SE)	-11.0 (3.85)	-21.7 (4.37)	-24.0 (3.56)
Change from BL, LSMD (SE) versus placebo	—	-10.7 (5.40)	-13.0 (4.53)*

BL, baseline; LSM, least-squares mean; SE, standard error; LSMD, least-squares mean difference; HIT-6, 6-item Headache Impact Test; Migraine Disability Assessment, MIDAS.

\* $P < 0.01$  versus placebo.

**Disclosure:** This study was funded by Teva Pharmaceuticals.

## EPO2154

**Cavernous malformation with ipsilateral headache like hemicrania continua.**

I. Leta<sup>1</sup>, L. Zheliba<sup>2</sup>, P. Dyachenko<sup>2</sup>, V. Mokanyuk<sup>3</sup>,  
E. Maslovskiy<sup>4</sup>

<sup>1</sup>Vinnitsa, Ukraine, <sup>2</sup>Neurology, Vinnitsa National Medical University, Vinnitsa, Ukraine, <sup>3</sup>Visualization, Neuromed clinic, Vinnitsa, Ukraine, <sup>4</sup>Vinnitsa National Medical University, Vinnitsa, Ukraine

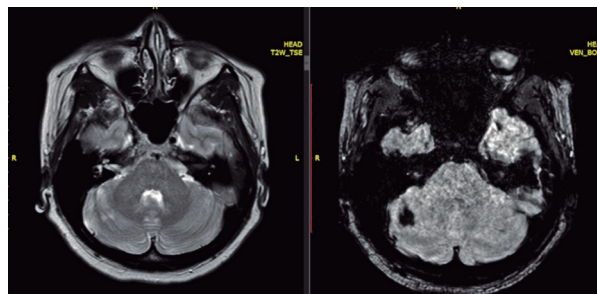
**Background and aims:** Hemicrania Continua refers to primary headaches classified as trigeminal autonomous cephalgia. According to the international classification of headache disorders 3rd edition, it is characterized as prolonged unilateral pain with autonomic symptoms and sensitive to treatment with indomethacin.

**Methods:** we present 2 clinical cases.

**Results:** 1. A man of 24 years without previous medical history. Appealed due to persistent left-sided headache with nasal congestion and lacrimation without nausea or vomiting. The pain was rated at 7 out of 10 by visual analog scale (VAS). The pain bothered for more than 30 days for 3 months. On examination, the neurological status is normal. MRI revealed a small cavernous malformation in the left temporal lobe.

2. Woman 33 years old. At the age of 13, she suffered a subarachnoid hemorrhage. Appealed due to a new persistent headache in the right part of the head for 4 months. Pain rated at 8/10 VAS. During the examination, slight swelling of the right half of the face, anisocoria D>S. An MRI revealed cavernous angioma in the left temporal lobe and left cerebellar hemisphere.

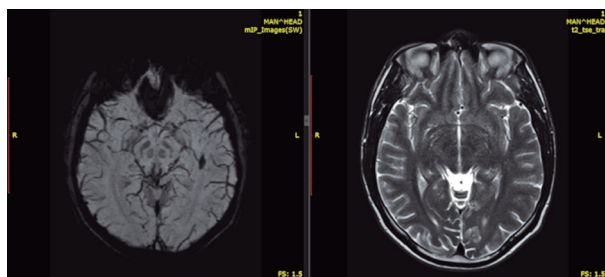
In both patients, pain regressed after taking indomethacin 150mg/day.



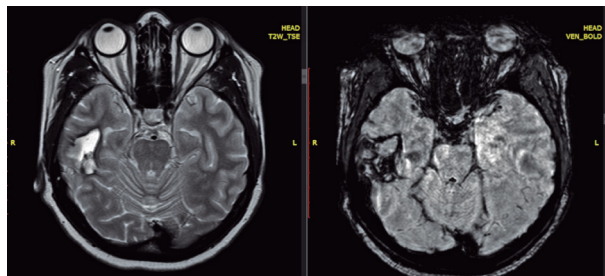
Woman MRI T2 and SWI

**Conclusion:** There are described cases of cluster headache with ipsilateral cavernomas. Perhaps there may be a connection in the development of trigeminal autonomous cephalgia and cavernous angiomas.

**Disclosure:** Nothing to disclose



Man MRI SWI and T2



Woman MRI T2 and SWI

## EPO2155

**Does postdural puncture headache influence the clinical course of previous chronic headache? One-year follow-up study**

S. Ljubisavljevic<sup>1</sup>, J. Zidverc Trajković<sup>2</sup>,  
M. Ljubisavljevic<sup>3</sup>

<sup>1</sup>Nice, Serbia, <sup>2</sup>Belgrade, Serbia, <sup>3</sup>Center for Mental Health Protection, Clinical Center of Nis, Nice, Serbia

**Background and aims:** The incidence of postdural puncture headache (PDPH) in relation to the pre-existing chronic headache (CH) was assessed as well as the effects of PDPH on the clinical course of CH (days with headache per months, duration of attacks, efficacy of therapy) 3, 6 and 12 months after PDPH.

**Methods:** The study was conducted as a single center, cohort prospective study which included 252 patients (105 men and 147 women), average age of 47.3±15.0 years, in which lumbar puncture (LP) was performed with traumatic needles of different caliber (20G vs. 18G, p=0,167).

**Results:** PDPH was reported in 133 (52.8%) patients. In the studied group, 82 (32.5%) patients had CH. Patients with CH were more likely to have PDPH (p=0.003). The individual clinical type of CH did not have an effect on the incidence of PDPH (p=0.128). Patients with PDPH and CH had a clinical deterioration of CH after 3, 6 and 12 months of LP in terms of higher days per months and/or incomplete efficacy of performed therapy regarding baseline values (p=0.047, p=0.027, p=0.030, respectively). Multivariate analysis confirmed the direct association of female sex and duration of CH and worsening of CH after 12 months of LP (OR 4.785 [95% CI: 1.248-14.322], p=0.033; OR 1.788 [95% CI: 1.332-1.988], p=0.032).

**Conclusion:** The presented results can be significant for the prediction of PDPH occurrence in patients having CH and for the prevention of clinical worsening of CH in patients having PDPH.

**Disclosure:** Nothing to disclose

## EPO2156

**Habituation study in visual evoked potentials in migraine patients with Ehlers-Danlos syndrome, hypermobility type**

I. Maestrini<sup>1</sup>, M. Toscano<sup>2</sup>, A. Viganò<sup>2</sup>, A. Gensano<sup>2</sup>,  
F. Puledda<sup>3</sup>, G. Giuliani<sup>2</sup>, V. Di Piero<sup>1</sup>

<sup>1</sup>Rome, Italy, <sup>2</sup>Department of Human Neurosciences, 'Sapienza' University of Rome, Rome, Italy, Rome, Italy, <sup>3</sup>Headache Group – NIHR-Wellcome Trust Clinical Research Facility, King's College London, London, United Kingdom

**Background and aims:** Migraine is one of the most frequent clinical manifestations in Ehlers-Danlos syndrome, hypermobility type (hEDS). The comorbidity between these 2 diseases has been only partially investigated. The aim of our study was to observe whether neurophysiological alterations described in migraineurs in visual evoked potentials (VEP), namely habituation deficit, were present in hEDS migraineurs.

**Methods:** We enrolled 22 hEDS migraineurs with and without aura (according to ICHD-3 criteria), 22 non-hEDS migraineurs with and without aura, and 22 healthy controls (HC) matching gender and age. Repetitive pattern reversal (PR) stimulation in basal conditions was studied in all participants. During uninterrupted stimulation, 250 cortical responses were recorded (4000Hz sample rate) and divided into epochs of 300ms after the stimulus. Cerebral responses were divided in 5 blocks. We expressed habituation as the amplitude change (%) between the 1st and the 5th block of averages in N75-P100 and P100-N145 components of PR-PEV.

**Results:** We observed a trend towards a habituation deficit in both components of PR-PEV in non-hEDS migraineurs compared to HC. Unexpectedly, we observed a significant habituation deficit in hEDS migraineurs compared to HC in the P100-N145 component of PR-VEP (respectively  $\Delta$  93.44%±167.30 vs -11.00%±27.77, p = 0.011).

**Conclusion:** The PR-VEP habituation deficit in the P100-N145 component observed in hEDS migraineurs might be explained by functional alterations of extrastriate cortical areas in relation to the chronic pain experienced by these patients due to the underlying disease. Functional neuroimaging studies are needed to confirm this hypothesis.

**Disclosure:** Nothing to disclose

## EPO2157

**Medication overuse Headache: Clinical features and treatment approach**

R.J. Martínez Marín, M. Sastre Leal, A. Plaza Herráiz, J.A. Membrilla, S. Secades García, M. Lara Lara, J. Díaz de Terán

*Neurology, Hospital Universitario La Paz, Madrid, Spain*

**Background and aims:** Medication Overuse Headache (MOH) is defined as a complication of another primary headache. The level of evidence to support different treatment strategies (early discontinuation alone vs discontinuation plus preventive treatment) is still low. Our aim is to describe patients' characteristics and evaluate the response to different strategies.

**Methods:** Retrospective analysis of the clinical features of patients diagnosed with medication overuse headache attended for the 1st time in a Headache Clinic from May 2017 to April 2018. Clinical outcome over 3 successive visits and response to Onabotulinumtoxin A were assessed. Response is defined as  $\geq 50\%$  reduction of headache days from baseline.

**Results:** 51 patients with MOH were included. 46 (88%) were women, with a median (IQR) age of 47 (14). 10 (19.6%) patients had opioid overuse and 13 (25%) were smokers. 22 (43.1%) had psychiatric comorbidities. The main associated primary headache was chronic migraine (CM), diagnosed in 37 patients (72.5%). 26 patients were treated with Onabotulinumtoxin A at first visit. Compared to those who received withdrawal strategy alone, patients who were treated with Onabotulinumtoxin A presented higher response rate (22.2% vs 50%,  $p=0.147$ )

**Conclusion:** Our results suggest that discontinuation of the overused medication with the addition of Onabotulinumtoxin A could lead to a better outcome than discontinuation alone.

**Disclosure:** Nothing to disclose

## EPO2158

**Medical Cannabis in the Treatment of Patients with Trigeminal Neuralgia: An Ongoing Retrospective Study**

L. Mechtler<sup>1</sup>, C. Ralyea<sup>2</sup>, P. Hart<sup>2</sup>, V. Bargnes<sup>2</sup>

*<sup>1</sup>Amherst, USA, <sup>2</sup>Cannabis research, Dent Neurologic Institute, Amherst, USA*

**Background and aims:** Presently, those clinically diagnosed with Trigeminal Neuralgia (TN) have few treatment options. With up to 50% of patients employing traditional pharmacologic approaches becoming refractory, surgical intervention is often the only remaining option. A growing body of evidence; however, suggests that medical cannabis (MC) is an effective option in treating a wide array of neuropathic pain syndromes including TN.

**Methods:** This retrospective chart review included patients clinically diagnosed with TN and were certified to use MC via New York State's Medical Marijuana Program. Patients were certified and followed in a neurologic outpatient setting in Buffalo, NY, USA.

**Results:** 85 patients (16=male, 69=female) with an average age of 60.5 years (range 33-93), were included in this study. Improvement in TN symptomology was self-reported by 87.1% of patients with the most common treatment modality being an oral tincture, which was utilized by 85.8% of patients. Type II chemovar products were most prevalent, with 77.65% of patients utilizing a 1:1 (THC:CBD) ratio. Adverse events (AEs) were reported by 30 patients (35.3%) with only 1 patient opting to discontinue MC treatment. The most common side effects were: fatigue, cognitive difficulty, dry mouth, and increased appetite. 30% of the 36 patients reporting opioid use upon initiation of MC treatment reduced their consumption.

**Conclusion:** This study suggests that MC is generally well-tolerated in the treatment of TN, with 87.1% of patients reporting improvement(s) in symptomology. While promising, future randomized placebo-controlled trials are needed to determine MC's place in a comprehensive treatment plan.

**Disclosure:** This study was supported by The Harry Dent Family Foundation, Inc., a 501(c)(3) Non-for-profit organization dedicated to supporting neuroscience research.

## EPO2159

### The use of Medical Cannabis in the Treatment of Neuropathies: An Ongoing Retrospective Study

L. Mechtler<sup>1</sup>, C. Ralyea<sup>2</sup>, P. Hart<sup>2</sup>, V. Bargnes<sup>2</sup>

<sup>1</sup>Amherst, USA, <sup>2</sup>Cannabis research, Dent Neurologic Insitiute, Amherst, USA

**Background and aims:** In recent years many governments have shifted their stance on the use of medical cannabis (MC) due to its wide array of medical benefits. With anti-inflammatory and neuroprotective properties MC presents as a probable option in the treatment of neuropathies, which, are estimated to affect more than 168 million individuals worldwide.

**Methods:** This retrospective chart review included patients clinically diagnosed with neuropathies and that were certified to use MC via New York State's Medical Marijuana Program. Patients were certified and followed in a neurologic outpatient setting in Buffalo, NY, USA.

**Results:** 265 patients (138=male, 127=female) with an average age of 60.3 years (range 22-95), were included in this study. Improvement in neuropathic symptomology was self-reported by 78.5% of patients with the most common treatment modality being an oral tincture, which was utilized by 83.4% of patients. Type II chemovar products were most prevalent, with 64.9% of patients utilizing a 1:1 (THC:CBD) ratio. Adverse events (AEs) were reported by 73 patients (27.5%) of which only 2 patients opting to discontinue MC treatment. The most common side effects were: somnolence, fatigue, and cognitive difficulty.

**Conclusion:** This study suggests that MC is generally well-tolerated in the treatment of neuropathies, with 78.5% of patients reporting improvement(s) in symptomology. While promising, future randomized placebo-controlled trials are needed to determine MC's place in a comprehensive treatment plan of those with neuropathies.

**Disclosure:** This study was supported by The Harry Dent Family Foundation, Inc., a 501(c)(3) Non-for-profit organization dedicated to supporting neuroscience research.

## EPO2160

### Semiology of Pain in Headache Diagnosis

J.A. Membrilla, M. Sastre Real, A. Plaza Herráiz, R.J. Martínez Marín, S. Secades, F.J. Díaz de Terán  
*Neurology, Hospital Universitario La Paz, Madrid, Spain*

**Background and aims:** To describe the location and quality of pain and other associated symptoms and its relationship with the final headache diagnosis.

**Methods:** Observational retrospective study of 1st-time-attending patients of a Headache Unit between May 2017 and April 2018. Patients were diagnosed by a headache specialist of a 3rd level hospital following the International Classification of Headache Disorders 3rd edition.

**Results:** 360 diagnoses were made for a total of 283 patients. Mean age was 47.7±16.3 and 222 (78.3%) were women. Overall, migraine was the most common diagnosis, with 181 cases, representing the 64.6% of bilateral headache, 48.9% of side-locked pain and 88.6% side-shifting headache. Tension-type headache (TTH) represented 29.1% of bilateral pain. Trigeminal autonomic cephalgias (TAC) were responsible of 19.1% of side-locked headaches. Throbbing headache was most commonly diagnosed as TTH (35%), closely followed by migraine (34%). 61% of oppressive pain cases were classified as cervicogenic headache. Migraine represented 37% of this kind of pain and TTH, only 24%. Shock-like headache was most commonly described in neuropathies. Photophobia and phonophobia was most commonly seen in migraine, but it was also frequent in other headaches, particularly TTH. 10% of migraines, 26% of TTH and 64% of TAC showed trigeminal autonomic features. Psychomotor agitation was most common in TAC and worsening with Valsalva manoeuvre, in cervicogenic headache.

**Conclusion:** Migraine is the most frequent diagnosis in the Headache Unit and its semiology is fairly diverse. Symptoms traditionally associated to migraine may be present in other primary headaches and vice versa.

**Disclosure:** Nothing to disclose

## EPO2161

**Treatment response to erenumab in refractory migraine patients**

R. Messina, I. Cetta, S. Guerrieri, B. Colombo, M. Filippi

*Neurology Unit, IRCCS San Raffaele Scientific Institute and Vita-Salute San Raffaele University, Milan, Italy*

**Background and aims:** Recent randomised studies reported a positive effect of erenumab in migraine prevention. Aim of our study was to investigate real-life efficacy and safety of erenumab in refractory migraine patients.

**Methods:** Patients received erenumab 70mg monthly for 3 months. At month 3 (M3), the dose of erenumab was increased to 140mg following patients' response. Changes in monthly migraine days (MMD), intake of acute medications, 50% responders rate, Headache Impact Test (HIT-6) and Allodynia Symptom Checklist (ASC-12) scores were assessed at M3 and after 6 months of treatment (M6).

**Results:** 58 patients with a mean age of 51 were enrolled in the study. The MMD at baseline was 19 (SD 8.0). 41 patients had chronic migraine and 44 patients had medication overuse headache (MOH). Before starting erenumab, patients have tried an average of 5 preventives (range: 1-10). 17 patients received erenumab 140mg at M6. The MMD was reduced by 3.9 at M3 and by 5.0 at M6 ( $p < 0.001$ ). The number of days of acute medication intake was reduced by 3.6 at M3 and by 5.3 at M6 ( $p < 0.001$ ). At M6, a 50% or greater reduction in the MMD was achieved for 39% of patients. Mean HIT-6 and ASC-12 scores were reduced by 7.4 ( $p = 0.002$ ) and 2.9 ( $p = 0.03$ ), respectively, at M6. MOH was not confirmed in 29% of patients at M6. 25% of patients had side effects.

**Conclusion:** 6-month treatment of Erenumab is effective in reducing migraine severity and patients' disability in refractory migraine in a daily-life setting.

**Disclosure:** Nothing to disclose

## EPO2162

**Which treatment is considered most effective in the treatment of trigeminal neuralgia? A survey on 106 Spanish Neurologists**

A. Minguez-Olaondo<sup>1</sup>, D. García-Azorín<sup>2</sup>, N. Morollón Sánchez-Mateos<sup>3</sup>, A.L. Guerrero<sup>4</sup>, P. Irimia<sup>5</sup>, M. Torres-Ferrus<sup>6</sup>, A. Gago Veiga<sup>7</sup>, S. Santos Lasasa<sup>8</sup>

<sup>1</sup>Neurology, Hospital Universitario Donostia, Donostia-San Sebastián, Spain, <sup>2</sup>Department of Neurology, Hospital Clínico Universitario de Valladolid, Valladolid, Spain,

<sup>3</sup>Neurology, Hospital Universitario MútuaTerrassa, Terrassa, Spain, <sup>4</sup>Neurology, Valladolid Hospital, Valladolid, Spain,

<sup>5</sup>Neurology, Clínica Universidad de Navarra, PAMPLONA, Spain, <sup>6</sup>Neurology, Hospital Universitario Vall d'Hebron,

Barcelona, Barcelona, Spain, <sup>7</sup>Neurology, Hospital Universitario de La Princesa, Madrid, Spain, <sup>8</sup>Neurology,

Hospital Universitario Lozano Blesa de Zaragoza, Saragossa, Spain

**Background and aims:** European guidelines include a number of prophylactic therapies for Trigeminal Neuralgia (TN); however, evidence is limited for most of the treatments. Clinical experience might give some light about the perceived efficacy of the different options. We aim to analyze clinicians' personal opinion about which therapies are the most effective in the treatment of TN.

**Methods:** We invited Spanish Neurologists to complete an online survey (carried out by the scientific committee of the Spanish Society of Neurology) evaluating the top-3 most effective treatments for TN in their opinion. We gave them a list including all TN therapies mentioned in the official local guidelines. We describe frequency and percentage of each election.

**Results:** The survey was completed by 106 neurologists, 48.6% of them focused on headache disorders, with a mean of  $11.4 \pm 8.4$  years of experience and seeing a mean number of  $6.8 \pm 6.8$  TN patients per month. Participants listed 6 different drugs as the most effective TN treatment, being eslicarbazepine the most frequently mentioned (59.4%), followed by carbamazepine (22.6%) and baclofen (9.4%). 14 and 15 different drugs were selected as the 2nd and 3rd most effective. The most frequently listed 2nd choice were baclofen (19.8%), followed by lamotrigine (17.9%) and eslicarbazepine (13.2%). The most frequently selected drugs as 3rd choice were lamotrigine (17.9%), topiramate and levetiracetam (12.3% each).

**Conclusion:** Eslicarbazepine was judged as the most effective drug in TN treatment, however there was significant heterogeneity. The drugs that were considered as most effective do not coincide with the guidelines and evidence supporting these choices is limited.

**Disclosure:** Nothing to disclose

## EPO2163

## Use of onabotulinumtoxin A in the treatment of Trigeminal Neuralgia in Spain: a nationwide survey on 106 Spanish Neurologists

A. Mínguez-Olaondo<sup>1</sup>, D. García-Azorín<sup>2</sup>,

N. Morollón Sánchez-Mateos<sup>3</sup>, A.L. Guerrero<sup>2</sup>, P. Irimia<sup>4</sup>,  
A. Gago Veiga<sup>5</sup>, M. Torres-Ferrus<sup>6</sup>, S. Santos Lasaosa<sup>7</sup>

<sup>1</sup>Neurology, Hospital Universitario Donostia, Donostia-San Sebastián, Spain, <sup>2</sup>Department of Neurology, Hospital Clínico Universitario de Valladolid, Valladolid, Spain,

<sup>3</sup>Neurology, Hospital Universitario MútuaTerrassa, Terrassa, Spain, <sup>4</sup>Neurology, Clínica Universidad de Navarra, PAMPLONA, Spain, <sup>5</sup>Neurology, Hospital Universitario de La Princesa, Madrid, Spain, <sup>6</sup>Neurology, Hospital

Universitario Vall d'Hebron, Barcelona, Barcelona, Spain, <sup>7</sup>Neurology, Hospital Clínico Universitario Lozano Blesa de Zaragoza, Saragossa, Spain

**Background and aims:** Several oral prophylactic drugs can be used in Trigeminal Neuralgia (TN); however, some patients might experience adverse effects or be treatment resistant. Some authors have reported positive results with the use of onabotulinumtoxin A (onabotA). In this study we aim to describe the opinion and pattern of use of onabotA among Spanish Neurologists.

**Methods:** We invited all the Spanish Neurologists to complete an online survey about TN management carried out through the scientific committee of the Spanish Society of Neurology and specifically asking about the use of onabotA, frequency of use, preferred scheme, number of units and when they considered it.

**Results:** The survey was completed by 106 neurologists, 48.6% of them focused on headache disorders, with mean age of 43.2±10.5 years and 48.1% of female participants. Mean monthly number of TN patients was described of 6.8±6.8 patients. OnabotA was used in monotherapy by 39.6% and as add-on treatment by 56.6%. Frequency of onabotA use is represented in figure 1. Mean number of prior treatments was 2.4±1.5. Preferred injection scheme was creating a “mesh” for 56%, 26.6% of responders also used a personal scheme and 22.7% injected trigger points. The number of employed units ranged from 10 to 75. Contralateral side was also injected by 19.8% of responders. Half of the users estimated that onabotA benefited most of the patients. The most frequently experienced adverse event was facial weakness.

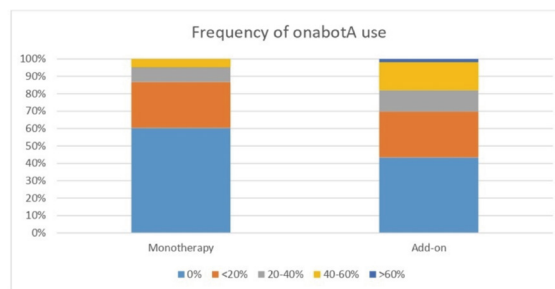


Figure 1. Frequency of onabotA use.

**Conclusion:** Onabotulinumtoxin A is considered for the therapy of treatment resistant TN patients by half of the Spanish neurologists, but the pattern of use is variable.

**Disclosure:** Nothing to disclose

## EPO2164

**The burden of migraine in the Netherlands: results from the My Migraine Voice survey**

E. Mos<sup>1</sup>, A. Buurman<sup>2</sup>, P. Vo<sup>3</sup>

<sup>1</sup>Amsterdam, Netherlands, <sup>2</sup>Novartis Pharma Netherlands, Amsterdam, Netherlands, <sup>3</sup>Basel, Switzerland

**Background and aims:** The My Migraine Voice survey aimed to investigate the migraine patient's journey through the Dutch healthcare system as well as the functional, emotional and economic impact of migraine, with a focus on patients who suffered from at least 4 monthly migraine days and reported use of prophylactic medication.

**Methods:** The My Migraine Voice online worldwide survey was conducted in partnership with the European Migraine and Headache Alliance (EMHA) in 31 countries, including Netherlands, from September 2017 until February 2018. In the Netherlands, survey respondents were recruited via online panels and patient advocacy organizations. Study participants were adult patients ( $\geq 18$  years) suffering from migraine. The survey investigated the patient journey, functional and emotional burden of migraine from the patient's perspective. Additionally, the impact of migraine on work productivity and activities during the past 7 days (prior to survey completion) was evaluated using the Work Productivity and Activity Impairment (WPAI) questionnaire. Descriptive survey results are presented and compared for 4 subgroups; prophylactic treatment naive, no prior prophylactic treatment failure (TF), 1 TF and  $\geq 2$  TF patient subgroups.

**Results:** A total of 340 Dutch people with migraine completed the survey. The results describe the patient's journey through the healthcare system and employment environment and demonstrate the often considerable social, emotional, functional and economic impact of migraine.

**Conclusion:** The Dutch results of the My Migraine Voice survey demonstrate that migraine is associated with a significant functional, emotional and economic burden. Results show a trend towards a higher burden as patients fail an increasing number of prophylactic treatments.

**Disclosure:** This abstract is fully funded by Novartis. The original publication is 'My Migraine Voice survey: a global study of disease burden among individuals with migraine for whom preventive treatments have failed. *J Headache Pain.* 2018; 19(1): 115.' This abstract is about the outcome of the Dutch survey data.



## Motor neurone diseases 2

### EPO2165

#### Neuroinflammation gene expression analysis in patients with amyotrophic lateral sclerosis

M. Ivanova, A. Voronkova, N. Abramychcheva, A. Shabalina, M. Zakharova

*Research Center of Neurology, Moscow, Russian Federation*

**Background and aims:** There is growing evidence on the role of immune reactions in disease development and progression in ALS but it's still not clear whether they bring more benefit or harm and what are the most important immunological features during various stages of the disease. This study aimed to analyze the expression of a wide range of neuroinflammation genes in patients with different stages, progression rates and duration of ALS.

**Methods:** The study included 23 patients with ALS (PALS) and 12 healthy controls (HCs). Gene expression was examined in patients PBMC RNA using the Neuroinflammation gene expression panel consisting of 770 genes for the Nanostring nCounter platform. Data was processed with the nSolver Analysis Software 4.0 and compared with clinical features.

**Results:** 2 patterns of gene expression in PALS were observed which differed mostly on genes related to innate and adaptive immune response, autophagy, matrix remodeling, oligodendrocyte function and Wnt pathways. PALS with distinct patterns differed among themselves in the duration of the disease. Median disease duration was 16.5 months for pattern 1 and 33 months for pattern 2 ( $p < 0.05$ ). Other clinical features such as age, stage and form of the disease, ALS-FRS-R scores, rates of progression were similar. Pattern 2 differed more significantly from the expression pattern observed in HCs.

**Conclusion:** 2 distinct patterns of neuroinflammation gene expression depending on disease duration but not stage or disease progression rate were detected in PALS.

**Disclosure:** Nothing to disclose

### EPO2166

#### Synaptic proteins in neuromuscular synapses at the presymptomatic and symptomatic stages of pathology in ALS model

A. Khabibrakhmanov<sup>1</sup>, L. Nurullin<sup>2</sup>, E. Bogdanov<sup>1</sup>, M. Mukhamedyarov<sup>3</sup>

<sup>1</sup>Kazan, Russian Federation, <sup>2</sup>Kazan Institute of Biochemistry and Biophysics, Kazan, Russian Federation,

<sup>3</sup>Normal physiology, Kazan State Medical University, Kazan, Russian Federation

**Background and aims:** Dysfunction of neuromuscular synapses is 1 of the earliest and most important events in the pathogenesis of amyotrophic lateral sclerosis (ALS). The aim of the present study is to investigate the molecular mechanisms of neuromuscular synapses dysfunction in ALS model. Presynaptic proteins, that mediate processes of synaptic vesicles recycling and its exocytosis, and neurotransmitter reception were studied for the 1st time. This study was supported by the Russian Science Foundation Grant #19-15-00329.

**Methods:** We have used transgenic mSOD1 (G93A) mice as a model of ALS. We used three groups of mice: mSOD1 mice at the presymptomatic and symptomatic stage of the disease, and wild-type mice as a control. The immunoexpression of synaptophysin, synapsin-1, SNAP-25, and nicotinic acetylcholine receptors was evaluated in the diaphragmatic muscle by the immunofluorescent method. Preparations of the diaphragmatic muscle were stained with primary and secondary antibodies. The preparations were studied on a confocal microscope. The fluorescence intensity and area of each protein in synapses were evaluated.

**Results:** A significant decrease in SNAP-25 and synapsin-I was found in the neuromuscular synapses of mSOD1 mice at the presymptomatic stage of pathology. In the symptomatic mSOD1 mice, the immunoexpression of all studied presynaptic proteins was markedly decreased, as well as a decrease in the degree of co-localization of the areas of expression of synaptophysin, and nicotinic acetylcholine receptors was shown.

**Conclusion:** The molecular aspects of neuromuscular synapses dysfunction in different stages of modeled ALS in mSOD1 mice were described, which expands our understanding of the mechanisms of the ALS pathogenesis.

**Disclosure:** Nothing to disclose

## EPO2167

### Treatment with nusinersen in adult patients with spinal muscle atrophy in Slovenia

L. Leonardiš, P. Pukšič, P. Avbelj, K. Petek, M. Lukša, M. Vučina, P. Kranjc, P. Klinar, B. Koritnik  
 University Medical Centre Ljubljana, Ljubljana, Slovenia

**Background and aims:** Nusinersen is the 1<sup>st</sup> approved drug for the treatment of spinal muscular atrophy (SMA). There is still lack of data about efficacy of treatment with nusinersen in adult SMA patients. So far, a few papers reported on feasibility, safety and some clinical effects of this treatment (Stolte, 2018, Bortolani, 2019, Walter, 2019, Veerapandiyam, 2019). We have started treating adult SMA patients in Slovenia in April 2019.

**Methods:** From the Register of neuromuscular disorders, all patients with genetically confirmed SMN1 (5q-SMA) were invited to receive treatment with nusinersen. Those who responded to the invitation were tested and divided in 6 groups according to their functional capabilities (Table 1). Patients with less disabilities were 1<sup>st</sup> to receive treatment.

**Results:** 44 out of 106 (42%) invited patients responded to the invitation letter. They were divided into functional groups (Table 1). First 27 patients with the best functional score were recruited for the treatment so far; however, 7 of them wished to postpone the beginning of treatment. Until January 2020, 20 patients (8 female) received between 1 to 8 nusinersen doses (Table 2). CT guided application was used in five patients.

Table 1 Patients who responded to invitation letter for treatment with nusinersen.

Group	Number of patients	Age (years)	Scoliosis operation	Non-invasive ventilation
1 (walking)	12	23-69	0	0
2 (walking with aids)	0			
3 (no gait, arms lifted to the head)	6	20-50	0	0
4 (no gait, arm movements but not reached to the head, VC>30% of predicted)	13	23-61	3	0
5 (no gait, distal arm movements, VC>30% of predicted)	7	24-66	5	3
6 (no gait, distal arm movements, VC<30% of predicted)	6	26-49	6	4

VC – vital capacity

Table 1 Patients who responded to invitation letter for treatment with nusinersen

Table 2 Adult SMA patients receiving nusinersen treatment

SMA type	Group	Number of patients	Age: median, range (years)	Disease duration: median, range (years)	Scoliosis operation, (number of pts)	CT guided administration, (number of pts)
SMA2	3, 4	4	22, 20-40	21, 19-36	3	3
SMA3	1, 3	16	42, 19-69	33, 4-53	0	2

Table 2 Adult SMA patients receiving nusinersen treatment

**Conclusion:** Intrathecal nusinersen can be successfully delivered in adult SMA patients, even in patients with severe scoliosis. Significant proportion of patients has not responded to treatment invitation. Some of those, who are interested in treatment, prefer to wait for further information before initiating treatment.

**Disclosure:** Nothing to disclose

## EPO2168

### Detection of speech dysfunction due to ALS based on acoustical analysis of sustained vowel phonation test

K. Malhina<sup>1</sup>, M. Vashkevich<sup>2</sup>, V. Haliyeuskaya<sup>1</sup>, S. Likhachev<sup>1</sup>, Y. Rushkevich<sup>1</sup>

<sup>1</sup>Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus, Minsk, Belarus, <sup>2</sup>Belarusian State University of Informatics and Radioelectronics, Minsk, Belarus

**Background:** Detection and assessing of speech impairments associated with ALS using acoustical analysis of speech signal is actual theoretical and practical problem. Development of such analysis methods could significantly simplify and standardize procedure of assessing speech dysfunction of ALS patients and may also contribute to early diagnosis of ALS.

**Aims:** In this study we have assessed suitability of sustained vowel phonation test for detection of speech dysfunction related to ALS.

**Methods:** There are 4 groups of voice signal parameters obtained using fundamental frequency (fo) analysis have been considered: 1) jitters; 2) shimmers; 3) statistical parameters of fo; 4) time-frequency parameters of fo contour. For classification of feature vectors to normal/pathology groups 2 approached have been used: 1) linear discriminant analysis and 2) k Nearest Neighbors (kNN). Accuracy of classifiers was assessed using K-fold cross validation method (K=6).

**Results:** The voice data of 54 speakers (39 healthy controls (HC) – 23 males, 16 females and 15 ALS patients – 6 males, 9 females) used in this study was collected in Republican Research and Clinical Center of Neurology and Neurosurgery (Belarus). The average age in HC group was 41.9 years, in ALS group – 57.7 years. Best classification results with 95.7% of accuracy (sensitivity 91.5% and specificity of 97.4%) have been obtained using kNN method.

**Conclusion:** We have presented an approach to automatic detection of bulbar ALS changes using acoustical analysis of speech signal with high levels of sensitivity 91.5% and specificity of 97.4%.

**Disclosure:** This study received the funding from the Ministry of Health of the Republic of Belarus.

## EPO2169

**SUNFISH Part 2: Efficacy and safety of risdiplam (RG7916) in patients with Type 2 or non-ambulant Type 3 spinal muscular atrophy (SMA)**

E. Mercuri<sup>1</sup>, N. Barisic<sup>2</sup>, O. Boespflug-Tanguy<sup>3</sup>, J.W. Day<sup>4</sup>, N. Deconinck<sup>5</sup>, A. Kostera-Pruszczyk<sup>6</sup>, R. Masson<sup>7</sup>, E. Mazzone<sup>1</sup>, A. Nascimento<sup>8</sup>, K. Saito<sup>9</sup>, D. Vlodayets<sup>10</sup>, S. Fuerst-Recktenwald<sup>11</sup>, S. Fuhrer<sup>12</sup>, M. Gerber<sup>12</sup>, K. Gorni<sup>13</sup>, H. Kletzl<sup>12</sup>, C. Martin<sup>14</sup>, W.Y. Yeung<sup>14</sup>, C. Vuillerot

On Behalf Of The Sunfish Working Group<sup>15</sup>

<sup>1</sup>Paediatric Neurology and Nemo Center, Catholic University and Policlinico Gemelli, Rome, Italy, <sup>2</sup>Department of Paediatrics, Clinical Medical Center Zagreb, University of Zagreb Medical School, Zagreb, Croatia, <sup>3</sup>I-Motion - Plateforme d'essais cliniques pédiatriques, Hôpital Armand Trousseau, Paris, France, <sup>4</sup>Department of Neurology, Stanford University, Palo Alto, USA, <sup>5</sup>Neuromuscular Reference Center, UZ Gent, Ghent, Belgium, <sup>6</sup>Katedra I Klinika Neurologii Warszawskiego Uniwersytetu, Warsaw, Poland, <sup>7</sup>Developmental Neurology Unit, Carlo Besta Neurological Research Institute Foundation, Milan, Italy, <sup>8</sup>Neuromuscular Unit, Neuropaediatrics Department, Hospital Sant Joan de Déu, Fundacion Sant Joan de Deu, CIBERER – ISC III, Barcelona, Spain, <sup>9</sup>Institute of Medical Genetics, Tokyo Women's Medical University, Tokyo, Japan, <sup>10</sup>Russian Children Neuromuscular Center, Veltischev Clinical Pediatric Research Institute of Pirogov Russian National Research Medical University, Moscow, Russian Federation, <sup>11</sup>Pharma Development Neurology, F. Hoffmann-La Roche Ltd, Basel, Switzerland, <sup>12</sup>Roche Pharmaceutical Research and Early Development, Roche Innovation Center Basel, Basel, Switzerland, <sup>13</sup>PDMA Neuroscience and Rare Disease, F. Hoffmann-La Roche Ltd, Basel, Switzerland, <sup>14</sup>Roche Products Ltd, Welwyn Garden City, United Kingdom, <sup>15</sup>Department of Pediatric Physical Medicine and Rehabilitation, Hôpital Mère Enfant, CHU-Lyon, Lyon University, Lyons, France

**Background and aims:** Spinal muscular atrophy (SMA) is a severe, progressive neuromuscular disease caused by reduced levels of survival of motor neuron (SMN) protein due to deletions and/or mutations of the SMN1 gene. A second gene, SMN2, produces only low levels of functional SMN protein. Risdiplam (RG7916) is an orally administered, centrally and peripherally distributed SMN2 pre-mRNA splicing modifier that increases the levels of functional SMN protein. Part 2 of the SUNFISH study (NCT02908685) aims to determine the safety and efficacy of risdiplam in patients with Type 2 or non-ambulant Type 3 SMA.

**Methods:** SUNFISH is a multicentre, 2-part, randomised, placebo-controlled, double-blind study (randomised 2:1, risdiplam:placebo) in patients, aged 2–25 years, with Type 2 or Type 3 SMA.

Part 1 (n=51) is a dose-selection study assessing the safety, tolerability and pharmacokinetics/pharmacodynamics of different risdiplam dose levels in patients with Type 2 and

Type 3 SMA (ambulant and non-ambulant); confirmatory Part 2 (n=180) assesses the safety and efficacy of the risdiplam dose level that was selected from Part 1 compared with placebo in patients with Type 2 and non-ambulant Type 3 SMA. The primary objective of Part 2 is to evaluate the efficacy of risdiplam compared with placebo in terms of motor function as assessed by the change from baseline in the 32-item Motor Function Measure total score at month 12.

**Results:** Here we will report data from SUNFISH Part 2 including baseline demographics, safety and novel efficacy data in participants treated with risdiplam or placebo for 12 months.

**Conclusion:** SUNFISH Part 2 is ongoing.

**Disclosure:** Study sponsored by F. Hoffmann-La Roche AG, Basel, Switzerland. Writing and editorial assistance was provided by MediTech Media, UK, in accordance with Good Publication Practice (GPP3) guidelines.

## EPO2170

### Role of routine Cerebrospinal Fluid (CSF) and serum parameters in adult 5q- SMA type 2/3 treated with Nusinersen: a prospective observational study

G. Milella<sup>1</sup>, G. Scaglione<sup>2</sup>, A. Fraddosio<sup>1</sup>, E. D’errico<sup>3</sup>, A. Intronà<sup>1</sup>, M. Ruggieri<sup>1</sup>, I.L. Simone<sup>1</sup>

<sup>1</sup>Neurology Unit, Department of Basic Medical Sciences, Neurosciences and Sense Organs, University of Bari “Aldo Moro”, Bari, Italy, <sup>2</sup>Department of Basic Medical Sciences, Neurosciences and Sense Organs, University of Bari, Bari, Italy, <sup>3</sup>Basic Medical Sciences, Neuroscience and Sense Organs., University “A. Moro” of Bari. Bari, Italy

**Background and aims:** The anti-sense oligonucleotide drug nusinersen was recently approved for spinal muscular atrophy (SMA). Our aim was to examine CSF routine parameters determining a prognostic marker for this treatment.

**Methods:** Consecutive SMA type 2-3 undergoing nusinersen were included in a single-center study. They were sampled for CSF and serum at baseline (T0), after loading dose (T1) and after one maintenance dose (T2). Serum/CSF albumin, oligoclonal IgG bands (OB), Neurofilament light chain (NFL), Tau, p-Tau, pTau/Tau, beta-amyloid 1-42 were evaluated. Motor function was assessed using HFMSE, RULM. Paired sample T-test and Pearson correlations were used.

**Results:** 9 patients whose clinical characteristics were described in Table 1 were recruited. BBB dysfunction was detected in 3 patients from T0 to T2 and in 1 more patient during the follow-up. Persistent OB systemic synthesis (OSS) were found in 4 patients from T0; 3 patients developed OSS in the follow-up; 1 patient had intrathecal OB from T0 to T2. Serum creatinine at T0 were much lower than normal values. Table 2 summarized serum/CSF parameters. HFMSE and RULM improved significantly between T0 and T1 (CI:95% p=0.032 and p=0.017 respectively). At T0 serum creatinine values strongly correlated to HFMSE and RULM, respectively r=0.93, p<0.001 r=0.799, p=0.001. Neuronal biomarkers did not correlate with functional scales at T0, T1 and T2.

Patients characteristics	Values
Number of patients	9
Age (mean ± SD), years	42,78 ± 13,95
SMA type 2:3	2:7
Disease onset (mean ± SD), years	6,89 ± 5,92
Gender male: female	6:9
HFMSE T0 (mean ± SD)	14,78 ± 20,87
RULM T0 (mean ± SD)	17,5 ± 13,89
HFMSE T1 (mean ± SD)	16,22 ± 20,87
RULM T1 (mean ± SD)	19,22 ± 14,08
HFMSE T2 (mean ± SD)	16,55 ± 22,01
RULM T2 (mean ± SD)	19,11 ± 14,24

Table 1 Clinical characteristics of SMA patients

Parameter	CSF	Serum	CSF	Serum	CSF	Serum	CSF	Serum	CSF	Serum
	CSF	Serum	CSF	Serum	CSF	Serum	CSF	Serum	CSF	Serum
Albumin (g/L)	0,21 ± 0,06	0,21 ± 0,06	0,21 ± 0,06	0,21 ± 0,06	0,21 ± 0,06	0,21 ± 0,06	0,21 ± 0,06	0,21 ± 0,06	0,21 ± 0,06	0,21 ± 0,06
OB	1 patient with intrathecal OB	1 patient with intrathecal OB	1 patient with intrathecal OB	1 patient with intrathecal OB	1 patient with intrathecal OB	1 patient with intrathecal OB	1 patient with intrathecal OB	1 patient with intrathecal OB	1 patient with intrathecal OB	1 patient with intrathecal OB
Tau (pg/mL)	6,28 ± 1,51	6,28 ± 1,51	6,28 ± 1,51	6,28 ± 1,51	6,28 ± 1,51	6,28 ± 1,51	6,28 ± 1,51	6,28 ± 1,51	6,28 ± 1,51	6,28 ± 1,51
p-Tau (pg/mL)	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000
pTau/Tau	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000
Beta-amyloid 1-42 (pg/mL)	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000
CSF/Serum ratio	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000	0,0000 ± 0,0000

Table 2 Serum and CSF parameters in 9 SMA patients (T0, T1, T2) (logarithmic values, unless specified)

**Conclusion:** In a mixed cohort of adult patients with SMA type 2-3, neuronal biomarkers did not have prognostic role during initial phase of treatment. The development of Ig-OSS related to the treatment need to be further confirmed.

**Disclosure:** Nothing to disclose

## EPO2171

**Sensory disturbances in the SOD1G93A murine model of ALS: the satellite glial cells as a new non-motor neuron target**

J. Riancho<sup>1</sup>, M. Ruiz-Soto<sup>2</sup>, J.A. Berciano<sup>3</sup>,  
M.T. Berciano<sup>2</sup>, M. Lafarga<sup>2</sup>

<sup>1</sup>Torrelavega, Spain, <sup>2</sup>University of Cantabria, Santander, Spain, <sup>3</sup>Santander, Spain

**Background and aims:** Several clinical and preclinical studies have shown sensory disturbances in both amyotrophic lateral sclerosis (ALS) patients and murine models of the disease. We aimed to evaluate sensory abnormalities in the transgenic SOD1-G93A mouse model of ALS, focusing on the satellite glial cells-sensory neuron functional units (GCSNFU) as a potential non-motor neuron target of the disease.

**Methods:** 24 SOD1-G93A transgenic and 24 control mice were used in the study. The presence of sensory disturbances was evaluated with specific sensory tests. Additionally, cell biology analysis was carried out at days 75 and 95, including conventional histology, immunofluorescence and electron microscopy on mechanically dissociated GCSNFU and tissue samples of sensory ganglia. Complementary biochemical analysis with western blot and qPCR were performed at day 95 of age.

**Results:** By day 75 of age, von Frey and hot plate tests demonstrated clear sensory disturbances in ALS transgenic mice in comparison with control mice. Histological studies demonstrated that in the transgenic mice the sensory neurons had a marked loss of glial coating. In addition, the GCSNFU had a severe accumulation of mutated SOD1 protein, enlarged lysosomal compartment and significantly increased levels of oxidative stress. Intriguingly, these alterations were much more pronounced within satellite glial cells than in sensory ganglion neurons.

**Conclusion:** In addition to the widely known motor symptomatology, SOD1G93A murine model of ALS, exhibit early sensory disturbances. In these alterations, the involvement of the GCSNFU, particularly of the satellite glial cells, seems to play an important role, thus emerging as a new target in ALS.

**Disclosure:** Nothing to disclose

## EPO2172

**ALS-derived fibroblasts exhibit reduced proliferation rate, cytoplasmic TDP-43 aggregation and a higher susceptibility to DNA damage**

J. Riancho<sup>1</sup>, M. Delgado-Alvarado<sup>1</sup>, F.J. Gil-Bea<sup>2</sup>,  
O. Tapia<sup>3</sup>, M.J. Sedano<sup>4</sup>, M.T. Berciano<sup>3</sup>,  
A. Lopez de Munain Arregui<sup>5</sup>, M. Lafarga<sup>3</sup>

<sup>1</sup>Hospital Sierrallana, IDIVAL, CIBERNED, Torrelavega, Spain, <sup>2</sup>Biodonostia, San Sebastian, Spain, <sup>3</sup>University of Cantabria, Santander, Spain, <sup>4</sup>Neurology, Hospital Marques de Valdecilla, Santander, Spain, <sup>5</sup>San Sebastián, Spain

**Background and aims:** Dermic fibroblasts have been proposed as a potential genetic-ALS cellular model. This study aimed to explore whether dermic fibroblasts from patients with sporadic-ALS (sALS) recapitulate alterations typical of ALS motor neurons and exhibit abnormal DNA-damage response.

**Methods:** Dermic fibroblasts were obtained from 8 sALS patients and 4 control subjects. Cellular characterization included proliferation rate analysis, cytoarchitecture studies and confocal immunofluorescence assessment for TDP-43. Additionally, basal and irradiation-induced DNA damage was evaluated by confocal immunofluorescence and biochemical techniques.

**Results:** sALS-fibroblasts showed decreased proliferation rates compared to controls. Additionally, whereas control fibroblasts exhibited the expected normal spindle-shaped morphology, ALS fibroblasts were thinner, with reduced cell size and enlarged nucleoli, with frequent cytoplasmic TDP-43 aggregates. Also, baseline signs of DNA damage were evidenced more frequently in ALS-derived fibroblasts (11 versus 4% in control-fibroblasts). Assays for evaluating the irradiation-induced DNA damage demonstrated that DNA repair was defective in ALS-fibroblasts, accumulating more than double of γH2AX-positive DNA damage foci than controls. Very intriguingly, the proportion of fibroblasts particularly vulnerable to irradiation (with more than 15 DNA damage foci per nucleus) was 7 times higher in ALS-derived fibroblasts than in controls.

**Conclusion:** Dermic-derived ALS fibroblasts recapitulate relevant cellular features of sALS and show a higher susceptibility to DNA damage and defective DNA repair responses. Altogether, these results support that dermic fibroblasts may represent a convenient and accessible ALS cellular model to study pathogenetic mechanisms, particularly those related to DNA damage response, as well as the eventual response to disease-modifying therapies.

**Disclosure:** This work was supported by grants from the Carlos III Health Institute (ISCIII, FEDER, PI18/01066), CIBERNED (2016-04), Bioef (BIO17/ND/023-BD) and the Basque Government (2017222027 and 2015111122) and the Institute of Research Valdecilla (IDIVAL) (INNVAL 16/11)

## EPO2173

**Impact of the disease on Quality Of Life in patients with Spinal Muscular Atrophy**

I. Hernandez-Rojo Claverie<sup>1</sup>,  
 J. Rodríguez Álvarez-Cienfuegos<sup>2</sup>, F.I. Monton Alvarez<sup>2</sup>,  
 J. Alemañ Díez<sup>2</sup>, C. Fregel Rodríguez<sup>2</sup>

<sup>1</sup>UDM AFYC MADRID SUR, H. UNIVERSITARIO SEVERO OCHOA, Madrid, Spain, <sup>2</sup>Neurology, Hospital Universitario Nuestra Señora de la Candelaria, Santa Cruz de Tenerife, Spain

**Background and aims:** Spinal muscular atrophy (SMA) is a degenerative disease that involves progressive muscle weakness with gradual loss of physical abilities in which quality of life (QoL) can be a parameter of special interest in determining the effectiveness of Nusinersen administration in advanced stages. We analyzed the impact of this disease on the QoL of patients diagnosed with SMA types III and IV.

**Methods:** Structured interviews measuring the EuroQol-5D, SF 36, ALSFRS, mRs, Hamilton and PRISM scales in patients diagnosed with SMA in a third-level hospital prior to Nusinersen administration.

**Results:** We identified 9 cases (66.6% male and 33.3% female) with ratio III/IV of 7/2 whose median years of evolution was 29 and median age 40. Although 55.6% were unable to walk, the score at EuroQol was 0.67 and 55.5% reported having no problems in carrying out domestic activities. More than half of patients did not see interference from the disease in their social or emotional relationships. 77.7% did not report psychic symptoms and 66% had no pain or discomfort, data consistent with those obtained on the SF 36 and Hamilton scales, being these responses equitable in terms of ages and years of evolution.

**Conclusion:** QoL in SMA could be related to the ability to adapt to the degree of motor impairment, so that they retain as much functional independence as possible, rather than this one itself. Its emotional impact is less than expected by its motor impairments and does not seem to be strictly related to age or years of evolution.

**Disclosure:** Nothing to disclose

## EPO2174

**Objective and Subjective impact of Nusinersen in Spinal Muscular Atrophy**

J. Rodríguez Álvarez-Cienfuegos<sup>1</sup>, F.I. Monton Alvarez<sup>1</sup>,  
 A. Gutiérrez Martínez<sup>2</sup>, C. Fregel Rodríguez<sup>1</sup>,  
 J. Alemañ Díez<sup>1</sup>, I. Hernandez-Rojo Claverie<sup>3</sup>

<sup>1</sup>Neurology, Hospital Universitario Nuestra Señora de la Candelaria, Santa Cruz de Tenerife, Spain, <sup>2</sup>Neurology, Complejo Hospitalario Universitario Insular Materno-Infantil, Las Palmas de Gran Canaria, Spain, <sup>3</sup>UDM AFYC MADRID SUR, H. UNIVERSITARIO SEVERO OCHOA, Madrid, Spain

**Background and aims:** Spinal muscular atrophy (SMA) is a neuromuscular disease characterized by degeneration and loss of spinal cord motoneurons leading to weakness and progressive muscular atrophy. Nusinersen's approval in June 2017 has opened a door to the treatment of this disease. We analyzed the objective and subjective impact of treatment in patients diagnosed with SMA III.

**Methods:** Structured interviews with measurement of subjective rating scales and Hammersmith (HFNSE), CHOP-Intend and RULM objective scales in patients diagnosed with SMA III in two third-level hospitals before and after the start of the treatment with Nusinersen.

**Results:** We identified 4 cases (1 male and 3 women) whose median years of evolution were 23.5 and the mean of age 35. 1 patient received 7 doses according to established protocol. 2 received 6 and 1 just four. 2 of them walked with support. The average improvement in HFNSE and CHOP-Intend was 1 point. Almost 2 points was achieved in RULM. The subjective improvement in health status was 40%, scoring an average of 2 on the EVA scale of satisfaction grade assessment (high degree). The areas of greatest improvement were the ability to perform activities and in problems with hands and feet, followed by mobility, fatigue, shortness of breath, weakness in the back, chest or abdomen and in problems in the hips, thighs or knees. There was no worsening in the other items evaluated.

**Conclusion:** Despite the short period of treatment, our patients experienced both objective and subjective improvement. Both should be taken into account in SMA therapeutic decision-making.

**Disclosure:** This research was suggested by Biogen.

## EPO2175

**Sensory nerve fiber involvement in amyotrophic lateral sclerosis (ALS)**

A. Rosenbohm<sup>1</sup>, A. Calderaro<sup>1</sup>, I. Katona<sup>2</sup>, J. Weis<sup>2</sup>, A.C. Ludolph<sup>1</sup>

<sup>1</sup>Neurology, University of Ulm, Ulm, Germany,

<sup>2</sup>Neuropathology, University Hospital RWTH Aachen, Aachen, Germany

**Introduction:** We investigated the involvement of sensory nerve fibers in ALS and compared small intraepidermal nerve fiber involvement in skin biopsies with quantitative sensory testing.

**Methods:** The cohort consisted of 51 patients with ALS (23 women, 28 men) according to the Revised El Escorial criteria. Sensory involvement was examined using neurography of the sural nerve, sensitive evoked potentials (SEP) of the tibial and median nerves, quantitative sensory testing (QST), and small fiber neuropathy in skin biopsy.

**Results:** Mild sensory symptoms including diffuse dysesthesias, paresthesias, and hypesthesia were inconsistently reported in patients. Skin biopsies could be evaluated in 44/51 patients. 63.6% showed small fiber neuropathy (SFN) in the biopsy. No significant correlation between SFN and onset type (bulbar, spinal), disease duration, age or ALSFRS-R could be detected. Histologically confirmed SFN cases were all detected in QST (n=28). Normal skin biopsies (n=16) had a pathological QST measurement in n=14 (87.5%) cases. When QST was completely normal, no SFN was detected in biopsy (n=2). When SFN was proven in the biopsy, QST measurement displayed an affection of A $\delta$  fibers in most of cases (86.4% versus C fibers 59.1% and A $\beta$  fibers 41.0%).

**Conclusion:** These results indicate that small, distal epidermal nerve fibers are frequently involved in ALS, detected by skin biopsy. Noninvasive QST measurement of small sensible fiber involvement has a poor predictive value compared to skin biopsy since specificity is low. Fiber type involvement, especially A $\delta$  fibers, cannot be distinguished histologically due to lack of characterizing stainings.

**Disclosure:** Nothing to disclose

## EPO2176

**The Terminal Complement Pathway Is Markedly Activated in the Cerebrospinal Fluid and Plasma of Amyotrophic Lateral Sclerosis Patients**

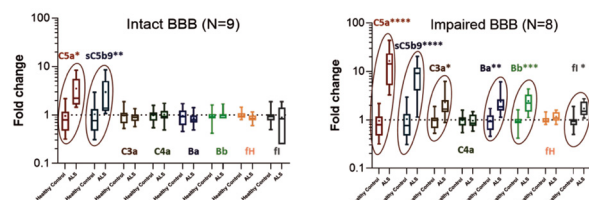
C. Sayegh, S. Read, A. Ricardo, G.-Q. Tang, Y. Tang, X. Xu

Ra Pharmaceuticals, Cambridge, USA

**Background and aims:** Hyperactivation of the complement system is observed in several neurodegenerative diseases. Amyotrophic lateral sclerosis (ALS) is a progressive and fatal disease characterized by degeneration of motor neurons leading to loss of muscle action. In this study, we examine levels of complement activation markers in the cerebrospinal fluid (CSF) and plasma from ALS patients compared to healthy controls and investigate correlations of complement split-products with markers of blood-brain barrier (BBB) permeability, neurodegeneration and neuroinflammation.

**Methods:** We sourced commercially CSF and plasma samples from ALS patients and age-matched healthy controls (PrecisionMed). Analytes were measured using multiplex and singleplex ELISAs.

**Results:** C5a and soluble C5b-9 (sC5b-9), markers of terminal complement (TCC) pathway activation, were significantly elevated in both CSF and plasma of ALS patients versus age-matched controls. Using albumin-quotient (CSF/plasma) as a measure of BBB permeability, we demonstrate additional elevation of markers of the alternative activation pathway including C3a, Ba and Bb, in CSF of patients with impaired BBB (Figure 1). Interestingly, markers of classical or lectin activation pathway, but not alternative pathway, were observed in plasma. Finally, we examine the correlation of markers of axonal neurodegeneration (NFL and pNFH) and neuroinflammation (CHIT1) in CSF with TCC levels.



Whiskers indicate 5-95 percentile and "\*" within boxes denotes mean. Albumin-quotient (Albumin-Q) was assessed by calculating the ratio of CSF to plasma human serum albumin levels. 8 of 17 ALS CSF patient samples (47%) showed Albumin-Q >9.0 indicating BBB impairment whereas only 1 of 14 healthy donors had an Albumin-Q >9.0. Data from all healthy controls were therefore included in both intact BBB and impaired BBB analyses. Statistical analysis performed using Kruskal-Wallis test; \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

Figure 1: CSF of ALS patients with impaired BBB shows elevated activation markers of TCC and alternative complement activation pathway

**Conclusion:** These studies provide comprehensive characterization of the activation of the terminal complement pathway in ALS patients and support additional studies aimed at investigating the utility of these markers as potential pharmacodynamic and mechanism-specific

biomarkers in an upcoming multicenter ALS platform trial investigating zilucoplan, a convenient, subcutaneously self-administered macrocyclic peptide inhibitor of complement component 5.

**Disclosure:** All authors are employees and shareholders of Ra Pharmaceuticals

## EPO2177

### **Amyotrophic lateral sclerosis and Curcumin: a double-blind, placebo-controlled clinical trial.**

G. Siciliano, C. Simoncini, E. Schirinzi, G. Ricci, L. Chico, A. Govoni  
*Department of Clinical and Experimental Medicine, University of Pisa, Pisa, Italy*

**Background and aims:** Literature data show that oxidative stress plays an important role in amyotrophic lateral sclerosis (ALS) pathogenesis.

**Methods:** The current study was designed to determine whether curcumin oral supplementation (1500mg/day) may be efficacious in the treatment of ALS. Patients had a diagnosis of definite/probable ALS. Clinical parameters such as ALS-Functional Rating Scale (ALS-FRS), Medical Research Council (MRC), body mass index, and oxidative stress markers including oxidative protein products (AOPPs), ferric reducing ability (FRAP), total thiols (T-SH) and lactate, were evaluated, before and after 3 months of curcumin/placebo treatment.

**Results:** A total of 33 ALS patients were evaluated before the introduction of experimental therapy, a subgroup of 10 patients were reevaluated after 3 months of placebo/curcumin supplementation. Compared to controls, the whole ALS population showed a greater oxidative stress valued by increased AOPP ( $p<0.001$ ), and decreased FRAP and t-SH ( $p<0.001$ ) levels.

After 3 months of curcumin administration, a positive trend was observed regarding lactic acid levels that were improved, with a borderline p-value ( $p=0.06$ ) with respect to placebo group. A small not significant difference was observed between groups, in AOPP, FRAP levels and in ALS-FRS and MRC scales.

**Conclusion:** Curcumin is a potent scavenger of reactive chemical species as observed in ALS mouse models. Related to this ongoing trial, the obtained results indicate a possible therapeutic effect of this compound in ALS, may be in add on or combined treatments, in any case worthy to be further studied on more consistent case histories as well as for a longer follow-up.

**Disclosure:** Nothing to disclose



## EPO2178

**Sema3E in CSF works as a diagnostic biomarker of amyotrophic lateral sclerosis (ALS)**

S. Tada<sup>1</sup>, T. Okuno<sup>1</sup>, A. Kumanogoh<sup>2</sup>, H. Mochizuki<sup>1</sup>  
<sup>1</sup>*Department of Neurology, Osaka University Graduate School of Medicine, Suita, Japan,* <sup>2</sup>*Department of Respiratory Medicine and Clinical Immunology, Osaka University Graduate School of Medicine, Suita, Japan*

**Background and aims:** Increasing evidence suggest that hypo-perfusion/hypoxia in the spinal cord is deeply involved in the pathogenesis of ALS. We previously showed that novel prostaglandin I<sub>2</sub> agonist ameliorated the motor function of ALS model mice by mitigating hypoxia in the spinal cord of ALS mice (Tada et al., *Scientific Reports*, 9(1), 5252., 2019). Based on this result, we speculated that hypo-perfusion/hypoxia in the spinal cord could initiate ALS, and hypothesized that Semaphorin 3E (Sema3E), which suppresses angiogenesis, might be involved in the pathogenesis of ALS. In order to further elucidate the possible contribution of hypo-perfusion/hypoxia to ALS, we measured the concentration of Sema3E in the cerebrospinal fluid (CSF) of ALS patients and compare it with that of control patients.

**Methods:** We measured the concentration of Sema3E in the CSF of 11 ALS patients (8 males and 3 females, average age at collection; 67.1 years old) and 11 control patients (8 males and 3 females, average age at collection; 64.8 years old) by ELISA.

**Results:** The concentration of Sema3E in CSF of ALS patients was significantly increased compared to that of control patients (2311±448.2pg/ml and 1071±171.6pg/ml, respectively, average ± SD). A cutoff value of 1036pg/ml confirmed the diagnosis of ALS with the sensitivity of 63.6% and the specificity of 81.8%.

**Conclusion:** We showed here that the concentration of Sema3E in CSF is elevated in ALS patients, and it could serve as a diagnostic biomarker for ALS. Sema3E could be a therapeutic target in ALS by regulating hypo-perfusion/hypoxia in the spinal cord.

**Disclosure:** Nothing to disclose

## EPO2179

**Integrated Safety Report for Intravenous (IV) Onasemnogene Apeparvovec Clinical Development Programs in Spinal Muscular Atrophy (SMA) Type 1 (SMA1)**

S. Tauscher-Wisniewski<sup>1</sup>, R.S. Finkel<sup>2</sup>, E. Mercuri<sup>3</sup>, R. Masson<sup>4</sup>, J. Parsons<sup>5</sup>, F. Baldinetti<sup>1</sup>, D. Chand<sup>1</sup>, A. Kleyn<sup>1</sup>, D.M. Sproule<sup>1</sup>, D.E. Feltner<sup>1</sup>, J.R. Mendell<sup>6</sup>  
<sup>1</sup>*AveXis, Inc., Bannockburn, USA,* <sup>2</sup>*Division of Neurology, Department of Pediatrics, Nemours Children's Hospital, Orlando, USA,* <sup>3</sup>*Department of Paediatric Neurology and Nemo Clinical Centre, Catholic University, Rome, Italy,* <sup>4</sup>*Developmental Neurology Unit, Fondazione IRCCS Istituto Neurologico Carlo Besta, Milan, Italy,* <sup>5</sup>*Department of Pediatrics, University of Colorado School of Medicine, Aurora, USA,* <sup>6</sup>*Nationwide Children's Hospital, Center for Gene Therapy; Ohio State University, Department of Pediatrics and Department of Neurology, Columbus, USA*

**Background and aims:** IV onasemnogene apearvovec (formerly AVXS-101) gene therapy addresses the genetic root cause of SMA, survival motor neurone 1 gene (SMN1) deletion/mutation. This report describes the safety of IV onasemnogene apearvovec in SMA1 across 4 clinical trials.

**Methods:** Symptomatic or pre-symptomatic SMA1 patients (2–3xSMN2) received a single IV onasemnogene apearvovec dose. Adverse events (AEs) were assessed per Common Terminology Criteria for Adverse Events and monitored/reported in accordance with study protocols.

**Results:** As of 8 Mar 2019, 75 patients received IV onasemnogene apearvovec (therapeutic dose [1.1e14 vg/kg]; mean [SD, range] age: 2.5 [1.8, 0.3–7.9] months [mos]; weight: 5.33 [1.33, 3.0–8.4] kg). Two deaths were reported: patient aged 7.8mos, respiratory arrest 5.7mos post-treatment (unrelated to treatment); patient aged 6.8mos, hypoxic/ischemic encephalopathy and an acute illness. 64 (85%) patients reported ≥1 AE; 33 (44%) patients had treatment-related AEs; 29 (39%) patients had serious AEs. Vomiting and pyrexia have been reported as treatment-emergent AEs at rates of >5% in the clinical development program (considered treatment-related). Increased liver transaminase (>upper limit of normal): 8 (11%) patients (considered treatment-related, clinically asymptomatic, and generally resolved with prednisolone. Transient thrombocytopenia was reported, without clinically significant bleeding/bruising. There is no consistent evidence of cardiac safety concerns associated with onasemnogene apearvovec. Anticipated safety update: Q1 2020.

**Conclusion:** As of 8 Mar 2019, the IV onasemnogene apearvovec safety profile remains consistent with the United States package insert and continues to be monitored across multiple settings.

**Disclosure:** These studies were sponsored by AveXis, Inc., a Novartis Company.

## EPO2180

### Cerebrospinal fluid phosphorylated neurofilament heavy chain and chitotriosidase in primary lateral sclerosis

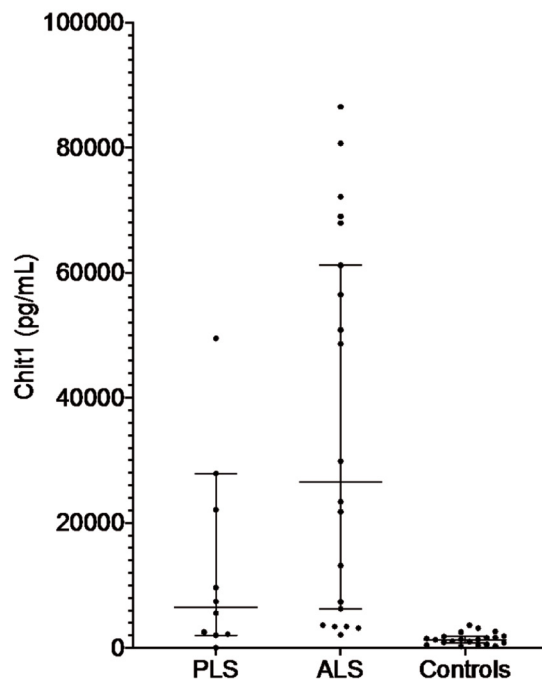
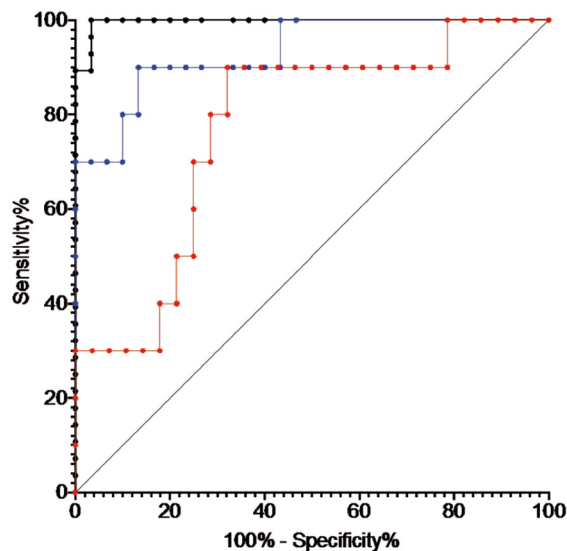
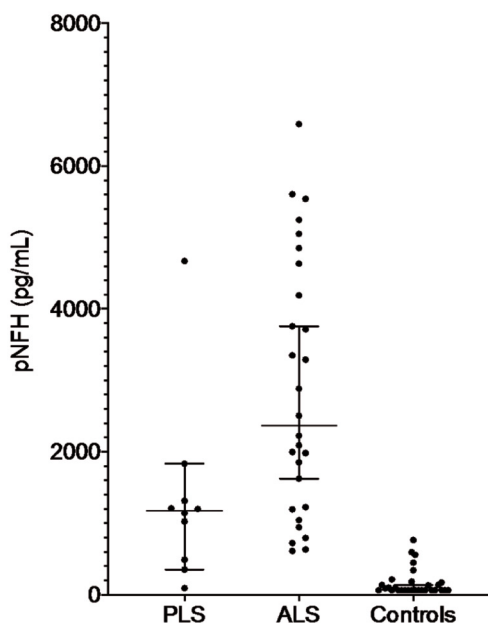
F. Verde<sup>1</sup>, G. Zaina<sup>2</sup>, C. Bodio<sup>3</sup>, O. Borghi<sup>3</sup>, S. Peverelli<sup>4</sup>, C. Colombrita<sup>3</sup>, L. Maderna<sup>3</sup>, D. Soranna<sup>3</sup>, A. Zambon<sup>5</sup>, C. Morelli<sup>3</sup>, N. Ticozzi<sup>1</sup>, A. Ratti<sup>2</sup>, P. L. Meroni<sup>3</sup>, V. Silani<sup>1</sup>

<sup>1</sup>Milan, Italy, <sup>2</sup>Università degli Studi di Milano, Milan, Italy, <sup>3</sup>IRCCS Istituto Auxologico Italiano, Milan, Italy, <sup>4</sup>Neurology, Istituto Auxologico, Milan, Italy, <sup>5</sup>Università di Milano Bicocca, Milan, Italy

**Background and aims:** The upper motor neuron disease primary lateral sclerosis (PLS) accounts for a small proportion of motor neuron disease cases. Early differentiation from ALS is difficult and there are no supporting biomarkers.

**Methods:** We measured the 2 ALS biomarkers phosphorylated neurofilament heavy chain (pNFH) and chitotriosidase (Chit1) in the CSF of 10 PLS patients, 28 ALS patients, and 30 controls.

**Results:** pNFH was significantly higher in ALS and in PLS patients in comparison with controls, but also higher in ALS vs. PLS (Figure 1). Accordingly, it discriminated between ALS and controls with AUC 0.996, between PLS and controls with AUC 0.933, and between PLS and ALS with AUC 0.77 (Figure 2; black, ALS vs. controls; blue, PLS vs. controls; red, PLS vs. ALS). Chit1 differed in a similar but weaker way between the same categories (Figure 3) (AUC for ALS vs. controls, 0.981; AUC for PLS vs. controls, 0.848; AUC for PLS vs. ALS, 0.74). pNFH was moderately correlated with progression rate in the ALS cohort ( $r=0.529$ ), and ALS patients with higher levels displayed a shorter survival (HR, 4.95). Chit1 had a moderate correlation with progression rate in the entire MND cohort ( $r=0.504$ ).



**Conclusion:** We confirm that pNFH and, to a lesser extent, Chit1 are promising diagnostic and prognostic biomarkers for ALS. Most importantly, we suggest a role for pNFH and possibly for wChit1 for the differentiation between PLS and ALS, which has important diagnostic, prognostic, and therapeutic implications.

**Disclosure:** Nothing to disclose

## Movement disorders 4

### EPO2181

#### Dystonia treatment with ultrasound-guided botulin toxin injection in a Niemann-Pick type C patient

D. Ferro, G. Pereira, C. Soares, M.J. Rosas  
*Neurology, Centro Hospitalar Universitário de São João, Porto, Portugal*

**Background and aims:** Niemann-Pick type C (NP-C) is a genetic and progressive disease characterized by an inability of the body to transport fatty acids inside the cells. Neurological symptoms are frequent in NP-C and include movement disorders such as dystonia, as well as psychosis and cognitive deficits. For dystonia treatment, ultrasound-guided botulin toxin (BT) injections allow for improved accuracy of the BT application, including the ones applied to deeper muscles, which are not easily accessible by palpation.

**Results:** A 27-year-old man, diagnosed with NP-C with neurological symptoms, namely a refractory epilepsy and generalized dystonia, was 1<sup>st</sup> examined on a movement disorders consultation because of a generalized dystonia. Since he had a progressive disease, he was not eligible for deep brain stimulation surgery and application of BT injections to the more affected dystonic muscles was started. He presented bilateral and persistent upper limb pronation and wrist flexion, beginning treatment with BT injections (50 Botox<sup>®</sup> units) in both flexor digitorum profundus muscles, showing a mild improvement. On a subsequent consultation, the same dose of BT was then applied to the pronator teres muscles, this time with an ultrasound-guided approach, leading to a much more significant improvement of the dystonic postures.

**Conclusion:** Through this case, we aim to show the benefit of ultrasound-guided BT injections in patients with NP-C disease associated dystonia. The application of BT to deeper muscles might show additional benefits, thus justifying the use of an ultrasound-guided approach for improved therapeutic success.

**Disclosure:** Nothing to disclose

### EPO2182

#### Salivary proteome in Parkinson's disease

M. Figura<sup>1</sup>, A. Friedman<sup>2</sup>

<sup>1</sup>Medical University of Warsaw, Department of Neurology, Faculty of Health Science, Warsaw, Poland, <sup>2</sup>Department of Neurology, Faculty of Health Science, Medical University of Warsaw, Warsaw, Poland

**Background and aims:** Parkinson's disease (PD) is a progressive neurodegenerative disorders. Lewy pathology involves numerous organs. Submandibular glands are affected in about 75% of in vivo cases, with higher rates of positive findings in post-mortem histopathological studies. Salivary microbiome composition in PD patients is also different than in healthy controls. Therefore, saliva may serve as a promising source of biomarkers of PD.

**Methods:** 39 subjects (24 PD patients and 15 healthy controls) were recruited for the study. Saliva was collected 30 minutes after rinsing mouths with tap water, in morning hours, using RNA- Pro Sal kits. Samples were frozen immediately after collection in -80°C. Label-free LC-MS/MS mass spectrometry was performed to comprehensively characterize the proteome of saliva.

**Results:** A total of 530 proteins and peptides were identified. We observed 10-fold change in concentrations of protein S100-A16 in PD group vs healthy control. We also observed about 4-fold change in concentrations of proteins from annexin family: annexin A2 and annexin A8, and in resistin concentration in PD vs control. Due to variability of expression of these proteins, q-value <0.05 was not reached.

**Conclusion:** To our knowledge very limited data on salivary proteome of PD subjects is available. The results of our analysis indicate that salivary proteome of PD patients might be different that in healthy controls. This could be caused by oral inflammatory process, reflected by increased concentration of S100-A16 protein and resistin. The main limitations of the study are variability of expression of proteins between subjects in two groups and variations caused by external factors.

**Disclosure:** Research was funded by Medical University of Warsaw grant NZZ/PM1/17

## EPO2183

**Personality changes after deep brain stimulation for Parkinson's disease**

D. Flisar

*Ljubljana, Slovenia*

**Background and aims:** Parkinson's disease (PD) patients frequently experience difficulties in social adjustment, especially in family relationships after subthalamic nucleus deep brain stimulation (STN-DBS). The reason may be in personality changes after DBS.

**Methods:** We applied the Iowa Rating Scales of Personality Change (ISPC) questionnaire to 27 patients and their caregivers for evaluation of personality changes after DBS. ISPC is an instrument that allows retrospective evaluation of personality changes after medical procedure. It consists of five composite scales: 1. Executive Deficits; 2. Disturbed Social Behavior; 3. Diminished Motivation; 4. Emotional Reactivity and 5. Distress. We used the Wilcoxon signed-rank test for the statistical analysis of perceived differences in personality traits before and after the operation.

**Results:** By applying the ISPC questionnaire to caregivers to evaluate personality changes in patients before and after DBS operation we found significant worsening in 2 composite ISPC scales: 1. Executive Deficits (Mdn=3.05 vs. Mdn=3.61,  $Z=-2.32$ ,  $p=0.01$ ) and 2. Disturbed Social Behavior (Mdn=2.52 vs. Mdn=2.99,  $Z=-2.00$ ,  $p=0.02$ ). There were no changes on any of the ISPC scales when presented to the patients themselves. On the ISPC sub-scale for Impulsivity there was also a significant change after DBS (Mdn=3.07 vs. Mdn=3.85,  $Z=-2.02$ ,  $p=0.03$ ), but no change on the ISPC sub-scale for Apathy, both perceived by the caregivers

**Conclusion:** In contrast to the caregivers, patients did not perceive significant changes in their personalities after STN-DBS operation according to ISPC questionnaire. This result may reflect a lack of patients' insight and may be one of the causes for family frictions after otherwise successful STN-DBS operation.

**Disclosure:** Nothing to disclose

## EPO2184

**Deep brain stimulation of the subthalamic nucleus in advanced Parkinson's disease: life quality beyond 15 years of follow-up**A. Gamaleya<sup>1</sup>, S. Omarova<sup>1</sup>, A. Tomskiy<sup>1</sup>, E. Bril<sup>2</sup>, V. Shabalov<sup>1</sup>

<sup>1</sup>*N.N. Burdenko National Medical Research Center of Neurosurgery, Moscow, Russian Federation, <sup>2</sup>Russian Medical Academy of Continuous Professional Education, Moscow, Russian Federation*

**Background and aims:** STN-DBS appeared to improve dramatically motor and nonmotor dopamine-sensitive symptoms in advanced PD-patients. However, a disease-modifying effect of STN-DBS was not proved and most of the patients deteriorate over time. We describe the longest follow-up after STN-DBS for PD-patients in our center.

**Methods:** In the 1st patient, PD manifested at the age of 32 years. He developed disabling dyskinesias soon after beginning of levodopa-treatment. Considering accompanying fluctuations, he underwent STN-DBS at 39 years (UPDRS-3 OFF/ON:46/19, LEDD:1200mg). The other man had a 9-year PD-history. By the age of 57 years, he suffered severe dyskinesias and motor fluctuations, hence he was assigned to STN-DBS (UPDRS-3 OFF/ON:42/13, LEDD:625mg). We assessed patients annually with maximal follow-up of 15 years.

**Results:** Following STN-DBS, we observed a significant amelioration of PD-symptoms in OFF-state and decrease in levodopa-induced complications in both patients. In the 1st patient, correction of right-electrode position was needed. By 8th-year of STN-DBS, patient retained moderate improvement in functioning and mobility in OFF-state, however, condition of ON-state deteriorated. By 15th-year, QoL deteriorated compared to preoperative (PDQ-39:112→139), though LEDD remained decreased by 33% and cognitive function preserved (MoCA:29). In the other patient, quality of ON-state got worsen after 10-year follow-up accompanied by progression in cognitive decline. By 15th-year, beside sufficient overall mobility, patient suffered pronounced dementia (MoCA:5) and became depend in most daily activities requiring admission to nursing home. LEDD remained reduced by a half.

**Conclusion:** Our observation demonstrates long-term effect of STN-DBS. Overall long-term outcome varies individually. Nevertheless, PD-progression with augmentation of dopamine-nonresponsive symptoms and cognitive decline over time remains challenging.

**Disclosure:** Nothing to disclose

## EPO2185

### Features of Parkinson's disease associated with mutation in the glucocerebrosidase A (GBA) gene in Russian population

O. Gankina<sup>1</sup>, E. Vasenina<sup>2</sup>, O. Levin<sup>1</sup>, E. Fedotova<sup>3</sup>, S. Illarioshkin<sup>3</sup>

<sup>1</sup>Neurology department, Russian Medical Academy of Postgraduate Education, Moscow, Russian Federation, <sup>2</sup>Moscow, Russian Federation, <sup>3</sup>Neurogenetics, Research Center of Neurology, Moscow, Russian Federation

**Background and aims:** Mutation in the GBA gene is quite common among the patients with Parkinson's disease (PD). Its prevalence varies significantly in various populations. Pronounced cognitive decline is the most prominent feature of GBA+ PD.

**Aim:** To identify the prevalence of GBA gene mutation in patients with PD in Russia and assess its effect on disease course.

**Methods:** To assess prevalence, 506 PD patients were examined for 2 most common mutations in GBA gene (N370S, L444P). 2 groups were formed, comparable by gender, age, and duration of disease: the main group that had the mutation in GBA gene (as shown on screening + 10 with pre-identified mutation) and control group GBA-. Patients of both groups were assessed for parkinsonism symptoms severity (UPDRS), cognitive state (MoCA), presence of autonomic, psychotic disorders, RBD, motor fluctuations and dyskinesias.

**Results:** Of 506 patients with PD a mutation was only identified in 8 patients (prevalence of 1.85% in Russian populace). There was a lower score in the 3rd section of a scale UPDRS in GBA-PD group compared to control (31.3±12.8 vs 40.8±9.2 respectively), but patients of GBA-PD group demonstrated higher score in the 4th section of UPDRS (p<0.05). Cognitive state was comparable in both groups (MoCA 25.8±2.9 vs 24.8±3.6 respectively).

**Conclusion:** Mutation in GBA gene in Russian PD patients is rare with prevalence of 1.85%. GBA+ PD patients have more mild motor features but more prominent motor fluctuation and dyskinesias. Our data showed no influence of this mutation on cognitive state.

**Disclosure:** Nothing to disclose

## EPO2186

### Cerebellar ataxias: clinical and molecular description – a case series in a centre of Buenos Aires, Argentina

N. Gonzalez Rojas<sup>1</sup>, M. Cesarini<sup>2</sup>, G. Da Prat<sup>1</sup>, J.L. Etcheverry<sup>3</sup>, E. Gatto<sup>3</sup>

<sup>1</sup>Movement Disorders, INEBA, Buenos Aires, Argentina, <sup>2</sup>INEBA, Buenos Aires, Argentina, <sup>3</sup>Buenos Aires, Argentina

**Background:** The new genetic diagnostic techniques allowed a huge knowledge expansion of hereditary ataxias. Classically, a regional distribution is described. There is a lack of a national registry in Argentina, with only case reports published in the literature.

**Aim:** To characterize a series of hereditary ataxias at a specialized centre of Buenos Aires, Argentina

**Methods:** Data was obtained from the medical records of 50 patients with diagnosis of ataxia. The positive molecular diagnosis was prioritized in order to typify the demographic and clinical characteristics

**Results:** 25 women and 25 men compose the sample, with a mean time of disease evolution of 3.18 years. 38% (n=19) had a positive family history. 22 patients agreed to the molecular study: SCA3 (9, corresponding to 4 families), SCA1 (1), SCA2 (4), SCA10 (1), Friedreich's ataxia (4), Episodic Ataxia type 1 (1); Stub 1 (1), FMR-1 (1). The predominant initial symptoms were gait instability and falls. A proportion of cases had another neurological sign (5.5%) with pyramidalism and lower limb polyneuropathy as the most frequent ones. Anti-GAD antibodies were identified in one patient with SCA2, with intravenous immunoglobulins positive response. A triplet expansion for Kennedy disease was identified in one member of a family with SCA3.

**Conclusion:** SCA3 was the most prevalent variant in our centre. Although the small sample we need to mention 2 unusual observations 1) the coexistence of genetic and immunomediated causes and 2) the presence of 2 different triplet expansions in siblings of the same family

**Disclosure:** Nothing to disclose

## EPO2187

### A Predominant Ataxic Syndrome in a Patient with both Huntington's Disease (HD) and Spinocerebellar Ataxia 35 (SCA 35)?

F. Godinho, M. Sequeira, M. Machado, A. Fernandes, J. Lourenco

*Centro Hospitalar de Lisboa Central, EPE; Hospital Santo António dos Capuchos, Lisbon, Portugal*

**Background and aims:** SCA 35 is characterized by a slow, progressive course of trunk/limb ataxia and hand tremors. It has been associated with mutations in the transglutaminase 6 gene (TGM6), however the pathogenicity of TGM6 in SCA has been questioned.

**Methods:** Case report

**Results:** A 37-year-old caucasian woman presented with symmetrical and progressive upper limb postural and intentional tremor since the age of 25. 5 years later she complained of gait imbalance. By the age of 35, she started with voice tremor, slurred speech, and abnormal movements with twitching/tics and chorea affecting upper limbs, trunk and neck; and dystonic movements of the extremities. She has family history of tremor and gait imbalance from the father's side.

Neurological examination revealed mild executive impairment, increased latency in saccade initiation, slow saccadic movements, dysarthria, a pancerebellar syndrome with pyramidal signs; abnormal movements with mild chorea affecting the extremities, trunk and neck, twitching/tics of the trunk and neck, and dystonic posture of her left hand. Her scale for the assessment and rating of ataxia (SARA) score was 17/40.

Imaging studies showed diffuse cortico-subcortical and cerebellar atrophy. Blood tests revealed the presence of acanthocytes. Serum iron kinetics, serum and urinary copper, and ceruloplasmin levels were normal. Genetic testing revealed one HTT allele with 49 CAG repeats and a heterozygous frameshift mutation in the TGM6 gene with a possible deleterious effect.

**Conclusion:** This case may highlight the inflation of TGM6 mutations in its causation in SCA 35, despite the absence of typical imagiological findings of HD and the more predominant ataxic features.

**Disclosure:** Nothing to disclose

## EPO2188

### Detecting promoter methylation pattern of apoptotic genes as a key of inverse comorbidity of Huntington's disease and cancer

D. Gomboeva<sup>1</sup>, O. Saik<sup>2</sup>, V. Ivanisenko<sup>2</sup>, E.Y. Bragina<sup>3</sup>, V. Puzyrev<sup>4</sup>

*<sup>1</sup>Tomsk National Research Medical Center of the Russian Academy of Sciences, Research Institute of Medical Genetics, Tomsk, Russian Federation, <sup>2</sup>Department of System Biology, Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Novosibirsk, Russian Federation, <sup>3</sup>Population Genetics Laboratory, Research Institute of Medical Genetics, Tomsk, Russian Federation, <sup>4</sup>Research Institute of Medical Genetics, Tomsk National Research Medical Center of the Russian Academy of Sciences, Tomsk, Russian Federation*

**Background and aims:** Many of epidemiological studies have shown a lower than expected incidence of cancer in patients with Huntington's disease (HD). Such decrease of co-occurrence of 2 diseases in 1 person is called an inverse comorbidity. Molecular mechanisms of this phenomenon are still unknown. Cancer is characterized by evasion of apoptosis, while, HD is characterized by an increase of apoptosis. Thus, apoptosis is 1 of relevant biological pathways crucial for both pathologies. Of particular interest in this study is identification of apoptotic genes that can inhibit cancer in patients with HD.

**Methods:** Reconstruction of associative gene network was carried out using "ANDSystem" (Ivanisenko V.A., 2015). The gene network of HD included 140 genes/proteins which were prioritized by standard methods of gene prioritization (ToppGene) and special criteria of prioritization, integrated in ANDSystem, such as: betweenness centrality, closeness centrality, stress centrality, cross-talk specificity and cross-talk centrality (Saik O. et al., 2018).

**Results:** As a result of prioritization according to prioritization criteria, 10 genes with highest ranks were determined, including APOE, PSEN1, INS, IL6, SQSTM1, SP1, HTT, LEP, HSPA4, BDNF. The next step of analysis was a search of CpG islands. In 8 of 10 genes CpG islands were observed, except INS and IL6. CpG islands in promoter regions were determined for 5 genes, including: SQSTM1, SP1, HTT, HSPA4, BDNF.

**Conclusion:** Identified genes implicated in apoptotic pathways may be possible cause of inverse comorbidity of cancer and neurodegeneration disease. DNA methylation patterns requires a further research.

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**Disclosure:** Nothing to disclose

## EPO2189

## Anomalies of serum antibodies to nerve tissue antigens in Parkinson's disease (PD)

M. Gelpey<sup>1</sup>, Z. Goncharova<sup>2</sup>, O. Oksenjuk<sup>1</sup>, T. Kolmakova<sup>1</sup>, E. Morgul<sup>1</sup>

<sup>1</sup>Rostov-on-Don, Russian Federation, <sup>2</sup>Department of diseases of nervous system and neurosurgery, Rostov State Medical University, Rostov-on-Don, Russian Federation

**Background and aims:** The system of natural autoantibodies (auto-AB) is the basis of the functioning of the human immune system. Looking at its changes it is possible to judge the role of neuroinflammation in pathogenesis, including neurodegenerative diseases.

The aim was a multiparameter evaluation of abnormal autoantibodies content, reflecting the state of the nervous system microstructures in PD.

**Methods:** The study has been conducted on the basis of Rostov State Medical University clinic and included 139 patients with diagnosis of PD (main group) and 31-as a control. We have assessed the following indicators of autoimmune inflammation: AB to NF-200, GFAP, S100, MBP proteins,  $\beta$ -Endorphin, voltage-dependent-Ca-channel, Na-Choline, GABA, glutamate, dopamine, Mu-Opiate and serotonin receptors in blood serum using ELI-test kits. The significance of differences has been determined by the Mann-Whitney test (U), the correlations - by the Spearman correlation coefficient.

**Results:** We have revealed significant differences in the immunoreactivity profiles between the patients and the control (Table 1). At the early stage of the disease, we have found significant differences in the level of auto-AB to dopamine receptors compared with the control (U=79.5, p=0.01).

We have revealed the correlations of auto-AB values with the severity of non-motor symptoms (assessed by the NMSS-scale) and with the severity of motor disorders (on the third part of the UPDRS-scale) (Table 2).

Table 1. Differences of the immunoreactivity profiles between the patients and the control group (by the Mann-Whitney test)

Auto-AB parameters	U-test	p-value
GFAP	428	p $\leq$ 0,01
Vd-CaChannel	221	p $\leq$ 0,01
GABA-R	541,5	p $\leq$ 0,01
Ser-R	449,5	p $\leq$ 0,01
Mu-Opiate_R	506	p $\leq$ 0,01
beta-Endorphine	462,5	p $\leq$ 0,01
Glut-R	583	p $\leq$ 0,05
DOPA-R	611,5	p $\leq$ 0,05
NF200	529	p $\leq$ 0,05

Table 1. Differences of the immunoreactivity profiles between the patients and the control group (by the Mann-Whitney test)

Table 2. The correlations of the clinical characteristics of the main group with the values of auto-AB (by the Spearman correlation coefficient).

Auto-AB parameters	NMSS point	UPDRS point
GABA-R	r = - 0,25 (p $\leq$ 0,01)	-
DOPA-R	r = - 0,23 (p $\leq$ 0,01)	-
Ser-R	r = - 0,23 (p $\leq$ 0,01)	r = 0,24 (p $\leq$ 0,05)
NF200	-	r = - 0,26 (p $\leq$ 0,05)

Table 2. The correlations of the clinical characteristics of the main group with the values of auto-AB (by the Spearman correlation coefficient).

**Conclusion:** Thus, the autoimmune response has a specific character, which manifests itself in wide range of auto-AB, progressive changes depending on the stage of the disease, which may reflect destructive and inflammatory processes in the nervous system tissues.

**Disclosure:** Nothing to disclose

## EPO2190

**Possible Early Markers of Parkinson's Disease (PD)**M. Gelpy<sup>1</sup>, Z. Goncharova<sup>1</sup>, O. Oksenjuk<sup>2</sup>, A. Tanova<sup>2</sup><sup>1</sup>Department of diseases of nervous system and neurosurgery, Rostov State Medical University, Rostov-on-Don, Russian Federation, <sup>2</sup>Rostov-on-Don, Russian Federation

**Background and aims:** No reliable serum markers still have been identified to diagnose PD in early stages. Along with studying the possible role of auto-antibodies to antigens of nervous tissue, it is important to study the role of inflammatory processes and free radical oxidation in the pathogenesis of neurodegenerative diseases, including PD. The aim was to reveal clinically significant markers of early diagnosis of PD.

**Methods:** The study was conducted on base of Rostov State Medical University Clinic on 139 patients with PD (main group), and 31-as the control. We determined the following parameters in blood serum: the total antioxidant activity (TAS), malondialdehyde's (MDA) level, small, medium, large, giant circulating immune complexes (CICs) and medium-weight molecules (MWM) at 254nm, 260nm and 280nm wavelengths on the Hitachi-U-2900 spectrophotometer. The significance of differences has been determined by the Mann-Whitney test (U), the correlations - by the Spearman coefficient.

**Results:** We revealed significant differences in neuroinflammation and endogenous intoxication profiles of patients and control, and the same - between the early-staged disease and control (Table1). When comparing the groups of early and late stages, significant differences were revealed in the MWM260 and TAS indices (U=147.5; U=137, respectively,  $p \leq 0.05$ ). The correlations of mCIC and TAS with the severity of motor disorders (on the third part of the UPDRS-scale) have been revealed ( $r=0.29$ ;  $r=0.26$  respectively,  $p \leq 0.05$ ).

Table 1. Differences of the neuroinflammatory and endogenous intoxication parameters between the patients and the participants of the control group (by the Mann-Whitney U-test),  $p \leq 0.01$

Parameters	Full main group	Early stage of PD
gCIC	301	52
mCIC	232	70,5
MDA	370,5	74
MWM 254	253,5	49
MWM 260	238	30,5
MWM 280	159,5	15
TAS	502	67

Differences of the neuroinflammatory and endogenous intoxication parameters between the patients and the participants of the control group (by the Mann-Whitney U-test),  $p \leq 0.01$

**Conclusion:** The revealed statistically significant changes in markers of neuroinflammation and endogenous intoxication in early stages of PD could be an argument for considering them the potential markers of early diagnosis of the disease.

**Disclosure:** Nothing to disclose

## EPO2191

**Voluntary posture control impairment in motor neuron disease and Parkinson's disease**

I. Goursky, Y. Rushkevich, V. Vashchylin, A. Buniak, S. Likhachev

Department of Neurology, Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus

**Background and aims:** Balance impairment is a symptom of several neurodegenerative diseases.

**Aims:** To study voluntary control of vertical posture (VCP) in patients with Parkinson's disease (PD) and motor neuron disease (MND).

**Methods:** We studied a group of 52 MND patients, from 22 to 82 (median 60) years old, and a group of 86 PD patients, from 33 to 79 (median 59.5) years old, and median Hoehn-Yahr stage 2.5.

We assessed VCP, utilizing videomotion analysis with biofeedback. A patient followed on-screen target by changing torso position. For the acquired positions of patient and target, VCP quality coefficients CVCPf and CVCPs were calculated as Spearman correlation, and phase shifts PSf and PSs were estimated using cross-correlation, in frontal and sagittal planes respectively.

**Results:** CVCPf and CVCPs in bulbar onset ALS are significantly lower, and absolute values of PSf and PSs are significantly higher (bigger lag between patient and target) compared to other forms of MND (U,  $p < 0.05$ ). 7 MND patients had CVCPf and CVCPs less than 10th centile, 5 of them had bulbar onset ALS with no weakness or spasticity in lower limbs and axial muscles.

In PD, CVCPf and CVCPs, PSf and PSs negatively correlate with Hoehn-Yahr stage (Spearman,  $p < 0.05$ ).

**Conclusion:** PD patients and MND patients may have impaired voluntary control of posture. Increased phase shift may reflect bradikinesia and increased response time. Impairments in bulbar onset ALS may be profound, therefore such patients may have an increased risk of falls, and may benefit from interventions like balance training and barrier-free environment.

**Disclosure:** This work has been partially funded by the Ministry of Health of the Republic of Belarus



## EPO2192

**Pilot study of memantine hydrochloride effectiveness in correction of falls in vascular parkinsonism**E. Gracheva<sup>1</sup>, T. Usenko<sup>2</sup>, I. Miliukhina<sup>1</sup><sup>1</sup>Center for Neurodegenerative Disease, Institute of Experimental Medicine, Saint-Petersburg, Russian Federation, <sup>2</sup>Pavlov First Saint Petersburg State Medical University, Saint Petersburg, Russian Federation

**Background and aims:** Vascular parkinsonism (VaP) is a rare condition in which clinical features of parkinsonism are caused by cerebrovascular disease. Most commonly VaP is a symmetrical lower-body parkinsonism with gait disturbance, postural instability, falls and poor response to levodopa which makes it a challenging condition to treat. Patients with VaP often suffer from cognitive decline. Modern researches consider cognitive impairment to add to falls which makes use of antidementia drugs perspective.

Aim of our study was to assess the effectiveness of memantine hydrochloride in correction of falls in VaP.

**Methods:** 13 patients with VaP and cognitive impairment were recruited for the current study. Each patient received 20mg/day of memantine hydrochloride alongside levodopa treatment. In order to objectify changes in gait parameters before and after 3 months of memantine treatment all patients underwent neuropsychological assessment (MMSE, MoCA, FAB, CDT), examination with the use of treadmill with integrated measurement platform. Statistical analysis was performed using R packages (version 3.6.2). Significance was established at  $p < 0.05$ .

**Results:** After 3 months of treatment with memantine hydrochloride several patients admitted less frequent falls, but no significant differences in comparison to baseline were shown in most gait parameters ( $p > 0.05$ ) except for the duration of "heel off" phase of stride ( $p = 0.0019$ ).

**Conclusion:** This is the 1st report to show changes in "heel off" phase after 3 months of administering 20mg/day of memantine hydrochloride. We plan to conduct further research with bigger group of patients in order to proof or refute effectiveness of memantine hydrochloride in reducing falls in VaP.

**Disclosure:** Nothing to disclose

## EPO2193

**Validation Turkish version of the simple screening tool for early diagnosis of advanced Parkinson's disease in daily practice: the CDEPA questionnaire**S. Güler<sup>1</sup>, N. Turan<sup>2</sup><sup>1</sup>Istanbul, Turkey, <sup>2</sup>Department of Biostatistics, Trakya University Faculty of Medicine, Adrianople, Turkey

**Background and aims:** We aimed was to modify to validate a simple screening tool, the CDEPA questionnaire (Cuestionario De Enfermedad de Parkinson Avanzada [Questionnaire for Advanced Parkinson's Disease (APD)], for the identification of APD in daily practice and to analyse the validity and reliability of the questionnaire.

**Methods:** 120 consecutive patients with APD (45% were women, mean age was  $69.3 \pm 11.6$  years) included in the study and stratified according to the Hoehn and Yahr scale. Permission regarding the translation and validation of the CDEPA questionnaire was obtained. The CDEPA questionnaire defined APD as the presence of severe disability requiring help for activities of daily living, motor fluctuations with limitation or inability to perform ADL, severe dysphagia, recurrent falls or dementia.

**Results:** PD was categorized as advanced in 45 (37.5%) patients when using the gold standard and in 75 (62.5%) patients when the CDEPA questionnaire was used. The CDEPA questionnaire and the gold standard agreed moderately ( $P < 0.001$ ). The CDEPA classified APD with a sensitivity of 98%; specificity of 58%; total accuracy of 74.6%; and area under the curve of 78.5%. The internal consistency determined by Cronbach's alpha indicated an extremely good correlation (0.975). Significant differences were found between the groups created by the CDEPA in several usual PD evaluations (HY Scale, SCOPA Motor Scale, Non-motor Symptoms Scale for PD, Clinical Impression of Severity Index for PD, Clinical Global Impression Severity Scale).

**Conclusion:** These findings suggest, Turkish version of the CDEPA questionnaire is a valid, reliable and useful instrument for easily screening APD.

**Disclosure:** Nothing to disclose

## EPO2194

**The Prevalence of Essential Tremor (ET) in Edirne and Its Districts Concomitant Comorbid Conditions**S. Güler<sup>1</sup>, A. Caylan<sup>2</sup>, N. Turan<sup>3</sup><sup>1</sup>*Istanbul, Turkey*, <sup>2</sup>*Department of Family Medicine, , Trakya University Faculty Of Medicine, Adrianople, Turkey*,<sup>3</sup>*Department of Biostatistics, Trakya University Faculty of Medicine, Adrianople, Turkey*

**Objective:** ET has negative impacts on the quality of life in patients. This condition is the subject of an increasing number of epidemiological studies. While it is recognized that genes play a major role in ET with  $\geq 50\%$  of the affected individuals having a positive family history.

**Methods:** To assess the prevalence of ET in Edirne and its districts, 3008 volunteers, including 1518 men and 1470 women, were included in the study. To account for the possibility of missing cases of ET in our study population, we added an additional 10% to the estimated number of individuals needed, for a total of 3367. However, ultimately, only 3008 individuals were included.

**Results:** The study population consisted of 3008 participants, including 50.8% men (n=1518) and 49.2% women (n=1490). The ET prevalence was 5.8 % and 173 participants were evaluated as ET positive. 135 (47.9%) of the ET patients were men, and 147 (52.1%) were women. There was a statistically significant difference in the presence of thyroid disease between those who received ET and those who did not (p=0.000).

**Conclusion:** As a result, in many countries and regions, despite many efforts and studies regarding the prevalence, epidemiology, mechanisms and treatment of the disease, ET has not been sufficiently elucidated. We determined family history of ET high frequency of positive. The field of essential tremor (ET) genetics remains extremely challenging. Thus, for the determination of the prevalence and mechanisms of the disease, additional detailed and comprehensive studies are needed.

**Disclosure:** Nothing to disclose

## EPO2195

**Varying Phenotypic Spectrum in Paroxysmal Exercise-Induced Dystonia: A Turkish family with SLC2A1 pathogenic variant**M. Gültekin<sup>1</sup>, R. Bayramov<sup>2</sup>, G. Sımsır<sup>3</sup>, A.N. Basak<sup>3</sup><sup>1</sup>*Department of Neurology, Erciyes University Faculty of Medicine, Kayseri, Turkey*, <sup>2</sup>*Department of Medical Genetics, Haseki Education Research Hospital, Istanbul, Turkey*, <sup>3</sup>*Molecular Biology and Genetics, Koç University School of Medicine, Istanbul, Turkey*

**Introduction:** Paroxysmal exercise-induced dyskinesia (PED, OMIM #612126) is characterized by recurrent episodes of involuntary movement disorders usually precipitated by sustained walking or running, with or without a history of epilepsy. SLC2A1 (OMIM \*138140) pathogenic variants were associated with a wide spectrum of clinical features of autosomal dominant inherited PED. We present varying phenotypic spectrum of PED in a Turkish family with a synonymous SLC2A1 pathogenic variant.

**Material and methods:** After examination and preliminary diagnosis of patients with clinical symptoms of PED, family members were tested for mutations in the SLC2A1 gene by whole exome sequencing.

**Results:** In all 5 family members with PED symptoms SLC2A1 NM\_006516.3:c.972G>A, (p.Ser324=), rs796053254 heterozygous pathogenic variant was detected which is not previously reported in healthy population. Case-1 (mother) had not any symptoms after the third decade of her life. Case-2, M, 39 years, has bilateral foot dystonia, dyskinesia, weakness, and chorea during PED attack. Also, he has psychiatric disorder. Case-3, F, 20 years, has unilateral foot dystonia, epileptic seizure and mild cognitive disorder. Case-4, M, 24 years, has just unilateral foot dystonia. Case-5, M, 26 years, has bilateral foot dystonia during the attack of the PED.

**Conclusion:** Despite of carrying same SLC2A gene p.Ser324= variant and being first degree relatives all PED diagnosed family members had varying symptoms. Clinicians should be aware of this phenomena while examining patients with PED symptoms.

**Disclosure:** Nothing to disclose

EPO2196

Cancelled

EPO2197

### The relation between the self-reported and objective motor symptoms and the health-related quality of life in functional movement disorders

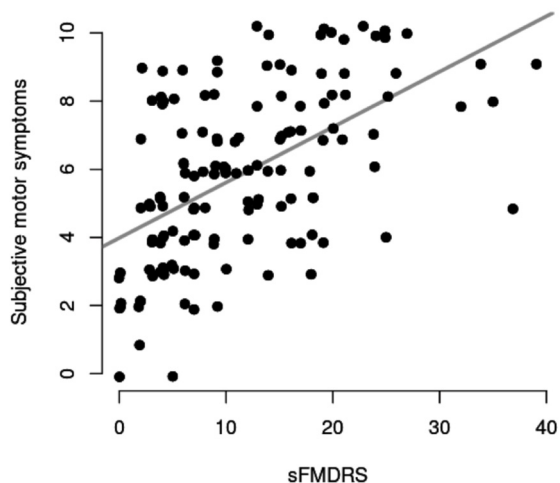
Z. Hanzlíková<sup>1</sup>, T. Sieger<sup>2</sup>, M. Slovák<sup>1</sup>, G. Věchetová<sup>1</sup>, E. Růžička<sup>1</sup>, T. Serranova<sup>1</sup>

<sup>1</sup>Department of Neurology and Center of Clinical Neuroscience, Charles University in Prague, Prague, Czech Republic, <sup>2</sup>Dept. of Cybernetics, Faculty of Electrical Engineering, Czech Technical University, Prague, Czech Republic

**Background and aims:** Multiple self-reported non-motor symptoms, but not objectively measured motor symptom severity correlated with impaired health-related quality of life (HRQoL) in a small sample of patients with functional movement disorder (FMD). This study aimed to analyse the relation between objective and self-reported motor symptoms measures and HRQoL in FMD patients.

**Methods:** In 144 patients with clinically established FMD 101 female, mean age 47 (21-81) years, mean FMD duration 6.7 (0.1-39) years, we measured motor symptom severity using The Simplified FMD Rating Scale (s-FMDRS) and number of different motor symptoms types (i.e. tremor, dystonia, gait disorder, myoclonus, and weakness). All patients evaluated each motor symptom type severity on Likert scale and completed questionnaires for depression, anxiety, pain, fatigue, cognitive complaints, and HRQoL (SF-12).

**Results:** The sum of self-reported motor symptoms severity correlated with s-FMDRS and the number of motor symptoms ( $p < 0.001$ ). Both the self-reported motor severity and s-FMDRS ( $p < 0.001$ ) but not the number of motor symptoms and FMD duration correlated with HRQoL. All non-motor measures strongly correlated with self-reported motor severity and HRQoL ( $p < 0.001$ ) and weakly with s-FMDRS ( $p < 0.01$ ). Multiple linear regression revealed pain ( $p < 0.001$ ), subjective motor severity ( $p < 0.01$ ), and depression ( $p < 0.01$ ) were the leading factors affecting the HRQoL while the effect of s-FMDRS was not significant.



Correlation between s-FMDS and self-reported motor symptoms severity

**Conclusion:** In this group of FMD patients, both subjective and objective measures of motor symptom severity were related to HRQoL. However, only subjective measures of symptom severity jointly predicted the HRQoL in FMD patients.

**Disclosure:** Supported by the grant AZV 16-29651A.

## EPO2198

### Effect of an increase in dose of istradefylline, an A2A receptor antagonist, in levodopa-treated patients with Parkinson's Disease (PD)

N. Hattori<sup>1</sup>, T. Nomura<sup>2</sup>, P.M. Salzman<sup>3</sup>, H. Kitabayashi<sup>2</sup>, M. Ishiuchi<sup>2</sup>, K. Toyama<sup>2</sup>, A. Mori<sup>2</sup>, D. Braccia<sup>4</sup>  
<sup>1</sup>Department of Neurology, Juntendo University School of Medicine, Tokyo, Japan, <sup>2</sup>Kyowa Hakko Kirin Co., Ltd., Tokyo, Japan, <sup>3</sup>Kyowa Kirin Pharmaceutical Development Inc., Princeton, USA, <sup>4</sup>Kyowa Kirin, Inc., Tokyo, Japan

**Background and aims:** Istradefylline is an oral adenosine A2A receptor antagonist for adjunctive treatment to a levodopa/decarboxylase inhibitor in adults with PD experiencing OFF time. Istradefylline significantly reduced OFF time in placebo-controlled, parallel-group studies of 20 and 40mg/day. We investigated whether increasing istradefylline from 20 to 40mg/day improves clinical responses.

**Methods:** Patients with PD receiving levodopa and experiencing motor fluctuations completing a 12-week, randomized, double-blind trial of istradefylline 20 or 40mg/day vs placebo could enter a 52-week open-label extension study. Initially, all patients received istradefylline 20mg once-daily. After 4 weeks, istradefylline was increased to 40mg/day as needed. Total daily OFF and ON time were assessed using patient-completed diaries, as were Clinical Global Impression-Global Improvement (CGI-I) and Unified Parkinson's Disease Rating Scale (UPDRS). Treatment-emergent adverse events (TEAEs) were recorded.

**Results:** After 4 weeks of istradefylline 20mg/day, patients previously receiving double-blind placebo had improvements in OFF time and ON time without troublesome dyskinesia (ON-WOTD), and those previously receiving 40mg/day showed worsened OFF time (Table 1). In patients requiring dose increase, OFF time, ON-WOTD, and UPDRS III (ON) improved after 4 weeks of 40mg/day, and a greater % had improved CGI-I, vs patients remaining on 20mg/day (Table 2). Among TEAEs (frequency  $\geq 5\%$ ), nasopharyngitis, dyskinesia, contusion, and constipation became more frequent with dose increase vs maintaining 20mg/day.

**Conclusion:** Reducing istradefylline dose from 40 to 20mg/day for 4 weeks resulted in increased OFF time/day. Increasing istradefylline from 20 to 40mg/day for 4 weeks improved OFF time, ON time without troublesome dyskinesia, UPDRS III (ON), and CGI-I compared with remaining at 20mg/day.

**Table 1.** Baseline to Week 4 Change in Study Endpoints in Patients Receiving Open-Label Istradefylline 20mg/day From Baseline to Week 4.

	Prior Placebo		Prior 20 mg/day		Prior 40 mg/day	
	Hours/day	Baseline to Week 4 Change, LS Mean [95% CI]	Hours/day	Baseline to Week 4 Change, LS Mean [95% CI]	Hours/day	Baseline to Week 4 Change, LS Mean [95% CI]
<b>Baseline</b>	5.98 (n=99)		5.39 (n=101)		4.91 (n=107)	
<b>Week 4</b>	5.52 (n=98)	-0.56 [-0.85, -0.27]	5.28 (n=96)	-0.09 [-0.37, 0.20]	5.07 (n=105)	0.11 [-0.17, 0.38]
Mean Total Daily OFF Time						
	Hours/day	Baseline to Week 4 Change, LS Mean [95% CI]	Hours/day	Baseline to Week 4 Change, LS Mean [95% CI]	Hours/day	Baseline to Week 4 Change, LS Mean [95% CI]
<b>Baseline</b>	9.92 (n=99)		10.36 (n=101)		10.99 (n=107)	
<b>Week 4</b>	10.46 (n=98)	0.47 [0.14, 0.79]	10.57 (n=96)	0.21 [-0.11, 0.54]	10.92 (n=105)	-0.02 [-0.34, 0.29]
Mean UPDRS III (ON)						
	Score	Baseline to Week 4 Change, LS Mean [95% CI]	Score	Baseline to Week 4 Change, LS Mean [95% CI]	Score	Baseline to Week 4 Change, LS Mean [95% CI]
<b>Baseline</b>	18.12 (n=99)		17.80 (n=100)		16.08 (n=106)	
<b>Week 4</b>	16.40 (n=98)	-1.69 [-2.58, -0.81]	16.34 (n=98)	-1.27 [-2.16, -0.39] (n=97)*	15.42 (n=104)	-0.92 [-1.78, -0.06]

\*n = number of subjects having a value at both Baseline and Week 4. CI, confidence interval; LS, least squares; UPDRS, Unified Parkinson's Disease Rating Scale.

**Table 2.** Week 4 to Week 8 Change in Study Endpoints in Patients Remaining on Istradefylline 20 mg/day vs Patients Increasing to 40 mg/day.

	Remained on 20 mg/day		Increased to 40 mg/day	
	Hours/day	Week 4 to Week 8 Change, LS Mean [95% CI] (n=130)	Hours/day	Week 4 to Week 8 Change, LS Mean [95% CI] (n=160)
<b>Week 4</b>	4.72		5.72	
<b>Week 8</b>	4.96	0.23 [-0.05, 0.51]	5.25	-0.48 [-0.73, -0.22]
Mean Total Daily ON Time Without Troublesome Dyskinesia				
	Hours/day	Week 4 to Week 8 Change, LS Mean [95% CI] (n=130)	Hours/day	Week 4 to Week 8 Change, LS Mean [95% CI] (n=160)
<b>Week 4</b>	11.11		10.33	
<b>Week 8</b>	10.80	-0.30 [-0.59, -0.01]	10.80	0.47 [0.21, 0.73]
Mean UPDRS III (ON)				
	Total Score	Week 4 to Week 8 Change, LS Mean [95% CI] (n=132)	Total Score	Week 4 to Week 8 Change, LS Mean [95% CI] (n=164)
<b>Week 4</b>	15.94		16.45	
<b>Week 8</b>	15.42	-0.51 [-1.05, 0.03]	15.45	-1.00 [-1.48, -0.52]
CGI-I Benefit (≥1 category) <sup>a</sup>				
	Remained on 20 mg/day, n (%) (n=132)		Remained on 40 mg/day, n (%) (n=164)	
<b>Week 4 to Week 8</b>	17 (12.9)		38 (23.2)	

<sup>a</sup>CGI-I Benefit is ≥1 category improvement to minimally, much, or very much improved at Week 8 relative to Week 4. CGI-I, Clinical Global Impression-Global Improvement; CI, confidence interval; LS, least squares; UPDRS, Unified Parkinson's Disease Rating Scale.

**Disclosure:** This work was supported by Kyowa Kirin Pharmaceutical Development, Inc.

## EPO2199

### Pre-existing severe polyneuropathy is not necessary a contraindication for LCIG treatment

P. Havrankova, M. Fialová, A. Rezková, E. Růžička, R. Jech  
Prague, Czech Republic

**Background and aims:** Levodopa/carbidopa intestinal gel (LCIG) administered by a jejunal catheter via gastrostomy connected to the extracorporeal pump is one of the device-aided treatments for advanced Parkinson's disease (PD). One of the serious complications is polyneuropathy, whereas pre-existing neuropathy is considered a relative contraindication for this treatment.

**Methods:** We present a 61-year-old male with a 26 year history of young-onset PD with a history of hallucinations and severe fluctuations poorly controlled by oral antiparkinsonian medication. The patient was indicated for LCIG treatment despite a severe axonal sensorimotor polyneuropathy of unknown etiology with a relatively high levodopa equivalent daily dose (LEDD) of oral treatment: (2869mg).

**Results:** The clinical symptoms significantly improved during the LCIG titration period at the price of an increased dosage of LEDD (3308mg). The plasma levels of folate and vitamin B12 supported by oral supplementation remained in a normal range after the LCIG initiation. However, a pre-existing severe sensorimotor polyneuropathy was initially detected with no further progression on an EMG within the next two years. Finally, the LEDD of the LCIG increased to 3484mg enabling very good control of motor symptoms and fluctuations.

**Conclusion:** A LEDD higher than 2000mg is usually considered to be a risk factor for the development or deterioration of polyneuropathy. Our patient demonstrated that doses of LCIG exceeding this limit in combination with pre-existing polyneuropathy were not automatically associated with its worsening. However, higher caution and regular clinical visits with more frequent EMG examinations and laboratory testing are advised in these patients.

**Disclosure:** Supported by GAČR 16-13323S and Progress Q27

## Movement disorders 5

### EPO2200

#### Movement disorders in NMDA encephalitis

S. Healy<sup>1</sup>, R. Ellis<sup>1</sup>, M. Bonello<sup>1</sup>, T. Marson<sup>2</sup>, A. Moore<sup>1</sup>, S. Alusi<sup>3</sup>

<sup>1</sup>The Walton Centre NHS Foundation Trust, Liverpool, UK,

<sup>2</sup>Unit of Neuroscience Research, University of Liverpool,

Liverpool, UK, <sup>3</sup>Neurology, Walton Centre for neurology and neurosurgery, Liverpool, United Kingdom

**Background and aims:** Since N-methyl-D-aspartate receptor (NMDAR) encephalitis was 1<sup>st</sup> described in 2007, the clinical phenotype has broadened dramatically. The majority of patients will develop a movement disorder during their illness, with wide variation seen in phenomenology, associated symptoms, severity and response to treatment.

**Methods:** In this study, we describe 4 cases of anti NMDAR encephalitis presenting to the neurology service at Walton Centre NHS Foundation Trust in Liverpool, UK.

**Results:** The 1st 2 cases occurred in women with histologically proven ovarian teratomas, 1 with a classical presentation of orofacial dyskinesia requiring aggressive treatment and the 2nd with stereotypies, perseveration and catatonia that was responsive to corticosteroids alone. The 3rd case had a monosymptomatic presentation of chorea. The 4th case had a biphasic presentation, initially with orofacial dyskinesia and chorea and much later developing an encephalopathy.

**Conclusion:** The cases presented here represent a spectrum of movement disorders associated with NMDAR encephalitis. Although orofacial dyskinesias are the most frequently observed movement disorder in NMDAR encephalitis, a range of hyperkinetic movements have been reported, including chorea, ballismus, athetosis, myoclonus, and dystonia. Monosymptomatic movement disorder presentations are rare, but should be considered in the evaluation of a subacute-onset hyperkinetic movement disorder in the absence of another cause, even without encephalopathy or seizures. NMDAR encephalitis should no longer be considered an afterthought in viral PCR negative syndromes, given its distinct clinical syndrome, as it is 4 times more common than individual infective encephalitides. Early and aggressive immunomodulatory treatment is associated with better outcomes.

**Disclosure:** Nothing to disclose

### EPO2201

#### Safinamide safety and tolerability in a Spanish elderly population

J.J. Hernandez Martinez

Alicante, Spain

**Background and aims:** Safinamide (Xadago<sup>®</sup>) is a new drug for Parkinson's disease with a double mechanism of action: It is a reversible MAO B inhibitor and a glutamate modulator. In pivotal trials, 016 and SETTLE, patients treated with 100 mg Safinamide were younger than usual clinical practice.

**Methods:** We decided to study the safety and tolerability profile of safinamide in our population in Yecla Hospital (Spain) which is 15 years older than previous populations included in these studies. We have done a retrospective analysis of our Parkinson's Unit collecting data from 53 patients that have been treated with safinamide. Variables studied are age, Levodopa Equivalent Dose (LED), months of treatment duration, discontinuation rate and causes of safinamide.

**Results:** These 53 patients are 75.0 ± 11.05 years and have received safinamide treatment for 7.67 ± 6.77 months. The LED is 786.83 ± 328.58 mg. The starting dose of safinamide was 50 mg during the 1st month and then increased to 100 mg. Change from prior iMAOB, when applicable, was done overnight without any adverse event. Only 4 patients (7.55%) have presented complications, derived from the introduction of safinamide, that lead to discontinuation. 3 of them were mild complications (food rejection, paresthesias and nocturnal hallucinations), and 1 was of severe degree (hyponatremia) and required hospital admission in the center.

**Conclusion:** In this elderly population, safety and tolerability profile of safinamide is good and remains similar to the 1% on pivotal trials, demonstrating that safinamide is also safe in people aged above 70s.

**Disclosure:** Nothing to disclose

## EPO2202

**Parkinson's disease and cancer**

Y. Herrero Infante, A. Rodríguez-Sanz,  
F. Vivancos-Matellano  
*Movement Disorders Unit-Neurology, La Paz University  
Hospital, Madrid, Spain*

**Background and aims:** Parkinson's disease (PD) is 1 of the most frequent neurodegenerative pathologies. In last years some studies have established a lower overall cancer risk in people with PD.

**Methods:** Retrospective study including 354 PD patients. Demographic features (age, sex, comorbidities), PD characteristics (disease duration, Hoehn and Yahr (HY), non-motor symptoms) and cancer history (histological diagnosis, management, outcome) were analyzed. Patients with and without cancer were compared.

**Results:** 198 (55.9%) were men. Mean age 71.99 years (DE 10.07). Hypertension was the most frequent comorbidity (48%). Mean time of disease duration was 8.85 years (DE 5.65). 76.8% had at least 1 non-motor symptom being depression the most common (31%). 68 patients (19.2%) had been diagnosed with cancer. A total of 87 malignant neoplasms were analyzed. Skin basal cell epithelioma was the most frequent (20.6% of all cancers) followed by prostatic adenocarcinoma (13.7%) and breast invasive ductal carcinoma (9.1%). All neoplasms received treatment: 80.4% surgery, 29.8% chemotherapy and 12.6% radiotherapy, reaching complete remission in 79.3% of cases.

Comparing patients with and without cancer we observed that the 1st group was older, with a higher rate of men and more frequent history of smoking and pulmonary pathology.

**Conclusion:** We found a high prevalence of cancer (specially skin cancer) although most had a good outcome. Patients with cancer were older, more frequently men and had a higher incidence of tobacco exposure and pulmonary comorbidity.

**Disclosure:** Nothing to disclose

## EPO2203

**Development and Validation of a PSP questionnaire as Screening Tool for early diagnosis of progressive supranuclear palsy (PSP)**

E. Höller<sup>1</sup>, G. Respondek<sup>1</sup>, G. Höglinger<sup>2</sup>  
*<sup>1</sup>Department of Neurology, Technical University of Munich, Munich, Germany, <sup>2</sup>Munich, Germany*

**Background and aims:** Our aim was to develop a screening questionnaire for progressive supranuclear palsy (PSP) for early clinical detection and differentiation from other parkinsonian syndromes.

**Methods:** 1 screening questionnaire for patients (PSP-SQ-Patient) and 1 for caregivers (PSP-SQ-Caregiver) with 19 dichotomous questions was developed in German language on the basis of the new clinical diagnostic criteria for PSP (Höglinger et al., *Mov Disord.* 2017;32:853-864.). After cognitive pretesting, PSP-SQ-Patient and PSP-SQ-Caregiver scores were collected from clinically diagnosed patients with PSP and Parkinson's disease (PD; Postuma et al., *Mov Disord.* 2015;30:1591-601) and their respective caregivers, together with demographic information, PSPRS scores and MDS-UPDRS scores.

**Results:** Demographic data are presented in Table 1. PSP-SQ-Patient and PSP-SQ-Caregiver are presented in Table 2. The mean PSP-SQ-Patient score was 13.16±0.88 SEM (R=19-7) in PSP and 7.15±1.07 SEM (R=14-0) in PD patients, the mean PSP-SQ-Caregiver score was 14.2±0.86 SEM (R=17-9) in PSP caregivers and 9.3±1.26 SEM (R=13-6) in PD caregivers.

Figure 1 shows sensitivity and specificity of the PSP-SQ-Patient (A) and PSP-SQ-Caregiver (B) as a function of different cut-off values.

Receiver operating characteristics showed good discrimination abilities for PSP-SQ-Patient (area under the curve [AUC]: 0.878) and PSP-SQ-Caregiver (AUC: 0.858).

TABLE 1. Demographic and clinical data

	PSP	PD
N	12	13
Gender (female/male)	5/7	2/11
Age	66.8 ± 6.0	66.8 ± 11.1
Disease duration (years)	4.7 ± 2.2	5.8 ± 5.0
PSPRS score (worst=100)	38.8 ± 10.0	-
UPDRS III score (worst=108)	30.9 ± 20.1	41.0 ± 11.3

Legend: PSP: Progressive Supranuclear Palsy; PD: Parkinson's disease; PSPRS: Progressive Supranuclear Palsy Rating Scale; UPDRS III: Unified Parkinson's Disease Rating Scale Part III.

TABLE 2.

PSP-SQ-Patient

Diagnostic domain	Screening questions
Ocular mobility	1 Haben Sie zunehmend Probleme, Ihre Augen nach oben und unten zu bewegen?
	2 Haben Sie manchmal Probleme, Ihre Augen zu öffnen?
	3 Sehen Sie manchmal doppelt?
	4 Sind Ihre Augen lichtempfindlicher geworden?
Postural Instability	5 Fällt es Ihnen zunehmend schwerer von einem Stuhl aufzustehen?
	6 Haben Sie beim Stehen oder Gehen das Gefühl, dass der Boden unter Ihnen schwankt?
	7 Haben Sie zunehmend Schwierigkeiten beim Stehen oder Gehen das Gleichgewicht zu halten?
Akinesia	8 Sind Sie im letzten Jahr mehr als einmal gestürzt?
	9 Sind Ihre Bewegungen zunehmend langsamer geworden?
Cognition	10 Sind Ihre Muskeln zunehmend steifer geworden?
	11 Fällt es Ihnen schwerer Knöpfe an Ihrer Kleidung zu schließen?
	12 Ist Ihre Handschrift zunehmend kleiner geworden?
	13 Fühlen Sie sich beim Gehen manchmal plötzlich wie eingefroren, als würden Sie am Boden festkleben, z.B. wenn Sie durch eine Tür gehen?
	14 Sagen Ihre Angehörigen, dass Ihr Antrieb zunehmend weniger geworden ist (z.B. Hobbies, Freunde, Gespräche)?
Clinical Chars	15 Fällt es Ihnen schwerer, sich gedanklich auf neue Situationen einzustellen?
	16 Meinen Sie, dass Ihr Denken langsamer geworden ist?

Table 1/2

Clinical Chars	17 Fallen Ihnen zunehmend beim Sprechen die Worte nicht ein?
	18 Ist Ihre Sprache zunehmend undeutlicher geworden?
	19 Verschlucken Sie sich in letzter Zeit häufiger?
<b>PSP-SQ-Caregiver</b>	
Diagnostic domain	Screening questions
Ocular mobility	1 Hat Ihr Angehöriger zunehmend Probleme, die Augen nach oben und unten zu bewegen?
	2 Hat Ihr Angehöriger manchmal Probleme, die Augen zu öffnen?
	3 Klagt Ihr Angehöriger manchmal darüber, dass er doppelt sieht?
	4 Klagt Ihr Angehöriger darüber, dass dessen Augen lichtempfindlicher geworden sind?
Postural Instability	5 Fällt es Ihrem Angehörigen zunehmend schwerer von einem Stuhl aufzustehen?
	6 Hat Ihr Angehöriger manchmal das Gefühl, dass beim Stehen oder Gehen der Boden unter ihm schwankt?
	7 Hat Ihr Angehöriger zunehmend Schwierigkeiten beim Stehen oder Gehen das Gleichgewicht zu halten?
Akinesia	8 Ist Ihr Angehöriger im letzten Jahr mehr als einmal gestürzt?
	9 Sind die Bewegungen Ihres Angehörigen zunehmend langsamer geworden?
Cognition	10 Sind die Muskeln Ihres Angehörigen zunehmend steifer geworden?
	11 Fällt es Ihrem Angehörigen schwerer Knöpfe an der Kleidung zu schließen?
	12 Ist die Handschrift Ihres Angehörigen zunehmend kleiner geworden?
	13 Ist Ihr Angehöriger während dem Gehen manchmal plötzlich wie eingefroren, als würde er am Boden festkleben, z.B. wenn er durch eine Tür geht?
	14 Ist der Antrieb Ihres Angehörigen zunehmend weniger geworden (z.B. Hobbies, Freunde, Gespräche)?
Clinical Chars	15 Fällt es Ihrem Angehörigen schwerer, sich gedanklich auf neue Situationen einzustellen?
	16 Meinen Sie, dass das Denken Ihres Angehörigen langsamer geworden ist?
	17 Fallen Ihrem Angehörigen zunehmend beim Sprechen die Worte nicht ein?
	18 Ist die Sprache Ihres Angehörigen zunehmend undeutlicher geworden?
	19 Verschluckt sich Ihr Angehöriger in letzter Zeit häufiger?

Table 1/2

Figure 1

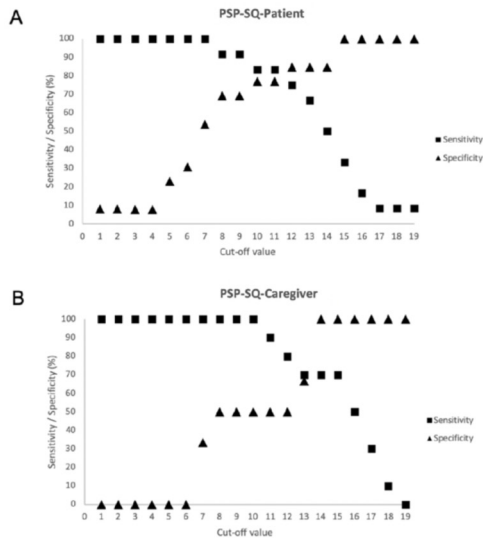


Fig. 2: Sensitivity (squares) and specificity (triangles) of the SQ-Patient (A) and SQ-Relative (B) as a function of the cut-off value (defined as ≥). The best trade-off between sensitivity and specificity is provided with a cut-off of 10 points in the PSP-SQ-Patient and of 13 points in the PSP-SQ-Caregiver.

Figure 1

**Conclusion:** PSP-SQ-Patient and PSP-SQ-Caregiver are easy, reliable, and sensitive tools to recognize clinically diagnosed PSP and differentiate them from PD. Next, we will evaluate the performance of both questionnaires in very early disease stages.

**Disclosure:** Nothing to disclose



## EPO2204

## None of the common tests distinguishes between essential and dystonic head tremor

P. Hollý<sup>1</sup>, T. Duspivová<sup>2</sup>, O. Ulmanova<sup>1</sup>, J. Ruzsz<sup>3</sup>, R. Jech<sup>1</sup>, R. Krupička<sup>2</sup>, E. Růžička<sup>1</sup>

<sup>1</sup>Dept. of Neurology and Center of Clinical Neuroscience, First Faculty of Medicine Charles University and General University Hospital in Prague, Prague, Czech Republic, <sup>2</sup>Biomedical Informatics, Czech Technical University in Prague, Faculty of Biomedical Engineering, Kladno, Czech Republic, <sup>3</sup>Faculty of Electrical Engineering, Czech Technical University in Prague 6, Prague, Czech Republic

**Background and aims:** In patients with head tremor, it is often difficult to distinguish between essential tremor (ET) and cervical dystonia with dystonic head tremor (DT). We aimed to assess the differential diagnostic value of standard clinical tests and accelerometric measurements.

**Methods:** 22 patients (66.8±10.7 years) with ET and 36 patients (58.8±10.8 years) with cervical dystonia and DT were included. The patients were examined using routine scales and questionnaires – Tab 1. In addition, head tremor was assessed in the sitting and supine position at rest, during phonation and cognitive tasks with an accelerometer fixed on the patient's forehead, and the power of tremor was calculated. The statistical analyses were performed with the significance level  $p < 0.01$ .

**Results:** Significantly higher scores for tremor and ataxia and lower scores for dystonia were found in ET compared to DT patients (Tab. 1). However, no significant intergroup differences in accelerometric tremor amplitude and power were found. In both groups, the tremor power increased significantly with serial subtraction but not with phonation (Tab 2). In none of the groups, the tremor power decreased significantly in the supine compared to sitting position, whereas in 5 ET and 11 DT patients, the supine tremor power persisted above the normal threshold.

	ET	DT	p
Positive family history	11/22 (50.00%)	11/36 (30.56%)	NS
Age at onset (years)	36.05 ± 18.01	40.50 ± 16.96	NS
Effect of alcohol	10/19 (52.63%)	12/26 (46.15%)	NS
TETRAS ADL	21.45 ± 10.35	8.56 ± 8.70	< 0.0001
TETRAS PS	16.23 ± 7.02	7.56 ± 5.17	< 0.0001
TETRAS total score	37.68 ± 16.46	16.11 ± 12.98	< 0.0001
TWSTRS part IA	0.91 ± 0.92	3.00 ± 1.51	< 0.0001
TWSTRS total score	5.77 ± 7.16	23.19 ± 12.93	< 0.0001
SARA	5.16 ± 3.49	2.69 ± 4.43	0.00026

Tab. 1: Results of the questionnaire and scales; ET = Essential Tremor, DT = Dystonic Tremor, TETRAS = The Essential Tremor Rating Assessment Scale, ADL = Activities of Daily Living, PS = Performance Subscale TWSTRS = Toronto Western Spasmodic Torticollis Rating Scale, part IA = the Torticollis Severity Subscale, SARA = Scale for the Assessment and Rating of Ataxia.

Tab. 1: Results of the questionnaire and scales

	SFon	SCog	LFon	LCog
ET	0.426	0.000	0.014	0.001
DT	0.179	0.002	0.196	0.000

Tab. 2: Differences between head tremor power in sitting at rest and in supine position; ET = Essential Tremor, DT = Dystonic Tremor, SFon = tremor in sitting during phonation, SCog = tremor in sitting during cognitive task (serial subtraction), LFon = tremor in supine position during phonation, LCog = tremor in supine position during cognitive task (serial subtraction). Results at significance level  $p < 0.01$ .

Tab. 2: Differences between head tremor power in sitting at rest and in supine position

**Conclusion:** Although comparisons between patients with essential and dystonic tremor of the head showed significant differences in the group scores of tremor, dystonia and ataxia, the individual scores did not allow for differential diagnosis. Moreover, neither the accelerometric power of tremor nor the sitting/supine test showed significant differential diagnostic performance.

**Disclosure:** Nothing to disclose

## EPO2205

**A possible link between Cisplatin treatment and tau pathology (an overlap between Progressive Supranuclear Palsy and Frontotemporal Degeneration)**

P.A. Ioan, O.C. Ioghen, A.-C. Ribigan, F. Antochi, O.A. Bajenaru  
*Neurology, University Emergency Hospital Bucharest, Bucharest, Romania*

**Background and aims:** Progressive Supranuclear Palsy (PSP) can frequently overlap symptoms with Frontotemporal Degeneration (FTD), as they are both taupathies. There is still much to discover regarding the etiology and predisposing factors of these neurodegenerative disorders. In a recent study performed on male mice it is postulated that Cisplatin induces taupathy and behavioural abnormalities

**Methods:** We present the case of a 65-year-old female patient with a history of anexectomy for an ovarian malignancy, followed by 6 cycles of Cisplatin (25 years ago). In the last 3 years she initially presented repeated falls, then scanning speech and dysphagia. Neurological examination revealed limitation of the upright vertical eye movements, slow and hypometric pursue movements, the absence of optokinetic nystagmus, mild axial rigidity, wide-base gait, postural instability with tendency to fall at the pull test. She also had disinhibition, impulsivity, hand automatisms and perseveration. The cerebral MRI showed important mesencephalic, cerebellar, frontal and temporal lobe atrophy.

**Results:** The clinic and neuroimaging tools point towards a probable PSP. The phenotype is compatible with Richardson syndrome, plus frontal and cerebellar signs. The changes in behaviour and the fronto-temporal atrophy overlap with FTD (behaviour variant).

**Conclusion:** We presume that in this patient's case the chemotherapy with Cisplatin could have played a role in accelerating a neurodegenerative disorder. It would be a point of interest in the future to assess the connection between Cisplatin treatment in humans and the development of neurodegenerative diseases, especially taupathies.

**Disclosure:** Nothing to disclose

## EPO2206

**Impact of baseline dyskinesia on the safety and efficacy of istradefylline, an adenosine A2A receptor antagonist, in patients with Parkinson's disease: a pooled analysis of 8 clinical studies**

S.H. Isaacson<sup>1</sup>, N. Hattori<sup>2</sup>, D. Truong<sup>3</sup>, O. Rascol<sup>4</sup>, A. Mori<sup>5</sup>, K. Toyama<sup>5</sup>, J. Parno<sup>6</sup>, P.M. Salzman<sup>6</sup>, F. Stocchi<sup>7</sup>

<sup>1</sup>Parkinson's disease and Movement Disorders Center of Boca Raton, Boca Raton, USA, <sup>2</sup>Department of Neurology, Juntendo University School of Medicine, Tokyo, Japan, <sup>3</sup>The Parkinson and Movement Disorder Institute, Fountain Valley, USA, <sup>4</sup>Hôpital Purpan-CHRU de Toulouse, Toulouse, France, <sup>5</sup>Kyowa Hakko Kirin Co., Ltd., Tokyo, Japan, <sup>6</sup>Kyowa Kirin Pharmaceutical Development Inc., Princeton, USA, <sup>7</sup>IRCCS San Raffaele Pisana, Rome, Italy

**Background and aims:** Istradefylline, a selective adenosine A2A receptor antagonist that acts via the indirect basal ganglia outflow pathway, is indicated as adjunctive treatment to a levodopa/decarboxylase inhibitor in adults with Parkinson's disease (PD) experiencing OFF time. This updated, posthoc, pooled analysis assessed the effect of baseline dyskinesia on the efficacy and safety of istradefylline.

**Methods:** The analysis included 8 randomized, placebo-controlled, double-blind, phase 2b/3 trials in which patients received istradefylline (20 or 40mg/day) or placebo for 12 or 16 weeks. The primary endpoint was change from baseline in OFF time (istradefylline vs placebo) based on patient-completed 24-hour ON/OFF diaries. Subgroups of patients with (+BL-dyskinesia) and without (-BL-dyskinesia) baseline dyskinesia were defined using patient-completed baseline ON/OFF diaries. Adverse events (AEs) were recorded throughout as spontaneous reports.

**Results:** 2719 patients were included (+BL-dyskinesia, n=1515; -BL-dyskinesia, n=1204). There were differences between subgroups in baseline daily levodopa dosage and time since PD diagnosis (Table 1). AEs of dyskinesia were more frequent with istradefylline vs placebo in the +BL-dyskinesia vs -BL-dyskinesia subgroups (Figure). Mean reduction in OFF time and increase in ON time without troublesome dyskinesia (ON-WOTD) were greater with istradefylline than placebo; these were unaffected by the presence of baseline dyskinesia (Table 2). Mean decreases in UPDRS scores were greater in -BL-dyskinesia than in +BL-dyskinesia subgroups (Table 2). Istradefylline was well-tolerated.

**Conclusion:** Dyskinesia as an AE was more frequent during istradefylline treatment, particularly in patients +BL-dyskinesia compared with -BL-dyskinesia patients. Istradefylline-induced improvements in OFF time and ON-WOTD time were not affected by the presence of baseline dyskinesia.

Table 1. Baseline Characteristics and Demographics.

Baseline Dyskinesia	Placebo		Istradefylline			
	No (n=423)	Yes (n=569)	20 mg/day		40 mg/day	
			No (n=362)	Yes (n=486)	No (n=419)	Yes (n=460)
Age, mean (SD), years	64.6 (8.98)	63.0 (8.98)	64.6 (9.18)	64.2 (8.92)	63.4 (8.91)	63.5 (8.77)
Male gender, n (%)	269 (63.6)	310 (54.5)	228 (63.0)	258 (53.1)	262 (62.5)	250 (54.3)
Daily levodopa dosage at study entry, mean (SD), mg	611.71 (332.90)	742.85 (397.83)	568.62 (279.32)	757.21 (386.23)	545.31 (263.80)	754.53 (450.82)
Time since PD diagnosis <sup>a</sup>						
n	385	409	313	341	378	300
Mean, years	7.46	10.02	7.08	10.67	7.37	9.85
Range, years	0.6-32.3	0.1-27.9	0.6-28.2	1.4-36.8	0.4-28.4	0.7-25.6
OFF time at baseline, mean (SD), hours	6.89 (2.350)	5.81 (2.189)	6.87 (2.577)	5.71 (2.364)	6.75 (2.430)	5.56 (2.178)
ON time without troublesome dyskinesia at baseline, mean (SD), hours	9.39 (2.425)	9.31 (2.558)	9.49 (2.454)	9.44 (2.672)	9.50 (2.409)	9.42 (2.729)

PD, Parkinson's disease; SD, standard deviation.

<sup>a</sup>Time since PD onset was only reported by a choice of range of years in one of the studies.

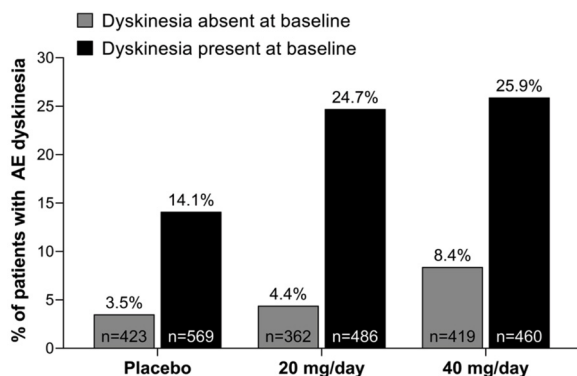


Table 2. Change From Baseline to Endpoint (LOCF) in Hours per Day in Total OFF Time and ON Time Without Troublesome Dyskinesia and in UPDRS Part III by Presence of Baseline Dyskinesia.

Baseline Dyskinesia	Placebo		Istradefylline			
	No (n=423)	Yes (n=569)	20 mg/day		40 mg/day	
			No (n=362)	Yes (n=486)	No (n=419)	Yes (n=460)
Mean change from baseline in total hours in the OFF state ( $\pm$ SD) <sup>a</sup>	-0.79 $\pm$ 2.703	-0.80 $\pm$ 2.337	-1.29 $\pm$ 2.693	-1.18 $\pm$ 2.394	-1.27 $\pm$ 2.582	-1.17 $\pm$ 2.459
Mean change from baseline in total hours in the ON state without troublesome dyskinesia ( $\pm$ SD) <sup>b</sup>	0.62 $\pm$ 2.658	0.73 $\pm$ 2.739	1.19 $\pm$ 2.735	1.03 $\pm$ 2.791	1.03 $\pm$ 2.676	0.90 $\pm$ 2.836
Mean change from baseline in UPDRS Part III score ( $\pm$ SD) <sup>c</sup>	-2.69 $\pm$ 7.331	-2.01 $\pm$ 7.451	-3.12 $\pm$ 7.125	-2.71 $\pm$ 8.167	-4.72 $\pm$ 7.716	-2.96 $\pm$ 8.408

LOCF, last observation carried forward; SD, standard deviation; UPDRS, unified Parkinson's disease rating scale.

<sup>a</sup>Treatment x baseline dyskinesia interaction p-value = 0.849.

<sup>b</sup>Treatment x baseline dyskinesia interaction p-value = 0.494.

<sup>c</sup>Treatment x baseline dyskinesia interaction p-value = 0.167.

**Disclosure:** This work was supported by Kyowa Kirin Pharmaceutical Development, Inc.

## EPO2207

### Protective effects of bilirubin toward dopaminergic neuron sufferance in an ex vivo model for Parkinson's disease

S. Jayanti, C. Gerotto, C. Tiribelli, S. Gazzin

Fondazione Italiana Fegato, Trieste, Italy

**Background and aims:** There is no current therapy to slow down the progression of Parkinson's disease (PD). Mildly elevated bilirubin levels are protective against in extra CNS diseases but the protection toward neurological diseases is still scarce. Therefore, we investigated the neuroprotective effects of bilirubin in PD's model.

**Methods:** We have developed a PD ex vivo model by using the organotypic brain cultures (OBCs) of substantia nigra obtained from Wistar rat at day 5 post-natal challenged with rotenone (Rot). Increasing concentration (0.5  $\mu$ M to 4  $\mu$ M) of unconjugated bilirubin (UCB) was applied to Rot-challenged OBCs and RT-qPCR was used to monitoring alterations of oxidative stress marker genes (Srxn1), inflammation related-genes (Tnf-alpha, Il6, Cox2), and neurotrophic genes (Bdnf). Immunofluorescence staining was used to evaluate the number of dopaminergic neurons (DOPAn)

**Results:** The mRNA level of Tnf-alpha, Il6, Cox2, Srxn1, and Bdnf was significantly ( $p < 0.05$ ) higher in Rot-treated OBCs compared to DMSO treated controls. UCB 0.5  $\mu$ M reverted Tnf-alpha expression to control level ( $p = 0.007$ ). UCB 1  $\mu$ M similarly reverted the expression of Tnf-alpha ( $p = 0.017$ ), Il6 ( $p = 0.001$ ), and Bdnf ( $p = 0.03$ ). UCB 2  $\mu$ M decreased the expression of Il6 ( $p = 0.003$ ) while UCB 4  $\mu$ M increased the mRNA level of all the selected markers above the expression in Rot challenged slices ( $p < 0.05$ ). The sufferance of DOPAn was indicated by the reduction of DOPAn number in Rot-treated OBCs (-30%,  $p = 0.003$ ) and was restored by UCB 1  $\mu$ M treatment ( $p = 0.01$ ).

**Conclusion:** UCB at low concentrations has protective effects on PD model as anti-inflammatory agents. The protective effect is lost at higher UCB concentrations.

**Disclosure:** This study was supported by the grant from the Italian Liver Foundation and the Lembaga Pengelola Dana Pendidikan (LPDP) of the Indonesian Ministry of Finance.

## EPO2208

### Levodopa, but not subthalamic deep brain stimulation modulates the resting activity of putamen in Parkinson's disease

R. Jech<sup>1</sup>, F. Ruzicka<sup>1</sup>, D. Urgosik<sup>2</sup>, Š. Holiga<sup>3</sup>, H.E. Möller<sup>3</sup>, J. Roth<sup>1</sup>, J. Vymazal<sup>2</sup>, M.L. Schroeter<sup>3</sup>, E. Růžička<sup>1</sup>, K. Mueller<sup>3</sup>

<sup>1</sup>Dept. of Neurology and Center of Clinical Neuroscience, Charles University Hospital, Prague, Czech Republic, <sup>2</sup>Dept. of Stereotactic and Radiation Neurosurgery, Na Homolce Hospital, Prague, Czech Republic, <sup>3</sup>Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany

**Background and aims:** Using a functional MRI, we investigated the effects of levodopa on brain activity during the execution of finger movements in comparison with subthalamic deep brain stimulation (STN-DBS) in Parkinson's disease (PD).

**Methods:** We investigated 18 patients with an advanced akinetic-rigid type of PD (age  $54.6 \pm 7.1$  years) during the execution of a finger-tapping task using a 1.5T MRI scanner with a gradient-echo echo-planar imaging. The task was performed after medication withdrawal and administration of a single levodopa dose. After STN-DBS implantation, the same group of patients was re-examined with the stimulator switched on and off. A 3-factorial design with within-subject factors Treatment (LDOPA/DBS), State (ON/OFF), and Finger Tapping (LEFT/RIGHT) resulted in 8 scanning sessions for each patient.

**Results:** While investigating levodopa treatment, we found a significant interaction between both factors of Treatment and State in the bilateral putamen, but not in other motor regions ( $p < 0.05$  FWE corrected, Figure 1). Specifically, in the levodopa-off state, the activity in the putamen was higher at rest than during tapping.

**Fig 1.** Cross-sectional brain slices showing significant brain activity differences with levodopa treatment and STN-DBS in Parkinson's disease using a block-based finger tapping paradigm.

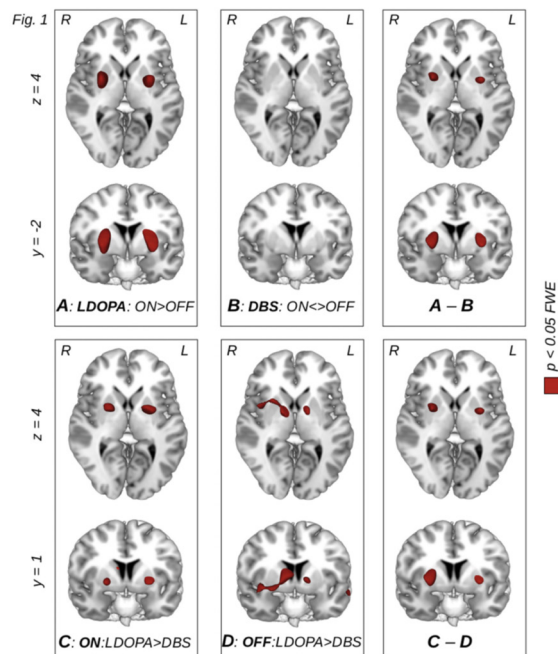


Figure 1

**Conclusion:** This represents an aberrant activity pattern probably indicating derangement of basal ganglia network activity due to lack of dopaminergic input. Levodopa but not STN-DBS reverted this pattern, so that the putaminal activity during finger tapping was higher than during rest, as previously described in healthy controls (Figure 2). This study shows for the 1st time the fundamentally different aspects of motor network functioning during motion and rest considering differential modulatory effects of levodopa and STN-DBS. Supported by the Czech Ministry of Health AZV NV19-04-00233

**Fig 2.** Contrast estimates from left and right putamen and motor cortex reflecting a different pattern of brain activity change with levodopa treatment and STN-DBS in Parkinson's disease.

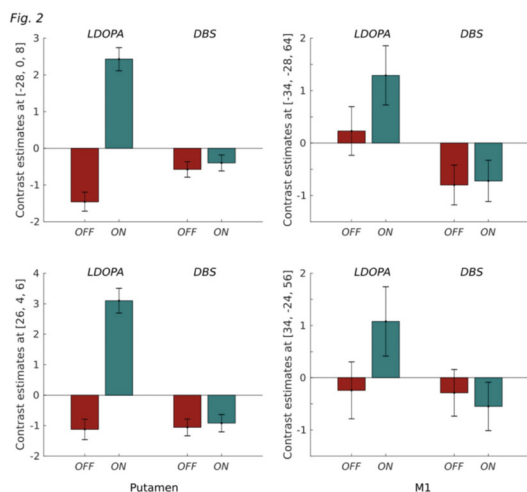


Figure 2

**Disclosure:** Supported by the Czech Ministry of Health AZV NV19-04-00233

## EPO2209

### Comparison of dystonic and essential tremor: clinical and quantitative assessment

Č. Jovanovic<sup>1</sup>, L. Berbakov<sup>2</sup>, M. Svetel<sup>1</sup>, I. Petrović<sup>1</sup>, N. Dragasevic<sup>1</sup>, T. Pekmezovic<sup>3</sup>, V. Kostic<sup>1</sup>

<sup>1</sup>Neurodegenerative diseases, Clinic of Neurology, Belgrade, Serbia, <sup>2</sup>Institute Mihailo Pupin, University of Belgrade, Belgrade, Serbia, <sup>3</sup>Neuroepidemiology, Clinic of neurology, Belgrade, Serbia

**Background and aims:** Despite being one of the most common neurological disorders, distinguishing different type of tremor is sometimes clinically challenging leading to misdiagnosis. The aim of this study was to assess clinical and electrophysiological features of patients with essential tremor (ET) and dystonic tremor (DT), as well as to test new tools for their differentiating.

**Methods:** This study included 173 patients with head tremor. Patients were assessed for presence, type and characteristics of tremor. Tremor measurement was done by using inertial sensors. It included frequencies, amplitude and other composed features such as tremor stability index (TSI) and signal power concentration ratio (SPCR).

**Results:** Of 173 patients, 96 had DT while 77 had ET. Comparison revealed that patients with ET were older at the beginning of disease ( $p=0.001$ ) and had more frequently positive family history ( $p=0.006$ ). Writing tremor, as well as bilateral postural, kinetic and rest tremor of arms were more frequent in ET ( $p<0.001$ ). A further comparison of electrophysiological features of head tremor showed that ET had a higher amplitude ( $p=0.02$ ) and magnitude ( $p=0.02$ ). Also TSI and SPCR were significantly different in these groups ( $p<0.001$ ). Regression analyze single out age and SPCR as statistically significant predictors of type of tremor ( $p<0.001$ ).

**Conclusion:** Patients with ET are older, more frequently they also had a tremor of other body parts and positive family history than patients with DT. Furthermore, ET had a significantly higher amplitude, magnitude, TSI and SPCR in comparison to DT. Among these, age and SPCR are statistically significant predictors of type of tremor.

**Disclosure:** Nothing to disclose

## EPO2210

**Kufor-Rakeb Syndrome due to a new ATP13A2 mutation – Case report**

A. Juhasz<sup>1</sup>, M. Harmat<sup>2</sup>, D. Pinter<sup>1</sup>, M. Kovacs<sup>1</sup>, N. Kovacs<sup>2</sup>

<sup>1</sup>Pécs, Hungary, <sup>2</sup>Department of Neurology, University of Pécs, Pécs, Hungary

**Background and aims:** Kufor-Rakeb Syndrome (KRS) is rare autosomal recessive disorder with diverse phenotypic features. Fewer than 50 affected individuals have been reported in literature. The hallmark clinical manifestations are young onset parkinsonism, pyramidal signs, dysarthria, dysphagia, cognitive impairment. KRS is part of the neurodegeneration with brain iron accumulation (NBIA) disease spectrum. Brain imaging usually demonstrates cerebral, cerebellar atrophy, and sometimes iron accumulation in basal ganglia. Only symptomatic treatment is available, early levodopa administration can be beneficial in terms of motor symptoms.

Mutations in ATP13A2 (formerly termed PARK9) in KRS has initially been described and previous studies uncovered the molecular mechanisms of ATP13A2/PARK9 function in disease pathogenesis : impaired Mn<sup>2+</sup> and Zn<sup>2+</sup> metabolism, disturbed mitochondrial homeostasis, and lysosomal dysfunction, whereas its physiological function remains unclear. Preceding papers suggest that there is clinical heterogeneity and variability in ATP13A2-related disorders and that the mutation type can influence clinical phenotype.

**Methods:** We report on the short-term follow-up of a young woman with adolescent-onset parkinsonism, showing therapeutic response to dopaminergic treatment, objectively measured by UDPRS, UDysRS, BFMDRS scales. Whole exome sequencing previously performed in other institute confirmed a novel mutation of ATP13A2 gene.

**Results:** We report on the short-term follow-up of a young woman with adolescent-onset parkinsonism, showing therapeutic response to dopaminergic treatment, objectively measured by UDPRS, UDysRS, BFMDRS scales. Whole exome sequencing previously performed in other institute confirmed a novel mutation of ATP13A2 gene.

**Conclusion:** This is the first reported Hungarian KRS case. Our aim is to highlight clinical variability.

**Disclosure:** Nothing to disclose

## EPO2211

**Abnormal thermal sensation thresholds in Parkinson's disease and their relationship to CSF 5-Hydroxyindoleacetic acid**

M. Kaiserova, Z. Grambalova, A. Janova, K. Mensikova, P. Kanovsky

Department of Neurology, Palacky University and University Hospital, Olomouc, Czech Republic

**Background and aims:** Little is known about the abnormal temperature sensation in Parkinson's disease (PD). Although abnormal pain thresholds respond to dopamine administration, thermal thresholds do not seem to be related to the dopaminergic deficit. In our study we measured warm and cold sensation thresholds in PD patients and correlated them with CSF 5-Hydroxyindoleacetic acid (5-HIAA), main metabolite of serotonin.

**Methods:** 28 patients with PD and 15 controls underwent quantitative sensory testing, 10 patients with PD had also CSF examination with 5-HIAA measurement. Conduction studies excluded polyneuropathy in all subjects.

**Results:** PD patients showed significantly higher thermal thresholds on the more affected side (cold p=0.015, warm p=0.045). There was a significant negative correlation between the CSF 5-HIAA and warm detection threshold on the affected side (p=0.001).

**Conclusion:** This study may help to better understand the pathophysiology of abnormal temperature sensation in PD. Serotonergic pathology may play a role in these abnormalities.

**Disclosure:** This study was supported by the grant project from the Ministry of Health of the Czech Republic - AZV NV18-04-00346, by European Regional Development Fund - Project ENOCH (No. Z.02.1.01/0.0/0.0/16\_019/0000868) and by Institutional Support MZ CR – RVO FNOL 2020.

## EPO2212

**Cancer and Parkinson's disease: is there dependency?**

D. Khasanova, Z. Zalyalova

*Neurology and Rehabilitation, Kazan State Medical University, Kazan, Russian Federation*

**Background and aims:** To determine association between concomitant diseases and Parkinson's disease (PD) forms in early-staged patients.

**Methods:** Prospective cohort study was performed in 2011-2014 on the base of Republican Center for Movement Disorders, Kazan, Russia. All observed PD patients with 1-2 stages (according to Hoehn&Yahr) without previous specific treatment and age-matching controls (without any signs of neurological impairment) were included. Shaking (SF) or rigid (RF) forms were identified according Unified PD Rating Scale. History taking regarding concomitant diseases and medical events in last 5 years was performed.

**Results:** 130 patients with PD (mean age 61.04±8.48) and 56 controls (mean age 58.84±12.25) were included. Among PD patients stage 1 was assigned in 76.9% cases and stage 2 – in 23.1%. SF was established in 56.9% cases, RF in 43.1%. The mean age of medical attendance in the Center between SF and RF significantly differed: 63.72±7.19 vs 57.63±8.96 ( $p<0.05$ ). Concomitant diseases were identified in 100% both PD and control groups. The most common concomitant diseases for SF and RF were cardiovascular (55.4% and 57.1%) and gastrointestinal disorders (39.2% and 42.9%), as well as in controls (41.0% vs 48.2%). There were no statistically significant differences in incidence of any concomitant conditions between SF, RF and control groups, except cancer. The incidence of any cancer was 4.1% in SF, 25.0% - in RF and 0% - in controls. Statistically significant difference was determined between RF and both SF and controls ( $p<0.0001$ ).

**Conclusion:** These results allow to suggest etiopathogenic interrelation between the development of rigid form of PD and cancer.

**Disclosure:** Nothing to disclose

## EPO2213

**Reliable diagnosis of spinocerebellar ataxia type 2 using dopamine transporter scan combined with nerve conduction study**

T. Kosaka, T. Amano, Y. Tsuda, M. Tsuda, Y. Kouzaki

*Neurology, Kumamoto Medical Center, Kumamoto, Japan*

**Background and aims:** Spinocerebellar ataxia type 2 (SCA2) is an autosomal dominant neurodegenerative disorder caused by an increased number of CAG repeats in the SCA2 gene (ATXN2). The diverse phenotypes of SCA2 sometimes make its diagnosis difficult.

**Methods:** We searched the medical records of 3 Japanese male cases of SCA2 including one example of autopsied twins. In addition to routine histology, immunohistochemical examinations were performed using anti-phosphorylated TDP-43 (pTDP-43) and anti-1C2 antibody recognizing expanded polyglutamine stretches.

**Results:** Genetic analysis demonstrated an expanded allele with 45, 45 and 36 CAG repeats in ATXN2, respectively. Immunostaining for pTDP-43 and 1C2 revealed many widely distributed positive neuronal inclusions in the CNS including the cerebral cortices, striatum and spinal horn. The pathology of frontotemporal lobar degeneration (FTLD) corresponded to FTLD-TDP type B. The remaining patient was a Japanese male who had developed an unsteady gait at the age of 52 years. Although no parkinsonism or loss of deep tendon reflex was evident, loss of uptake was demonstrated in a dopamine transporter (DAT) scan of the striatum and a nerve conduction study (NCS) revealed sensory axonal neuropathy.

**Conclusion:** In comparison to other SCA types, degeneration of the striatum and spinal horn cells are unique characters of SCA2, and therefore, DAT scan combined with NCS in addition to routine examinations might be useful for early diagnosis.

**Disclosure:** Nothing to disclose

## EPO2214

### VR Environment Can Reliably Trigger Freezing of Gait in Patients with Parkinson's disease

Z. Kosutzka<sup>1</sup>, A. Kusnirova<sup>2</sup>, M. Turi Nagy<sup>3</sup>, I. Straka<sup>1</sup>, P. Valkovic<sup>1</sup>

<sup>1</sup>Bratislava, Slovakia, <sup>2</sup>2nd Department of Neurology, Comenius University Bratislava, Bratislava, Slovakia, <sup>3</sup>Neuroconsan, Neuroconsan, Bratislava, Slovakia

**Background and aims:** Freezing behaviour (FoG) can occur in the course of Parkinson's disease (PD) and it significantly impairs the quality of life. Due to its episodic features, it might be challenging to trigger and study FoG in clinical settings. The aim of the current study was to assess the feasibility of a specific VR paradigm using VR first experience fully immersive headset to trigger freezing behaviour in a replicable manner.

**Methods:** The inclusion criteria were the diagnosis of PD with implanted STN-DBS since at least one year, on stable medication. All patients had to self-report FoG based on the question „Do you have the feeling of feet glued to the floor?“. VR environment consisted of imitation of airport security check including gait through airport security whole-body scanners (for illustration, see Fig.1). Standard spatiotemporal gait parameters were collected using 4 Microsoft Kinect sensors. All patients were measured during OFF stage (OFF medication and OFF stimulation) and ON stage (ON medication and ON stimulation). Freezing behaviour was verified by an experienced clinician blinded to the motor condition.

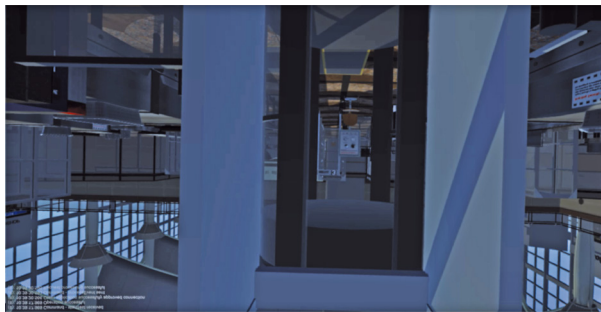


Fig. 1 Example of VR environment used in triggering freezing behaviour

**Results:** We recruited 8 patients meeting the inclusion criteria and self-reported OFF-FoG (mean PD duration=11y; mean DBS duration=2.6y; mean FoG-Q score=10.5). With VR paradigm, we managed to repeatedly trigger FoG in all 8 patients when being OFF. Two patients had FoG when being ON.

**Conclusion:** VR simulated environment using VR fully immersive headset can reliably trigger FoG in patients with PD. This suggests a great potential for further use of VR paradigms in studying episodic gait phenomena.

**Disclosure:** This study was supported by Grant of Ministry of Health, Slovak Republic nr. 2018/32-LFUK-6

## EPO2215

### Randomised Double-blind Comparison of the Acute Affective and Cognitive Effects of Oral and Intrajejunal Levodopa in Parkinson's disease

J. Kulisevsky<sup>1</sup>, S. Martinez-Horta<sup>2</sup>, H. Bejr-Kasem Marco<sup>2</sup>, A. Horta-Barba<sup>3</sup>, A. Campolongo<sup>2</sup>, B. Pascual-Sedano<sup>4</sup>, C. Izquierdo<sup>2</sup>, J. Marin-Lahoz<sup>2</sup>, J. Pérez-Pérez<sup>4</sup>, I. Aracil-Bolaños<sup>2</sup>, J. Pagonabarraga<sup>4</sup>, O. De Fabregues<sup>5</sup>, V. Puente<sup>6</sup>, M. Calopa<sup>7</sup>, A. Ávila Rivera<sup>8</sup>

<sup>1</sup>Hospital de la Santa Creu i Sant Pau, Barcelona, Spain, <sup>2</sup>Research Institute, Sant Pau Hospital, Barcelona, Spain, <sup>3</sup>Research Institute, Sant Pau Hospital, Barcelona, Spain, <sup>4</sup>Neurology, Sant Pau Hospital, Barcelona, Spain, <sup>5</sup>Neurology, Vall d'Hebron University Hospital, Barcelona, Catalonia, Spain, <sup>6</sup>Neurology, Hospital del Mar, Barcelona, Spain, <sup>7</sup>L'hospitalet de Llobregat, Spain, <sup>8</sup>Neurology, Consorci Sanitari Integral, Hospital General de L'Hospitalet, Barcelona, Spain

**Background and aims:** Chronic levodopa treatment in Parkinson's disease (PD) may promote undesirable motor and non-motor fluctuations coinciding with the rise and fall of levodopa levels. To explore differences in the profile of plasmatic levodopa concentrations and associated measures of affect and cognition patients were challenged with an intermittent immediate-release formulation of carbidopa/levodopa (LC-IR) and with continuous infusion of levodopa/carbidopa intestinal gel (LCIG).

**Methods:** We performed a randomized, double-blind, double-dummy, crossover, acute exploratory study in advanced, non-demented PD. All patients underwent 2 experimental sessions separated by a 2-week interval. They arrived in "off" condition and were allocated to receive every 2 hours first, either their usual dose of LCIG infusion and 3 separate oral doses of over-encapsulated placebo of LC-IR, or an infusion of placebo LCIG plus 3 separate oral doses of over-encapsulated LC-IR. We monitored plasmatic levels of levodopa, motor status, mood, anxiety, and frontal functions at baseline and hourly after each levodopa challenge.

**Results:** At +1 hour, levodopa concentrations had increased notably and similarly in both groups, but in LC-IR levodopa concentrations fluctuated significantly at subsequent time-points. No significant treatment interactions were seen in MDS-UPDRS-III. Compared to LC-IR, LCIG showed a higher and more sustained improvement in anxiety scores which was associated with the percentage of change in levodopa plasmatic concentrations. In the LCIG group mood and verbal fluency improved significantly at three hours.

**Conclusion:** The better pharmacokinetics of LCIG is associated with a more favorable profile of acute affective and cognitive fluctuations. The long-term consequences of these differences should be addressed.

**Disclosure:** Partially supported by FIS Grant PI15/00962; Rio Hortega CM17/00209 and CIBERNED (Instituto de Salud Carlos III, Spain); La Marató de TV3, Expedient 20142910, 2014/U/477, and an unrestrictive research grant from Abbvie.



## EPO2216

**Risk factors for freezing of gait and related non-motor symptoms in Parkinson's disease**

S. Kuzieva

*Rheuma-neurology, Tashkent Medical Academy, Tashkent, Uzbekistan*

**Background and aims:** To identify possible risk factors and the anamnestic association of gait freezing (FOG) in patients with Parkinson's disease (PD).

**Methods:** 84 patients with PD were evaluated on the basis of a sample on the following scales: MDS-UPDRS scale, modified Hoehn and Yahr (HY) Stage, MMSE and Clinical Dementia Rating scale. MDS-UPDRS was used to evaluate and determine PIGD, as well as for the Balance-Gait (PIGD minus FOG) score, non-motor symptoms (nM-EDL) and motor complications (MC). To clarify the clinical signs and their relationship with FOG, 1-way tests were followed up with subsequent nominal logistic regression (Log Regr).

**Results:** 36% of patients had FOG, these cases were associated with stage HY ( $p=0.05$ ), 70% of patients had PIGD. Patients with FOG + more often had MC and a higher equivalent dose of levodopa (LED) ( $p=0.04$ ) compared with PIGD/FOG patients, PIGD/FOG + patients had a longer duration of PD duration during the disease, a higher score of Bal -Gait, a higher indicator of LED, a higher frequency of psychosis, they are more likely to have dyskinesia, a higher rate of impact on motor vibrations and a general deviation from the norm and problems with urination, while differences in cognitive status were not significant.

**Conclusion:** In PD the obvious factors for the development of FOG are PIGD, MC/LED and Cog Imp. Their nature may be additive in its effect. Also, for patients with FOG, more pronounced motor dysfunctions, in particular Bal-Gait disorder are more characteristic.

**Disclosure:** Nothing to disclose

## EPO2217

**Effect of dopamine on the level of DNMT1 and DNA SNCA-intron1 methylation status in Parkinson's disease**A. Lavrinova<sup>1</sup>, N. Melnikova<sup>2</sup>, A. Dmitriev<sup>2</sup>,I. Miliukhina<sup>1</sup>, E. Litusova<sup>1</sup>, P. Gagarina<sup>1</sup>, O. Berkovich<sup>3</sup>, S. Pchelina<sup>1</sup>, A. Emelyanov<sup>1</sup>

<sup>1</sup>*Molecular and Radiation Biophysics Division, Petersburg Nuclear Physics Institute named by B.P.Konstantinov of NRC «Kurchatov Institute», Saint-Petersburg, Russian Federation,*

<sup>2</sup>*Engelhardt Institute of Molecular Biology, Russian Academy of Sciences, Moscow, Russian Federation,* <sup>3</sup>*Pavlov First Saint Petersburg State Medical University, Saint-Petersburg, Russian Federation*

**Background and aims:** Alpha-synuclein (SNCA) oligomers are believed to be the major neurotoxic agents in neurodegenerative process in Parkinson's disease (PD). DNMT1 is predominantly involved in the maintenance of DNA methylation during cell division. SNCA gene expression has been shown to be regulated by DNA SNCA-intron1 methylation status. We examined alterations in DNMT1 levels in cytosolic (CP) and nuclear protein (NP) fractions and the methylation status of the SNCA-intron1 at peripheral blood lymphocytes (PBLs) in patients with sporadic PD.

**Methods:** Here we examined alterations in DNMT1 levels in CP and NP fractions of cultivated PBLs derived from 10 drug-naïve patients (mean age  $63.8 \pm 6.46$  years) with sporadic PD and 11 controls (mean age  $61.82 \pm 8.19$  years) as well as DNA methylation status of the SNCA-intron1 in presence of dopamine hydrochloride ( $100 \mu\text{M}$ ) (DH). CP and NP fractions were isolated from PBLs using the EpiQuik nuclear extraction kit. The level of DNMT1 in these fractions was estimated by ELISA method (DNMT1 Assay Kit). The assessment of SNCA-intron1 methylation status was performed using Next-Generation bisulphite sequencing on MiSeq. Bisulfite-mediated conversion of the genomic DNA (500 ng) was performed with EZ DNA Methylation-Gold Kit.

**Results:** The level of DNMT1 in CP and NP fractions of PBLs was decreased in PD patients compared to control both in presence and without DH in cell medium. No differences in the methylation of the SNCA-intron1 region between PD patients and controls were found.

**Conclusion:** Our data suggest the involvement of DNMT1 in the pathogenesis of PD.

**Disclosure:** This research has been supported by RFBR grant 16-04-01187.

## EPO2218

### Reliability and validity of passively collected step frequency variability as a measure of real-life walking impairment in patients with Huntington's disease (HD)

C. Simillion<sup>1</sup>, W.-Y. Cheng<sup>1</sup>, F. Lipsmeier<sup>1</sup>,  
F.B. Rodrigues<sup>2</sup>, R. Tortelli<sup>2</sup>, L.M. Byrne<sup>2</sup>,  
T. Kilchenmann<sup>1</sup>, A. Bamdadian<sup>1</sup>, A. Smith<sup>3</sup>,  
S.A. Schobel<sup>4</sup>, E.J. Wild<sup>2</sup>, M. Lindemann<sup>1</sup>

<sup>1</sup>Roche Pharmaceutical Research and Early Development, pRED Informatics, F. Hoffmann-La Roche Ltd, Basel, Switzerland, <sup>2</sup>Huntington's Disease Centre, UCL Queen Square Institute of Neurology, University College London, London, United Kingdom, <sup>3</sup>Ionis Pharmaceuticals Inc, Carlsbad, USA, <sup>4</sup>F. Hoffmann-La Roche Ltd, Basel, Switzerland

**Background and aims:** Remote patient monitoring enables the frequent assessment of HD signs and symptoms in daily life. A previous report on the reliability and validity of active smartphone-based tests showed that step frequency variability in the 2-Minute Walk Test (2MWT) and U-Turn Test were associated with HD clinical scales. Passive, continuous monitoring of motor function using sensor data from mobile devices can circumvent the need for motor tests which rely upon active patient engagement. This analysis aimed to assess the reliability and validity of step frequency variability during passive monitoring of individuals with HD.

**Methods:** Active and passive data were collected from 184 individuals with HD from the Digital-HD Study, HD Natural History Study (NCT03664804) and open-label extension of the RG6042 Phase I/IIa study (NCT03342053). Passive data were analysed to detect gait bouts and step frequency variability per bout. Values of all bouts during the 2 weeks post-screening were aggregated and correlated with standard clinical tests at screening of motor impairment, with the same feature extracted from the 2MWT and U-Turn Test.

**Results:** Test-retest reliability for the passive feature was high across studies. Analyses showed significant correlations of passive step frequency variability with the Unified HD Rating Scale, Total Motor Score and gait-specific items, in line with previously reported correlations of the same feature from active gait tests. Passive and active data correlated significantly across studies.

**Conclusion:** Individuals with HD experience walking difficulties. These data support the validity and reliability of using passive monitoring to measure gait abnormalities, yielding similar results to active tests.

**Disclosure:** Initial sponsorship for the open-label extension study by Ionis Pharmaceuticals transferred to F. Hoffmann-La Roche Ltd; HD Natural History Study sponsored by F. Hoffmann-La Roche Ltd; Digital-HD study sponsored by University College London and supported by F. Hoffmann-La Roche Ltd; the authors thank Shuang Song, of Meditech Media, for providing editorial support for this abstract.

## Movement disorders 6

EPO2219

**Oculomasticatory miorhythmia as a key finding in topographic and etiological diagnosis in patients with rhombencephalitis. Videographic record of a case.**

D. López Domínguez<sup>1</sup>, D. López Domínguez<sup>2</sup>,

G. Alvarez Bravo<sup>1</sup>, M. Puig Casadevall<sup>3</sup>,

L. Sánchez Cirera<sup>3</sup>, A. Boix Lago<sup>2</sup>, B. Solano Vila<sup>4</sup>

<sup>1</sup>Gerona, Spain, <sup>2</sup>Neurology, Hospital Josep Trueta, Girona, Spain, <sup>3</sup>Neurology, Hospital Josep Trueta, Gerona, Spain,

<sup>4</sup>Neurology, Institut d'Assistència Sanitària (IAS) - Institutí Català de la Salut, Girona, Spain

**Background and aims:** Oculomasticatory miorhythmia (OMM) is a hyperkinetic movement disorder, consisting of synchronous contraction of ocular and oromandibular muscles. This infrequent disorder is of great value for topographic (mesencephalic involvement) and etiological diagnosis (highly specific for Whipple's disease).

**Methods:** Clinical-radiological description of a patient in whom OMM was key in the diagnosis.

**Results:** A 60-year-old male is admitted in our Neurology plant due to dysarthria and ophthalmoparesis, experiencing progressive worsening (decreased level of consciousness, tetraparesis and Holmes Tremor). A year prior to admission, he had presented weight loss and polyarthralgias. Later on, a continuous, rhythmic lingual protrusion movements, as well as synchronous palpebral occlusion-opening movements and convergent nystagmus, were added to previous symptoms. These findings were suggestive of OMM (video available) Brain MRI showed T2-FLAIR hyperintensity in rhombencephalon (Figure-1) and corpus callosum (Figure-2), with homogeneous contrast uptake. CSF study shows 28 leukocytes (78% PMN), PCR studies, onconeuronal and anti-MOG antibodies were negative. Upon observation of OMM, T. Whipplei PCR in CSF is requested, which resulted positive; leading to the diagnosis of NeuroWhipple. Given the diagnosis, treatment with IV ampicillin was started (for 3 weeks) achieving progressive clinical improvement (currently able to walk), highlighting OMM resolution.

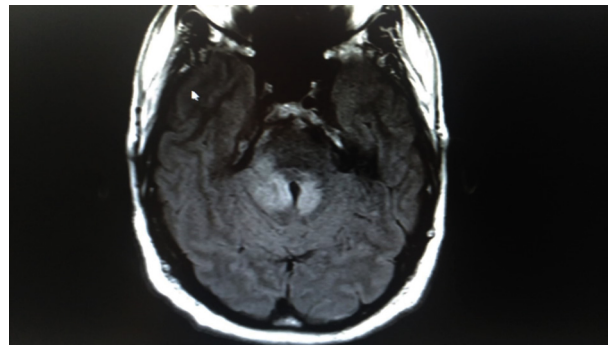


Figure 1

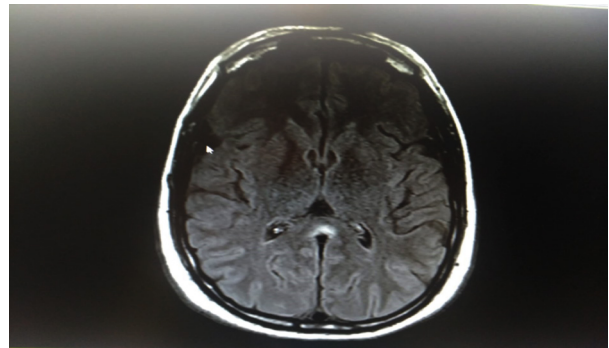


Figure 2

**Conclusion:** Whipple's disease is an uncommon illness, caused by *Tropheryma whipplei*, typically with digestive and neurological clinic. Exclusive neurological involvement is seen in only 5% of cases, which makes it a challenging diagnosis. In case of OMM finding, neurowhipple should be taken into account, as a potentially curable cause of encephalitis with a fatal course in the absence of treatment.

**Disclosure:** Nothing to disclose

## EPO2220

**Influence of peripheral immune system on non motor symptoms in Parkinson's disease**

L. Magistrelli<sup>1</sup>, E. Storelli<sup>2</sup>, A.V. Milner<sup>1</sup>, E. Contaldi<sup>1</sup>, E. Rasini<sup>3</sup>, F. Marino<sup>2</sup>, M. Cosentino<sup>2</sup>, R. Cantello<sup>1</sup>, C. Comi<sup>1</sup>

<sup>1</sup>University of Piemonte Orientale, Novara, Italy, <sup>2</sup>Centre of Research in Medical Pharmacology, University of Insubria, Varese, Italy, <sup>3</sup>Centre of Research in Medical Pharmacology, University of Insubria, Varese, Italy

**Background and aims:** Recent papers highlight the emerging role of peripheral immune system in the pathophysiology of Parkinson's disease (PD). How the immune system may influence motor and non motor symptoms in PD patients is not yet fully understood. The aim of this study is to describe the suitable role of peripheral immune system on non motor symptoms in PD patients.

**Methods:** Patients were recruited at the Movement Disorders Center of Novara. All subjects underwent a neurological assessment using specific motor (UPDRS III and H&Y) and non motor scales: Zung score (total and percentage), Epworth, BDI II, Questionnaire for Impulsive-Compulsive Disorders, the REM Sleep Behavior Disorder Screening Questionnaire, Non-Motor Symptom (NMS) assessment scale, Compass 31. Lymphocytes subpopulations (Th1, Th2, Th17) were evaluated with flow cytometry.

**Results:** 42 PD patients were enrolled (12 female). Mean age was 68.9±8.4. Mean Zung, BDI-II and Epworth total score were respectively 34.8±7.04; 11.08±9.7 and 5.17±4.07. QUIP-RS total score was 13.6±14.9, with the highest sub-score in hobby with a total of 4.11±5.58. Total score NMS score was 31.5±21.7. A significant positive correlation was detected between NMS urinary sub-score and Th2 total number ( $p=0.04$ ;  $r^2=0.12$ ) and between NMS cardiovascular sub-score and Th1 total number ( $p=0.004$ ;  $r^2=0.23$ ). Mean RBD score was 4.8±2.9; a positive correlation was found for RBD total score and Th2 total number ( $p=0.003$ ;  $r^2=0.24$ ).

**Conclusion:** In this study we point out a possible role of peripheral immune system in the development of non motor symptoms in a cohort of PD patients.

**Disclosure:** Nothing to disclose

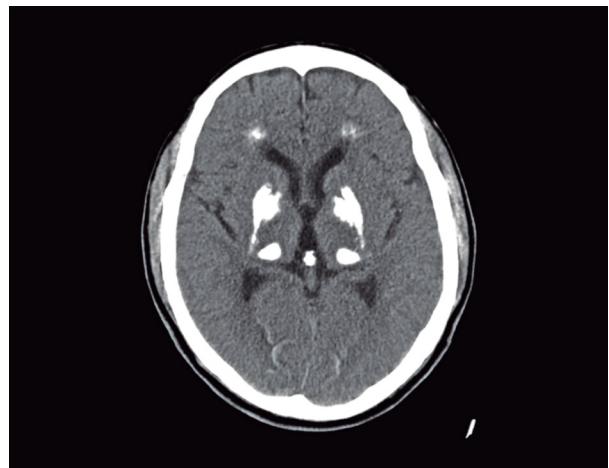
## EPO2221

**Primary Familial Brain Calcification, a cohort study from Padua**

M. Mainardi<sup>1</sup>, G. Bonato<sup>1</sup>, L. Lerjefors<sup>1</sup>, F. Pistonesi<sup>1</sup>, R. Biundo<sup>2</sup>, A. Antonini<sup>3</sup>, M. Carecchio<sup>3</sup>

<sup>1</sup>University of Padua, Padua, Italy, <sup>2</sup>Venice, Italy, <sup>3</sup>Padua, Italy

**Background and aims:** Primary familial brain calcification (PFBC) is a rare genetic disorder manifesting with bilateral calcification in different parts of the brain. The disease can present with variable symptoms. Related genes are SCL20A2, PDGFRB, PDGFB, XPR1 and MYORG. We investigated the clinical, genetic, neuroradiological and neuropsychiatric characteristics of a cohort of patients.



calcifications in basal ganglia



calcifications in dentate nuclei

**Methods:** 14 patients (4 F, 10M) with evidence of bilateral brain calcifications on CT scan were enrolled at the

department of Neurology of Padua University. Exact localization of calcification (subcortical white matter, dentate nuclei, cerebral cortex, basal ganglia, brainstem) was detected on CT scan. Genetic testing was performed by NGS with a customized gene panel including all PFBC-related genes; segregation analysis was performed in available relatives. A cognitive evaluation was performed including Mini Mental State Evaluation and Montreal Cognitive Assessment test.

**Results:** Mean age at onset was 38,4 years; mean age at last examination was 62 years with a mean disease duration of 23 years. 9 patients presented with a movement disorder; 2 had neuropsychiatric symptoms (depression, anxiety and obsessive-compulsive disorder), 4 were asymptomatic. A positive family history was reported in 2 cases. 2 patients carried mutations in SLC20A2, 4 (from 2 different families) in MYORG gene, 2 tested negative for pathogenic variants; genetic analysis is under way in 3 cases. We performed a cognitive evaluation in 7 patients, that found an MCI phenotype in 6 patients.

**Conclusion:** PFBC represents an important differential diagnosis of Parkinsonism. Patients from our cohort showed heterogeneous clinical presentations, in particular mild parkinsonism, dysarthria and neuropsychiatric symptoms.

**Disclosure:** Nothing to disclose

## EPO2222

### Patient Reported Outcomes (PROs) predicting outcome in Parkinson's disease: a Systematic Review

M. Majeed, S. Gentleman, R.S. Nicholas

*Brain Sciences, Imperial College London, London, United Kingdom*

**Background and aims:** Patient-reported outcomes (PROs) are easy and cheap to administer but have not been associated with clinically significant outcomes. We recently found a PRO can predict mortality in multiple sclerosis. The United Kingdom Parkinson's disease (PD) tissue bank plan to evaluate their own donor questionnaire, the Imperial College London Disease Questionnaire (ICLDQ), to test if this tool can be used to predict outcome in patients with PD. We conducted a systematic search in order to find out if PROs have been used to assess for outcome in PD, evaluate their structure and compare them to the ICLDQ.

**Methods:** We conducted a systematic search across 3 databases: MEDLINE, PubMed and Embase looking for cohort studies that matched our aims. Key search terms included 'Parkinson Disease' and 'patient-reported outcome'.

**Results:** A search yielded 4263 papers however after de-duplication, 6 studies matched our criteria. 5 PROs were used to assess outcome in PD, the 16-item and 6-item Activities-specific Balance Confidence Scale, Short Form Health Survey Questionnaire, Falls Efficacy Scale – International and the Barratt Impulsiveness Scale–11. The only outcome assessed was falling, with all PROs demonstrating a significant ability to predict risk of future falls. Many of these PROs showed overlap with questions found in the ICLDQ.

**Conclusion:** 6 studies tested PROs to predict prognosis in PD. Falls were the only outcome tested. Research on the predictive capabilities of PROs in PD is still in its infancy and further work is needed.

**Disclosure:** R Nicholas is funded by the Imperial Biomedical Research Centre (BRC) and Multiple Sclerosis Trials Collaboration (MSTC).

## EPO2223

**Acquired hepatocerebral degeneration: Experience at a Tertiary Center**

M.J. Malaquias<sup>1</sup>, C. Mendes Pinto<sup>2</sup>, J. Gandra<sup>3</sup>, S. Ferreira<sup>3</sup>, S. Cavaco<sup>4</sup>, H. Pessegueiro Miranda<sup>3</sup>, M. Magalhães<sup>1</sup>

<sup>1</sup>Neurology, Centro Hospitalar Universitário do Porto, Porto, Portugal, <sup>2</sup>Neuroradiology, Centro Hospitalar Universitário do Porto, Porto, Portugal, <sup>3</sup>Liver and Pancreas Transplantation Unit and Medicine Department, Centro Hospitalar Universitário do Porto- Hospital de Santo António, Porto, Portugal, Porto, Portugal, <sup>4</sup>Neuropsychology Unit, Centro Hospitalar do Porto – Hospital de Santo António, Porto, Portugal

**Background and aims:** Acquired hepatocerebral degeneration (AHD) is a rare neurological disorder observed in patients with chronic liver disease (CLD) associated with portosystemic hypertension (PH).

To characterize AHD in a cohort of patients with CLD.

**Methods:** This retrospective study included patients with AHD, defined as neurological manifestations, CLD and globus pallidus T1 hyperintensity on brain MRI. It focused on the clinical, laboratorial, imagiological, and neuropsychological results at first neurological observation. Hepatic encephalopathy (HE) was defined as transient altered level of consciousness.

**Results:** The clinical records of 76 patients were reviewed (68% males; average age= 56.5±10.8 years). The majority presented mild to moderate hepatic dysfunction (Child-Pugh score A-B). Patients were classified in 2 diagnostic groups: AHD and HE (82.9%) and AHD (17.1%). The most frequent neurological manifestations were: neuropsychiatric disorders (93.4%), tremor (60.5%), gait impairment (55.2%) and parkinsonism (44.7%). On neuropsychological tests, 32 of the 61 evaluated (52%) were in the dementia spectrum (total Dementia Rating Scale-II, percentile<5). The most common neuroradiological abnormalities were subcortical (64.3%) and cortical (49.3%) atrophy and, subcortical T2 hyperintensities (47.1%). In comparison to AHD, the group AHD and EH had higher median ammonia values and had more frequently dementia and cortical hyperintensities. Nineteen patients underwent liver transplantation, with a statistically significant improvement in survival (number of deaths 3 vs 29, p=0.006).

**Conclusion:** In this study, AHD was clinically heterogeneous. The ammonia levels in plasma and cortical hyperintensity helped identify the coexistence of HE, which was very frequent in our cohort. Liver transplantation significantly modified the survival curve.

**Disclosure:** Nothing to disclose

## EPO2224

**Parkinsonism associated with Systemic Lupus Erythematosus: a case report.**

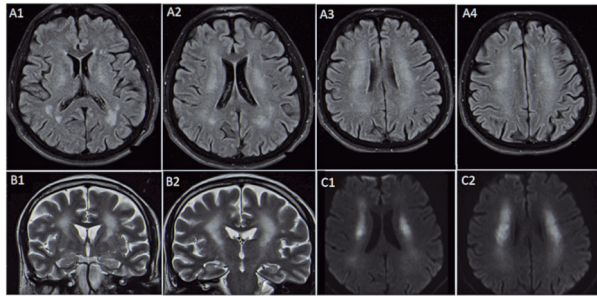
E. Marín Conesa<sup>1</sup>, J.B. Escribano Paredes<sup>1</sup>, E. Gómez López<sup>2</sup>, I. Pellice Espinosa<sup>3</sup>, M. Martínez Zarco<sup>1</sup>, E. Giménez López<sup>1</sup>, J. Marín Marín<sup>2</sup>, J.M. Rodríguez García<sup>2</sup>, I. Pena Fernández<sup>4</sup>, L. Sanchez Alonso<sup>5</sup>, N. Lacasa Perez<sup>4</sup>, J. Iniesta Valera<sup>6</sup>  
<sup>1</sup>General University Hospital Reina Sofía de Murcia, Murcia, Spain, <sup>2</sup>Neurology, Hospital General Universitario Reina Sofía, Murcia, Spain, <sup>3</sup>Murcia, Spain, <sup>4</sup>Hospital General Universitario Reina Sofía, Murcia, Spain, <sup>5</sup>Neurology Department, Hospital General Universitario Reina Sofía Murcia, Spain, Murcia, Spain, <sup>6</sup>Neurology, General University Reina Sofía's Hospital, Murcia, Spain

**Background and aims:** The involvement of Central Nervous System (CNS) involvement in Systemic Lupus Erythematosus (SLE) usually includes Neuropsychiatric manifestations; Movement Disorders (MD) are barely described, being chorea being the one most frequently reported. SLE is an infrequent cause of Parkinsonism. We report a man with SLE and Parkinsonism

**Methods:** A 53-year-old man with a 2-years history of SLE and antiphospholipid syndrome, anticoagulated with acenocumarol, presented a 4-months history of cognitive impairment, depression, hypophonia, bradypsychia and bradyllalia, gait disturbances and slowness of movements. Neurological examination revealed hypomimia, overactivity of the frontalis, weak and soft speech, upper limbs paratonic rigidity and bradykinesia, and a short-step gait with a lack of accessory right arm movement. Inexhaustible glabellar and bilateral palmomental reflexes were also noted.

**Results:** ANAs and lupus anticoagulant were positive. CSF analyses disclosed a mild protein elevation. Electroencephalography (EEG) and DATscan were normal. Brain MRI showed white matter diffuse and symmetrical high-intensity signal in semioval centres, periventricular region and corticospinal tracts on T2/FLAIR weighted sequences. Basal ganglia stroke was not found. Renal biopsy concluded to a lupic nephropathy class III. He was treated with 1g iv/day of methylprednisolone (5 pulses) and mycophenolate mofetil 1g/12h, followed by oral prednisone descending dose during 6 months. After 3 days, he showed an improvement of parkinsonism, particularly of gait and rigidity.

**Conclusion:** In our case, an inflammatory rather than ischemic cause of parkinsonism was suspected since the patient was under treatment with anticoagulants, and also because of the results of MRI and the good response to corticosteroid treatment.



Brain contrast MRI scan: FLAIR (A1-A4) and T2 (B1-B2) sequence reveals high-intensity signal of white matter near to both posterior horns and bilateral and symmetric at semioval centres, periventricular region and both corticospinal tracts. DWI (C1-C2) shows diffusion restriction.

**Disclosure:** Nothing to disclose

## EPO2225

### Plasma NfL correlates with widespread extrastriatal monoaminergic deficits in early Parkinson's disease

S. Masciocchi<sup>1</sup>, A. Pilotto<sup>1</sup>, M. Toffali<sup>1</sup>, S. Nocivelli<sup>1</sup>, A. Imarisio<sup>1</sup>, A. Scalvini<sup>1</sup>, B. Paghera<sup>1</sup>, L. Bonanni<sup>2</sup>, H. Zetterberg<sup>3</sup>, N. Ashton<sup>4</sup>, A. Hye<sup>5</sup>, A. Padovani<sup>1</sup>  
<sup>1</sup>Brescia, Italy, <sup>2</sup>Chieti, Italy, <sup>3</sup>Section of Clinical Neuroscience and Rehabilitation, University of Gothenburg, Mölndal, Sweden, <sup>4</sup>Department of Psychiatry and Neurochemistry, University of Gothenburg, Gothenburg, Sweden, <sup>5</sup>Psychiatry, Psychology and Neuroscience, King's College London, London, United Kingdom

**Background and aims:** Plasma neurofilament light chain (NfL) has been related to clinical progression in Parkinson's disease (PD). The aim of this study was to investigate the relationship between striatal and extrastriatal 123I-FP-CIT SPECT monoaminergic projections and NfL in patients with recent diagnosis of PD.

**Methods:** Consecutive patients with suspected PD underwent 123I-FP-CIT SPECT imaging, motor and cognitive assessment and blood sampling. Plasma NfL levels were quantified by Single molecule array (Simoa; Quanterix). 123I-FP-CIT SPECT binding in nigrostriatal and extrastriatal regions of interest (ROI) was calculated in each patient from spatially normalized images. The relationship between NfL plasma levels and 123I-FP-CIT was evaluated by ROI analyses and whole-brain linear regression model adjusting for the effects of age of onset, sex, disease duration and motor functions (UPDRS). A covariance analysis provided the correlates of local and long-distance regions related to higher peripheral NfL levels.

**Results:** 42 patients with suspected parkinsonism entered the study and 28 patients with established PD at follow-up underwent imaging analyses. Higher NfL plasma levels correlated with lower 123I-FP-CIT SPECT binding in several extrastriatal regions, especially anterior cingulate and temporal lobe ( $p < 0.001$ ) without significant nigrostriatal binding differences. Covariance patterns revealed a widespread monoaminergic depletion in PD patients with high NfL levels, including frontal and parietal lobes.

**Conclusion:** Our data showed for the first time that serum NfL is associated with widespread extrastriatal monoaminergic deficits in PD patients. This suggests a strong relationship between NfL and cortical function and pathology in PD, pointing out NfL's role as early marker of motor and cognitive progression.

**Disclosure:** Nothing to disclose

## EPO2226

**Dystonia is a common feature of adults and adolescents with AS**

G. Mastroianni<sup>1</sup>, F. Abate<sup>1</sup>, M. Ascoli<sup>1</sup>, S. Neri<sup>1</sup>, T. Garcea<sup>1</sup>, C. Lobianco<sup>1</sup>, G.G. Tripodi<sup>1</sup>, T. D'agostino<sup>1</sup>, A. Prestandrea<sup>1</sup>, A. Martino<sup>1</sup>, G. Ferrigno<sup>1</sup>, V. Cianci<sup>1</sup>, S. Gasparini<sup>2</sup>, E. Ferlazzo<sup>2</sup>, U. Aguglia<sup>2</sup>

<sup>1</sup>Great Metropolitan Hospital, Reggio Calabria, Italy,  
<sup>2</sup>Magna Graecia University, Catanzaro, Reggio Calabria, Italy

**Background and aims:** Angelman Syndrome (AS) is an inherited, neurodevelopmental disorder mainly characterized by severe cognitive disability, speech impairment, hyperactivity, and seizures. The presence of dystonia in AS subjects has never been studied in detail. The purpose of this study was to evaluate the prevalence, distribution and severity of dystonia in adolescents and adults with AS.

**Methods:** video-polygraphic recordings of 40 patients with AS genetically confirmed were evaluated. Subjects older than 14 were included. We assessed the presence, distribution and severity of dystonia using the "Barry-Albright Dystonia Scale (BAD).

**Results:** 26 subjects (aged 14-48 years, median 24) were evaluated. Dystonia was present in 24/26 (92.3%) of the subjects. In all, dystonia involved upper limbs. 7/24 subjects had dystonia involving mouth, 3/24 (12.5%) involving neck, 1/24 (4%) involving trunk. The severity of dystonia ranged from "mild" to "moderate. There was no difference in terms of severity of dystonia among genetic subgroups either for upper limbs ( $p=0.86$ ) or mouth ( $p=0.80$ ).

**Conclusion:** dystonia is a common feature of adults and adolescents with AS

**Disclosure:** Nothing to disclose

## EPO2227

**Effect of tolcapone on peripheral neuropathy in patients with Parkinson's disease treated with levodopa/carbidopa intestinal gel**

P. Matejička, M. Minar, Z. Kosutzka, K. Gmitterova, P. Valkovic  
Bratislava, Slovakia

**Background and aims:** Patients with Parkinson's disease (PD) treated with levodopa/carbidopa intestinal gel (LCIG) are at higher risk of peripheral neuropathy. Metabolites of levodopa degradation play important role in its pathophysiology. The aim of study was to assess possible role of catechol-O-methyl transferase inhibitor (COMT) tolcapone on levels of vitamin B12, homocysteine (HCY) and electromyographic (EMG) findings in patients on LCIG.

**Methods:** We examined 10 patients with advanced PD on stable dose of LCIG for at least 3 months, and after 6 months intervention – either with tolcapone add-on therapy and reduction of LCIG dose ( $n=6$ ), or with B12 and folic acid supplementation ( $n=4$ ). Conduction velocity (CV) of tibial nerve (motor) and ulnar nerve (sensory) was assessed.

**Results:** The levels of homocysteine decreased similarly in group with vitamin supplementation (3 out of 4) as well as in tolcapone group (5 out of 6) (Fig1). The level of vitamin B12 increased in both groups (vitamin B group 3 out of 4, tolcapone 4 out of 6). Motor CVs improved in 5 out of 6 tolcapone treated patients but in none of patients with vitamin B supplementation (Fig2). Sensory CVs worsened in all patients treated with B vitamins, and in 3 out of 6 patients in tolcapone subgroup (Fig3).

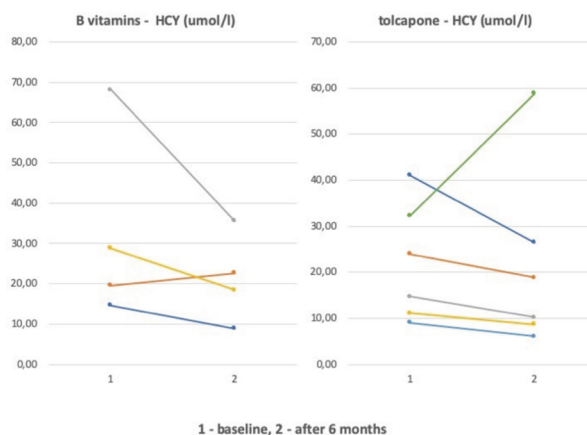


Figure 1



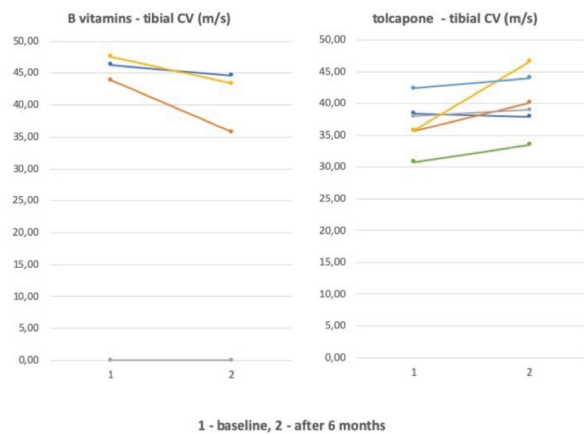


Figure 2

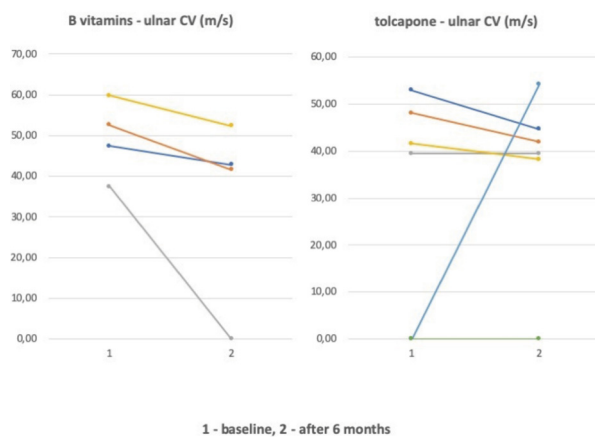


Figure 3

**Conclusion:** Although tolcapone add-on therapy and vitamin B supplementation decrease HCY and increase vitamin B levels, only patients treated with tolcapone had improved EMG findings – especially improvement in motor CV. This suggests that also other mechanisms connected with COMT function may play role in amelioration of peripheral neuropathy.

**Disclosure:** Nothing to disclose

## EPO2228

### Opicapone in Parkinson's Disease – a centre's real-life experience

F. Meira Carvalho<sup>1</sup>, J.D. Da Silva<sup>2</sup>, J. Araújo<sup>1</sup>, D. Matos<sup>3</sup>, J. Pinto<sup>1</sup>, M.M. Rodrigues<sup>1</sup>

<sup>1</sup>Neurology, Hospital Braga, Braga, Portugal, <sup>2</sup>Life and Health Sciences Research Institute, University of Minho, Braga, Portugal, <sup>3</sup>Neurology, Unidade Local de Saúde Alto Minho, Viana do Castelo, Portugal

**Background and aims:** Opicapone is a recent treatment for motor fluctuations of patients with Parkinson's disease (PD) under levodopa therapy. This drug has proven efficacy and safety in clinical trials.

**Methods:** Retrospective study, with evaluation of clinically relevant data from hospital visits of PD patients that initiated opicapone from January 2019 to December 2019. Patients' and clinicians' perception of symptom improvement was objectified by Clinical Global Impression of Change Scale (PGI-C and CGI-C, respectively). Changes in total daily levodopa equivalent dose (LED), adverse events (AEs), dropouts and reasons for discontinuation were also evaluated.

**Results:** Opicapone was initiated in 35 PD patients (mean age: 71.2±8.9 years; 63% men) and 26 had at least one reevaluation. PGI-C (2.88±1.07 points) and CGI-C (2.86±0.56 points) revealed a perception of improvement of PD symptoms soon after initiation, by both clinicians and patients. The introduction of opicapone led to LED reduction in 13 patients (mean decrease: 226.5±125.6mg). Nineteen patients experienced at least one of the following AEs: dyskinesia (n=12), orthostatic hypotension (n=4), constipation (n=3), dizziness (n=3), hallucinations (n=2), dry mouth (n=1) and confusional state (n=1). Most of the dyskinesia events occurred in patients already experiencing dyskinesia at baseline (n=10;83.3%). Opicapone was discontinued in 6 patients due to AEs. The most common event leading to discontinuation was dyskinesia (n=3;50%).

**Conclusion:** In this real-life evaluation, in line with data from clinical trials, opicapone was well tolerated and had therapeutic benefits in patients with advanced PD, including LED reduction. Dyskinesia, reflecting greater dopaminergic availability, was the most common side effect and the leading cause of discontinuation.

**Disclosure:** Nothing to disclose

## EPO2229

### Apomorphine infusion in the treatment of camptocormia in Parkinson's disease: a 24-months longitudinal open, prospective follow-up study

K. Mensikova, M. Kaiserova, M. Vastik, M. Nevrlý, S. Kurcova, P. Kanovsky  
*Department of Neurology, Palacky University Medical School and University Hospital, Olomouc, Czech Republic, Olomouc, Czech Republic*

**Background and aims:** Camptocormia in Parkinson's disease (PD) is difficult to affect by therapeutic procedures such as paravertebral botulinum toxin injections, manipulation with oral dopaminergic treatment or deep brain stimulation. The aim of the study was to assess the long-term effect of subcutaneous infusions of apomorphine on this significantly limiting disease manifestation.

**Methods:** Patients with advanced fluctuating PD who developed camptocormia were treated with apomorphine infusions, based on a positive clinical response and good apomorphine tolerance during apomorphine testing. The daily dose of apomorphine was gradually increased according to clinical effect and tolerance. Patients were monitored regularly, at monthly intervals, over a 24-month follow-up period. The clinical effect of treatment was assessed using the UPDRS-III, UDysRS, and GCI-I scales.

**Results:** Treatment was initiated in a total of 11 patients. The effective daily doses of apomorphine varied according to clinical effect and tolerance in the range of 40-70mg. Improvement of camptocormia was observed in all patients approximately after four weeks of continuous apomorphine treatment, and this effect remained stable over the whole follow-up period. The treatment was well tolerated by all patients, the side effects were rare and, if present, not serious.

**Conclusion:** Apomorphine infusion therapy may have a beneficial effect on this very unpleasant manifestation of the disease. This effect can be explained by the sustained stimulation of the ventrolateral striatal D1 receptors, alleviating this type of dystonia.

**Disclosure:** Supported by: grant from the Ministry of Health, Czech Republic – conceptual development of research organization – MH CZ – DRO (FNOL, 00098892) 2020.

## EPO2230

### Prevalence of Restless Legs Syndrome in Multiple Sclerosis patients in a tertiary centre – a case-control study

T. Monschein, C. Schestak, C. Schillerwein-Kral, F. Leutmezer, T. Berger, S. Seidel  
*Department of Neurology, Medical University of Vienna, Vienna, Austria*

**Background and aims:** Previous studies suggested an association between MS and RLS. Data on the influence of DMT are lacking. The aim of this case-control study is to determine the prevalence of RLS in MS patients in an Austrian tertiary centre and to investigate possible associations between the RLS prevalence and disease modifying therapies (DMT) in these patients.

**Methods:** For this study MS patients seen at the outpatient department and healthy controls aged >18 years were screened between October 2014 and December 2019. RLS was diagnosed based on the criteria of the International Classification of Sleep Disorders, 3rd edition and quantified with the International Restless Legs Syndrome Study Group Rating Scale for Restless Legs Syndrome (IRLSSG).

**Results:** 302 participants were examined, of which 121 patients (71.9% female) and 120 controls (73.3% female) met the inclusion criteria. The MS group was significantly older than healthy controls ( $35.4 \pm 9.0$  vs.  $30.8 \pm 7.2$ ,  $p < 0.001$ ). In the control group 3.3% (95% CI [0.1%; 6.5%]) had RLS (IRLSSG score >10), in the MS group 21.5% (95% CI [14.2%; 28.8%]). In the subgroup analysis of MS patients 10% had RLS in the "no therapy" group, compared to 23.8% in the therapy groups (detailed percentages see figure 1).

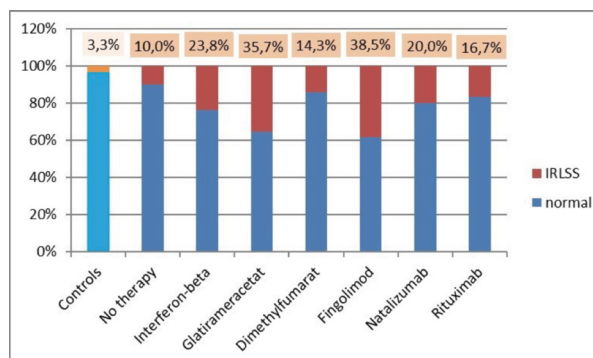


Figure 1: Percentages of RLS in the different therapy groups

**Conclusion:** Based on our data, a valid association between RLS and MS can be assumed. A higher RLS prevalence in MS Patients with DMT compared to treatment naive patients and healthy controls could be explained by a suspected higher disease activity in these groups.

**Disclosure:** Nothing to disclose

## EPO2231

**Series of infrequent cases of Spinocerebellar Ataxias (SCA).**

M. Morales de la Prida<sup>1</sup>, J. López Sánchez<sup>1</sup>, G. Valero López<sup>1</sup>, M.T. Alba Isasi<sup>1</sup>, M. Cánovas Iniesta<sup>1</sup>, J. Vazquez Lorenzo<sup>1</sup>, M.O. Caballero Lozano<sup>1</sup>, V.M. Pérez Navarro<sup>1</sup>, E. Gómez López<sup>2</sup>, L. Fuentes Rumi<sup>1</sup>, A.E. Báidez Guerrero<sup>3</sup>, E. García Molina<sup>1</sup>, B. Palazon Cabanes<sup>1</sup>, R. Carrasco Torres<sup>4</sup>, J. Jimenez Veiga<sup>5</sup>, O. Morsi Hasan<sup>1</sup>  
<sup>1</sup>Neurology, Virgen de la Arrixaca University Clinical Hospital, Murcia, Spain, <sup>2</sup>Neurology, Reina Sofía University General Hospital, Murcia, Spain, <sup>3</sup>Neurology, Elche University General Hospital, Elche, Spain, <sup>4</sup>Neurology, Los Arcos del Mar Menor University Hospital, Murcia, Spain, <sup>5</sup>Neuropsychology, Virgen de la Arrixaca University Clinical Hospital, Murcia, Spain

**Background and aims:** Spinocerebellar ataxias (SCA) are a heterogeneous group of hereditary diseases, mostly dominant, characterised by a progressive cerebellar syndrome with onset in middle age. They have a great phenotypic variability and they may be associated with eye disorders, pyramidal and extrapyramidal, sensitive or cognitive symptoms.

**Methods:** The current classification of autosomal-dominant cerebellar ataxias consists of SCA followed by a number, being SCA 3 the most common variety. 3 cases of infrequent variants of genetically confirmed SCA are analysed.

**Results:** A 38-year-old woman who progressively experiences difficulty walking and lack of coordination in upper limbs. In the following years, she develops abasia, dysphagia, dysarthria and hypophonia, vertical nystagmus, pyramidal symptoms and severe distal hypopalesthesia. Diagnosed with SCA 5 (Holmes or Lincoln ataxia). A 42-year-old man, whose father and brother had similar symptoms, who presents progressive gait disturbance. Over the next few years, he develops scanning speech, nystagmus, slight paraparesis, severe hypopalesthesia and areflexia in lower limbs with pyramidal symptoms. Diagnosed with SCA 11. A woman with a maternal history of gait disturbance who consults at 39 years old due to gait disturbance and dysmetria. In the next 15 years, she develops scanning speech, nystagmus, severe and generalized ataxia and pyramidal symptoms. Diagnosed with SCA 8.

**Conclusion:** The clinical manifestation of SCA is usually variable and slowly progressive. In its differential diagnosis, acquired ataxias (toxic, metabolic, immunological ...) should be dismissed. After confirming the diagnosis, genetic counselling, neurorehabilitation and symptomatic treatment are important.

**Disclosure:** Nothing to disclose

## EPO2232

**Expected and Unexpected Acute Effects on Motility and Balance in De Novo Parkinson's disease Patients due to a Standard Dose of L-dopa. Subclinical Instrumental Evidences.**

G. Mostile, A. Nicoletti, G. Portaro, R. Terranova, P. Cunsolo, F. Contrafatto, G. Donzuso, C. Rascunà, C.E. Cicero, A. Luca, M. Zappia  
 Department "G.F. Ingrassia", Section of Neurosciences, University of Catania, Catania, Italy

**Background and aims:** Gait impairments are a hallmark of Parkinson's disease (PD). Although patients benefit from L-dopa therapy, its acute effect on gait is poorly understood. This study investigates the acute effects of L-dopa on balance and motility in patients with de novo Parkinson's disease (PD) using an instrumental approach.

**Methods:** We studied 20 subjects newly diagnosed as clinically probable PD. All patients underwent a standardized acute L-dopa challenge test. Gait assessment was carried out both at baseline and at pharmacologic peak. For each section, subjects performed the Timed Up and Go (TUG) test wearing an inertial sensor. Conventional kinematic parameters processed by the system together with parameters from non-linear multifractal analysis of raw motion data were obtained.

**Results:** A common trend of improvement on medication was observed for most sensorial parameters. A subgroup of 14 patients was identified based on short-duration response magnitude with a greater clinically detectable motor response. In these patients, L-dopa effect results in unexpected accelerations during postural changes, possibly reflecting instability. Multifractal analysis of motion signals revealed an opposite behavior as expected by the normalization effect of the drug in the rotational tasks.

**Conclusion:** Balance and motility processes may respond differently to L-dopa in PD, also in an early stage of disease. Patients with a greater acute motor response may present worse postural control when on medication. L-dopa may sub-clinically worsen rotational tasks, requiring an instrumental monitoring for treatment optimization.

**Disclosure:** Nothing to disclose

## EPO2233

### Electrophysiological study of eye movements and cognition in Progressive Supranuclear Palsy and Parkinson's disease

A. Neji<sup>1</sup>, A. Nasri<sup>2</sup>, S. Mrabet<sup>2</sup>, A. Gargouri<sup>2</sup>, M. Ben Djebbara<sup>2</sup>, I. Kacem<sup>2</sup>, R. Gouider<sup>2</sup>

<sup>1</sup>Department of Neurology, LR18SP03, Razi University Hospital, Tunis, Tunisia, La Manouba, Tunisia, <sup>2</sup>Faculty of Medicine of Tunis, University Tunis El Manar, Tunisia, La Manouba, Tunisia

**Background and aims:** Eye movement abnormalities and cognitive impairment are present to varying degrees in parkinsonian syndromes. They are classic in Progressive Supranuclear Palsy (PSP) and can be seen in Parkinson's disease (PD). Seeing the overlap of neurocognitive and ocular control circuits, the study of eye movements (SEM) could be a tool to assess cognitive functions. Our aim was to compare SEM and study their correlations with cognitive profile in PSP and PD.

**Methods:** Retrospective study over a period of 16 years (2004-2019) in the Neurology department of Razi University Hospital, including a group of PSP patients (2017MDS-PSP criteria) and a group of PD patients. Clinical, neurocognitive and SEM characteristics of the 2 groups were analyzed. SEM recording studied pursuit, pro-saccades and anti-saccades tasks using video-oculography.

**Results:** 46 patients were included: 23PSP and 23PD matched in age and sex ( $p > 0.05$ ). Executive dysfunction was the most common cognitive impairment in the PSP group (78.2%). The SEM was uninterpretable in 6 PSP patients and pathological in all the other PSP patients and 30.4% of PD patients. In the PSP group, anti-saccade abnormalities were the most frequent (70%), while in PD group, pro-saccade latencies were abnormal in all patients and pursuit and anti-saccades were affected in 13%. There was no significant correlation between SEM abnormalities and cognitive profile in PSP and PD groups, nor with PSP phenotypes.

**Conclusion:** SEM anomalies were constant in PSP compared to PD with different profile between the 2 pathologies, which could constitute a differential diagnostic tool. The anti-saccade anomalies in PSP are linked to the more marked frontal dysfunction.

**Disclosure:** Nothing to disclose

## EPO2234

### Cerebellar Cognitive affective syndrome scale highly correlates with ataxia score and disease duration in Friedreich Ataxia

G. Naeije<sup>1</sup>, M. Rai<sup>2</sup>, M. Pandolfo<sup>1</sup>

<sup>1</sup>Brussels, Belgium, <sup>2</sup>Laboratory of Experimental Neurology, Université Libre de Bruxelles, Brussels, Belgium

**Background and aims:** The cerebellum modulates motor and cognitive functions by receiving afferences from cortico-ponto-cerebellar and spinocerebellar tracts and feeds-back through its dentate nuclei (DN) and associated dentato-thalamo-cortical connections. Friedreich ataxia (FRDA) is a genetic disorder characterized by cerebellar and proprioceptive ataxia with progressive atrophy of the DN. FRDA clinical evolution is evaluated by clinical scales that only reflect the motor cerebellar component. Yet, cerebellar cognitive disorders can be assessed by the cerebellar cognitive affective syndrome scale (CCAS).

We looked for a correlation between SARA and CCAS in FRDA that would reflect common pathophysiology through DN impairment.

**Methods:** 16 FRDA patients were included. CCAS and SARA score were evaluated concomitantly. Pearson rank correlation test was used for correlations between CCAS and SARA, disease duration, age of onset and GAA1.

Patients' characteristics are summarized in table 1.

Female / Male	10/6
Age	27 ± 13
Disease duration (years, mean ± SD)	15 ± 12
Age of onset (years, mean ± SD)	12 ± 6
GAA1 (mean ± SD)	647 ± 179
Point-mutations	2/16
SARA (mean ± SD)	22 ± 10
CCAS (mean ± SD)	
Absolute value (/120)	84 ± 11.4 / 120
Failed items. (/10)	3.3 ± 1.5 / 10

Table 1.

Table legend. SARA: Score on the scale for the assessment and rating of ataxia, CCAS: cerebellar cognitive and affective syndrome scale (2 failed item corresponds to probable cognitive cerebellar disorder while 3 failed items to definite cognitive cerebellar disorder). GAA1: size of GAA1 triplet expansion on the shortest allele.

table 1.

**Results:** SARA correlated with CCAS absolute score ( $r = -0.71$ ,  $p = 0.003$ ) and failed items score ( $r = 0.84$ ,  $p = 0.0007$ ). Disease duration also correlated with CCAS absolute ( $r = -0.53$ ,  $p = 0.04$ ) and failed items ( $r = 0.66$ ,  $p = 0.005$ ) scores. There was no correlation between GAA1 nor age of onset and CCAS neither for absolute nor failed item scores. (respectively:  $r = -0.12$ ,  $p = 0.7$ ;  $r = 0.4$ ,  $p = 0.2$  and  $r = 0.21$ ,  $p = 0.43$ ;  $r = -0.2$ ,  $p = 0.43$ )

**Conclusion:** FRDA progressive DN atrophy leads to a cerebellar cognitive impairment that parallels motor ataxic symptoms. CCAS is a reliable tool to study and monitor cognitive function in FRDA patients.

**Disclosure:** Nothing to disclose

## EPO2235

**Beyond what the eyes can see, pathology holds the key**

E. Natera-Villalba<sup>1</sup>, A. Gómez-López<sup>1</sup>, V. Ros-Castelló<sup>1</sup>, A. Sánchez-Sánchez<sup>1</sup>, J.L. Lopez-Sendon<sup>1</sup>, A. Rabano<sup>2</sup>, E. Gómez-Blázquez<sup>2</sup>, J.C. Martínez-Castrillo<sup>1</sup>, A. Alonso-Canovas<sup>1</sup>

<sup>1</sup>Neurology, Hospital Universitario Ramon y Cajal, Madrid, Spain, <sup>2</sup>Neuropathology and Tissue Bank, Research Foundation for Neurological Diseases, Madrid, Spain

**Background and aims:** Clinical diagnosis of atypical parkinsonisms may be challenging. The eye-of-tiger sign on MRI, typical of neurodegeneration with brain iron accumulation, has been anecdotally observed in cases clinically diagnosed as atypical parkinsonism.

**Methods:** Clinico-pathological case.

**Results:** A 67-year-old-woman presented with progressive painful stiffness and allodynia in her left arm. On examination, she presented hypomimia, bradykinesia, and rigidity with greater involvement of left limbs. 2 years later she developed dystonia, with myoclonic tremor, and hyposthesia involving her left arm, as well as an impairment of balance with falls, in the presence of bilateral but asymmetric parkinsonian signs. She referred constipation, urge incontinence, and restless legs syndrome. Smell was preserved and no pyramidal or cerebellar signs, orthostasis, REM sleep disorder behaviour, cognitive decline, or hallucinations were noted. There was no response to levodopa. She associated a significant axial involvement with disabling rigidity, supranuclear gaze abnormalities, facial dystonia, dysphonia, severe dysphagia, anarthria. Brain SPECT disclosed a presynaptic dopaminergic involvement with postsynaptic preservation, and bifrontal and bitemporal hypoperfusion. T2-weighted brain-MRI revealed a typical eye-of-the-tiger sign. She died 5 years after onset with the clinical diagnosis of progressive supranuclear palsy. Neuropathology disclosed neuronal loss and gliosis, alpha-synuclein-positive cytoplasmic glial and nuclear inclusions, and cytoplasmic neuronal inclusions, typical of MSA, with isolated involvement of nigrostriatal system.

**Conclusion:** We present the 1st case of neuropathologically confirmed multisystemic atrophy with the eye-of-the-tiger sign on MRI. The presence of gaze abnormalities further complicated a correct clinical diagnosis. Pathological postmortem study remains essential in atypical parkinsonisms.

**Disclosure:** Nothing to disclose

## EPO2236

**PRO-PARK study: Is there an association between Professional occupation and Parkinson's disease?**

E. Natera-Villalba<sup>1</sup>, V. Ros-Castelló<sup>1</sup>, A. Gómez-López<sup>1</sup>, A. Sánchez-Sánchez<sup>1</sup>, P. Pérez-Torre<sup>1</sup>, S. Fanjul Arbos<sup>2</sup>, G. Garcia-Ribas<sup>1</sup>, C. Estevez-Fraga<sup>3</sup>, I. Parees-Moreno<sup>2</sup>, J.C. Martínez-Castrillo<sup>1</sup>, A. Alonso-Canovas<sup>1</sup>

<sup>1</sup>Neurology, Hospital Universitario Ramon y Cajal, Madrid, Spain, <sup>2</sup>Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain, <sup>3</sup>Department of Neurodegenerative Diseases, UCL Institute of Neurology, London, United Kingdom

**Background and aims:** Some personality features including rigidity, less novelty-seeking, and less creative behaviour have been linked to Parkinson's disease (PD). This may be related to dopaminergic deficit, might influence the preference of professional occupation and substances addiction, even in prodromal/prediagnostic stages.

**Methods:** On-going case-and-control study in our Movement Disorders Unit. Cases were patients with clinical diagnosis of PD. Controls were patients with different neurological diseases, excluding atypical parkinsonisms, essential tremor, dementia. Professional categories following RIASEC classification and smoke habit were registered.

**Results:** So far, 330 patients (220 cases, 110 controls), mean age 71.5+9.7 and 64.1+12.5 years-old, respectively ( $p<0.001$ ), have been included. Males predominated among cases (66% vs. 51%,  $p=0.006$ ). Dystonia and migraine were the most common diagnosis among controls.

The most prevalent professions among PD patients were basic works, agriculture and livestock (41.1%), investigative (science and health) (24.7%), administration and finance (15.1%), vs. 31.8%, 20.0%, and 20.0% in controls ( $p=0.26$ ). There was a trend towards an increased frequency of creative professions among controls [teaching (3.6% vs 2.3%), journalism (3.6% vs 0.9%), culture (5.4% vs 3.2%), art (6.4% vs 4.6%)], and lower rate of past/current smoking in PD (36% vs. 46%,  $p=0.06$ ).

**Conclusion:** Albeit non-significant, we found certain trends suggesting a peculiar professional profile in PD, in line with previous studies. Higher levels of routine and less creative professions might be more appealing for subjects who subsequent develop PD. The relatively small sample size and demographic differences, equally the heterogeneous control group for comparison, may have limited the power of our study to detect significant differences.

**Disclosure:** Nothing to disclose

## EPO2237

**Spastic paraplegia as a presentation of oculodentodigital dysplasia with a de novo mutation: case report**

E. Natera-Villalba<sup>1</sup>, A. Sánchez-Sánchez<sup>2</sup>,

A. Gómez-López<sup>2</sup>, V. Ros-Castelló<sup>1</sup>,

J.L. López-Sendon Moreno<sup>2</sup>

<sup>1</sup>Madrid, Spain, <sup>2</sup>Neurology, Hospital Ramón y Cajal, Madrid, Spain

**Background and aims:** Oculodentodigital dysplasia (ODDD) is an infrequent disorder with craniofacial and limb dysmorphic features due to mutations in the GJA1 gene encoding the protein connexin-43, component of connexon membrane channels.

**Methods:** Case report.

**Results:** A 34-year-old man with hypothyroidism and without a relevant family history was referred to our department because of progressive spastic paraplegia. On the examination, apart from generalized hyperreflexia and a spontaneous clonus, dysmorphic features were noted: dorsal kyphosis, scoliosis, flat face, wide forehead, microphthalmia, hypotelorism, narrow nasal bridge, prominent columella, microdontia, misalignment of teeth, low-set ears, camptodactyly, and clinodactyly. He also developed urinary incontinence. His perinatal history was uneventful, just a type 3 syndactyly was observed at birth requiring surgery. Psychomotor milestones were normal. He was able to walk unaided, but he presented frequent falls since early childhood. His gait got worse progressively, being unable to walk unassisted, thereby currently he needs a wheelchair. His parents were not consanguineous. A brain-MRI showed white matter alterations involving both pyramidal tracts, occipital lobes, and a thin corpus callosum. A de novo heterozygous c.443G>A (p.R148Q) mutation was found with damaging impact on connexin-43 structure (absent in his parents). The *Xenopus* oocyte pair system was used to study the functionality of this protein (Neuro2A cell line).

**Conclusion:** Our patient presents a de novo missense heterozygous mutation in the GJA1 gene leading to a nonfunctional Cx43 of ODDD syndrome. ODDD is uncommon and must be considered in patients with spastic paraplegia. Its recognition is important in terms of genetic counselling and preimplantation diagnosis.

**Disclosure:** Nothing to disclose

## MS and related disorders 3

## EPO2238

**Anti MOG antibody disease case series: Moroccan experience**

I. Ferrassi, S. Bellakhdar, B. El Moutawakil, M.A. Rafai, H. El Otmami  
*Neurology, Ibn Rochd University Hospital, Casablanca, Morocco*

**Background and aims:** Optic neuritis (ON) is a common clinical manifestation in myelin oligodendrocyte glycoprotein (MOG) antibody-associated disease. Other clinical manifestations include acute demyelinating encephalomyelitis, transverse myelitis and neuromyelitis optica spectrum disorders. MOG Ab disease has recently emerged as a distinct entity carved out of the patient population diagnosed with NMOSD. We aimed to delineate the common features of MOG-IgG-positive ON, and report uncommon presentations.

**Methods:** In this study, we report 6 cases presenting MOG-IgG-related ON. We collected demographic, clinical, imaging and laboratory data, as well as therapeutic measures and clinical outcome of each patient. The diagnosis was confirmed, according to the 2018's guidelines, by the association of a retrobulbar optic neuritis (RBON) with a high level of anti MOG-Abs in the blood.

**Results:** ON was described in all our patients with qualifying lesions on brain MRI, except for the 2nd case where imaging was normal. An extensive search for infectious and inflammatory etiology was negative while serum was positive for MOG-Abs tested twice at an interval of 3 months. They showed remarkable clinical resolution with steroids and had remained symptom-free on follow-up. Unusual presentations were identified in 4 patients: intracranial hypertension syndrome, an uveitis, meningitis and epileptic seizures. MOG-Ab-related disorders shared common clinical and prognostic features, but encompass a spectrum wider than recently reported.

**Conclusion:** Our aim is to increase awareness of the unique findings of MOG-IgG-positive ON, which may initially exhibit uncommon presentations, thereby delaying treatment.

**Disclosure:** Nothing to disclose

## EPO2239

**Quality of life (QoL) assessment in multiple sclerosis (MS) patients undergoing autologous hematopoietic stem cell transplantation (AHSCT)**

D. Fedorenko<sup>1</sup>, I. Nikolaev<sup>2</sup>, D. Kanshina<sup>2</sup>

*<sup>1</sup>Department of Hematology and chemotherapy with bone marrow and hematopoietic stem cell transplantation unit, Federal state budgetary institution "National Medical and Surgical Center named after N.I. Pirogov" of the Ministry of Healthcare of the Russian Federation, Moscow, Russian Federation, <sup>2</sup>Neurology Department for patients with cerebral circulation disorders, Federal state budgetary institution "National Medical and Surgical Center named after N.I. Pirogov" of the Ministry of Healthcare of the Russian Federation, Moscow, Russian Federation*

**Background and aims:** QoL is an important outcome of MS treatment. We studied QoL changes before and after AHSCT.

**Methods:** A total of 93 patients with MS. Mean follow-up was 24 months (range 12-53 months), mean age 30.0, range 18-15, male/female -39/54. Relapsing-remitting MS (RRMS) - 49 patients, 44 patients – progressive types of MS (PrMS). All patients were treated by AHSCT. QoL was assessed using generic questionnaire SF-36.

**Results:** QoL parameters in MS patients at 12 months after AHST improved in comparison to base-line: physical functioning – 66.3 vs 52.6, role-physical functioning - 62.8 vs 43.8, bodily pain - 78.2 vs 76.4, general health - 64.1 vs 56.7, vitality - 62.8 vs 45.4, social functioning - 72.4 vs 57.7, role-emotional functioning - 68.0 vs 55.6, and mental health - 72.1 vs 58.6. With further improvements: Integral QoL Index exhibited 0,50 at long-term follow-up as compared to 0.32 at base-line. QoL improvement was more dramatic in RRMS than in PrMS. We found a significant increase of all 8 SF-36 scales in a year post-transplant as compared with base-line in RRMS patients ( $p < 0.05$ ). In PrMS patients statistically significant improvement was registered for 6 out of eight SF-36 scales ( $p < 0.05$ ). Improved QoL parameters were preserved over the study period in all the patients who did not have disease progression or relapse.

**Conclusion:** QoL monitoring in MS patients after AHSCT provides clinicians with the unique information regarding the trajectory of changes in QoL parameters. Further studies are needed to examine QoL profile changes in this patient population.

**Disclosure:** Nothing to disclose

## EPO2240

**Evaluation of MS diagnostic criteria in a cohort of CIS patients**

F. Fela<sup>1</sup>, E. Morvan<sup>1</sup>, C. Bensa<sup>1</sup>, A. Moulignier<sup>1</sup>, J. Savatovsky<sup>2</sup>, R. Deschamps<sup>1</sup>, O. Gout<sup>1</sup>, A. Gueguen<sup>1</sup>  
<sup>1</sup>Neurology, Fondation Oph. A. de Rothschild, Paris, France, <sup>2</sup>Radiology, Fondation Oph. A. de Rothschild, Paris, France

**Background and aims:** Multiple Sclerosis diagnostic criteria, based on Dissemination In Space and Time, have evolved over time leading to earlier diagnosis and simplified process. However, these criterion remained imperfect regarding their accuracy and false positive risk

To analyse the diagnostic performances of 2010 and 2017 McDonald criteria in a cohort of patients since the 1st clinical event

**Methods:** MS diagnostic criteria were applied to a cohort of CIS patients with baseline brain MRI available and included between 1996 and 2002. We assessed conversion to clinically definite MS, according to Poser criteria clinical definition. The initial MRI was analysed by two neurologists and a neuroradiologist.

**Results:** 227 patients were included; 136 evolved to a clinically definite MS. At baseline, sensitivities (Se)-Specificities (Sp) for Paty, Barkhof, and Swanton DIS criteria were, respectively: 78.7-52.7%, 61-72.5%, and 81.9-48.2%. Oligoclonal band presence was 71.3% sensitive, and 39.6% specific. DIS according to MacDonald 2017 and 2010 was 82.3% sensitive and 48.2% specific. Se-Sp for DIT according to McDonald 2017 and 2010 were, respectively: 81.8-34.4%, and 55.3-66.7%. Se-Sp for DIT+DIS according to McDonald 2017 were 69.8-52.7%, versus 51.5-72.5% for the 2010 criteria. At 15 years, respective the Sp were: 51.6%, and 68.1% for McDonald 2017 and 2010.

**Conclusion:** Our results are in accordance with prospective cohorts used to assess MS diagnosis criteria and enforce the need to increase the specificity of MS diagnostic criteria. Some limitations of our study are related to the improvement of MRI technic over time and the absence of sequence dedicated to assess cortical lesion in our MRI material

**Disclosure:** Nothing to disclose

## EPO2241

**Unilateral blown pupil as initial presentation of Multiple Sclerosis**

P. Ferreira, F. Correia, S. Moreira  
 Neurology, ULSM - Hospital Pedro Hispano, Senhora da Hora, Portugal

**Background and aims:** Multiple Sclerosis (MS) diagnosis includes a plethora of MS-related symptoms that prompt evaluation. Since demyelination affects any CNS region, clinical suspicion can be shadowed in the presence of atypical/uncommon symptoms.

**Methods:** Clinical description of a unilateral fixed dilated pupil as presentation of MS.

**Results:** A healthy 19-year-old woman presented with complaints of right eye mydriasis and blurred vision. She denied previous medication, drug consumption, contact with plants, ergotamines or head trauma. On examination, a fixed dilated right pupil was striking with slight diminished visual acuity. Pilocarpine test was negative and ophthalmoscopy was unremarkable. Ocular movements were normal. Muscle bulk, tone, strength and reflexes were normal, with flexor plantar responses. All sensitive modalities were preserved. She had no dysmetria nor gait instability. Cerebral CT scan showed multiple white matter subcortical hypodensities. Lumbar puncture revealed positive oligoclonal bands. Erythrocyte sedimentation rate was normal. Drug, infectious and autoimmune testing were negative. Cerebral MRI showed numerous supra- and infratentorial T2 white matter hyperintensities involving periventricular, callosal, and cerebellar areas. 4 months later, she developed left eye optic neuritis, with suboptimal recovery after intravenous methylprednisolone. Last EDSS was 4,5. Natalizumab will be started.

**Conclusion:** MS suspicion is often challenging given its clinical heterogeneity. A fixed dilated pupil is usually seen with parasympatholytics, sympathomimetics, ergotamine exposure or with other signs of III nerve dysfunction. To our knowledge, this is the 1st report of a unilateral fixed mydriasis as the sole presentation of MS. Young age and clinical suspicion were key to prompt diagnostic work-up and start proper treatment.

**Disclosure:** Nothing to disclose



## EPO2242

**Haematological abnormalities in a series of patients with multiple sclerosis treated with teriflunomide or dimethyl fumarate**

D.A. García-Estévez<sup>1</sup>, N. Sabbagh<sup>2</sup>, G. Pérez Lorenzo<sup>1</sup>, M. Pardo Parrado<sup>1</sup>, L.M. López Díaz<sup>1</sup>, C. Cid Rodríguez<sup>1</sup>, G. Ozaita Arteché<sup>1</sup>

<sup>1</sup>Neurology, Complejo Hospitalario Universitario de Ourense, Ourense, Spain, <sup>2</sup>Neurology, Complejo Hospitalario Universitario de Ourense, Ourense, Spain

**Background and aims:** Teriflunomide (TERI) and dimethyl fumarate (DMF) are oral treatments for relapsing-remitting multiple sclerosis. Both treatments cause lymphopenia by different mechanisms. DMF has been related to the occurrence of progressive multifocal leukoencephalopathy (PML) when lymphopenia is under 500 maintained over time.

Our aim was to assess haematological abnormalities caused by these treatments in our patients.

**Methods:** All patients in active treatment with TERI (n=55) or DMF (n=44) for at least 12 months were studied. Degree of lymphopenia and neutropenia were established according to Common Terminology Criteria for Adverse Events guidelines. The lowest value of haematological parameters available for each patient was recorded.

**Results:** TERI group. 1) Leukocyte count: basal vs 12 months (6490±2026 vs 5799±1763, p<0.001); 2) Lymphopenia: 70.9% were normal, 14.5% presented grade 1 (range: 810-970), 12.9% presented grade 2 (530-780), and 1.6% (n=1) presented grade 3. DMF group: 1) Leukocyte count: basal vs 12 months (7171±1912 vs 5746±1756, p<0.001); 2) Lymphopenia: 54.3% were normal, 23.9% presented grade 1 (840-990), 17.4% grade 2 (550-790) and 6.5% (n=3) grade 3. Grade 1-2 neutropenia was presented in 16.7% of TERI group and in 2.4% of DMF group (no increase in infection rate). 6 patients left DMF treatment by lymphopenia (risk of PML).

**Conclusion:** TERI is a safe treatment and it only caused transient lymphopenia. DMF treatment caused grade 3 lymphopenia in 6.5% of patients and was withdrawn in 13.6% of the patients. Neutropenia is not a serious problem in these patients.

**Disclosure:** Nothing to disclose

## EPO2243

**Malignant NMO Rhombencephalitis**

M. Ghabaee<sup>1</sup>, N. Javadian<sup>2</sup>

<sup>1</sup>Tehran, Iran, Islamic Republic of, <sup>2</sup>Neurology, Tehran University of medical sciences, Tehran, Iran, Islamic Republic of

**Background and aims:** Rhombencephalitis is an inflammatory processes with diverse etiology.

Listeria Monocytogenes, Herpes simplex virus, autoimmune processes such as Behcet's syndrome, and paraneoplastic syndromes are the common causes

**Methods:** This is a report from 16 years old boy who admitted in our department with a chief complaint of hypersomnia, ophthalmoplegia and blurred vision since 6 months prior to admission.

**Results:** MRI showed bilateral diencephalic and upper mid brain hyper intense T2 lesion without any enhancement or restriction, which lead us to investigate rhombencephalitis etiologies. Serum and CSF samples evaluated for vasculitis esp. Behcet's disease, autoimmune antibody disorders, bacterial & viral meningoencephalitis and NMO-spectrum disorders.

Based on positive Anti-NMO antibody, plasmapheresis and pulse therapy started and followed with 2 dose of Rituximab (1 gram with 2 weeks interval). Other lab finding showed normal ESR, CRP, and normal serum and CSF analysis for all tested autoimmune and infectious profiles

**Conclusion:** NMO spectrum disorder is reasonable to consider in patients with autonomic symptoms with drowsiness and thalamic, brainstem lesions in Neuroimaging.

**Disclosure:** Nothing to disclose

## EPO2244

### When you have Multiple Sclerosis how bad is it to also have a headache?

C. Ghita, A.M. Niculescu, R.A. Radu, E.O. Terecoasa, C. Tiu

*Emergency University Hospital, Bucharest, Romania*

**Background and aims:** Headache can significantly impact quality of life in patients with multiple sclerosis (MS). Careful distinction between different headache etiologies (disease manifestation, adverse effect of immunomodulatory treatment or associated condition) is essential for establishing the most appropriate therapeutic approach.

**Methods:** We performed a cross-sectional study including 62 patients with MS; they were asked to complete a questionnaire regarding headache and its characteristics, commonly used therapeutic options, Headache Impact Score (HIT-6 score) and Beck Depression Inventory (BDI-II).

**Results:** Mean age of the patients was 34.6±9.3 years and 87.1% had relapsing-remitting MS. Median EDSS score was 2 points. 72.6% of the patients had headache: tension-type 46.8%, migraine 16.1%, headache with other characteristics 6.5%, trigeminal neuralgia 3.2%. Headache appeared after MS onset for 36.7% of patients. 24.2% associated depression. Headache had a significant impact on daily life (HIT-6 score >50 points) for 55.1% of patients and was considered by 38.8% a factor that significantly interfered with daily activities. All patients treated with Teriflunomide, subcutaneous Interferon beta1a and beta1b reported headaches. 46% of those treated with Interferon stated that immunomodulatory treatment did not change frequency or severity of preexisting headache, but 36% experienced more frequent and 8% more severe episodes after therapy initiation.

**Conclusion:** Careful evaluation of headache in patients with MS is of utmost importance as it can have a significant impact on the physical and emotional aspects of daily activity and appropriate treatment can lead to significant improvement of quality of life.

**Disclosure:** Nothing to disclose

## EPO2245

### The effect of cladribine tablets in patients with relapsing-remitting multiple sclerosis who had evidence of disease activity in CLARITY

B. Greenberg<sup>1</sup>, K. Rammohan<sup>2</sup>, J. Aldridge<sup>3</sup>, L.A. Lebson<sup>4</sup>, F. Dangond<sup>5</sup>, G. Giovannoni<sup>6</sup>

*<sup>1</sup>UT Southwestern Medical Center, Dallas, USA, <sup>2</sup>Multiple Sclerosis Research Center, University of Miami School of Medicine, Miami, FL, USA, <sup>3</sup>EMD Serono Inc., Billerica, USA, <sup>4</sup>EMD Serono, Inc., Rockland, USA, <sup>5</sup>EMD Serono, Inc, Billerica, USA, <sup>6</sup>Queen Mary University of London, Blizard Institute, Barts and The London School of Medicine and Dentistry, London, United Kingdom*

**Background and aims:** Less than half of patients with multiple sclerosis (MS) receiving currently approved therapies achieve no evidence of disease activity (NEDA) status over 2 years, and the long-term prognostic value of NEDA is unclear. In the Phase 3 CLARITY study examining the effect of cladribine tablets (CT) 10mg (3.5mg/kg [CT3.5] or 5.25mg/kg cumulative dose over 2 years) in relapsing-remitting MS, 44.3%, 46.0% and 15.8% of patients receiving CT3.5, CT5.25, or placebo, respectively, achieved NEDA status over 96 weeks. Data from CLARITY were used in a post hoc analysis to evaluate CT3.5 treatment benefit in patients who did not achieve NEDA status.

**Methods:** Treatment benefit was defined as free from qualifying relapse, new magnetic resonance imaging (MRI) activity (new T1 gadolinium-enhancing and active T2 lesions) or 3-month confirmed disability progression (CDP), at Week 96 (Kaplan-Meier). In this exploratory analysis, p-values <0.05 were considered nominally significant.

**Results:** In CLARITY, 355 patients receiving placebo and 240 patients receiving CT3.5 did not achieve NEDA status, representing 68% of the 2 groups combined. For these patients, baseline characteristics were similar between groups. Compared with placebo, treatment with CT3.5 was associated with a significant treatment benefit, with similar event-free probability of 3- and 6-month CDP between treatment groups (Table 1).

**Table 1.** Treatment benefit associated with CT3.5 vs placebo in patients who did not achieve NEDA status over 96 weeks

	CT3.5 (N=240)	Placebo (N=355)	P value
Annualised relapse rate (95% CI)	0.26 (0.21–0.31)	0.41 (0.36–0.47)	<0.0001
Number of new T1 Gd+ lesions, mean (SD)	0.5 (1.1)	2.7 (4.7)	<0.0001
Number of active T2 lesions, mean (SD)	1.7 (2.1)	4.4 (5.3)	<0.0001
Event-free probability for risk of 3-month CDP (95% CI)*	0.74 (0.68–0.79)	0.71 (0.66–0.76)	-
Event-free probability for risk of 6-month CDP (95% CI)*	0.83 (0.78–0.87)	0.80 (0.76–0.84)	-

\*Kaplan-Meier; CDP, confirmed disability progression; CI, confidence interval; CT3.5, cladribine tablets 3.5mg/kg cumulative dose over 2 years; Gd+, gadolinium enhanced; NEDA, no evidence of disease activity; SD, standard deviation

Table 1

**Conclusion:** In patients who showed some evidence of disease activity at Week 96, CT treatment still reduced the risk of relapse and active MRI lesions versus placebo with nominal significance.

**Disclosure:** This study was sponsored by EMD Serono, Inc., a business of Merck KGaA, Darmstadt, Germany (in the USA), and Merck Serono SA, Geneva, an affiliate of Merck KGaA, Darmstadt, Germany.

## EPO2246

### Sensitivity and specificity of 2017 McDonald criteria for multiple sclerosis

F. Gobbin<sup>1</sup>, R. Orlandi<sup>1</sup>, M.D. Benedetti<sup>2</sup>, A. Gajofatto<sup>1</sup>

<sup>1</sup>Department of Neurosciences, Biomedicine and Movement Sciences, University of Verona, Verona, Italy, <sup>2</sup>Azienda Ospedaliero Universitaria Integrata, Verona, Italy

**Background and aims:** In 2017 McDonald diagnostic criteria for multiple sclerosis (MS) were revised in order to anticipate diagnosis and allow early start of treatment. The aim of the study was to compare sensitivity and specificity of 2010 and 2017 McDonald criteria and to evaluate the risk of MS in patients with an initial demyelinating event (IDE), in a condition in which the time factor has always been decisive.

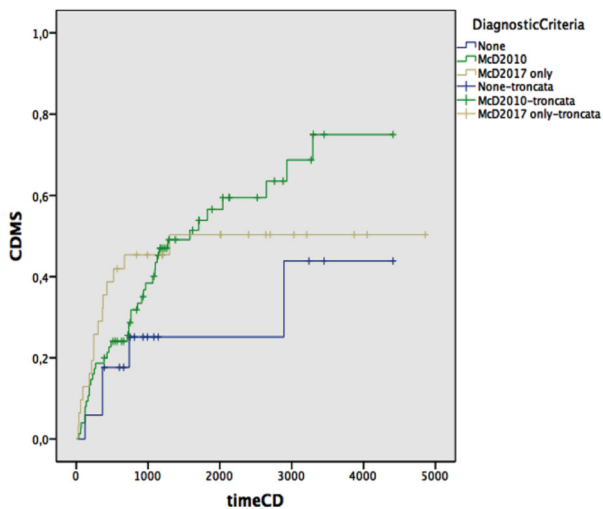
**Methods:** We retrospectively analyzed clinical data of 123 patients followed at Verona MS Center with an IDE suggestive of MS in order to demonstrate fulfillment of 2010 and 2017 McDonald criteria. Sensitivity and specificity of both 2010 and 2017 diagnostic criteria were calculated using conversion to clinically definite MS (CDMS) as the gold standard. Survival analysis using Kaplan-Meier curve was also performed.

**Results:** In the analysis for sensitivity and specificity we included 102 patients with 2 years of follow up [median 70 months (24-185)]. 49 patients (48%) converted to CDMS. 2010McDonald criteria showed 65.3% sensitivity (95% IC: 50.36-78.33%) and 45.28% specificity (95% IC: 31.6-59.5%). 2017McDonald criteria 89.8% sensitivity (95% IC: 77.8-96.6%) and 16.98% specificity (95% IC: 8.0-29.8%). Survival analysis showed that patients with MS diagnosis according to 2010McDonald had higher risk to convert to CDMS with median time to conversion of 1583 days (882.9–2283.1).

2010 McDonald criteria		CD + (n)	CD- (n)		
DIS: can be demonstrated by one or more T2- hyperintense lesions in two or more of four areas of CNS: periventricular, cortical or juxtacortical, infratentorial brain regions and spinal cord. Symptomatic lesions in brainstem or spinal cord are excluded	McD10+ (n)	32	29	61	PPV= 52,5%
	McD10- (n)	17	24	41	NPV=58,5%
	tot	49	53	102	
SENS=65,3% SPEC=45,3%					
2017 McDonald criteria		CD + (n)	CD- (n)		
DIS: can be demonstrated by one or more T2- hyperintense lesions in two or more of four areas of CNS: periventricular, cortical or juxtacortical, infratentorial brain regions and spinal cord. Symptomatic lesions in brainstem or spinal cord are included.	McD17+ (n)	44	44	88	PPV= 50%
	McD17- (n)	5	9	14	NPV=64,3%
	tot	49	53	102	
SENS=89,8% SPEC=17%					

Fig1. Sensitivity and specificity analysis

Fig1. Sensitivity and specificity analysis



0	17	7	4	3	1	0
1=McD'10	75	37	15	6	1	0
17=McD'17	31	14	10	5	2	0

Fig2. Kaplan-Meier curve

Fig2. Kaplan - Meier curve

**Conclusion:** 2017McDonald criteria enable MS diagnosis in a greater number of patients with IDE compared to 2010McDonald but they seem to underestimate the risk of a second clinical event.

**Disclosure:** Nothing to disclose

## EPO2247

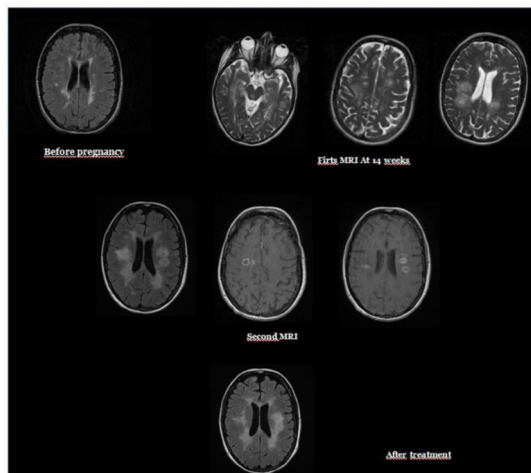
### Management of severe rebound of natalizumab during pregnancy

I. Gómez Estévez<sup>1</sup>, J. Díaz-Díaz<sup>1</sup>, R. Ginestal López<sup>1</sup>, E. Lopez Valdes<sup>1</sup>, A. Marcos Dolado<sup>1</sup>, N. Perez Perez<sup>2</sup>, J.A. Martinez Orgado<sup>3</sup>, C. Oreja-Guevara<sup>1</sup>  
<sup>1</sup>Neurology, Hospital Clínico San Carlos, Madrid, Spain,  
<sup>2</sup>Gynecologist, Hospital Clínico San Carlos, Madrid, Spain,  
<sup>3</sup>Pediatrician, Hospital Clínico San Carlos, Madrid, Spain

**Background and aims:** It is well known that after natalizumab treatment discontinuation there is a risk of catastrophic rebound, specially in highly active multiple sclerosis patients. To manage severe rebound after stopping natalizumab in a pregnant patient.

**Methods:** A 33-year-old woman with RRMS, treated with natalizumab for the last 5 years. Natalizumab was stopped due to her desire for pregnancy. After a month she got pregnant on purpose.

**Results:** At 14 weeks pregnant she presented with spastic paralysis of lower limbs and gait ataxia; the EDSS score was 6.5. A brain magnetic resonance imaging (MRI) was performed with increase of the number of T2 lesions. Intravenous methylprednisolone was given for 5 days with partial recovery. At 16 weeks pregnant she came again with progressive worsening. On admission, she presented bilateral lower limbs and left arm plegia with an EDSS score of 8. A 2nd MRI showed increase of the number of T2 lesions, some of them with pseudotumoral form and an opening gadolinium enhancement. Methylprednisolone was given for 5 days, followed by 1 therapeutic plasma exchange (TPE) cycle, with no improvement. For this reason, a combination regimen of methylprednisolone 1g/daily plus alternate-day single-volume plasma exchange prior to alternate-day dose of IV immunoglobulin. She progressively improved up to an EDSS score of 6.5. At 18 weeks pregnant natalizumab was restarted with extended interval dosing (every 6 weeks). Later, she presented with preterm premature rupture of membranes at 34 weeks. She gave birth to a healthy child. Natalizumab treatment was administered 1 week after delivery.



**Conclusion:** MS treatment during pregnancy is controversial and there is a lack of information about how to treat relapses.

**Disclosure:** Nothing to disclose

## EPO2248

### Rate of Confirmed Macular Oedema With Ozanimod in Patients With Relapsing Multiple Sclerosis: Results From the Ozanimod RMS Clinical Development Program

S.A. Gross<sup>1</sup>, N. Minton<sup>1</sup>, J.K. Sheffield<sup>1</sup>, A. Henry<sup>1</sup>, J. Calkwood<sup>2</sup>, K.W. Selmaj<sup>3</sup>

<sup>1</sup>Bristol-Myers Squibb, Summit, USA, <sup>2</sup>Minneapolis Clinic of Neurology, Golden Valley, USA, <sup>3</sup>Center for Neurology, Łódź, Poland and Collegium Medicum, Department of Neurology, University of Warmia and Mazury, Olsztyn, Poland

**Background and aims:** Ozanimod is a sphingosine 1-phosphate (S1P) receptor 1 and 5 modulator. Macular oedema (ME) has been reported with S1P modulators, and is potentially related to effects on vascular endothelial barrier function. We evaluated the incidence of confirmed ME with exposure to ozanimod across all clinical trials of relapsing multiple sclerosis (RMS).

**Methods:** This analysis included all RMS participants who received ozanimod HCl 0.5 or 1mg/d in phase 1, 2, and 3 clinical trials, and the ongoing open-label extension (OLE) trial of ozanimod HCl 1mg/d. An independent Macular Edema Review Panel (MERP) reviewed treatment-emergent adverse events of ME and related macular terms, cases of increased central foveal thickness >20% of baseline, and any relevant optical coherence tomography abnormalities.

**Results:** With exposure to ozanimod in any RMS trial (n=2787; data cutoff 31/1/2019; mean [SD] exposure, 37.1 [14.7] months; 8688.3 patient-years on study), there were 7 cases (0.3%) of MERP-confirmed ME. Of these, 4 occurred during controlled phase 3 trials (0.2% of ozanimod-treated phase 3 trial participants) and 3 occurred during the ongoing OLE trial (0.1% of OLE participants). Most cases of ME occurred between 6-12 months of ozanimod exposure. All 7 cases had either pre-existing or confounding factors and all cases resolved or were resolving (Table).

Table. Confirmed Cases of Macular Oedema in All RMS Patients Treated With Ozanimod

Case	Study	Treatment Group	Time of Onset Relative to Treatment Initiation, Months	Pre-existing Risk Factor or Confounding Factor	Action Taken With Study Drug	Status
1	RADIANCE Phase 3 (NCT02047734)	Ozanimod HCl 0.5 mg	-7	History of ME	Ozanimod withdrawn permanently	Resolved
2	SUNBEAM (NCT02294058)	Ozanimod HCl 0.5 mg	-6	ME secondary to ocular trauma	Ozanimod withdrawn permanently	Resolved
3	RADIANCE Phase 3	Ozanimod HCl 0.5 mg	-12	Central serous chorioidopathy	Ozanimod withdrawn permanently	Resolved
4	SUNBEAM	Ozanimod HCl 1 mg	-6	Prior unreported uveitis (intraocular inflammation)	Ozanimod withdrawn permanently	Resolved
5	DAYBREAK (NCT02576717)	Ozanimod HCl 1 mg	-12	Pigment epithelial detachment with possible choroidal neo-vascularization	No action taken	Resolving*
6	DAYBREAK	Ozanimod HCl 1 mg	-0.5	Uveitis	Ozanimod withdrawn permanently	Resolved
7	DAYBREAK	Ozanimod HCl 1 mg	-10	History of retinopathy and optic neuritis	Ozanimod withdrawn permanently	Resolved

\*As of 31 January 2019 data cutoff.  
HCl, hydrochloride; ME, macular oedema; RMS, relapsing multiple sclerosis.

**Conclusion:** ME was confirmed in 0.3% of ozanimod-treated participants in the ozanimod RMS clinical development program. All confirmed cases had predisposing comorbid conditions, which may increase the risk of ME in subjects on ozanimod.

**Disclosure:** Study funded by Celgene, a wholly-owned subsidiary of Bristol-Myers Squibb.

## EPO2249

### Atrophy of different cortical and subcortical compartments contributes to explain clinical disability in patients with MS: a multicenter study

M. Hidalgo de la Cruz<sup>1</sup>, P. Valsasina<sup>1</sup>, C. Gobbi<sup>2</sup>, A. Gallo<sup>3</sup>, C. Zecca<sup>2</sup>, A. Bisecco<sup>3</sup>, M.A. Rocca<sup>1</sup>, M. Filippi<sup>1</sup>

<sup>1</sup>Neuroimaging Research Unit, Institute of Experimental Neurology, Division of Neuroscience, IRCCS San Raffaele Scientific Institute, Milan, Italy, <sup>2</sup>Department of Neurology, Neurocenter of Southern Switzerland, Regional Hospital Lugano (EOC), Lugano, Switzerland, <sup>3</sup>Department of Advanced Medical and Surgical Sciences, and <sup>3</sup>T MRI Center, University of Campania "Luigi Vanvitelli", Naples, Italy

**Background and aims:** Multiple sclerosis (MS) affects several cortical and subcortical structures. The multiparametric assessment of cortical, deep grey matter (DGM), cerebellar and cervical cord atrophy is likely to help characterizing MS phenotypes and explaining patients' disability.

**Methods:** 3T brain and cervical cord T2- and T1-weighted images were acquired from 195 MS patients (137 relapsing-remitting [RR] MS, 58 progressive [P] MS) and 67 healthy controls (HC) at 3 European sites. Brain and cord lesion burden was assessed. Cortical thickness (CTh), DGM volumes, cerebellar volumes and cervical cord cross-sectional area (CSA), calculated using Freesurfer6.0, FSL-FIRST, SPM12-SUIT and the active surface methods, were compared between patients and HC and between phenotypes. Age-, sex- and site-corrected stepwise linear regression models investigated the association of lesions and cortical/subcortical atrophy with clinical disability.

**Results:** Compared to HC, MS patients had widespread atrophy in all cortical lobes, DGM nuclei and cerebellar lobules, as well as reduced cord CSA. Similar results were observed in PMS vs RRMS patients, with a particular involvement of frontal, sensorimotor, parietal and insular cortices and anterior cerebellar lobules. In MS patients, higher disability was associated with atrophy of cortical and DGM structures, and with reduced cord CSA ( $p = \text{range} < 0.00-0.03$ ). The multivariate model retained phenotype ( $\beta = 0.52$ ,  $p < 0.001$ ), brain lesion volume ( $\beta = 0.16$ ,  $p = 0.002$ ), left postcentral gyrus CTh ( $\beta = -0.11$ ,  $p = 0.029$ ) and cord CSA ( $\beta = -0.25$ ,  $p < 0.001$ ) as significant predictors of clinical disability ( $R^2 = 0.642$ ,  $p < 0.001$ ).

**Conclusion:** In MS, the multiparametric evaluation of lesion volume and atrophy of different cortical/subcortical structures contribute to explain a large portion of clinical disability.

**Disclosure:** Nothing to disclose

## EPO2250

**Clinical predictors of disability in treatment-naive relapsing-remitting multiple sclerosis patients**

A. Ivaniuk, I. Solodovnikova  
Odessa, Ukraine

**Background and aims:** Multiple sclerosis is a demyelinating disease of the CNS characterized by progressive accumulation of disability. Investigation of risk factors for disability progression in multiple sclerosis (MS) is a prospective field of research. In the era of disease-modifying therapy (DMT), most such studies involve mixed populations of patients DMT-receiving and DMT-naive patients. Risk factors of disability in the natural course of MS are poorly outlined.

**Methods:** Clinical data of DMT-naive patients with relapsing-remitting MS (n=70, mean age 38.73±10.34 years) were retrospectively studied. EDSS score 4 was taken as a disability milestone (DM). 2 sets of clinical parameters (1 for symptoms at the MS onset and 1 for other onset-specific features) were studied as the risk factors for reaching the milestone using multivariate Cox regression.

**Results:** In Cox model, pyramidal symptoms at MS onset (HR 2.4, 95%CI 1.0-5.8, p=0.05), MS onset at >50 years (HR 5.5, 95%CI 1.4-21.1, p=0.013) and BMI <18.5 (HR 4.05, 95%CI 1.2-12.8, p=0.017) were associated with a higher risk, while EDSS 1 to 2.5 at MS onset (HR 0.23, 95%CI 0.098-0.52, p<0.001) was protective against reaching EDSS 4.

**Conclusion:** The risk factors identified in our study are consistent with other studies conducted in mixed populations suggesting the same trend for predictive factors in the pure population of DMT-naive patients.

**Disclosure:** Nothing to disclose

## EPO2251

**The Epstein-Barr antibody paradox in Multiple Sclerosis**

D. Jons<sup>1</sup>, T. Bergström<sup>2</sup>, L. Persson Berg<sup>3</sup>, P. Sundström<sup>4</sup>, O. Andersen<sup>5</sup>

<sup>1</sup>Gothenburg, Sweden, <sup>2</sup>Department of Clinical Microbiology, Sahlgrenska University Hospital, Department of Clinical Microbiology, Västra Götaland Region, Gothenburg, Sweden., Gothenburg, Sweden, <sup>3</sup>Department of Clinical Microbiology, Sahlgrenska University Hospital, Department of Clinical Microbiology, Västra Götaland Region, Gothenburg, Sweden, <sup>4</sup>Robertsfors, Sweden, <sup>5</sup>Mölndal, Sweden

**Background and aims:** Increased levels of serum and cerebrospinal fluid (CSF) antibodies against morbilli, varicella zoster and rubella, and increased serum antibodies against Epstein-Barr virus (EBV), are common features of MS. Paradoxically, several studies showed that the level of antibodies against the Epstein-Barr nuclear antigen 1 (EBNA1) is low in the CSF, which may be due to immune evasive properties of EBNA1 or to low level of exposure of this antigen in the central nervous system. Our objective is to determine whether low CSF antibody levels against EBNA1 also apply to an immunodominant viral envelope EBV antigen, gp350.

**Methods:** The level of anti-gp350 IgG was determined in serum and CSF in MS patients (n = 23) and healthy controls (n = 18) by an ELISA using a recombinant gp350 antigen. The antibody index was calculated as adjusted QOD (QOD/total IgG CSF/total IgG serum).

**Results:** The serum concentration of anti-gp350 IgG was higher in the MS patients. The CSF antibody index (adjusted QOD) for gp350 was significantly lower in the MS patients (0.070) than in the healthy controls (0.142, p<0.001). We obtained similar results if we included EBV seropositive controls only.

**Conclusion:** Our finding of low CSF gp350 antibody index is consistent with other reports on the EBV antibody paradox in MS, arguing against antigenic exposure of this virus in the central nervous system. Interaction with EBV in MS pathogenesis might be confined to the peripheral immune system.

**Disclosure:** Nothing to disclose

## EPO2252

**Real-world Effectiveness and Safety of Fingolimod in Relapse-Remitting Multiple Sclerosis in a Portuguese Tertiary Center**

A.F. Jorge<sup>1</sup>, J. Ramos-Lopes<sup>1</sup>, I. Correira<sup>1</sup>, S. Batista<sup>1</sup>, C. Nunes<sup>1</sup>, M.C. Macário<sup>1</sup>, I. Campelo<sup>2</sup>, L. Sousa<sup>1</sup>

<sup>1</sup>Department of Neurology, Centro Hospitalar e Universitário de Coimbra (CHUC), Coimbra, Portugal,

<sup>2</sup>Department of Pharmacy, Centro Hospitalar e Universitário de Coimbra (CHUC), Coimbra, Portugal

**Background and aims:** Fingolimod is a highly effective disease modifying treatment (DMT) for relapsing-remitting multiple sclerosis (RRMS). Nevertheless, considering the changing treatment landscape with newer drugs, it is important to evaluate its real-world effectiveness to adequate it in the decision algorithm.

**Methods:** Retrospective study, including all RRMS patients treated with fingolimod in our centre. Demographic and clinical data were collected. Annualized relapse rate (ARR) and EDSS progression was evaluated in patients with more than 6 months of treatment.

**Results:** 278 patients were included, 62.6% female, with mean age of 41.6 years and mean disease duration of 8.69 years when fingolimod was started. Mean treatment duration with fingolimod was 38.5±24 months. Adverse events occurred in 29.9%, mainly lymphopenia. There were 3 cases of in-situ melanoma, 2 life-threatening infections and 1 macular oedema. Fingolimod was discontinued in 27.1%, mostly due to inefficacy and only in 4.2% due to adverse events. In naïve and switching from first-line DMT patients (n=141), there was a significant decrease in mean ARR (1.15 vs. 0.41) and in median EDSS (2.5 vs 2.0). At the end of follow-up, 44.3% patients remained relapse-free and 90% had no disease progression. 95 patients switched from natalizumab, mostly due to PML risk. Those patients showed no differences in mean ARR (0.49 vs. 0.5), however there was a significant increase in median EDSS (2.5 vs. 3).  
**Conclusion:** Our study highlights that fingolimod remains a safe DMT for RRMS, with consistent effectiveness. However, its use should be weighted in patients switching from natalizumab.

**Disclosure:** Nothing to disclose

## EPO2253

**A long-term follow-up study on biochemical markers of response to interferon beta-1b treatment in relapsing-remitting multiple sclerosis**

A. Pietrzak<sup>1</sup>, A. Kalinowska-Lyszczarz<sup>2</sup>, K. Osztynowicz<sup>2</sup>, A. Khamidulla<sup>3</sup>, W. Kozubski<sup>1</sup>, S. Michalak<sup>4</sup>

<sup>1</sup>Department of Neurology, Poznan University of Medical Sciences, Poznan, Poland, <sup>2</sup>Department of Neurology, Division of Neurochemistry and Neuropathology, Poznan University of Medical Sciences, Poznan, Poland,

<sup>3</sup>Department of Neurology, West Kazakhstan Marat Ospanov Medical University, Aktobe, Kazakhstan, <sup>4</sup>Division of Neurochemistry and Neuropathology, Poznan University of Medical Sciences, Poznan, Poland

**Background and aims:** While interferon  $\beta$ -1b (IFN $\beta$ -1b) is still commonly used disease-modifying drug in multiple sclerosis (MS), therapeutic possibilities are expanding, and treatment failure should be identified early. Markers to predict response to IFN $\beta$ -1b, either clinical or biochemical, are therefore urgently needed. Interferon-induced proteins, including viperin, Suppressor of cytokine signalling-3 (SOCS3), Ubiquitin specific peptidase-18 (USP18) and Myxovirus resistance protein A (MxA), are possible markers of IFN $\beta$ -1b bioavailability and treatment response. The objective of our study was to evaluate viperin, SOCS3, USP18 and MxA as markers of treatment response in Polish IFN $\beta$ -1b-treated multiple sclerosis patients.

**Methods:** In 45 IFN $\beta$ -1b-treated Polish MS patients, serum concentrations of viperin, SOCS3, USP18 and MxA were assessed before and after 24 months of IFN $\beta$ -1b treatment. The patients were followed clinically and with magnetic resonance imaging for a median of 6,8 years.

**Results:** Low viperin, USP18 and MxA at baseline and 24 months and high SOCS3 at 24 months correlated with higher disease activity up to the 6th year of observation, but only baseline MxA and USP18 were independently related to outcome, with higher concentrations predicting less disease activity in the first 3 years and after the 1st year, respectively.

**Conclusion:** We confirm the predictive value of MxA and propose USP18 as a possible new prognostic biomarker in IFN $\beta$ -1b- treated MS patients.

**Disclosure:** Nothing to disclose



## EPO2254

**Real-World Alemtuzumab Efficacy and Safety in a Multiple Sclerosis Patient Population: A Single-Center Cohort Study**

M.-E. Kalligianni-Sofikiti<sup>1</sup>, V. Mastorodemos<sup>2</sup>, P. Mitsias<sup>2</sup>  
<sup>1</sup>Heraklion, Greece, <sup>2</sup>Neurology, University of Crete,  
Heraklion, Crete, Greece

**Background and aims:** Alemtuzumab (ALZ) is an anti-CD52 humanized monoclonal antibody approved for the treatment of relapsing-remitting multiple sclerosis (RR-MS). We here present our experience from a cohort of MS patients since initiation of ALZ treatment.

**Methods:** We analyzed prospectively collected demographic, adverse event and clinical outcome data of all patients with RR-MS treated with ALZ in our tertiary referral MS center, for time period 2014-2019. Clinical outcomes of interest were: a) Expanded Disability Status Scale (EDSS) score, and b) the relapse rate.

**Results:** We included 20 RR-MS patients (9 women); median age 42 years [range 27-59], median disease duration 14.5 [1-23] years. Median EDSS at ALZ treatment initiation was 5.00 [range 2.00-6.00]. 3 patients received only the baseline treatment and not the 1st annual anniversary course. At the end of 2nd year of ALZ treatment, median EDSS was 4.00 [range 2.00-6.00]. 9 of 20 (45%) patients needed a 3rd treatment. 4 of 20 (20%) patients experienced a relapse within 2 years of treatment initiation; 1 (5%) patient experienced a relapse before the 1st annual anniversary dose. 6 of 20 (30%) patients developed mild infusion-associated reactions. No serious adverse events were observed.

**Conclusion:** In our cohort of RR-MS patients with more severe disability and longer disease duration at treatment onset compared to patients in the pivotal trials, ALZ led to improved clinical outcomes and was not associated with serious adverse events. Extended period of observation in a larger patient population will help further confirm its safety and efficacy.

**Disclosure:** Nothing to disclose

## MS and related disorders 4

## EPO2255

**Myelin Oligodendrocyte Glycoprotein Antibody-associated Neuromyelitis optica spectrum disorders (NMOSD)**

F.M. Khan, D. Dave, S. Nirhale, S. Rohatgi, P. Rao, P. Naphade

*Neurology, Dr. D. Y. Patil Medical College, Hospital & Research Centre, Pune, India*

**Background and aims:** MOG-antibody associated neuromyelitis optica spectrum disorder (NMOSD) is an emerging demyelinating disorder that is characterized by a broad range of clinical phenotypes and neuroimaging findings with a disease course that is distinct from aquaporin-4 antibody-positive NMOSD and multiple sclerosis (MS). The aim was to study the clinical, radiological profile and treatment outcome in MOG antibody-positive NMOSD.

**Methods:** The study was carried out at a tertiary care multi-specialty hospital in Western Maharashtra.

The study protocol was approved by the institutional ethics committee. The study design was a prospective observational study with patients recruited over a period of 1 year from December 2018 to November 2019. The 2015 International consensus diagnostic criteria were used for the diagnosis of NMOSD. 15 patients of MOG-antibody associated NMOSD were studied.

**Results:** Male preponderance was seen. The mean age of onset was 29 years. Isolated optic neuritis (ON) was the most common presentation, bilateral ON and longitudinally extensive ON was also seen. High dose corticosteroid as 1st-line in treatment of acute attack was not sufficient and 46.67% of patients required plasmapheresis for treatment of acute attack. Frequency and interval of relapse in patients not on prophylaxis was variable, with one patient had 3 relapses in 1 year. Rituximab was most effective in the prevention of relapse.

**Conclusion:** Despite some overlap, MOG-antibody associated NMOSD exhibits different radiological and phenotypic features than both AQP4-IgG-associated NMOSD and typical MS. MOG-antibody should be tested in all patients of seronegative NMOSD and in patients of MS in whom oligoclonal bands are absent.

**Disclosure:** Nothing to disclose

## EPO2256

**Sensitivity of EDSS Cerebral Functional System in assessment of cognitive decline in relapsing-remitting multiple sclerosis**

J. Komendziński, M. Chylinska, A. Wyszomirski, H. Wójcik-Draczkowska, M. Hałas, B. Karaszewski  
*Gdańsk, Poland*

**Background and aims:** Multiple sclerosis (MS) is an inflammatory and neurodegenerative disease that might lead to physical disability, chronic fatigue, depression and cognitive impairment. The Expanded Disability Status Scale (EDSS) is widely used to assess and monitor progression of disability in patients with multiple sclerosis. It is based on functional assessments in 8 systems (FS): pyramidal, cerebellar, brainstem, sensory, bowel and bladder, visual and cerebral (mental) functions. The Cerebral Functional System (CSF) assessment was intended to take into account level of depression and euphoria, decrease in mentation and fatigue. We investigated if the CFS score mirrors more extensive and well validated neuropsychological testing.

**Methods:** We performed neuropsychological examination including: Symbols Digits Modalities Test (SDMT), Paced Auditory Serial Addition Test (PASAT), California Verbal Learning Test (CVLT), Wisconsin Card Sorting Test (WCST), Benton Visual Retention Test (BVRT), Color Trail Test (CTT) and phonemic and semantic verbal fluency tests in 65 Polish-speaking patients with relapsing-remitting MS (RRMS), all receiving IFN-beta. We tested these data for associations with CFS score (Spearman's rank correlation coefficient).

**Results:** The greater disability measured with CFS score was associated only with decline in SDMT-evaluated information processing speed ( $\rho = -0,32$ ).

**Conclusion:** This study confirms previous speculations and some findings that interview-based cognitive assessment - CFS is not enough sensitive to detect subtle but clinically relevant cognitive changes in patients with RRMS. There is an urgent need to replace current CSF protocol with more objective examination tools.

**Disclosure:** Nothing to disclose

## EPO2257

**Sleep Disorders in Patients with Multiple Sclerosis**

O. Kopchak<sup>1</sup>, N. Bachinskaya<sup>2</sup>, T. Odintsova<sup>1</sup>, V. Kholin<sup>2</sup>

<sup>1</sup>Neurology, Kyiv Medical University, Kiev, Ukraine, <sup>2</sup>Age Physiology and Pathology of Nervous System, D.F.

Chebotarev Institute of Gerontology NAMS of Ukraine, Kiev, Ukraine

**Background and aims:** The aim was to assess relationships between sleep disorders (SD), cognitive impairment (CI), anxiety and depression in patients with relapsing-remitting (RR) multiple sclerosis (MS).

**Methods:** 105 patients with RR MS (80 females and 25 males) aged from 22 to 67 years were included into the study (mean age: 41.8±10.7; EDSS: 3.5±1.6; disease duration (DD): 10.3±8.5 years). All participants completed questionnaires on sleep (the Pittsburgh Sleep Quality Index /PSQI), cognitive functions (the Montreal Cognitive Assessment/MoCA), depression (Beck Depression Inventory/BDI) and anxiety (Hamilton Anxiety Rating Scale /HAM-A).

**Results:** According to PSQI score the patients were divided into 2 groups: with (n=42) and without SD (n=63). The patients with MS and SD were older (45.36±1.66 vs 39.41±1.27, p=0.005), had higher score on EDSS (3.98±0.26 vs 3.14±0.19, p=0.008), BDI (13.79±1.14 vs 8.96±0.86, p=0.0009) and HAM-A (24.52±1.42 vs 16.56±0.99, p<0.0001) scales compared with patients without SD. The frequency of anxiety (p=0.0034) and depression (p=0.038) was significantly higher in MS patients with SD compared to those without SD. No significant difference was found in gender, level of education, DD and MoCA score. In patients with SD significant negative correlation between MoCA and BDI score (r=-0.42, p<0.005) was found. In the group of patients without SD significant negative correlation between MoCA and EDSS (r=-0.27, p=0.03), MoCA and BDI (r=-0.26, p=0.043), MoCA and HAM-A (r=-0.25, p=0.041) score was detected.

**Conclusion:** SD was prevalent in MS patients and associated older age, higher EDSS score and presence of anxiety and depression.

**Disclosure:** Nothing to disclose

## EPO2258

**Prevalence of pregnancy outcomes after exposure to interferon beta before or during pregnancy stratified by maternal characteristics: A register-based cohort study in Finland and Sweden**

M. Korjagina<sup>1</sup>, K. Hakkarainen<sup>1</sup>, S. Burkill<sup>2</sup>, Y. Geissbuehler<sup>3</sup>, M. Sabidó<sup>4</sup>, N. Everage<sup>5</sup>, K. Suzart-Woischnik<sup>6</sup>, R. Klement<sup>1</sup>, J. Hillert<sup>7</sup>, A. Verkkoniemi-Ahola<sup>8</sup>, S. Bahmanyar<sup>2</sup>, S. Montgomery<sup>9</sup>, P. Korhonen<sup>1</sup>

<sup>1</sup>StatFinn-EPID Research, Espoo, Finland, <sup>2</sup>Centre for Pharmacoepidemiology, Karolinska Institute, Stockholm, Sweden, <sup>3</sup>Novartis Pharma AG, Basel, Switzerland, <sup>4</sup>Merck KGaA, Darmstadt, Germany, <sup>5</sup>Biogen Ltd, Maidenhead, United Kingdom, <sup>6</sup>Bayer AG, Berlin, Germany, <sup>7</sup>Department of Clinical Neuroscience, Karolinska Institutet, Stockholm, Sweden, <sup>8</sup>Clinical Neurosciences, Neurology, University of Helsinki and Helsinki University Hospital, Helsinki, Finland, <sup>9</sup>Karolinska Institute, Stockholm, Sweden

**Background and aims:** A cohort study in women with multiple sclerosis (WMS) reported no increase in the prevalence of adverse pregnancy outcomes after interferon beta (IFNβ) exposure before or during pregnancy. However, differing prevalence by maternal characteristics is unknown. This study describes the prevalence of serious adverse pregnancy outcomes (SAPO) among pregnant WMS exposed to only IFNβ and those unexposed to any multiple sclerosis (MS) disease modifying drugs (MSDMD), stratified by maternal characteristics.

**Methods:** Data on pregnant WMS 1) dispensed only IFNβ within 6 months before last menstrual period (LMP) or during pregnancy (IFNβ-exposed, n=718 pregnancies) and 2) without dispensed MSDMD (unexposed, n=1397 pregnancies) was extracted from Finnish and Swedish Registers. Prevalence (%) of SAPO (elective terminations due to foetal anomaly, major congenital anomalies in live birth, and stillbirth) with 95% confidence intervals (CI) was analysed with stratification by maternal characteristics at LMP: Time since MS diagnosis, duration of IFNβ treatment, maternal age, and having chronic diseases.

**Results:** Prevalence of SAPO appeared similar in IFNβ-exposed versus unexposed WMS when MS was diagnosed ≤2 years, 3-5 years and >5 years before LMP (Table 1). The prevalence was lower among the IFNβ-exposed versus unexposed WMS with ≤2-year and 3-5-year of treatment, but was higher in IFNβ exposed WMS with >5-year treatment. However, differences were nonsignificant (Table 2). The prevalence was similar among the IFNβ-exposed vs unexposed WMS in strata by maternal age and having chronic diseases.

Table 1. Prevalence of SAPO among the IFNβ-exposed versus unexposed in women diagnosed with MS at =2 years, 3-5 years and >5 years before LMP

	Prevalence of SAPO, % (95% CI)	
	IFNβ exposed	IFNβ unexposed
MS diagnosed at =2 years before LMP	0.9 (0.1–3.2)	3.0 (1.6–5.2)
MS diagnosed at 3–5 years before LMP	2.4 (0.9–5.1)	6.0 (4.0–8.6)
MS diagnosed at >5 years before LMP	3.3 (1.4–6.4)	3.0 (1.7–4.8)

CI, confidence interval; IFN, interferon; LMP, last menstrual period; MS, multiple sclerosis; SAPO, serious adverse pregnancy outcomes

Table 1

	Prevalence of SAPO, % (95% CI)	
	IFNβ exposed	IFNβ unexposed
MS diagnosed at =2 years before LMP	0.9 (0.1–3.2)	3.0 (1.6–5.2)
MS diagnosed at 3–5 years before LMP	2.4 (0.9–5.1)	6.0 (4.0–8.6)
MS diagnosed at >5 years before LMP	3.3 (1.4–6.4)	3.0 (1.7–4.8)

CI, confidence interval; IFN, interferon; LMP, last menstrual period; MS, multiple sclerosis; SAPO, serious adverse pregnancy outcomes

Table 2

**Conclusion:** The descriptive prevalence of SAPO appeared similar with IFNβ-exposure before or during pregnancy, when pregnant WMS were stratified by maternal characteristics.

**Disclosure:** Funding for the analysis, project management and medical writing was provided by Bayer AG, Biogen, Merck KGaA and Novartis Pharma AG.

## EPO2259

### The dynamics of clinical, laboratory and neuroimaging parameters in patients with anti-MOG encephalomyelitis who received a course of B-depletion therapy

S. Kotov<sup>1</sup>, E. Novikova<sup>1</sup>, A. Kotov<sup>1</sup>, V. Lijdvoy<sup>2</sup>  
<sup>1</sup>Department of Neurology, Vladimirsky Moscow Regional Research Clinical Institute, Moscow, Russia, Moscow, Russian Federation, <sup>2</sup>Department of Neurology, M. F. Vladimirskiy Moscow Regional Research Clinical Institute, Moscow, Russian Federation

**Background and aims:** Anti-MOG encephalomyelitis is an autoimmune demyelinating disease which damages optic nerves, brain and spinal cord, with the detection of specific antibodies to myelin glycoprotein oligodendrocytes (anti-MOG) in the blood serum. Despite the similarity of the clinical picture with multiple sclerosis (MS), the treatment of anti-MOG encephalomyelitis is different.

**Methods:** We monitored 6 patients with anti-MOG encephalomyelitis. revealed acute onset with visual impairment, ataxia, transverse myelitis (pyramidal, sensitive and bladder disorders). The level of anti-MOG was more than 15pg/ml (26-92pg/ml) in all patients. The patients received a course of B-depletion therapy with Rituximab (1000mg +1000mg 2 weeks later).

**Results:** Neurologic status, neuroimaging and laboratory parameters (main subpopulations of B-lymphocytes) were monitored in dynamics. After 6 months, all patients showed a positive trend in sensitive disorders, spasticity, increased walking distance, but none of them had a full recovery of the CD-20 pool of B-lymphocytes. MRI with contrast enhancement 6 months after B-depletion therapy course displayed positive dynamics - a decrease in the signal intensity on T2, the absence of additional focuses in the substance of the brain and spinal cord, in one patient - regression of focuses in the cervical and thoracic spinal cord. There were no signs of repeated exacerbation.

**Conclusion:** Rituximab therapy was effective and well tolerated in anti-MOG encephalomyelitis. Therefore, at the atypical beginning of MS, an anti-MOG study is shown, since only early B-depletion therapy reduces the risk of disability

**Disclosure:** Nothing to disclose

## EPO2260

**Coagulation activation and cerebral hypoperfusion in relapsing-remitting multiple sclerosis**

T. Koudriavtseva<sup>1</sup>, S. Zannino<sup>1</sup>, M. Fiorelli<sup>2</sup>, M.M. Filippi<sup>3</sup>, A. Cortese<sup>2</sup>, C. Piantadosi<sup>4</sup>, C. Lapucci<sup>5</sup>, D. Giannarelli<sup>6</sup>, A. Stefanile<sup>1</sup>, G. D'agosto<sup>7</sup>, C. Mandoj<sup>1</sup>, L. Conti<sup>1</sup>, V. Villani<sup>1</sup>, F. Pimpinelli<sup>8</sup>, M. Salvetti<sup>9</sup>, M. Inglese<sup>10</sup>

<sup>1</sup>Department of Clinical Experimental Oncology, Regina Elena National Cancer Institute, Rome, Italy, <sup>2</sup>Department of Human Neurosciences, Sapienza University of Rome, Rome, Italy, <sup>3</sup>Fatebenefratelli, Rome, Italy, <sup>4</sup>Neurology Unit, San Giovanni-Addolorata Hospital, Rome, Italy, <sup>5</sup>IRCCS Ospedale San Martino, Genoa, Italy, <sup>6</sup>Biostatistics, Scientific Direction, Regina Elena National Cancer Institute, Rome, Italy, <sup>7</sup>Clinical Pathology and Microbiology, CISan Gallicano Dermatological Institute IRCCS, Rome, Italy, <sup>8</sup>Clinical Pathology and Microbiology, San Gallicano Dermatological Institute IRCCS, Rome, Italy, <sup>9</sup>Department Of Neuroscience Mental Health and Sensory Organs, Sapienza University, Sant'Andrea Hospital, Rome, Italy, <sup>10</sup>Neurology, Icahn School of Medicine at Mt Sinai, New York, USA

**Background and aims:** Multiple sclerosis (MS) is an inflammatory-demyelinating and degenerative disease of the central nervous system. The aim of our study is to evaluate the serum/plasma levels of coagulation/complement factors in relapsing MS patients compared to remitting ones and to healthy controls, and to assess the presence of brain hemodynamic changes of patients in order to correlate their coagulation status with MRI perfusion data.

**Methods:** We included 57 relapsing-remitting MS patients and 31 age/sex-matched controls. Complement/coagulation factors, endothelial damage markers, blood count have been dosed in all participants. MS patients underwent dynamic susceptibility contrast-enhanced 3.0-T MRI.

**Results:** 26 relapsing (21F/5M, age 40.7±9.7 years) and 31 remitting (23F/8M, 40.8±8.8 years) patients compared to 31 controls (23F/8M, 40.9±9.1 years) showed: a higher either body-mass-index (23.8±3.5, 24.4±4.1, 21.8±3.3, respectively, p=0.02), fibrinogen (323±82, 322±80, 282±43mg/dl, p=0.04), d-dimer (299.6±156.9, 307.2±203.7, 210.2±99.3, p=0.06) or protein-C (114±20, 111±18, 99±15%, p=0.004), a lower either hematocrit (40.4±3.4, 41.0±3.4, 42.5±3.1%, p=0.05), lymphocyte count (1564±596, 1797±608, 1947±588n/mmc, p=0.05) or protein-S (86±17, 81±22, 92±15%, p=0.05). Relapsing compared to remitting patients had: a higher either EDSS (2.9±1.1, 1.6±1.3); number of relapses either during overall disease (5.2±3.6, 2.7±3), previous one (0.9±0.8, 0.2±0.5) or 2 years (1.4±1.4, 0.2±0.7), (p<0.0001 for all); a lower lymphocyte B count (217.7±92.6, 293.3±160.9n/mmc, p=0.04). Perfusion MRI data are under evaluation.

**Conclusion:** Our preliminary data indicate coagulation activation in relapsing-remitting MS patients compared to healthy controls suggesting their inflammatory-thrombotic

status with reduced lymphocyte count as well as decreased number of circulating B-lymphocytes during the relapse.

**Disclosure:** Our research has been granted by Italian Ministry of Health (Project code: PE-2013-02357745)

## EPO2261

**The use of plasma exchange in NMOSD and MS**

S. Kuzieva

*Rheumo-neurology, Tashkent Medical Academy, Tashkent, Uzbekistan***Background and aims:** To analyze successful cases of plasma exchange in patients with NMOSD.**Methods:** We retrospectively studied 30 NMOSD episodes and 20 MS cases based on the TMA clinic database over the past 5 years. Among them, 24 patients from the NMOSD group (including 20 patients with seropositive NMOSD) and 15 patients from the MS group underwent plasma exchange. The reason for conducting plasma metabolism was low efficacy with intravenous administration of methylprednisolone in high doses. To determine the dynamics of the course and evaluate the effectiveness of the use of plasma metabolism, we also studied the medical records of patients 6 and 12 months after plasma exchange.**Results:** Among the total volume of patients, plasma exchange was 84% of patients, of which 64% had transverse myelitis and 72% optic neuritis (with an average age of 38 years and an average course of the disease of 0.7 years) at the time of plasma exchange. Plasma metabolism in these patients led to a measurable improvement in clinical symptoms in 62% of patients after 6 and in 81% of patients after 12 months ( $p=0.05$ ). Evaluation of the Extended Disability Status Scale (EDSS)  $\leq 6$  before the attack was associated with significant improvement after 6 months ( $p=0.03$ )**Conclusion:** Plasma metabolism after therapy with methylprednisolone is effective as a treatment for patients experiencing a severe attack of NMOSD or MS.**Disclosure:** Nothing to disclose

## EPO2262

**PRO-MSACTIVE Baseline Patient Characteristics: A Phase IV Study Evaluating Ocrelizumab in Active Relapsing Multiple Sclerosis**D. Laplaud<sup>1</sup>, C. Lebrun-Frenay<sup>2</sup>, S. Vukusic<sup>3</sup>, T. Moreau<sup>4</sup>, J.-M. Grouin<sup>5</sup>, M. Lotz<sup>6</sup>, E. Manchon<sup>7</sup><sup>1</sup>Nantes, France, <sup>2</sup>Nice, France, <sup>3</sup>Lyons, France, <sup>4</sup>Burgundy University, Dijon University Hospital, Dijon, France,<sup>5</sup>INSERM 1219 Pharmaco-épidémiologie et évaluation de l'impact des produits de santé sur les populations, Université de Rouen, Rouen, France, <sup>6</sup>Roche, Boulogne-Billancourt, France, <sup>7</sup>Neurologie, Centre hospitalier de Gonesse, Gonesse, France**Background and aims:** PRO-MSACTIVE (NCT03589105) is an open-label, single arm, phase IV study designed to evaluate the efficacy, safety and impact of ocrelizumab on patient reported outcomes (PROs) in patients with active relapsing multiple sclerosis (RMS). This analysis presents patient characteristics at baseline.**Methods:** PRO-MSACTIVE is being conducted in France (49 centers) in patients with active RMS (relapsing-remitting RRMS, secondary progressive SPMS),  $\geq 18$  years old, naïve or pretreated with disease-modifying therapy (DMT). The initial dose of ocrelizumab consists of 2 infusions of 300mg (D1, D15) followed by one infusion (600mg) at week 24 (W24). Efficacy is evaluated at D15-W24-W48, and safety at D15-W24-W48-W72. The study includes a 4-week screening period, 48 weeks of treatment and 24 weeks of safety follow-up.**Results:** PRO-MSACTIVE has enrolled 422 patients: mean age (SD) 39.7 years (10.5), median age [min-max] 39 years (18-71); 311 women (73.7%), 111 men (26.3%); 375 RRMS (88.9%) and 47 SPMS (11.1%); 106 naïve patients (25.1%) and 316 (74.9%) pretreated with at least one DMT. Mean EDSS score was 2.80 (2.04), median EDSS score was 2.5 [0.0-8.0]; 68.8% of patients had an EDSS $<4$ . 213 patients (50.6%) were enrolled due to clinical activity (relapse within 6 months prior to screening), 109 (25.9%) to imaging activity, and 99 (23.5%) to both.**Conclusion:** The study population is consistent with some characteristics of the OFSEP cohort (71.1% women, 88.7% RRMS – Vukusic et al. 2018). The forthcoming main analysis will assess the impact of ocrelizumab on disease activity after 1 year of treatment.**Disclosure:** The PRO-MSACTIVE study is funded by Roche SAS

## EPO2263

### Short-term safety and efficacy of switching from alemtuzumab to ocrelizumab in MS patients with disease activity after two alemtuzumab courses: an Italian multicentric, real-life study.

C. Lapucci<sup>1</sup>, J. Frau<sup>2</sup>, E. Cocco<sup>3</sup>, M. Vercellino<sup>4</sup>, P. Cavalla<sup>4</sup>, M. Petracca<sup>5</sup>, R. Lanzillo<sup>5</sup>, P. Grossi<sup>6</sup>, M.T. Ferro<sup>7</sup>, C. Guaschino<sup>8</sup>, M. Zaffaroni<sup>9</sup>, F. Tazza<sup>10</sup>, G. Novi<sup>1</sup>, A. Uccelli<sup>1</sup>, M. Inglese<sup>11</sup>

<sup>1</sup>Genoa, Italy, <sup>2</sup>Multiple Sclerosis Center Binaghi Hospital, Department of Medical Sciences and Public Health,, University of Cagliari, Cagliari, Italy, <sup>3</sup>Cagliari, Italy, <sup>4</sup>Turin, Italy, <sup>5</sup>Naples, Italy, <sup>6</sup>University of Padova, Padua, Italy, <sup>7</sup>Neuroimmunology, Multiple Sclerosis Center, Neurological Department, Ospedale Maggiore, Crema, Italy, <sup>8</sup>Neurology Department, Multiple Sclerosis Study Center, Gallarate, Italy, <sup>9</sup>Multiple Sclerosis Center, ASST Valle Olona, Gallarate Hospital, Gallarate (VA), Italy, <sup>10</sup>IRCCS Ospedale San Martino, Genoa, Italy, <sup>11</sup>Neuroscience, University of Genoa, Genoa, Italy

**Background and aims:** The management of MS patients who show disease activity after 2 alemtuzumab courses represents an unsolved issue. No real-life data about the switch to ocrelizumab have been reported yet.

**Methods:** 21 MS patients who switched to ocrelizumab were retro- and prospectively collected from different Italian MS centers (mean age: 35.2 (SD±7.1); female, 39.5%; Relapsing Remitting, (RR): 76.3%, active Secondary progressive, (aSP): 23.7%; mean time interval (days) from II alemtuzumab course: 85.6 (SD±104); cumulative number of relapses: 22; mean number of new T2 and Gd+ lesions: 3.7 (SD±4.5) and 1.4(SD±3.1); median EDSS: 3 (range 1-7).

**Results:** Mean follow-up (FU): 5.6±5.4 months. Efficacy: one patient relapsed during the interval between the 1st and the 2nd infusion of ocrelizumab. No further relapses occurred. One patient showed a new asymptomatic T2 lesion at 9 month-FU MRI. EDSS was stable except for 1 aSP patient who showed 1-year disability progression. (II) Safety. A) Infusion Associated Reactions (IARs) occurrence was significantly lower with respect to alemtuzumab courses (p<0.05). B) Infections: mild upper airways (n=1) and urinary infections (n=1), appendicectomy (n=1). No patients showed T CD4+ cell count decrease <200cell/mm<sup>3</sup> at 3 month-FU; complete B CD19+ cell depletion (<5 cell/mm<sup>3</sup>) was confirmed at 3 and 6 months-FU. None of the patients developed hypogammaglobulinemia. C) Autoimmunity: no alemtuzumab-related new complications occurred.

**Conclusion:** short-term follow-up seems to suggest that the switch to ocrelizumab in MS patients who showed disease activity after 2 alemtuzumab courses is characterized by a good safety and efficacy profile. Longer follow-up is warranted and recruitment is still ongoing.

**Disclosure:** travel grant from Sanofi and Roche

## EPO2264

### Adolescents with NMOSD achieved similar exposures and favorable safety profile when treated with the adult satralizumab dosing regimen

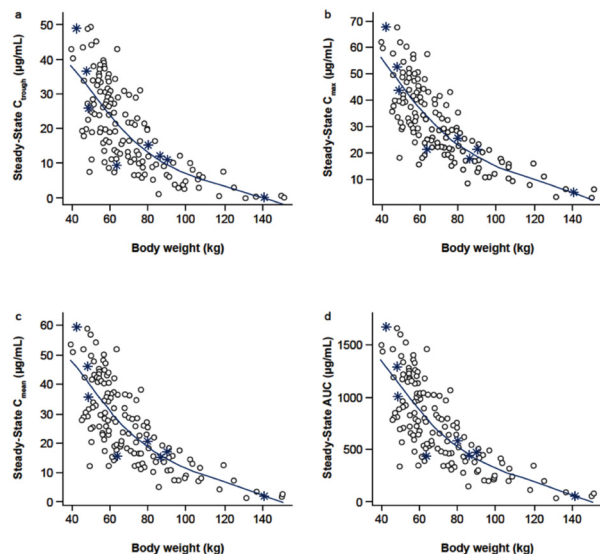
C. Hemingway<sup>1</sup>, H. Silber Baumann<sup>2</sup>, X. Kou<sup>3</sup>, D. Stokmaier<sup>3</sup>, P. Sanwald Ducray<sup>2</sup>, V.G. Anania<sup>4</sup>, H. Ito<sup>5</sup>, H.-C. Von Büdingen<sup>3</sup>, S. Lennon-Chrimes<sup>6</sup>

<sup>1</sup>Great Ormond Street Children's Hospital, London, United Kingdom, <sup>2</sup>Roche Innovation Center, F. Hoffmann-La Roche Ltd, Basel, Switzerland, <sup>3</sup>F. Hoffmann-La Roche Ltd, Basel, Switzerland, <sup>4</sup>Genentech, San Francisco, USA, <sup>5</sup>Chugai Pharmaceuticals Co. Ltd, Tokyo, Japan, <sup>6</sup>Roche Innovation Center, Welwyn Garden City, United Kingdom

**Background and aims:** Interleukin-6 (IL-6) is implicated in neuromyelitis optica spectrum disorder (NMOSD) immunopathology. Satralizumab, a humanized recycling monoclonal antibody that binds to the IL-6 receptor (IL-6R), reduced NMOSD relapse risk in two phase 3 studies: SAKuraSky (in combination with baseline immunosuppressants; NCT02028884) and SAKuraStar (monotherapy; NCT02073279). We describe satralizumab exposure in adolescent NMOSD patients to support dose selection.

**Methods:** Patients (N=178) received placebo or satralizumab 120 mg at Weeks 0, 2, 4, and every four weeks (Q4W) thereafter. Data on clinical and protocol-defined relapses (PDRs), aquaporin-4 autoantibody (AQP4-IgG) serostatus, safety, pharmacokinetics (PK) and pharmacodynamics (PD) was evaluated in adolescent patients. A popPK model, using data from a Phase I satralizumab trial (healthy volunteers) and both Phase 3 studies, was used to analyse PK data.

**Results:** Of eight adolescent patients enrolled in SAKuraSky (adolescents were not permitted in SAKuraStar), seven were evaluated for efficacy. Mean age was 15.4 years (13–17); mean weight (79.3kg [47.5–140.4]) was similar to the adult population. Six patients were female; three were AQP4-IgG seropositive. The range of model-predicted exposures was similar to adult patients, correlating inversely with body weight, and not age. There was similar predicted median IL-6R occupancy (>95% maintained over the dose interval) between adults and adolescents. One of four patients receiving satralizumab experienced a relapse (PDR, n=1); all three receiving placebo relapsed (PDR, n=1; clinical relapse, n=2). No new safety signals were identified in adolescents.



Relationship between individual model predicted steady state exposure measures (a) C<sub>trough</sub>, (b) C<sub>max</sub>, (c) C<sub>mean</sub> and (d) AUC and body weight in adolescent patients with NMOSD

**Conclusion:** Findings support the adult 120 mg loading and Q4W maintenance satralizumab dosing regimen in adolescent NMOSD patients.

**Disclosure:** Sponsored by F. Hoffmann-La Roche Ltd.; writing and editorial assistance was provided by ApotheCom, UK.

## EPO2265

### Characterisation of the PK and PD of satralizumab, a recycling antibody, to support Q4W dosing in patients with NMOSD

S. Lennon-Chrimes<sup>1</sup>, H. Silber Baumann<sup>2</sup>, G. Klingelschmitt<sup>3</sup>, X. Kou<sup>3</sup>, P. Sanwald Ducray<sup>2</sup>, V.G. Anania<sup>4</sup>, H. Ito<sup>5</sup>, H.-C. von Büdingen<sup>3</sup>

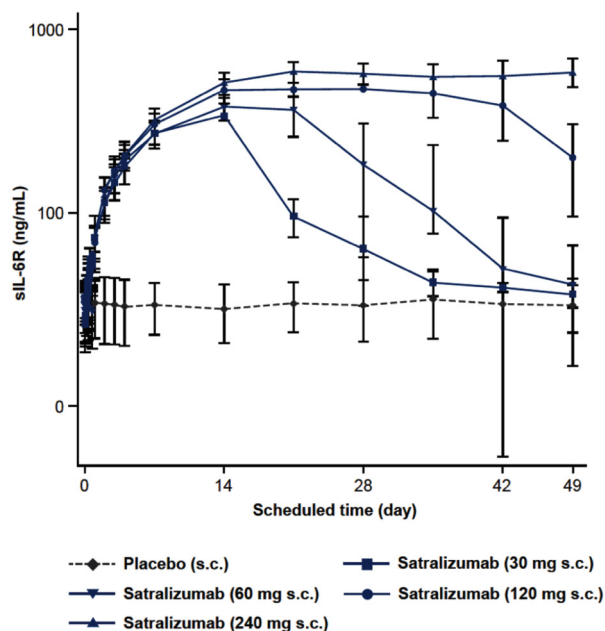
<sup>1</sup>Roche Innovation Center, Welwyn Garden City, United Kingdom, <sup>2</sup>Roche Innovation Center, F. Hoffmann-La Roche Ltd, Basel, Switzerland, <sup>3</sup>F. Hoffmann-La Roche Ltd, Basel, Switzerland, <sup>4</sup>Genentech, San Francisco, USA, <sup>5</sup>Chugai Pharmaceuticals Co. Ltd, Tokyo, Japan

**Background and aims:** Interleukin-6 (IL-6) has been implicated in neuromyelitis optica spectrum disorder (NMOSD) immunopathology. Satralizumab, a subcutaneously administered monoclonal antibody, binds to and blocks the IL-6 receptor (IL-6R). Satralizumab is recycled back into the circulation via the neonatal Fc receptor, increasing its serum half-life and prolonging IL-6R inhibition. We aim to define an effective, convenient, long-term satralizumab dosing regimen for NMOSD patients.

**Methods:** Satralizumab pharmacokinetics (PK) and pharmacodynamics (PD) were assessed in 72 healthy volunteers (HVs; single dose, 30-240mg), 33 rheumatoid arthritis (RA) patients (multiple doses, 30-120mg), and 104 NMOSD patients from 2 phase 3 studies in NMOSD (SAkuraSky [NCT02028884], SAkuraStar [NCT02073279]; 120 mg loading, once every four weeks [Q4W]). A popPK model, based on HV and NMOSD data, was used to derive predictions for individual PK parameters.

**Results:** Satralizumab significantly inhibited IL-6R signalling for 4 weeks; target engagement resulted in sustained increases in soluble IL-6R levels in HVs, RA and NMOSD patients. In NMOSD, the PK of satralizumab (120mg) was non-linear, with a half-life of approximately 30 days. Median predicted IL-6R occupancy (>95%) was maintained throughout the 4-week dose interval. There was meaningful, comparable efficacy vs placebo in NMOSD patients in both phase 3 studies; hazard ratio (95% CI) for reduction in protocol-defined relapse risk: 0.38 (0.16-0.88), p=0.0184 (SAkuraSky); 0.45 (0.23-0.89), p=0.0184 (SAkuraStar). Satralizumab monotherapy or in combination with baseline immunosuppressants showed a favourable safety profile in NMOSD.





Soluble IL-6R concentration-time profile in healthy volunteers following single s.c. dose of satralizumab (30-240mg) [Figure shows mean±standard deviation. IL-6R, interleukin-6 receptor; s.c. subcutaneous]

**Conclusion:** The satralizumab 120mg loading and Q4W maintenance regimen is effective, safe and convenient in NMOSD.

**Disclosure:** Sponsored by F. Hoffmann-La Roche Ltd.; writing and editorial assistance was provided by ApotheCom, UK.

## EPO2266

### Effect of teriflunomide on cognitive abilities of patients with multiple sclerosis

V. Likhodvov, S. Kotov  
Moscow, Russian Federation

**Background and aims:** Changes in cognitive function are observed in the early stages of multiple sclerosis (MS), which leads to a decrease in the quality of life.

**Objective:** to study these changes for patients with relapsing MS who received teriflunomide therapy.

**Methods:** In this study 91 patients received teriflunomide for 1 year. The majority (84.6%) had previously received first-line injectable immunomodulatory therapy.

To assess the severity of neurological deficits and functional state we used Kurtzke Expanded Disability Status Scale (EDSS), MS Functional Composite test (MSFC), which includes assessment of walking - Timed 25-Foot walk, assessment of upper limb functions - 9-Hole Peg Test (9-HPT), assessment of thinking abilities - Symbol Digit Modalities Test (SDMT) before the start of therapy and after 1 year. We evaluated average frequency of exacerbations, brain neuroimaging data before and after 1 year of therapy. Emotional changes were judged by the results of the Hospital scale of anxiety and depression (HADS).

**Results:** there was a decrease in the average frequency of exacerbations per year from 0.5 to 0.3. Severity of neurological deficits did not change, but 19 patients maintained negative dynamics during neuroimaging. Frequency of depression decreased by 32%, anxiety by 17% ( $p < 0.05$ ). Performing SDMT 12 patients showed an improvement in the indicator, for 76 - the indicators remained at the same level (about 80-120% of the initial value).

**Conclusion:** The use of teriflunomide helped to reduce average annual frequency of disease exacerbation, normalize emotional background and led to cognitive function stabilization for patients with MS.

**Disclosure:** Nothing to disclose

## EPO2267

**The effects of education in cognitive impairment associated with multiple sclerosis: “classic” neuropsychological domains versus social cognition**

R. Machado<sup>1</sup>, O.C. D'almeida<sup>2</sup>, A. Afonso<sup>3</sup>, M.C. Macário<sup>1</sup>, L. Sousa<sup>1</sup>, M. Castelo-Branco<sup>4</sup>, I. Santana<sup>1</sup>, S. Batista<sup>1</sup>

<sup>1</sup>Neurology, CHUC, Coimbra, Portugal, <sup>2</sup>Instituto de Ciências Nucleares Aplicadas à Saúde, University of Coimbra, Coimbra, Portugal, <sup>3</sup>Faculty of Medicine, University of Coimbra, Coimbra, Portugal, <sup>4</sup>Instituto de Ciências Nucleares Aplicadas à Saúde, Coimbra, Portugal

**Background and aims:** Recent data suggest that education modulates cognitive performance in multiple sclerosis (MS) patients, attenuating the negative effect of brain damage. However, the role of education in social cognition is still unclear. Our aim was to determine if education level moderates the association of grey matter (GM) atrophy with cognitive impairment (CI) in MS patients, on classic neuropsychological domains and on social cognition measures.

**Methods:** 60 consecutive MS patients were enrolled and underwent a comprehensive neuropsychological assessment, Theory of Mind (ToM) testing (Eyes Test, Videos Test) and 3 Tesla brain MRI. Using Freesurfer software, total GM volume was calculated.

**Results:** 40 patients (66.7%) were female. 50 patients (83.3%) were classified as relapsing-remitting and 10 (16.7%) as secondary progressive. Mean age was 37.2±7.5 years, with 13.2±4.0 years of education and disease duration of 10.6±6.6 years. Median EDSS score was 2.0 (range, 1-7.5). In the multivariate analysis, controlling for age and sex, the interaction between education and GM volume was retained as the single significant predictor of CI in MS patients (OR:0.575; 95%CI: 0.360-0.917; p=0.020) with higher education moderating/attenuating the negative impact of GM atrophy on cognitive status. Regarding social cognition performance, neither education or interaction of education with the GM volume were significant predictors.

**Conclusion:** More years of education seem to protect against the negative effect of GM atrophy on neuropsychological performance in classic cognitive domains. On the other hand, interestingly, our study suggests that social cognition does not seem to be modulated by education level, in MS patients.

**Disclosure:** Nothing to disclose

## EPO2268

**PRO-MSACTIVE Baseline Patient Reported Outcomes (PROs): A Phase IV Study Evaluating Ocrelizumab in Active Relapsing Multiple Sclerosis**

E. Manchon<sup>1</sup>, D. Laplaud<sup>2</sup>, S. Vukusic<sup>3</sup>, P. Labauge<sup>4</sup>, G. Kobelt<sup>5</sup>, M. Lotz<sup>6</sup>, C. Lebrun-Frenay<sup>7</sup>

<sup>1</sup>Neurologie, Centre hospitalier de Gonesse, Gonesse, France, <sup>2</sup>Nantes, France, <sup>3</sup>Lyons, France, <sup>4</sup>CHU Montpellier, Montpellier, France, <sup>5</sup>Stockholm, Sweden, <sup>6</sup>Roche, Boulogne-Billancourt, France, <sup>7</sup>Nice, France

**Background and aims:** PRO-MSACTIVE (NCT03589105) is an open-label, single-arm, phase IV study designed to evaluate the efficacy, safety and impact of ocrelizumab on patient reported outcomes (PROs) in patients with active relapsing multiple sclerosis (RMS). 1 of the secondary objectives of the study is to describe the impact of ocrelizumab on several PROs: MS symptom severity, fatigue, health-related quality of life, work productivity and treatment satisfaction. This analysis presents PROs at baseline.

**Methods:** Questionnaires are self-administered throughout the study at D1-D15-W24-W48 prior to the administration of ocrelizumab: MS symptom severity scale (SymptoMScreen), Modified Fatigue Impact Scale (MFIS), EuroQol 5-Dimension Questionnaire (EQ-5D-5L with VAS), Work Productivity and Activity Impairment scale (WPAI:SHP), Multiple Sclerosis International Quality of Life Questionnaire (MusiQoL), and Treatment Satisfaction Questionnaire (TSQM-14) from D15.

**Results:** PRO-MSACTIVE has enrolled 422 patients in France with active RMS, including 375 with active relapsing-remitting (RRMS) and 47 with active secondary progressive (SPMS). Mean (SD) EDSS score was 2.80 (2.04). 213 patients (50.6%) were enrolled due to clinical activity (relapse within 6 months prior to screening), 109 (25.9%) to imaging activity, and 99 (23.5%) to both. Of the questionnaires collected at baseline, 416 patients (98.6%) answered to SymptoMScreen and MFIS, 414 (98.1%) to EQ-5D-5L and WPAI:SHP, and 415 (98.3%) to MusiQoL. Baseline data will be reported.

**Conclusion:** PROs are of increasing use in clinical practice since they provide qualitative information about patients' perspectives of their quality of life and healthcare experiences. This study will provide new data on the impact of ocrelizumab on PROs.

**Disclosure:** The PRO-MSACTIVE study is funded by Roche SAS

## EPO2269

**Understanding the economic burden of secondary progressive multiple sclerosis in Portugal**M. José Sá<sup>1</sup>, G. Kobelt<sup>2</sup><sup>1</sup>Neurology, Centro Hospitalar de S. João, Porto, Portugal,<sup>2</sup>European Health Economics, Mulhouse, France

**Background and aims:** Information on the economic burden of Secondary Progressive Multiple Sclerosis (SPMS) in Portugal is limited. We aimed to estimate costs of Portuguese patients with SPMS by level of disability from the societal perspective.

**Methods:** This analysis was performed considering the Portuguese subgroup of patients with SPMS included in a cross-sectional retrospective Multiple Sclerosis European study. Vast majority of patients were enrolled from a national Patients' Association. Unit costs were taken from public sources (EUR 2015). Descriptive analyses are presented by Expanded Disability Status Scale (EDSS).

**Results:** 114 SPMS Portuguese patients were included, representing 21% of the Portuguese full study sample (n=535). EDSS levels were merged due to limited sample size (EDSS 4-6.5, n=74; EDSS 7-9, n=40). About 75.7% of EDSS 4-6.5 and 47.5% of EDSS 7-9 patients were on disease modifying treatments (DMT). Among those, 32.1% and 15.8% were on their first DMT treatment, respectively. Mean annual costs per patient were € 28.493 at EDSS 4-6.5 and € 35.215 at EDSS 7-9. Within direct costs, DMTs in EDSS 4-6.5 (50%) and informal care in EDSS 7-9 (32%) were the main cost drivers. Indirect costs represent 64.3% and 66.9% of the overall cost in EDSS 4-6.5 and EDSS 7-9, respectively. Costs by EDSS in the SPMS subgroup were found to be similar for the overall sample (€ 28.700 at EDSS 4-6.5; € 34.400 at EDSS 7-9).

**Conclusion:** These results are an important contribution to the knowledge of the economic burden of SPMS in Portugal suggesting that costs do not differ by type of disease when stratified by EDSS.

**Disclosure:** Nothing to disclose

## EPO2270

**Neuromyelitis optica spectrum disorder: hospital-based data**V. Martinovic<sup>1</sup>, J. Ivanović<sup>1</sup>, S. Mesaros<sup>2</sup>, M. Andabaka<sup>1</sup>, G. Maric<sup>1</sup>, T. Pekmezovic<sup>1</sup>, J. Drulovic<sup>1</sup><sup>1</sup>Belgrade, Serbia, <sup>2</sup>Clinic of Neurology, Faculty of Medicine, University of Belgrade, Belgrade, Serbia

**Background and aims:** Neuromyelitis optica spectrum disorder (NMOSD) is an autoimmune demyelinating disorder of the central nervous system, whose prevalence increased with the new diagnostic criteria 2015. The aim of our study was to describe a NMOSD cohort of patients, from the Clinic of Neurology, CCS, Belgrade, Serbia.

**Methods:** Analysis of patients' hospital records, who fulfilled diagnostic criteria for NMOSD 2015, and who were examined and followed at the Clinic of Neurology, Belgrade, until December 2019. We describe their clinical and paraclinical data.

**Results:** Our study comprise 112 patients. 92 patients were females. The mean age at onset was 37.7 (range 7.1-69.3) years, with average disease duration 8.4 (range 0.2-34.5) years. Anti-AQP4 antibodies were positive in 87 (77.7%) patients, and 3 patients had anti-MOG antibodies. Oligoclonal bands were present in 21 (18.8%) patients. Most frequent clinical presentation at onset was myelitis (58.1%), followed by optic neuritis (40.2%) and brainstem syndrome (22.3%). Relapsing course was present in 67.9 % of patients, and in the remaining was monophasic. Brain MRI demonstrated hyperintense T2-weighted lesions in 73 (65.2%) patients, and spinal cord MRI lesions in 94 (83.9%) patients (9 never performed spinal cord MRI, and 9 were normal). Commonest treatment option was combination of corticosteroids and immunosuppressants, in 66 (58.9%) patients. Therapeutical plasma exchange as adjuvant option was performed in 25 patients, and Rituximab was administered in 2 patients.

**Conclusion:** Having in mind significant clinical and paraclinical heterogeneity in NMOSD, data from hospital-based registries might be useful if including a large set of variables.

**Disclosure:** Nothing to disclose

## EPO2271

**Multiple Sclerosis: Risk of relapse after yellow fever vaccination**

J. Mazoyer<sup>1</sup>, V. Pourcher<sup>2</sup>, C. Lebrun Frenay<sup>3</sup>,  
J.-S. Vidal<sup>4</sup>, E. Maillart<sup>1</sup>, C. Lubetzki<sup>1</sup>, C. Papeix<sup>1</sup>

<sup>1</sup>Neurology, hôpital Pitié Salpêtrière, Paris, France,

<sup>2</sup>Service des maladies infectieuses, Pitié Salpêtrière, Paris,

France, <sup>3</sup>CRCSEP neurology, Hopital Pasteur, Nice, France,

<sup>4</sup>Neurogeriatry, Hôpital BROCA, Paris, France

**Background and aims:** Yellow fever (YF) vaccine is mandatory for travel in YF-endemic areas but is not recommended for multiple sclerosis (MS) patients because of the potential risk of post-vaccine flare-ups.

The aim of the study is to assess the risk of relapse in RR MS within 12 months after YF vaccination.

**Methods:** In this observational study exposed/non-exposed, each patient vaccinated against YF after the onset of the disease was matched to 3 patients with no history of YF vaccination and identified by the local EDMUS database. The matching criteria were: age, sex and annualized relapse rate before vaccination. Time to 1st relapse of exposed and non-exposed was analyzed by a log-rank test and by Cox models adjusted to estimate Hazard Ratios.

**Results:** 31 (20 F/11 M) vaccinated patients were included. The mean age at disease onset was 38 years [SD 10] and the mean disease duration before the vaccination was 10.8 years [SD 6.9]. 19.3% of patients experienced at least one relapse one year before the YF vaccination. At the time of YF vaccination, median EDSS was 1 [0-3]. The final results will be presented at the conference.

**Conclusion:** French and US recommendations for immunization in MS concluded that “There is insufficient data in the literature to conclude on the potential risks related to yellow fever vaccine because studies are either lacking or insufficiently powered”. The results of this case/control epidemiological study presented at the congress will provide advice to neurologists and MS patients travelling to endemic areas for professional or personal reasons.

**Disclosure:** Nothing to disclose

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## EPO2272

**Economic burden of multiple sclerosis (MS) in Bosnia and Herzegovina (BiH)**E. Suljic<sup>1</sup>, T. Catic<sup>2</sup>, A. Mehicevic<sup>1</sup>, N. Mahmutbegović<sup>1</sup><sup>1</sup>Department of Neurology, Clinical Center University of Sarajevo, Sarajevo, Bosnia and Herzegovina, <sup>2</sup>Sarajevo School of Science and Technology, Sarajevo, Bosnia and Herzegovina

**Background and aims:** Many costs of illness (COI) studies have been published around the world, providing valuable input source for health policy and medicines reimbursement decisions. According to our best knowledge no similar pharmaco-economic study has been conducted in BiH previously. Therefore, our aim was to analyze the direct and indirect costs of patients with MS in BiH, and compare it to other Western European populations.

**Methods:** We applied the same methodology already used in the study conducted across nine European countries with necessary adaptation to local specificities of healthcare system. Questionnaire for cost collection was adopted to specificities of local healthcare system.

**Results:** Our study enrolled 62 patient, mean age 39.8±10.9 with average duration of the disease 8,33±5,96. Patients were categorized according to treatment; 53.2% of them were treated with disease-modifying drugs (DMD), 32.3% with high doses of corticosteroids (HCD) and 14.5% did not receive any treatment for MS (NT). We observed a significant difference in total direct costs between the groups: DMD (40,884.20 (38,397.60-45,318.70) BAM; HCD 15,768.00 (11,058.00-20,448.00 BAM; p=0.0001. On average, the indirect cost per patient per year based on these bases was BAM 29,093.82 including the costs of 3<sup>rd</sup>-party assistance, loss of productivity, illness and early retirement.

**Conclusion:** Our results indicate that in BiH, we record the higher costs of hospitalization in relation to other EU countries, while we do not have recorded the costs of rehabilitation and home care, which is not the case in any of the EU countries.

**Disclosure:** Nothing to disclose

## EPO2273

**Interferon-beta for the treatment of multiple sclerosis in the Campania Region of Italy: a retrospective analysis based on routinely collected healthcare data**

M. Moccia

Naples, Italy

**Background and aims:** The extent to which different Interferon-beta formulations are used in the clinical practice of multiple sclerosis (MS), is currently unknown.

**Methods:** This is a retrospective analysis of routinely collected healthcare data, recorded from 2015 to 2017, on MS patients living in the Campania Region (Italy), and receiving Interferon-beta. Study variables were treatment features (adherence, discontinuation), healthcare resource utilization (inpatient and outpatient admissions, reasons for admission), and costs. We used mixed-effect regression models to evaluate differences in study variables between Interferon-beta formulations; covariates were age, sex and treatment duration.

**Results:** Subcutaneous Interferon-beta1a was the most commonly prescribed formulation in the Campania Region (Rebif<sup>®</sup> 22µg and 44µg; 784 patients), followed by intramuscular Interferon-beta1a (Avonex<sup>®</sup>; 618 patients), Interferon-beta1b (Betaferon<sup>®</sup> and Extavia<sup>®</sup>; 417 patients), and pegylated Interferon-beta1a (Plegridy<sup>®</sup>; 259 patients). Rebif was more commonly prescribed to younger patients (<30 years and 30-45 years), when compared with other Interferon-beta formulations (>45 years). Adherence rates ranged between 84% and 96% between different Interferon-beta formulations, without any statistical difference. Over 3 years, 84.8% patients discontinued Interferon-beta, without any statistical difference between different formulations. Patients treated with Betaferon<sup>®</sup> presented with higher risk of MS-related admissions (OR=11.7; 95%CI=3.9, 34.6; p<0.01), and subsequent costs (Coeff=11.94; 95%CI=0.81, 23.07; p<0.01), when compared with Rebif<sup>®</sup>.

**Conclusion:** From 2015 to 2017, Interferon-beta formulations, and especially Rebif<sup>®</sup>, were largely used in the management of MS in the Campania Region of Italy. Rebif<sup>®</sup> was specifically prescribed in younger and possibly more active patients, and was associated with lower MS-related complications and costs, suggesting an overall better disease control.

**Disclosure:** Marcello Moccia has received research grants from MAGNIMS-ECTRIMS, United Kingdom and Northern Ireland MS Society, and Merck; and honoraria from Biogen, Sanofi-Genzyme, and Merck.

## EPO2274

**Long-term prognosis 15 years after a first demyelinating**

E. Morvan, C. Bensa, A. Moulignier, R. Deschamps, O. Gout, A. Gueguen  
*Neurology, Fondation Oph. A. de Rothschild, Paris, France*

**Background and aims:** Long-term prognosis in multiple sclerosis (MS) remain partially known in the disease modified treatment area. Observational study with a long-term follow-up are needed to address this question. To assess the long-term prognosis 15 years after a 1st demyelinating event and associated factors

**Methods:** We analyzed a cohort of patients followed after the first demyelinating event and included between 1996 and 2002. The main evaluation criteria were: 1) MS conversion according to clinical definition and McDonald 2010 criteria. 2) Time to EDSS 3 or EDSS 6. 3) Time to conversion in secondary progressive MS. A descriptive analysis of the population and univariate and multivariate survival analysis of the evaluation criteria were conducted.

**Results:** The median duration of follow-up since the 1st event was 13.5 years [6.5-19.9] at the time of analysis. 203 patients were included, 120 presented a 2nd clinical event converting to MS, 136 meet the 2010 MacDonal criteria. The predictors for this conversion were: 1) age of onset <25 years, 2) Oligoclonal band. 3) Spatial dispersion of the lesions on the initial MRI. The transition to EDSS 3 (n=32) and 6 (n=10) were associated with early and late inflammatory activity as well as conversion to SP-MS. Oligoclonal band plays a role only in the evolution towards EDSS 3

**Conclusion:** The analysis of the long-term monitoring data allows us to highlight the pejorative action of inflammation that occurs along the disease and the progressive phase independently.

**Disclosure:** Nothing to disclose

## EPO2275

**The Effects of Core Stability Exercises and Transcranial Direct-Current Stimulation of brain on balance, walking capacity and quality of life in women with Multiple Sclerosis**

S. Mohammadkhan Beigi<sup>1</sup>, Y. Moghadas Tabrizi<sup>1</sup>, S.M. Nabavi<sup>2</sup>

<sup>1</sup>*Health & Sport Medicine, University of Tehran, Tehran, Iran, Islamic Republic of,* <sup>2</sup>*Brain and Cognitive sciences, Royan institute for stem cell biology and technology, Tehran, Iran, Islamic Republic of*

**Background and aims:** Multiple sclerosis (MS) is a progressive neurological disorder autoimmune disease that affects the brain and spinal cord. Due to MS, loss of balance and ability to walk in the lower extremities is appeared. In this study the effect of core stability exercises, transcranial direct-current stimulation (tdcs) of the brain on balance, walking capacity and quality of life in MS patients was investigated.

**Methods:** 39 female with EDSS less than 4.5 with mean age of 37.44±7.891 years were selected purposefully and randomly divided into 4 groups of core stability exercises, tdcs, control and sham. Balance, walking capacity and quality of life were measured and recorded as pretest. The core stability training group participated in a course of core stability exercises in addition to their usual drug therapy for 6 weeks, and the tdcs group received a 5-session course of tdcs. After finishing protocols, posttest was taken from each group.

**Results:** A significant improvement from pre-test to post-test in core stability training group on balance and walking ability and in tdcs group a significant improvement in balance, ability (walking) and quality of life was observed. The comparison between groups showed that although the tdcs group performed better on quality of life, there was no significant difference between the effects of the 2 training protocols in this index ( $p \geq 0.05$ ) but on balance and Walking Capacity ( $p \leq 0.05$ ).

**Conclusion:** significant difference was observed between the effectiveness of the 2 training protocols, indicating the superiority of the tdcs group over the core stability group.

**Disclosure:** Nothing to disclose

EPO2276

**Is there relationship between sexual dysfunction and body image of women with multiple sclerosis? A cross sectional study**

B. Afshar<sup>1</sup>, L. Amini<sup>1</sup>, S.M. Nabavi<sup>2</sup>, M. Hasani<sup>3</sup>  
<sup>1</sup>Midwifery, Iran Universit of Medical Sciences, Tehran, Iran, Islamic Republic of, <sup>2</sup>Neurology and Neuroscience Research and Clinical Department, Roan institute for stem cell biology and technology, Tehran, Iran, Islamic Republic of, <sup>3</sup>Midwifery, Lorestan Universit of Medical Sciences, Lorestan, Iran, Islamic Republic of

**Background and aims:** Sexual dysfunction is prevalent in women with multiple sclerosis. Men and women who experience greater body image dissatisfaction believe that their physical appearance influences on their sexual function. This study was conducted to determine the relationship between body image and sexual dysfunction in women with multiple sclerosis.

**Methods:** This study was done in 87,18 to 45 years, married women with MS and sexual dysfunction who referred to Neurology Clinic in Tehran. Patients who met the inclusion criteria (Defined sexual dysfunction by a score of 4 or 5 on any MSISQ-19 item, At least 1 year has passed since diagnosis of MS, EDSS score less than 4.5, no taking any drugs that affect sexual function, no Chronic disease other than MS, and no pregnancy or lactation) completed the Multiple Sclerosis Intimacy and Sexuality Questionnaire-19 and Fisher Body Image test. Data were analyzed using descriptive statistics and SPSS software 16.

**Results:** Table 1 shows the demographic information. The mean of total sexual dysfunction was 57.41±12.16; including 16.95±3.25 (85%) in primary sexual dysfunction, 21.57±6.14 (60%) in secondary sexual dysfunction and 16.16±2.97 (80%) in tertiary sexual dysfunction. Also the mean score of body image was 135.31±18.98. There was a significant reverse correlation between body image and primary (p=0.001), secondary (p=0.001), tertiary (p=0.041) and total sexual dysfunction (p=0.001).

Table 1: demographic information and their relationship with main variables

variable	Mean ± SD		Relationship with					
			PSD*	SSD*	TSD*	SD*	Body image	
Women age	32.75±6.15		-	-	-	-	-	
Spouse age	37.86±6.75		-	-	-	-	-	
Marriage age	22.78±3.74		-	0.035	0.011	-	-	
Disease duration	4.52±2.91		-0.001	-0.001	-0.001	-0.001	-	
onset of the disease	25.55±6.98		-	-	-	-	0.004	
Child number	2.27±1.41		-	-	0.019	0.018	-	
Women Occupation status	Housewife (N%)	Employed (N%)	-	-	-	-	-	
	48 (55.2)	39 (44.8)	-	-	-	-	-	
Spouse occupation status	Self-employed	Employee	manual worker	Unemployed	-	-	-	-
	39(44.8)	42(48.3)	1(1.1)	5(5.7)	-	-	-	-
	elementary school	guidance school	High school	Academic	-	0.009	0.026	0.047
	8	19(11.9)	28 (32.2)	49(56.3)	-	-	-	-
Spouse education	elementary school	guidance school	High school	Academic	0.046	<0.001	0.001	0.002
	8 (8.3)	8 (8.3)	29(44.8)	36(61.4)	-	-	-	-
	RMMS	SPMS	PPMS	PPMS	0.007	0.001	0.001	0.002
	52%	-	8%	-	-	-	-	-
Economic status	Undesirable	Relatively desirable	desirable	-	0.045	-	-	-
	35(67.2)	54(62.3)	18 (20.7)	-	-	-	-	

\*PSD: primary sexual dysfunction/ SSD: secondary sexual dysfunction/ TSD: tertiary sexual dysfunction/ SD: total sexual dysfunction

Table 1: demographic information and their relationship with main variables

Table 2: relationship between sexual dysfunction and body image

variable	Mean ± SD	Relationship with body image
primary sexual dysfunction scoring range: 5-25	16.95±3.25	P=0.001
secondary sexual dysfunction scoring range: 9-45	21.57±6.14	P=0.001
tertiary sexual dysfunction scoring range: 5-25	16.16±2.97	P=0.041
total sexual dysfunction scoring range: 19-95	57.41±12.16	P=0.001
Body image scoring range: 46-230	135.31±18.98	-

Table 2: relationship between sexual dysfunction and body image

**Conclusion:** Sexual dysfunction is common in women with MS, and body image can be impaired at all levels (primary, secondary, and tertiary) of sexual dysfunction.

**Disclosure:** Nothing to disclose

## EPO2277

**Improvement of sexual satisfaction in multiple sclerosis; a systematic review**B. Afshar<sup>1</sup>, M. Hasani<sup>2</sup>, L. Amini<sup>3</sup>, S.M. Nabavi<sup>4</sup>

<sup>1</sup>Midwifery, Iran University of Medical Sciences, Tehran, Iran, Islamic Republic of, <sup>2</sup>Midwifery, Lorestan University of Medical Sciences, Lorestan, Iran, Islamic Republic of, <sup>3</sup>Midwifery, Iran University of Medical Sciences, Tehran, Iran, Islamic Republic of, <sup>4</sup>Neurology and Neuroscience Research and Clinical Department, Roan institute for stem cell biology and technology, Tehran, Iran, Islamic Republic of

**Background and aims:** Individuals with Multiple sclerosis face sexual dysfunction and they also report lower levels of sexual satisfaction. The purpose of this study was to identify the beneficial interventions for sexual satisfaction.

**Methods:** The search was performed over electronic databases including PubMed, Scopus, Cochrane, Medline, PsycINFO, EMBASE, CINAHL, and Google Scholar. The interventional studies (in English or Persian) on the sexual satisfaction in patients with multiple sclerosis were included in this review. The search was performed from 1990 to December 2019.

**Results:** 528 articles were imported to EndnoteX7, after removing duplicate articles 336 studies remained. While reviewing, 313 studies could not provide required information and excluded, Thus 23 studies entered. 10 papers were quasi experimental, 11 were randomized control trials, 2 of them were cohort non-randomized control trial.

990 men and women patients were entered which 575 people were in intervention group and 415 people were in control group. Sexual satisfaction was measured by Marital Satisfaction Inventory (MSI) (N=1) and extracted from the subscale of MSQOL-54 (N=22).

Interventions were divided into 3 categories: educational-counseling interventions (N=14), exercise interventions (N=5) and medical interventions (N=4). Only 8 interventions were effective that 6 were educational-counseling interventions. The courses duration were verifying from 2 to 12 sessions of 40 to 90 minutes. The 2 other remaining effective interventions were an exercise and a medical interventions (table 1 shows effective interventions by details).

Categories	design	questionnaire	interventions
educational-counseling	quasi-experimental	Marital Satisfaction Inventory (MSI)	12 one-hour educational/ counseling sessions with the study psychologist.
	Randomized control trial	MSQOL-54	Eight 45-minute training sessions over a 3-month period were conducted based on patients' educational needs and based on the Orem model.
	longitudinal cohort study	MSQOL-54	The five-day residential retreat (educational and experiential)
	quasi-experimental	MSQOL-54	The experimental group was treated in 8 sessions of group mindfulness- based stress reduction program [one session in a week for 90 minutes each session]
	quasi-experimental	MSQOL-54	12 weekly sessions of sexual therapy
exercise	quasi-experimental	MSQOL-54	2-4 sessions of 40 minutes of training program, based on the extracted needs of the patients in the
	Randomized control trial	MSQOL-54	Yoga exercises for 3 months, which consisted of 8 sessions per month for 60 to 90 minutes at each session.
medical	Randomized control trial	MSQOL-54	The intervention group received 5mg of folic acid daily for two month and 3 doses of 1mg vitamin B12

Table 1: effective interventions on sexual satisfaction

Table 1: effective interventions on sexual satisfaction

**Conclusion:** educational-counseling interventions had a greater impact on sexual satisfaction. Further studies are recommended to investigate the impact of interventions on sexual satisfaction in patients with multiple sclerosis specifically.

**Disclosure:** Nothing to disclose



# EPO2278

## The relationship between quality of life and sexual dysfunction in women with multiple sclerosis; a cross sectional study

L. Amini<sup>1</sup>, B. Afshar<sup>2</sup>, M. Hasani<sup>3</sup>, S.M. Nabavi<sup>4</sup>, G. Ghaedi<sup>5</sup>

<sup>1</sup>Midwifery, Iran University of Medical Sciences, Tehran, Iran, Islamic Republic of, <sup>2</sup>Tehran, Iran, Islamic Republic of, <sup>3</sup>Midwifery, Lorestan University of Medical Sciences, Tehran, Iran, Islamic Republic of, <sup>4</sup>Neurology and Neuroscience Research and Clinical Department, Roan institute for stem cell biology and technology, Tehran, Iran, Islamic Republic of, <sup>5</sup>Psychiatry, Shahed University, Tehran, Iran, Islamic Republic of

**Background and aims:** Multiple sclerosis may lead to a wide range of problems related to physical and mental health such as Sexual dysfunction or a reduction in quality of life. We performed a cross-sectional study to assess the relationship between quality of life and sexual dysfunction in women with MS.

**Methods:** 87 married women with MS and sexual dysfunction were referred to one of the Neurology Clinic of Tehran in 2019. The inclusion criteria were: Defined sexual dysfunction by a score of 4-5 on any MSISQ-19 item, At least 1 year has passed since diagnosis of MS, EDSS score less than 4.5, no taking any drugs that affect sexual function, no Chronic disease other than MS, and no pregnancy or lactation. The assessment tools were MSISQ-19 and MSQOL-54. The collected data was analyzed by Pearson correlation and regression analyses in SPSS 16.

**Results:** demographic data reported in table 1. The mean score of total sexual dysfunction was 57.41±12.16; including 16.95±3.25 in primary sexual dysfunction, 21.57±6.14 in secondary sexual dysfunction and 16.16±2.97 in tertiary sexual dysfunction. According to our results the overall quality of life score was 56.74±11.31, and mean score of 2 main quality of life subscales including physical health and mental health were 46.16±9.37 and 45.80±13.25 respectively.

Table 1: demographic information and their relationship with main variables

variable	Mean ± SD				Relationship with				
	PSD*	SSD*	TSD*	SD*	PHI*	MH*	QOL*		
Women age	32.72±6.15								
Spouse age	37.26±6.25								
Marriage age	22.78±3.74				0.036	0.011			0.032
Drug use duration onset of the disease	4.95±3.61				<0.001	<0.001	<0.001	<0.001	0.050
Child number	2.37±1.41						0.019	0.018	
Women Occupation status	Housewife 8(%)	Employed 8(%)							
	48 (55.2)	39 (44.8)							0.032
Spouse occupation status	Self-employed	Employee	manual worker	Unemployed					
	29(44.9)	42(48.3)	1(1.5)	5(7.7)					
Women education	elementary School	guidance school	High school	Academic		0.009	0.026	0.047	
	0	10(11.5)	28 (32.2)	49(56.3)					0.002
Spouse education	elementary School	guidance school	High school	Academic	0.046	<0.001	0.001	0.002	
	6 (6.9)	6 (6.9)	39(44.8)	36(41.4)					0.046
Disease process	RISM5	SPM5	PPM5	PRM5	0.007	0.001	0.001	0.002	
	92%	8%							
Economic status	Undesirable	Relatively desirable	desirable			0.045			
	15(17.2)	54(62.1)	18 (20.7)						

\*PSD: primary sexual dysfunction/ SSD: secondary sexual dysfunction/ TSD: tertiary sexual dysfunction/ SD: total sexual dysfunction/ PHI: physical health/ MH: mental health/ QOL: Overall quality of life

Table 1: demographic information and their relationship with main variables

Table 2: relationship between sexual dysfunction and quality of life

variable	Mean ± SD	Relationship with		
		physical health	mental health	Overall quality of life.
primary sexual dysfunction scoring range: 5-25	16.95±3.25	0.038	-	-
secondary sexual dysfunction scoring range: 9-45	21.57±6.14	-	-	0.019
tertiary sexual dysfunction scoring range: 5-25	16.16±2.97	0.003	-	0.001
Total sexual dysfunction scoring range: 19-95	57.41±12.16	0.029	-	0.014
physical health	46.16±9.37	-	-	-
mental health	45.80±13.25	-	-	-
Overall quality of life	56.74±11.31	-	-	-

Table 2: relationship between sexual dysfunction and quality of life

**Conclusion:** In general, primary, tertiary and total sexual dysfunction had a significant reverse correlation with physical health. Besides, there is a significant correlation between secondary, tertiary and total sexual dysfunction with overall quality of life.

**Disclosure:** Nothing to disclose

## EPO2279

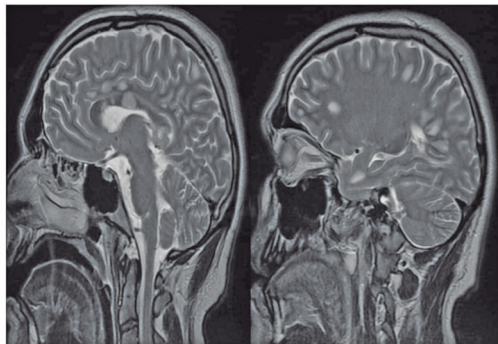
### Acute onset psychosis and cognitive impairment as primary manifestation in Relapsing Remitting Multiple Sclerosis.

A. Nandy<sup>1</sup>; M. Nielsen<sup>1</sup>; C. Hilt<sup>1</sup>; P. Henning Mogensen<sup>1</sup>, Y. Yavarian<sup>2</sup>

<sup>1</sup> Department of Neurology, Aalborg University Hospital, Denmark, <sup>2</sup> Department of Radiology, Aalborg University Hospital, Denmark.

**Background and aim:** Multiple Sclerosis (MS) is a demyelinating disorder of the central nervous system. Neuro-psychiatric symptoms have previously been reported as a rare manifestation of MS, yet onset of MS with psychosis is rarely encountered especially with Relapsing Remitting type of Multiple sclerosis (RRMS). Untreated psychosis in patients with MS can adversely impact on MS medication, levels of disability, and quality of life.

**Method:** A 23-year-old Caucasian male was admitted due to sudden onset of cognitive deficit, agitation, aggressive self-harming behavior and neurological symptoms with paresis of the right upper extremity along with ataxic gait. His clinical, radiological and laboratorial examinations initially lead to the suspicion of ADEM, eventually diagnosed with RRMS (Fig.).



**Figure 2:** Control SAGITAL T2 FLAIR sequences after 5 weeks (on the right) from the first scan (on the left) showed partial regression of the lesion load with significant reduction of contrast enhancement

**Result:** Acute onset of neuro-psychotic symptoms with MRI brain verified fulminant contrast enhancing ovoid lesions, both nodular and ring-enhancing involving both cerebral hemispheres (Fig.), response to high dose of steroids and plasma exchange, with a relatively short interval between psychiatric and neurological signs indicate a high likelihood that acute psychosis in our patient could be a manifestation of underlying MS.

**Conclusion:** Acute onset psychosis and cognitive impairment is a significant problem in RRMS. Particularly in RRMS, the incidence of psychosis and CI is approximately 40%, involving complex attention, processing speed and memory and executive dysfunction, agitation and self harming behavior. As RRMS in relatively young age group, shown worsening of cognitive dysfunction with psychosis, our case report underscores the importance of early recognition of acute psychosis and cognitive impairment, which could impose diagnostic challenge in multiple sclerosis.

**Disclosure:** Nothing to disclose

## EPO2280

### Sexual dysfunction in Greek patients with multiple sclerosis.

I. Nikolaidis<sup>1</sup>, C. Bakirtzis<sup>1</sup>, M. Boziki<sup>1</sup>, A. Artemiadis<sup>2</sup>, E. Deli<sup>1</sup>, M. Petri<sup>3</sup>, T. Tatsi<sup>1</sup>, E. Grigoriadou<sup>1</sup>, N. Grigoriadis<sup>1</sup>

<sup>1</sup>2<sup>nd</sup> Dep. of Neurology, Aristotle University of Thessaloniki, Thessaloniki, Greece, <sup>2</sup>Medical school, University of Cyprus, Nicosia, Cyprus, <sup>3</sup>University of Thessaloniki, Thessaloniki, Greece

**Background and aims:** Sexual dysfunction is common in both men and women with multiple sclerosis but is often under-estimated. This study was conducted to assess the prevalence of sexual dysfunction (SD) in Greek MS patients and to determine disease-related and psychological risk factors.

**Methods:** A sample of 218 patients recruited from the MS Center, AHEPA University Hospital of Thessaloniki. They filled out the Multiple Sclerosis Intimacy and Sexuality Questionnaire (MSISQ19) along with demographic data. Psychological status was assessed with Depression Anxiety Stress Scales (DASS), Beck Depression Inventory (BDI) questionnaire and the neurological impairment using the Expanded Disability Status Scale (EDSS). Between group comparisons were made by using Pearson's chi-square test and Mann-Whitney U test. The data were analyzed with SPSS v22.0.

**Results:** Sexual dysfunction was identified in 98 (45%) out of 218 patients. There was not significant difference with respect to gender in the 2 groups. SD patients were older ( $44.3 \pm 11.4$  vs.  $34.4 \pm 10.7$ ,  $p < 0.001$ ), had longer disease duration ( $12 \pm 8.6$  vs.  $8.2 \pm 7.4$ ,  $p < 0.001$ ) and suffered significantly larger disability ( $4.1 \pm 2.0$  vs.  $2.6 \pm 1.7$ ,  $p < 0.001$ ). Finally, SD patients sustained more depressive symptoms ( $5.7 \pm 3.6$  vs.  $2.6 \pm 2.9$ ,  $p < 0.001$ ) and more psychological distress in general ( $20.6 \pm 12.9$  vs.  $10.3 \pm 9.8$ ,  $p < 0.001$ ).

**Conclusion:** Sexual dysfunction is a common symptom in MS and affects both sexes. Aging, the duration and severity of the disease in addition to depression and psychological distress are significant factors that contribute to sexual dysfunction.

**Disclosure:** Nothing to disclose

## EPO2281

### Co-occurrence of Cerebral Toxoplasmosis and Multiple Sclerosis – case presentation

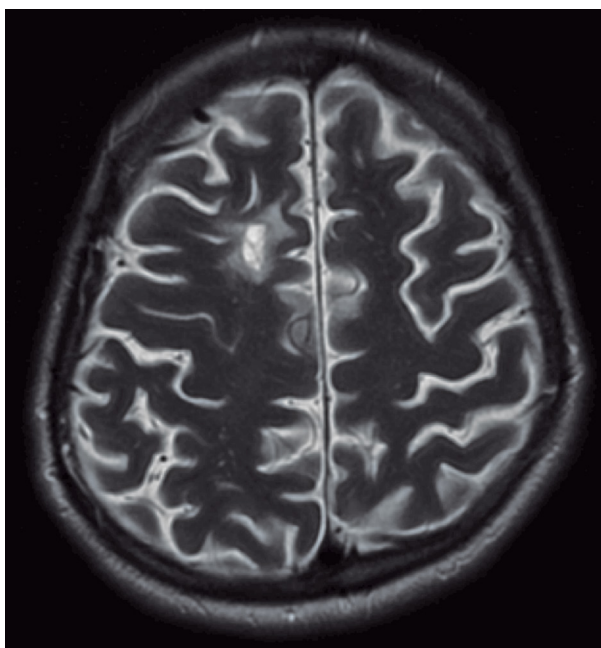
I. Odajiu<sup>1</sup>, I. Tanase<sup>2</sup>, E.I. Davidescu<sup>1</sup>

<sup>1</sup>Bucharest, Romania, <sup>2</sup>Hiperdia, Radiology, Colentina Clinical Hospital, Bucharest, Romania

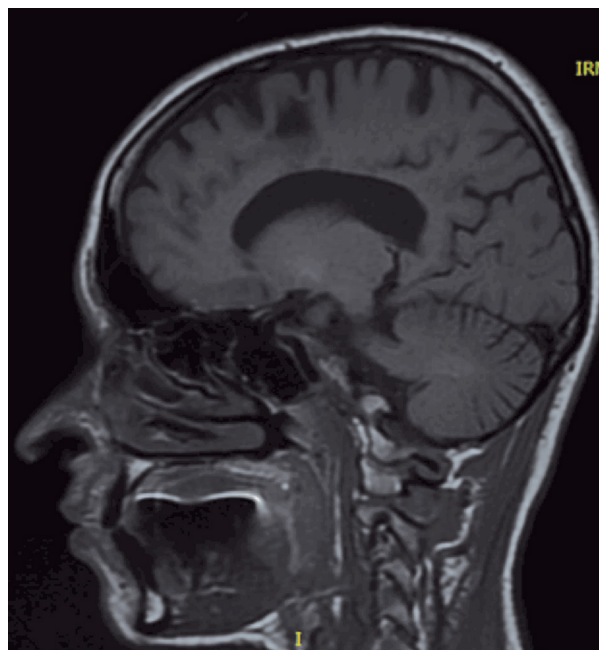
**Background and aims:** Toxoplasmosis is an ubiquitous infection most frequently encountered in HIV infected patients. The presence of anti-Toxoplasma IgG antibodies in multiple sclerosis (MS) patients is quite common, although the relation between multiple sclerosis and Toxoplasma gondii infection seems controversial. Our objective was to describe the occurrence of toxoplasmosis in an immunocompetent patient with multiple sclerosis.

**Methods:** Case report. Cerebral MRI with gadolinium enhancement and serology testing.

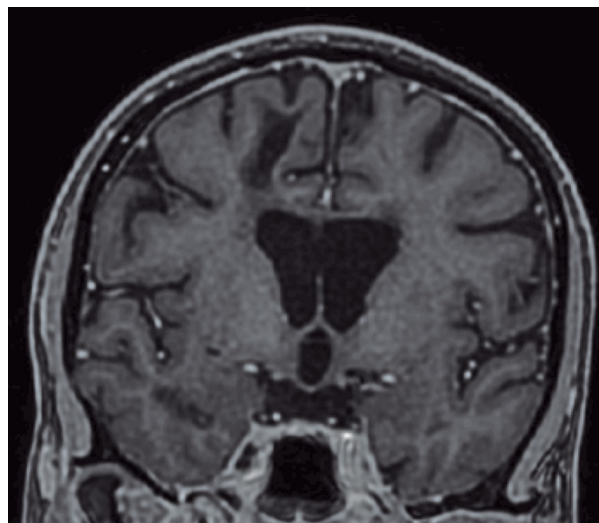
**Results:** We present the case of an immunocompetent 37-year-old woman, known with relapsing-remitting multiple sclerosis since 2006, who underwent treatment with Glatiramer acetate from 2007 to 2012. In 2008, on annual MRI, there were revealed numerous supratentorial ring-enhancing lesions, with a hypointense core and crenelated outline. Serologic tests for Toxoplasma gondii confirmed the diagnosis of toxoplasmosis and she underwent etiologic treatment. Patient discontinued treatment for RRMS between 2012-2015, due to a personal decision, thus undergoing serious deterioration of her neurological condition. Afterwards, on repeated cerebral imaging there remained a lesion of about 2cm in diameter with peripheral hyperintensity and a hypointense core on T2 and FLAIR, located paraventricular in the right frontal lobe. She undergoes treatment with Natalizumab since 2015.



Axial T2 – hyperintense oval lesion in the right frontal lobe



T1 sagittal – extensive hypointense paraventricular lesion in the right frontal lobe



Contrast-enhanced T1 Coronal sequence

**Conclusion:** The peculiarity of the case relies in the fact that cerebral toxoplasmosis was accounted in an immunocompetent patient with multiple sclerosis under immunomodulatory treatment with Glatiramer acetate, who remained with a residual cystic lesion on MRI, which could also be encountered in chronic multiple sclerosis lesions. Toxoplasmosis should not be missed out in such cases, as it requires etiologic treatment.

**Disclosure:** Nothing to disclose

## EPO2282

### A rare disease in the differential diagnosis of ms: granulomatosis with polyangiitis (gpa)

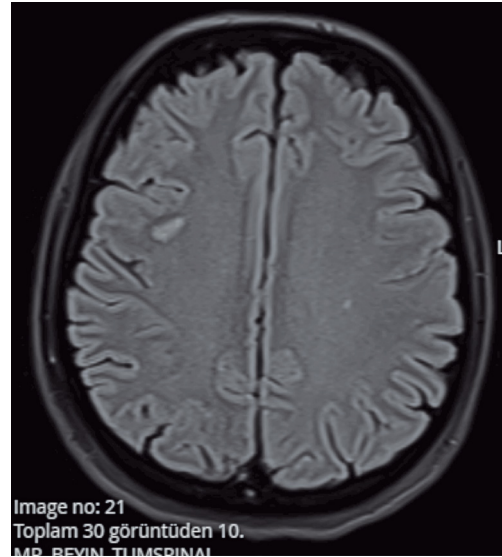
A. Ayaslı, A. Ozturk  
Duzce, Turkey

**Background and aims:** Granulomatosis with polyangiitis (GPA), is a systemic inflammatory disease of unknown etiology, with small and medium arteries involvement, characterized by necrotizing granulomatosis. In this article, we present a patient who was referred to our MS outpatient clinic due to the result of MR scans suspicion of MS, however was diagnosed as GPA with the central nervous systems involvement as a result of the examination.

**Methods:** 39-year-old female, her complaints were visual impairment, hearing loss, and weakness in her right arm and leg. In her history, she had shortness of breath and complaints of painful urination and bloody urine. Her visual acuity was both 0.4. In the muscle strength examination right upper extremity was 3/5 and right lower extremity was 2/5. There was hypoesthesia in the right extremity. Biochemistry values were normal. She had diffuse purpuritic lesions of the lower extremity (Figure 1). On Cranial MRI, non-specific T2-FLAIR sequences hyperintense foci settled in white matter. The right optic nerve was evaluated as having a slight kink (Figure 2-3).



purpuritic lesions of the lower extremity



non-specific T2-FLAIR sequences hyperintense foci settled in white matter



The right optic nerve was evaluated as having a slight kink

**Results:** Multiple Sclerosis (MS) is an autoimmune central nervous system (CNS) disease characterized with inflammation, demyelination and axon damage. MS is diagnosed according to McDonald's Criteria which was revised in 2017. A lot of disease are in the differential diagnosis of MS. GPA may affect peripheral and central nervous systems in varying proportions (10-45%).

**Conclusion:** Although Granulomatosis with Polyangiitis is with atypical onset and especially involvement of central nervous system is rarely seen, it takes part in the differential diagnosis of MS.

**Disclosure:** Nothing to disclose

## EPO2283

### Atypical haemolytic uremic syndrome as rare adverse event of Interferon beta treatment in Multiple Sclerosis: which is the most suitable therapeutic approach?

M. Parisi, A. Manni, F. Caputo, G. Falcicchio, G. Milella, I.L. Simone, D. Paolicelli, M. Trojano  
*Department of Basic Medical Sciences, Neurosciences and Sense Organs., University of Bari "Aldo Moro", Bari, Italy*

**Background and aims:** Interferon beta (IFNβ) is a consolidated 1st-line therapy for Relapsing-Remitting Multiple Sclerosis (RRMS) patients. We hereby present a case of a young MS patient, who experienced atypical haemolytic uremic syndrome (aHUS) during IFNβ therapy. **Methods:** A 39-year-old Caucasian man was diagnosed with MS in 1997 and since 1999 he assumed IFNβ-1a 44mcg, with good tolerability and optimal treatment-response. In July 2018 he came to our attention for sudden bilateral visual loss, after an episode of severe asthenia and fever, for which he had suspended IFN therapy. Laboratory tests were remarkable for anemia and positive hemolysis indices, thrombocytopenia and acute kidney injury. He underwent a brain magnetic resonance (MRI), and atypical posterior reversible encephalopathy syndrome (PRES) was detected, so he started an aggressive antihypertensive therapy. Clinical and radiological features progressively improved. Finally aHUS was diagnosed. After the failure of plasma exchange, he underwent Eculizumab 900mg (monoclonal antibody against C5 protein), with improvement of glomerular filtration rate and without new signs of MS activity. However, 3rd stage kidney impairment persisted. The patient is currently undergoing neurological follow-up and recently started Dimethyl-fumarate.

**Results:** In demyelinating diseases there is a possible involvement of the complement pathways. Therefore, Eculizumab, approved to treat HUS, may also have some beneficial effects on neuroinflammation, as proven by its recent approval for NMOSD-treatment in USA.

**Conclusion:** In this case, a clinical challenge can be the pharmacological decision to start a safe drug in a mild-disease activity, considering the impossibility to discontinue Eculizumab.

**Disclosure:** Nothing to disclose

## EPO2284

### Emotional impact on relapsing remitting multiple sclerosis

F. Guerra, D. Passafiume, J. Ranieri, D. Di Giacomo  
*Life, Health and Environmental Science, University of L'Aquila, L'Aquila, Italy*

**Background and aims:** Multiple sclerosis (MS) is a chronic degenerative disease of the central nervous system that involves the functionality of the brain and spinal cord. Relapsing Remitting Multiple Sclerosis (RRMS) is the most common disease course and is characterized by cognitive deficits and clearly defined attacks of new or increasing neurological symptoms. The goal of our study was to investigate the psychological impact of RRMS (Multiple Sclerosis Relapsing Remitting) in terms of depression, anxiety and stress and to explore the role of metacognitions in relation to emotional variables

**Methods:** A cross-sectional study was conducted on sample composed of 102 RRMS patients aged 19-50 years (mean 36.3±8sd). The sample consist of 88 women (86.27%) and 14 men (13.73%). The patients were divided into 2 groups: a group consisting of patients diagnosed for more than 10 years and a group consisting of patients diagnosed for less than 10 years. The Expanded Disability Status Scale (EDSS) ranges from 3 to 8 (mean=3.34). Emotional variables have been measured through 2 self-report questionnaire: 1) Depression, Anxiety and Stress Scale (DASS-21), 2) Metacognition Questionnaire (MCQ-30).

**Results:** The analysis of variance showed significant differences between groups based on the time elapsed since the diagnosis. Data showed inverse correlations between emotional variables, such as depression and anxiety and the role of metacognitions, such as negative beliefs.

**Conclusion:** These results suggest that a metacognitive approach in psychological care can play an important role in preventing psychological distress in MS patients.

**Disclosure:** Nothing to disclose

## EPO2285

### Rate of Nonmelanoma Skin Cancer in Patients Diagnosed With Multiple Sclerosis

R. Persson<sup>1</sup>, S. Lee<sup>2</sup>, N. Minton<sup>3</sup>, S. Niemcryk<sup>3</sup>, A. Lindholm<sup>3</sup>, S. Jick<sup>4</sup>  
<sup>1</sup>Boston Collaborative Drug Surveillance Program, Lexington, USA, <sup>2</sup>Drug Safety, Celgene Europe Limited, Uxbridge, United Kingdom, <sup>3</sup>Celgene Corporation, Summit, USA, <sup>4</sup>Boston Collaborative Drug Surveillance Program, Lexington, MA, USA

**Background and aims:** To describe rates of nonmelanoma skin cancers (NMSC) in patients after multiple sclerosis (MS) diagnosis and compare them to matched non-MS patients.

**Methods:** Using UK Clinical Practice Research Datalink GOLD, each MS patient diagnosed from 2001-2015 with ≥1 year of pre-diagnosis history was matched with non-MS patients of comparable age, sex, and record history length. Patients with history of NMSC were excluded. We identified incident NMSCs recorded after cohort entry (MS diagnosis date or matched date in non-MS patients). We calculated incidence rates (IRs) and incidence rate ratios (IRRs) with confidence intervals (CIs).

**Results:** In total, 6,846 MS patients were identified and compared with 67,800 non-MS patients (female, 70%; median age, 43 years). During median follow-up of 5 years, IRs of any NMSC diagnosis were 17.5 (95% CI 13.7-22.1) per 10000 person-years (PY) for MS patients and 19.1 (17.8-20.5) per 10,000 PY for non-MS patients. IRs of NMSC with supporting codes (e.g. biopsy) were 10.4 (7.6-14.1) per 10000 PY for MS patients and 11.7 (10.6-12.8) per 10,000 PY for non-MS patients. Rates were similar between MS and non-MS patients among older patients and when stratified by sex. Among patients <45 years old, rates of NMSC were more than 2-fold higher among MS patients compared with non-MS patients; however, numbers were small and uncontrolled bias, such as surveillance bias, may have affected the estimates.

Table 1. Incidence rates and incidence rate ratios of non-melanoma skin cancer (NMSC) by sex and age in MS and non-MS patients.

	MS patients			Non-MS patients			IRR (95% CI)
	# events	Person-years	IR (95% CI), per 10,000 person-years	# events	Person-years	IR (95% CI), per 10,000 person-years	
Any NMSC	67	38219	17.5 (13.7-22.1)	734	383816	19.1 (17.8-20.5)	0.9 (0.7-1.2)
Sex							
Female	41	27251	15.0 (11.0-20.2)	450	274473	16.4 (14.9-18.0)	0.9 (0.7-1.2)
Male	26	10968	23.7 (15.9-34.2)	284	109342	26.0 (23.1-29.1)	0.9 (0.6-1.3)
Age							
<45 years	13	16399	7.9 (4.4-13.2)	60	162344	3.7 (2.8-4.7)	2.1 (1.1-3.8)
45-59 years	19	15021	12.6 (7.9-19.3)	272	150546	18.1 (16.0-20.3)	0.7 (0.4-1.1)
60+ years	35	6799	51.5 (36.5-70.7)	402	70926	56.7 (51.3-62.4)	0.9 (0.6-1.3)
NMSC with supporting codes*	40	38314	10.4 (7.6-14.1)	449	385179	11.7 (10.6-12.8)	0.9 (0.3-1.2)
Sex							
Female	21	27322	7.7 (4.9-11.5)	271	275359	9.8 (8.7-11.1)	0.8 (0.5-1.2)
Male	19	10992	17.3 (10.8-26.4)	178	109820	16.2 (14.0-18.7)	1.1 (0.6-1.7)
Age							
<45 years	10	16411	6.1 (3.1-10.8)	35	162431	2.2 (1.5-3.0)	2.8 (1.3-5.5)
45-59 years	8	15045	5.3 (2.5-10.0)	153	151035	10.1 (8.6-11.8)	0.5 (0.2-1.0)
60+ years	22	6858	32.1 (20.7-47.7)	261	71714	36.4 (32.2-41.0)	0.9 (0.5-1.3)

\* Dermatology visit or referral, biopsy, excision, skin operation within 30 days before or after NMSC diagnosis or receipt of consultant or discharge letter on the day of NMSC diagnosis.  
 CI, confidence interval; IR, incidence rate; IRR, incidence rate ratio; MS, multiple sclerosis

**Conclusion:** MS patients have a similar risk of NMSC as non-MS patients, with the possible exception of an increased risk among MS patients age <45 years.

**Disclosure:** Sponsorship: Celgene Corporation

## EPO2286

### OCT measures are associated with disease burden and inflammatory activity in newly diagnosed MS and clinically isolated syndromes

M. Pisa<sup>1</sup>, T. Croese<sup>1</sup>, G. Dalla Costa<sup>1</sup>, S.C. Huang<sup>1</sup>, S. Guerrieri<sup>1</sup>, F. Sangalli<sup>2</sup>, B. Colombo<sup>2</sup>, G. Comi<sup>1</sup>, R. Furlan<sup>1</sup>, L. Leocani<sup>1</sup>

<sup>1</sup>Neurology, Institute of Experimental Neurology (INSPE) - University Vita Salute San Raffaele, IRCCS-San Raffaele Hospital; Milan, Italy, <sup>2</sup>Department of Neurology, San Raffaele Scientific Institute, Vita-Salute San Raffaele University, Milan, Italy

**Background and aims:** Features of asymptomatic involvement of optic nerve and retina in early multiple sclerosis (MS) and clinically isolated syndromes (CIS) are still unclear. Growing evidences support the use of retinal layers as candidate markers of neurodegeneration (ganglion cell-inner plexiform: GCIPL) and inflammation (inner nuclear layer: INL) occurring throughout the CNS.

**Methods:** After a clinical episode suggestive of MS, 150 consecutive patients underwent OCT, lumbar puncture, visual, somatosensory, and motor evoked potentials (VEP, SSEP-MEP), brain MRI, visual acuity, and EDSS. The 51.3% reached the McDonald 2010 MS criteria, the 21.3% were clinically defined MS.

**Results:** 1) evidence of prior subclinical ON was detected using VEP or OCT in the 19.2% and 17.8% of CIS patients, respectively. Asymptomatic VEP involvement was associated with greater disease-burden: brain T2 lesion load (p=0.01), MEP-SSEP score (p=0.002), oligoclonal bands (p=0.005), disease duration (p=0.02).

2) GCIPL thinning was associated with a disease-burden independently of prior clinical or subclinical ON (R2 0.2; p<0.001).

3) INL was thicker in the post-acute phase after a relapse (1.1 to 3.7 months). This phenomenon was reduced by concomitant steroid treatment. No correlation was found with markers of acute inflammation: presence of gadolinium enhancing lesions, Link Index, serum neurofilaments.

**Conclusion:** Asymptomatic optic nerve involvement, revealed by OCT and VEP, is frequent in CIS and associated with greater disease-burden. While ganglion cells thinning reveals diffuse disease burden in early MS, the INL thickening might reveal a reactive response of Muller cells to neuronal injury.

**Disclosure:** Nothing to disclose

## EPO2287

**A case-control study of environmental risk factors in an Italian cohort of Multiple Sclerosis patients**

M. Pozzato, A. Mollica, C. Starvaggi Cucuzza, A. Cagol, L. Saraceno, M. Rodegher, N. Bresolin, A. Protti, F.G. Martinelli Boneschi  
Milan, Italy

**Background and aims:** Multiple sclerosis (MS) is a demyelinating inflammatory disease of the central nervous system due to the interaction between genetic and environmental risk factors. Cigarette smoking, low serum vitamin D levels and obesity at young age are known environmental risk factors. The aim of this work is to analyse the role of environmental factors in an Italian cohort of consecutive MS patients, through the administration of an Italian translation of an environmental questionnaire.

**Methods:** The questionnaire has been developed by the Karolinska Institute, and it explores the role of different environmental risk factors including smoking habits, sun exposure, physical activity, diet, alcohol intake, working habits and questions specific for women. It has been administered to 136 consecutive MS patients and 136 age- and sex-matched healthy matched controls. Statistical analyses and Odds Ratios (ORs) have been calculated using SPSS software (version 25).

**Results:** Despite the reduced sample size, we found that smokers had an ORs of disease of 1.87 ( $p=0.01$ ) with a significant dose-effect measured with pack-year index ( $p=0.03$ ). A greater sun exposure before 30 years, a mixed diet at 20 years of age and a lower BMI were protective factors, while a higher vitamin D intake in cases were due to reverse causality.

**Conclusion:** Despite limitations, this study confirms the role of known environmental risk factors for MS like cigarette smoking and reduced sun exposure at young age, further supporting the importance to discuss lifestyle habits with persons at risk of MS. Further studies are needed to obtain more meaningful data.

**Disclosure:** Nothing to disclose

## EPO2288

**Expert opinion consensus on recommendations for treating relapsing multiple sclerosis with cladribine tablets in daily clinical practice**

P. Soelberg Sørensen<sup>1</sup>, D. Centonze<sup>2</sup>, G. Giovannoni<sup>3</sup>, X. Montalban<sup>4</sup>, D. Selchen<sup>4</sup>, P. Vermersch<sup>5</sup>, H. Wiendl<sup>6</sup>, B. Yamout<sup>7</sup>, H. Salloukh<sup>8</sup>, P. Rieckmann<sup>9</sup>

<sup>1</sup>Department of Neurology, Danish Multiple Sclerosis Center, University of Copenhagen and Rigshospitalet, Copenhagen, Denmark, <sup>2</sup>Unit of Neurology and Neurorehabilitation, IRCCS Neuromed, Pozzilli, Italy, <sup>3</sup>Queen Mary University of London, Blizard Institute, Barts and The London School of Medicine and Dentistry, London, United Kingdom,

<sup>4</sup>University of Toronto, Division of Neurology, St. Michael's Hospital, Toronto, Canada, <sup>5</sup>Univ. Lille, INSERM U1172, CHU Lille, FHU Imminent, Lille, France, <sup>6</sup>Department of Neurology, Institute of Translational Neurology, University of Münster, Münster, Germany, <sup>7</sup>Nehme and Therese Tohme Multiple Sclerosis Center, American University of Beirut, Beirut, Lebanon, <sup>8</sup>Merck KGaA, Darmstadt, Germany,

<sup>9</sup>Center for Clinical Neuroplasticity, Medical Park Loipl and University of Erlangen, Erlangen, Germany

**Background and aims:** Disease-modifying agents, such as cladribine tablets, are changing the management of patients with active relapsing multiple sclerosis (MS). In the EU, however, product labels tend not to provide specific or detailed information for real-life usage, meaning physicians can have many unanswered practical questions. Therefore, the aim of this consensus-based programme is to provide physicians with practical guidance for using cladribine tablets in clinical practice based on expert recommendations.

**Methods:** A modified Delphi consensus methodology was used by a steering committee of nine international MS experts to develop the clinical recommendations. Practical clinical questions regarding the use of cladribine tablets were identified and 11 key questions to be answered were selected through a prioritisation exercise. Evidence from a comprehensive literature search, a review of available evidence and the experience and perspectives of the MS experts was used to develop statements for each question. These questions were also extended to 33 faculty members to be answered via an online platform. The 9 MS experts used the consolidated answers to devise the clinical recommendations. For each recommendation, consensus was achieved when  $\geq 75\%$  of the respondents conveyed an agreement score of 7 to 9, on a 9-point scale.

**Results:** Table 1 provides an overview of the consensus achieved based on six individual topics. Consensus was achieved for 46 out of 47 clinical recommendations with only one failing to achieve consensus.

Table 1: Consensus achievement in clinical recommendations by topic

Topic	Consensus achieved for clinical recommendations	Consensus range achieved for clinical recommendations	Strength range
Defining highly active disease	2 of 2	2 at 80–90%	8
Patterns of treatment response in patients treated with cladribine tablets	3 of 3	2 at 90–100% 1 at 80–90%	8–9
Managing patients with evidence of disease activity while being treated with cladribine tablets	6 of 7	5 at 90–100% 1 at 80–90% 1 at <75%	7–9
Infection risk and immune function in patients being treated with cladribine tablets	14 of 14	8 at 90–100% 4 at 80–90% 2 at 75–80%	8–9
Pregnancy planning management and malignancy risk in patients being treated with cladribine tablets	8 of 8	7 at 90–100% 1 at 80–90%	8–9
Treatment switching to and from cladribine tablets and monitoring considerations	13 of 13	12 at 90–100% 1 at 80–90%	8–9
<b>Total</b>	<b>46 of 47</b>	<b>34 at 90–100%</b> <b>10 at 80–90%</b> <b>2 at 75–80%</b> <b>1 at &lt;75%</b>	<b>7–9</b>

Table 1

**Conclusion:** This expert consensus-based programme provides physicians with practical recommendations on the use of cladribine tablets for managing MS in clinical practice.

**Disclosure:** This work was supported by Merck KGaA, who provided funding for the project but had no influence on the development of the questions or recommendations.



## Muscle and neuromuscular junction disease 2

### EPO2289

#### Time-course of respiratory decline in type 1 myotonic dystrophy (DM1): longitudinal 19-year experience from a Neuromuscular clinic

E. Iori<sup>1</sup>, M. Mazzoli<sup>1</sup>, A. Ariatti<sup>1</sup>, G. Garuti<sup>2</sup>, V. Agnoletto<sup>3</sup>, R. Fantini<sup>4</sup>, G. Galassi<sup>1</sup>

<sup>1</sup>Department of Biomedical, Metabolic and Neural Sciences, Modena, Italy, <sup>2</sup>Mirandola Hospital, Respiratory Unit, Modena, Italy, <sup>3</sup>Cardiology Unit, Modena, Italy, <sup>4</sup>Respiratory Unit, Azienda Ospedaliera Universitaria, Modena, Italy

**Background and aims:** Restrictive ventilatory pattern is common in DM1. There is no clear relationship between trinucleotide repeat length and time-course of respiratory decline. Furthermore, role of central respiratory drive dysfunction is not established

**Methods:** The study included 33 DM1 with abnormal CTG expansion of DMPK gene seen between 2000 and 2018. Trinucleotide repeat year scores reflecting disease duration and mutation severity were determined. Participants were assessed with Muscular Impairment Rating Scale (MIRS). Respiratory evaluations included pulmonary function tests (PFTs) i.e. forced vital capacity (FVC), forced expiratory volume in 1 sec, FEV<sub>1</sub>/FVC. Non invasive ventilation (NIV) either positive airway pressure, continuous or bilevel was planned by pneumologist in presence of respiratory symptoms worsening and/or PFT abnormalities. Impact of PFTs on MIRS worsening and NIV requirement as outcomes were assessed at baseline, during follow up and at last evaluation

**Results:** NIV was started in 12 cases (36%). Median age at NIV was 50 years (range 33-54). Median time to NIV was 195 months. Basal FVC values were significantly lower in subjects who underwent NIV (p<0.001). FVC showed worsening (p=0.003) between baseline and last follow up. Linear regression suggested cumulative effect of trinucleotide repeat year scores on FVC at baseline and at last follow up. FVC was linked to progression of neurological impairment assessed with MIRS at Wilcoxon (p=0.038) and logistic regression (p=0.02). MIRS scores related with NIV need.

**Conclusion:** Size of repeat, duration of exposure to specific repeat size and FVC are independent predictors of respiratory outcome in DM1.

**Disclosure:** Nothing to disclose

### EPO2290

#### Duchenne Muscle dystrophy due to a novel silent p.Ser443= mutation in the DMD gene

P. Joshi<sup>1</sup>, J. Sarangere<sup>2</sup>, R. Munkhbayar<sup>2</sup>, D. Gläser<sup>3</sup>, S. Zierz<sup>4</sup>

<sup>1</sup>Neurology, Martin.Luther University, Halle (Saale), Germany, <sup>2</sup>Reflex Neurological Clinic, Ulaanbaatar, Mongolia, <sup>3</sup>Genetikum, Neu-Ulm, Germany, <sup>4</sup>Department of Neurology, Martin Luther University Halle-Wittenberg, Halle, Germany

**Background and aims:** Duchenne muscular dystrophy (DMD) is the most common and 1 of the most severe progressive, hereditary muscle diseases affecting boys. This X-linked inherited disease is predominantly caused by out-of-frame mutations in DMD gene leading to absence of dystrophin protein. Here, we report a 14-year-old Mongolian boy presented with proximal muscle weakness, pseudohypertrophic deltoid and gastrocnemius muscles since early childhood. Gower's sign and myopathic pattern were reported on EMG. Lactate dehydrogenase was increased 1.3-fold and creatine kinase (CK) was elevated 13-fold. The boy is the only child of a healthy mother with no family history of muscle disorders.

**Methods:** Mutation analysis including MLPA and sequencing of the DMD gene was performed. cDNA analysis was performed to assess exon splicing pattern of exon 11.

**Results:** A hemizygous silent variant, c.1329C>T (p.Ser443=) in exon 11 was identified. This silent mutation, listed in the SNP database, was described as a variant of unknown significance (VUS) in ClinVar database. cDNA analysis demonstrated partial skipping of exon 11 due to this mutation.

**Conclusion:** Present data shows that silent mutations in DMD are perhaps not very rare. So far, only one pathogenic DMD silent point mutation p.Leu2256= (c.6766C>T) has been listed in UMD-TREAT database. Published data and further details on this mutation are not available. Although silent mutations are usually considered non-pathogenic, our case emphasizes that silent mutations can be potentially pathogenic. Hence, if silent variants are not annotated in database or not known to be benign, they should be analysed further at cDNA level.

**Disclosure:** Nothing to disclose

## EPO2291

**Oligoclonal bands in the cerebrospinal fluid of patients with Guillain-Barre syndrome**

A. Kalac<sup>1</sup>, I. Basta<sup>2</sup>, I. Bozovic<sup>1</sup>, M. Janković<sup>1</sup>, I. Berisavac<sup>2</sup>, A. Palibrk<sup>1</sup>, O. Tamas Stojiljković<sup>1</sup>, D. Jovanovic<sup>2</sup>, Z. Stevic<sup>2</sup>, V. Rakocevic Stojanovic<sup>2</sup>, D. Lavrnic<sup>2</sup>, S. Peric<sup>2</sup>

<sup>1</sup>Neurology Clinic, Clinical Center of Serbia, Belgrade, Serbia, <sup>2</sup>Neurology Clinic, Clinical Center of Serbia, School of Medicine, University of Belgrade, Belgrade, Serbia

**Background:** Finding of increased cerebrospinal fluid (CSF) proteins and absence of cells is a diagnostic criterion for Guillain-Barre syndrome (GBS). Data on presence of oligoclonal bands in CSF of GBS patients are scarce.

**Aim:** To analyze presence of oligoclonal bands in CSF and serum from a large cohort of GBS patients and to assess their significance.

**Methods:** Overall 344 patients were diagnosed with GBS at our hospital from 2009-2018, among whom 213 (62%) had analysis of oligoclonal bands. Severity of GBS was graded using GBS disability scale (GDS).

**Results:** Eighteen (8%) GBS patients had CSF oligoclonal bands: 2 only CSF bands, one CSF bands and a smaller number of bands in serum, and 15 patients had parallel bands both in CSF and serum. Patients with and without CSF oligoclonal bands did not differ regarding clinical and sociodemographic features ( $p>0.05$ ), except for GDS at nadir ( $3.8\pm 0.8$  in patients with bands vs.  $3.4\pm 1.1$  in patients without bands,  $p<0.05$ ). Among patients with CSF bands only, one developed CIDP and other 1 connective tissue disease (CTD). The patient with CSF bands and a smaller number of bands in serum was diagnosed with Lyme disease. Among 15 patients with parallel bands, 2 had CTD, 2 system vasculitis, 1 Hodgkin, 1 monoclonal gammopathy of undetermined significance, and 1 Lyme disease. Among 195 patients without oligoclonal bands, 2 later developed CIDP and one Hodgkin.

**Conclusion:** CSF oligoclonal bands are rare in GBS and when present, further analysis should be performed to seek for other diseases.

**Disclosure:** Nothing to disclose

## EPO2292

**Longer-term Experience with Nusinersen in Teenagers and Young Adults with Spinal Muscular Atrophy: Phosphorylated Neurofilament Heavy Chain (pNF-H) and Efficacy Results From the CS2-12/SHINE Studies**

F. Muntoni<sup>1</sup>, B.T. Darras<sup>2</sup>, R.S. Finkel<sup>3</sup>, M.M. Ryan<sup>4</sup>, E. Mercuri<sup>5</sup>, M. Tulinius<sup>6</sup>, N. Deconinck<sup>7</sup>, D. Ramirez-Schrempp<sup>8</sup>, R. Foster<sup>9</sup>, Y. Liu<sup>8</sup>, M. Petrillo<sup>8</sup>, J. Wong<sup>8</sup>, B. Kandinov<sup>8</sup>, W. Farwell<sup>8</sup>

<sup>1</sup>UCL Great Ormond Street Institute of Child Health and Great Ormond Street Hospital Foundation Trust, London, United Kingdom, <sup>2</sup>Department of Neurology, Boston Children's Hospital and Harvard Medical School, Boston, MA, USA, <sup>3</sup>Division of Neurology, Department of Pediatrics, Nemours Children's Hospital, Orlando, FL, USA, <sup>4</sup>Department of Neurology, Royal Children's Hospital and Murdoch Children's Research Institute, and University of Melbourne, Parkville, Victoria, Australia, <sup>5</sup>Department of Paediatric Neurology, University Cattolica del Sacro Cuore, Rome, Italy, <sup>6</sup>Department of Pediatrics at Institute of Clinical Sciences, University of Gothenburg, Gothenburg, Sweden, <sup>7</sup>Hôpital Universitaire des Enfants Reine Fabiola, Université Libre de Bruxelles, Brussels, Belgium, <sup>8</sup>Biogen, Cambridge, MA, USA, <sup>9</sup>Biogen, Maidenhead, Berkshire, United Kingdom

**Background and aims:** Nusinersen has demonstrated clinically meaningful efficacy in presymptomatic and symptomatic infants/children with SMA.

**Methods:** 5 teenagers aged 14–15 years initiated nusinersen (3mg, n=3; 6mg, n=1; 9mg, n=1) in CS2 (Phase 1b/2a), received intrathecal nusinersen 12mg in the CS12 extension, transitioned to the SHINE (NCT02594124) long-term extension, and were 19–21 years as of 15 October 2018. Assessments included: plasma pNF-H levels and HFMSE (all participants); ULM (non-ambulatory); 6MWT (ambulatory).

**Results:** Participant 1 had SMA Type II; all others had SMA Type III. At CS2 baseline, Participants 2–4 (female) were ambulatory, Participants 1 and 5 (male) non-ambulatory. CS2 baseline plasma pNF-H levels were 317 pg/ml in Participant 1, and 146, 421, 1170, and 693pg/ml in Participants 2–5, respectively. At the end of CS12 plasma pNF-H levels had declined and were 263, 110, 293, 659, and 512pg/ml, respectively. From CS2 baseline to SHINE last visit (median time: 1952 [range: 1860–2121] days), HFMSE scores changed by +5 (Participant 1), +4 (Participant 2), -3 (Participant 3), 0 (Participant 4), and -2 (Participant 5) points. ULM scores were stable in Participants 1, 2, and 5 (0-point change) and 6MWT distance increased in Participants 2 (+69m), 3 (+81m), and 4 (+24m). New 2019 interim analysis data will be reported, including pNF-H analyses.

**Conclusion:** Plasma pNF-H levels were lower at the end of CS12 than CS2 baseline. Teenagers with SMA Type II/III treated with nusinersen demonstrated stable/improved

motor function, in contrast to the expected slow decline based on SMA natural history.

**Disclosure:** This study was sponsored by Biogen (Cambridge, MA, USA). Writing and editorial support for the preparation of this abstract was provided by Excel Scientific Solutions (Horsham, UK): funding was provided by Biogen.

## EPO2293

### Clinical characterization of familial hyperkalemic periodic paralysis with a SCN4A Met1592Val mutation

S.-Y. Kang

*Jeju, Korea, Republic of*

**Background and aims:** Hyperkalemic periodic paralysis (HyperPP) is characterized by episodic flaccid paralysis of skeletal muscles that is exacerbated by the consumption of potassium-containing foods, fasting, or rest following exercise. We describe the clinical and electromyographic characteristics in familial HyperPP with the Met1592Val mutation in the SCN4A gene.

**Methods:** 30 patients from 7 families were assessed by interviews and clinical examinations. Standardized protocols comprising short and long exercise tests were applied to 15 unaffected control subjects and the 30 patients with familial HyperPP. To identify comorbidities in patients, we surveyed subjects for common medical conditions.

**Results:** All patients experienced clinical myotonia at the eyelids or lips. Attack duration varied from less than 1 hour to greater than 3 weeks. The mean age of onset was 7.3 years (range 1-14 years), attacks beginning before 10 years in 86.3% of patients studied. Exercise of short duration induced an immediate increase in the amplitude of the compound motor action potential (CMAP) in the patients, and this was significantly larger and lasted longer than that observed in controls within 50 seconds ( $p < 0.05$ ). A long exercise test induced a large increase in the CMAP amplitude in patients immediately after exercise completion, which decreased to normal values with 1 minute. In contrast, controls showed a decreased CMAP amplitude immediately after exercise, which subsequently also returned to the normal value.

**Conclusion:** Affected members were phenotypically heterogeneous and showed similar response in exercise test. The exercise tests may be helpful in confirming abnormal excitability of muscle membrane in HyperPP patients.

**Disclosure:** Nothing to disclose

## EPO2294

**The epidemiology of hereditary pediatric neuromuscular disorders in the Republic of Belarus**

A. Kashyna<sup>1</sup>, S. Kulikova<sup>2</sup>, S. Likhachev<sup>1</sup>,  
Y. Rushkevich<sup>3</sup>, K. Malhina<sup>4</sup>

<sup>1</sup>Minsk, Belarus, <sup>2</sup>Department Of Neurology, Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus, <sup>3</sup>Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus, <sup>4</sup>Neurology, Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus

**Background and aims:** Most hereditary neuromuscular disorders (NMD) are life-long, life-limiting, disabling conditions. Understanding the epidemiology of NMD at prevalence exist is important to understand the effect on the healthcare system and standard of living of patients. In 2019, the first Belarusian register for children with NMD started.

**Methods:** We collected data about all patients with NMD using health administrative databases to determine the prevalence for children from 0 to 18 years old. Information was received on 417 pediatric patients, 246 male and 171 female.

**Results:** NMDs showed prevalence rates 4.4 per 100,000 population. The leading position of nosology is occupied by myopathies of 214 (51.3%) cases (2.3 per 100,000 population), of which Duchenne/Becker muscular dystrophy consists of 125 (29.9%) cases (1.3 per 100,000 population, 2.8 per 100,000 male population), group of hereditary polyneuropathy - 74 (17.7%) cases (0.8 per 100,000 population). Also a large group includes patients with spinal muscular atrophy - 76 (18.2%) people (0.8 per 100,000 population). 53 (12.7%) patients had an unspecified diagnosis of NMD. The prevalence of NMD among boys was higher than among girls due to high prevalence of Duchenne/Becker muscular dystrophy. The largest number of patients with NMD lives in Minsk - 79 (18.9%), the lowest level in Grodno - 43 (10.3%).

**Conclusion:** Data were obtained about patients who will be used to prepare the NMDs registry. Myopathy is the most common NMD in children, of which Duchenne/Becker muscular dystrophy dominates.

**Disclosure:** Nothing to disclose

## EPO2295

**GNE Myopathy in the Bulgarian Roma population: clinical course and 24-month follow-up study**

K. Kastreva<sup>1</sup>, T. Chamova<sup>2</sup>, V. Gergelcheva<sup>3</sup>,  
M. Gospodinova<sup>4</sup>, T. Dimitrova<sup>1</sup>, K. Chobanov<sup>1</sup>,  
O. Kamenov<sup>5</sup>, I. Tournev<sup>6</sup>

<sup>1</sup>Department of Neurology, Medical Univeristy, University Hospital Alexandrovska, Sofia, Bulgaria, <sup>2</sup>Sofia, Bulgaria, <sup>3</sup>Department of Neurology, University Hospital SofiaMed, Sofia, Bulgaria, <sup>4</sup>Department of Cardiology, Medical Institute of Ministry of Interior Affairs, Sofia, Bulgaria, <sup>5</sup>Ethnic Minorities Health Problems Foundation, Sofia, Bulgaria, <sup>6</sup>Sofia Medical University, Department of Neurology, University Hospital Alexandrovska, Department of Cognitive Science and Psychology, New Bulgarian University, Sofia, Bulgaria

**Background and aims:** GNE myopathy is a rare autosomal recessive neuromuscular disorder. The aim is to describe the clinical presentation and to follow up the progression of the disease over a period of 2 years.

**Methods:** Genetic testing, neurological examination, spirometry, echocardiography, serum CK levels and motor functions were tested at baseline, after 6, 12 and 24 months. Patients were divided into 4 groups, depending on the period of progression (I-1 to 10yr.,II-11 to 20yr.,III-21 to 30yr.,IV>30yr.).

**Results:** 42 patients were homozygous (p.I618T) while 2 were compound heterozygous (p.I618T/p.R277W, p.I618T/M60V). Mean age at onset was 23±6yr. The most common initial symptom was foot drop (70%). 11/22 patients had impaired cardiac fraction. 10/19 patients had restrictive respiratory weakness. Significant difference (p=0.014) was detected in serum CK levels at baseline between the groups and did not continue to be observed during follow-up period. Patients from III and IV groups had significantly lower motor activity scores than I group and their results did not change during follow-up period. In I and II groups a decline in the motor activity was observed. Significant difference (p<0.05) between the results in I and II, III and IV groups were detected at baseline for all the motor tasks.

**Conclusion:** GNE myopathy is a slowly progressive disease. The motor activity is relatively preserved in the first 10 years of the clinical course. Serum CK levels can be used as a biomarker of the progression rate. Even in the advanced stages of the disease restrictive respiratory failure was not observed.

**Disclosure:** Nothing to disclose

## EPO2296

**Determinants of quality of life in myasthenia gravis patients**

P. Szczudlik<sup>1</sup>, E. Sobieszczuk<sup>2</sup>, B. Szyluk<sup>2</sup>, M. Lipowska<sup>1</sup>, J. Kubiszewska<sup>1</sup>, A. Kostera-Pruszczyk<sup>2</sup>

<sup>1</sup>Neurology, Medical University of Warsaw, Warsaw, Poland, <sup>2</sup>Warsaw, Poland

**Background and aims:** Approximately half of myasthenia gravis (MG) patients achieve remission, the remaining have a chronic disease. Understanding factors affecting Quality of Life (QoL) in MG is needed to optimize treatment.

**Methods:** We performed a cross-sectional study in 339 MG adults (64.9 % women). SF-36 and a structured questionnaire was administered.

**Results:** Mean disease duration was 7.5+9.3 years, current age 51.6+18.3 years, 55% had Early-Onset (>50 years) MG. There were no significant differences in mean SF-36 subscores between women and men. Worse MGFA class was related to lower QoL in physical (PCS) and mental (MCS) subscore (p=0.000). Patients with MGFA I-II class had significantly better QoL in physical and mental subscores than patients with more severe MG (p<0.005). Late-onset MG patients had worse QoL than EOMG in PCS (p=0.049). Overweight and obese patients had lower PCS (p=0.002) and MCS (p=0.038) than patients with normal BMI. Depression adversely affected vitality score (p<0.02). University education was related to statistically higher PCS (p=0.015) and MCS (p=0.006). QoL in currently employed was better in PCS and MCS (p=0.000), white collar workers reported higher PCS (p=0.049) than the remaining group. Patients living with family evaluated their MCS (p=0.015) better. Moderate physical activity (2x week) improved PCS (p=0.045).

**Conclusion:** Our data support the need to address not only severity of MG but comorbidities, such as obesity or depression as well, to improve QoL. Family support, employment and moderate physical activity are important as well.

**Disclosure:** Nothing to disclose

## EPO2297

**Camptocormia as a novel phenotype in a heterozygous POLG2 mutation**

D. Lehmann Urban<sup>1</sup>, L. Motlagh Scholle<sup>2</sup>, K. Alt<sup>3</sup>, A. Ludolph<sup>4</sup>, A. Rosenbohm<sup>4</sup>

<sup>1</sup>Ulm, Germany, <sup>2</sup>Department of Neurology, University of Halle/S., Halle/S., Germany, <sup>3</sup>Genetikum, Neu-Ulm, Neu-Ulm, Germany, <sup>4</sup>Neurology, University of Ulm, Ulm, Germany

**Background and aims:** Mitochondrial dysfunction is known to play a key role in the pathophysiological pathway of neurodegenerative disorders. Nuclear-encoded proteins are involved in mtDNA replication, including DNA polymerase gamma, which is the only known replicative mtDNA polymerase, encoded by nuclear genes Polymerase gamma 1 (POLG1/POLG) and Polymerase gamma 2 (POLG2). POLG1 mutations are well-known as a frequent cause of mitochondrial myopathies of nuclear origin. However, only rare descriptions of POLG2 mutations leading to mitochondriopathies exist.

**Methods:** Here we describe a 68-year-old woman presenting with a 20- year history of camptocormia, mild proximal weakness and moderate CK increase.

**Results:** Muscle histology showed COX-negative fibres. Genetic analysis by next-generation-sequencing revealed an already reported heterozygous c1192-8\_1207dup24 mutation in the POLG2 gene.

**Conclusion:** This is the 1st report on a POLG2 mutation leading to camptocormia as the main clinical phenotype, extending the phenotypic spectrum of POLG2-associated diseases. This underlines the broad phenotypic spectrum found in mitochondrial diseases, especially in mitochondrial disorders from nuclear origin.

**Disclosure:** Nothing to disclose

## EPO2298

### Comparison of recent pivotal recommendations for the diagnosis and treatment of late onset Pompe disease using diagnostic nodes

D. Leupold<sup>1</sup>, B. Schoser<sup>2</sup>, K. Rösler<sup>3</sup>, P.M. Putora<sup>4</sup>, T. Hundsberger<sup>1</sup>

<sup>1</sup>St. Gallen, Switzerland, <sup>2</sup>Friedrich Baur Institut, Universitätsklinik München, Campus Innenstadt, Munich, Germany, <sup>3</sup>Basel, Switzerland, <sup>4</sup>Cantonal Hospital St.Gallen, St. Gallen, Switzerland

**Background and aims:** Pompe disease is a rare autosomal-recessive disorder characterised by limb girdle myopathy and respiratory weakness in the late onset form (LOPD) and cardiomyopathy only in the early onset form. Various mutations in the acid alpha-glucosidase gene lead to toxic lysosomal and extra-lysosomal glycogen accumulation in all organs due to ineffective glycogen clearance by the encoded enzyme. Only one randomized trial demonstrated beneficial effects of respiratory function and meters walked in the 6-minute walking test with enzyme replacement therapy (ERT). These results were confirmed in several retrospective and prospective observations and in meta-analyses. Due to a potential life-long therapy, moderate efficacy and high treatment costs time of ERT initiation and cessation is an ongoing matter of debate. So far, several national and international recommendations have been published with different criteria concerning diagnosis, initiation and cessation of ERT in LOPD.

**Methods:** We therefore formally analysed recent published recommendations and consensus statements of LOPD using diagnostic nodes (DODES) as a special software tool. With DODES, an objective analysis becomes possible if the content of the recommendations is represented as algorithms using cross-compatible elements.

**Results:** This analysis formally disclosed both, areas of great heterogeneity and concordance for the diagnosis and management of LOPD and paved the way for a Pompe disease burden scale focussing on ERT initiation.

**Conclusion:** According to this investigation further clinical research should concentrate on ERT in pre-symptomatic and severely affected LOPD patients and on cessation criteria for ERT as these issues are areas of international uncertainty and discordance.

**Disclosure:** Nothing to disclose

## EPO2299

### Myasthenia gravis in the elderly: evaluation of an Italian cohort.

A. Lupica, G. Nicocia, C. Bonanno, A. Pugliese, S. Sinicropi, S. Messina, A. Toscano, C. Rodolico  
*Clinical and Experimental Medicine, University of Messina, Messina, Italy*

**Background and aims:** Myasthenia gravis MG is an autoimmune disorder of neuromuscular junction (NMJ); in the last years an unexpected increased incidence of elderly-age MG was found. Very late onset MG can be underdiagnosed because some disturbances can be ascribed to more common chronic diseases. We evaluated the incidence and the features of MG, presenting after the age of 75 years, among our MG population

**Methods:** 35 patients (17F,18M) with a MG onset >75 years (age-range 75-89) were identified. All the patients were evaluated at onset with clinical examination, QMG score, SFEMG, RNS, thorax CT, routine blood examinations, Ab AChR and Anti MuSK assays.

**Results:** According to MGFA criteria, the majority of patients at onset showed a type-2 MG (25/35), 7 patients type-1 MG, 2 patients type-3 and only one patient type-4. AChR Ab were positive in (31/35); 4 patients were negative for AChR and MuSK Ab. Thymoma was found in 2 patients. The average time before the diagnosis was 11 months. The most common regimen of therapy was prednisone at low doses (less than 12.5mg/day); Azathioprine (50 to 100mg) was used as steroid sparing agent.

**Conclusion:** Our findings show that the diagnosis and therapy of MG in the elderly can be difficult. Among our population, there were no patients with MuSK related MG. MG type, comorbidities (hypertension, diabetes, glaucoma, osteoporosis) should be carefully considered for a positive outcome.

**Disclosure:** Nothing to disclose

## EPO2300

**Myotonic dystrophy type 2: a single-centre experience**

R. Machado<sup>1</sup>, L. Almendra<sup>2</sup>, A. Geraldo<sup>2</sup>, A. Matos<sup>2</sup>, L. Negrão<sup>2</sup>

<sup>1</sup>Centro Hospitalar e Universitário de Coimbra, Neurology, Coimbra, Portugal, <sup>2</sup>Neuromuscular Disease Unit, Neurology Department, University and Hospital Center of Coimbra, Coimbra, Portugal

**Background and aims:** Myotonic dystrophy type 2 (DM2) is an autosomal dominant muscle disease caused by CCTG-repeat expansion in the 1<sup>st</sup> intron of CNBP gene. It is an underdiagnosed multisystem disorder characterized by myalgias, muscle weakness, myotonia and cataracts. The aim of this study was to analyse demographic and clinical data of DM2 patients diagnosed at our Neuromuscular Disease Unit.

**Methods:** Clinical examination and review of medical files of eight patients with genetically confirmed DM2.

**Results:** 8 patients (50% females) from 6 unrelated families were studied. The actual mean age is 56.9±10.2 years and the mean age of first symptoms was 52.5±10.0 years. The most common 1<sup>st</sup> symptom was lower limb weakness (n=3), followed by lower limb stiffness (n=2) and frequent falls (n=1). 2 patients were diagnosed after the DM2 diagnosis in a family member, as they were originally pauci-symptomatic. Myalgia was present in 5 patients and clinical myotonia in 3. Cataracts occurred in 5 patients and diabetes mellitus in 2. 1 patient had an history of 2 myocardial infarctions with permanent pacemaker placement by the age of 48. His father, sister and paternal uncle, the latter with genetically confirmed DM2, all suffered sudden cardiac death. 2 patients presented ECG abnormalities: atrial fibrillation and 1<sup>st</sup>-degree atrioventricular block.

**Conclusion:** In this cohort, the main demographic and clinical features are similar to what has been previously described. However, regarding cardiac involvement, our results emphasize clinical similarities with myotonic dystrophy type 1. Careful cardiac follow-up is recommended, even in asymptomatic carriers.

**Disclosure:** Nothing to disclose

## EPO2301

**Diagnostic yield of an NGS panel of muscle genes in a Reference Unit in Neuromuscular Diseases**

P. Martí<sup>1</sup>, M.M.N. Muelas<sup>2</sup>, A. Casasus<sup>1</sup>, I. Azorin<sup>3</sup>, R. Vilchez<sup>1</sup>, J.J. Vilchez<sup>1</sup>

<sup>1</sup>Neuromuscular, IIS la Fe, Valencia, Spain, <sup>2</sup>Neurology, Hospital Universitario La Fe, Valencia, Spain, <sup>3</sup>Neuromuscular, CIBERER, Valencia, Spain

**Background and aims:** Next generation sequencing (NGS) methods have become a fundamental tool for the diagnosis myopathies. However, its final performance must be evaluated in a global context taking into account clinical aspects and biomarkers, often requiring a multidisciplinary interpretation.

**Methods:** The objective is to evaluate the diagnostic performance of 2 home design gene panel in muscular diseases. We studied 417 undiagnosed patients at a Reference Center in Valencia County. 1<sup>st</sup> we sequenced 253 cases by an Ion Torrent PANEL1 composed of 40 genes during 2015-2017 year period. An Illumina PANEL2 harboring of 272 genes was applied to 184 subjects (including PANEL1 unsolved cases) during 2017-2019.

**Results:** PANEL1 gave a diagnostic outcome of 24% confirmed, 32% possible and 44% inconclusive cases; being ANO5, FKRP, DES and MYH7 the most frequent gene mutations. PANEL2 yielded 32% confirmed, 26% possible and 42% inconclusive cases; in this group the most frequent mutations were those related to metabolic myopathies and channelopathies genes. The global performance rate was 28% with definitive molecular diagnosis, 27% of a possible one and 45% remained unsolved.

**Conclusion:** These results confirm NGS is a very useful tool in the study of neuromuscular diseases, especially when the panel contains a large gene list and hold high coverage. Nevertheless, this procedure provides many raw data that requires experience and sometimes biological analysis in tissues or cells to confirm the pathogenicity of the variants.

**Disclosure:** This research has been granted support by: Carlos III Research Institute projects: PI11/0203 and PI16/00316 - ISABEL GEMIO FOUNDATION FOR THE RESEARCH OF MUSCLE DYSTROPHIES AND OTHER RARE DISEASES: 2018/0200

## EPO2302

**Spanish family with scapulo-peroneal myopathy due to HNRNPDL mutation: the first European family**

L. Martinez Vicente, P. Marti, I. Azorin,  
N. Muelas Gomez, J.J. Vilchez  
*Neuromuscular, IIS la Fe, Valencia, Spain*

**Background and aims:** LGMD D3 is a rare genetic disease caused by mutations in HNRNPDL. There are only 5 unrelated families described with this inherited condition: 4 South American families with European ancestors, and 1 Chinese family. We describe the 1st European family with HNRNPDL related muscle dystrophy.

**Methods:** The index patient was a 70-year-old female with a late-onset scapulo-peroneal weakness and scapular winging. Her 67-years-old paternal cousin had a more severe late-onset scapulo-peroneal and distal weakness predominantly affecting flexor muscles of fingers. They had a family history with an autosomal dominant inheritance. They also had 2 relatives with cognitive impairment, 1 of them also affected with myopathy.

**Results:** CK levels were mildly increased. Electromyography presented myopathic features. Muscle MRI of the index patient showed a involvement of quadriceps, tibialis anterior and medial gastrocnemius with focus of brightness in STIR sequences, while her cousin had a more widespread involvement. Muscle biopsy showed myopathic changes with atrophic angulated fibers and rimmed vacuoles with abundant inclusion bodies. Sanger sequence of VCP and other multisystem proteinopathy genes were normal. A NGS study with a self-custom panel yielded a pathogenic missense mutation in codon 378 of HNRNPDL gene, already described in an Uruguayan family.

**Conclusion:** We present the 1st European family with HNRNPDL related muscle dystrophy. Our data support a particular phenotypic profile that differentiate HNRNPDL from others dominant hereditary IBM. Further information will be needed to study association between HNRNPDL mutation and cognitive impairment, as already described in other ribonucleoproteinopathies.

**Disclosure:** Nothing to disclose



## Neurogenetics 1

## EPO2303

**Expanding the genotype and phenotype of filamin-C-related myofibrillar myopathy.**

S. Kopishinskaya<sup>1</sup>, D. Abramova<sup>1</sup>, Y. Fomicheva<sup>2</sup>, A. Kostareva<sup>2</sup>

<sup>1</sup>Neurology, Privolzhskii Research Medical University, Nizhny Novgorod, Russian Federation, <sup>2</sup>Institute of Genetics, Almazov National Medical Research Center, Saint Petersburg, Russian Federation

**Background and aims:** Filaminopathies are recently identified progressive skeletal myopathies manifesting initially by bilateral weakness in either proximal leg muscles or in distal upper limb muscles spreading to other muscle groups and in some forms eventually resulting in tetraparesis and wheelchair dependence. 3 distinct types of filaminopathy are recognized.

**Methods:** We investigated 13 patients (3 males and 10 females) from the 3 different families. Needle electromyography and blood test for creatin phosphokinase were done in all patients. 5 patients underwent MRI of the crural muscles of both legs. Genetic examination was done in eight patients.

**Results:** We revealed moderate myopathic lesions by needle electromyography in all patients. The 1st manifestations were at the age of 25-43 starting from distal muscles of legs and then arms with subsequent involvement of proximal muscles of legs and then arms. The clinical core of this filaminopathy is proximal paresis, distal paresis is in the background. All patients showed a severe, in most cases, total lesion of m. tibialis anterior, m. extensor digitorum longus. Slight increase of creatin phosphokinase and frequent heart pathology are observed in the given form of filaminopathy. The progression of this filaminopathy is either moderate or severe. A genetic examination detected a new, previously undescribed variant in the FLNC gene (Chr7:128498528, NM\_001458:c.G8129A:p.Trp2710Ter), which can be considered as the probable cause of the development of the disease. The variant was classified a likely pathogenic according to ACMG criteria.

**Conclusion:** We revealed a new late autosomal dominant filamin-C-related myofibrillar myopathy with distal-proximal phenotypes.

**Disclosure:** Nothing to disclose

## EPO2304

**MicroRNA in mitochondrial patients with mtDNA deletion and ETF dehydrogenase variant**

C. Angelini<sup>1</sup>, R. Marozzo<sup>2</sup>, V. Pegoraro<sup>3</sup>, A. Di Stadio<sup>3</sup>

<sup>1</sup>No Department, IRCCS San Camillo, Venice, Italy,

<sup>2</sup>Neuromuscular Center, IRCCS S. Camillo, Venice, Italy,

<sup>3</sup>Clinical Neurobiology lab, IRCCS San Camillo, Venice, Italy

**Background and aims:** MicroRNAs are small non-coding RNA that regulate gene at post-transcriptional levels. Changes in circulating microRNAs (miR-34a and miR-29b) play an important role in aging processes such as hearing loss. Mitochondrial dysfunction is associated with the aging process and with the pathogenesis of a variety of disorders such as sensorineural hearing loss (SNHL).

**Methods:** We investigated 3 patients with a SNHL that were analyzed evaluating the hearing capacity by pure tone auditory test (PTA) and impedance, Auditory Brainstem Response (ABR) test and Distortion Product Otoacoustic Emissions (DPOAE). We also measured serum mitochondrial microRNAs (34a, 29b) that are probably involved in damage and in the mitochondrial metabolism.

**Results:** The 1st patient was a 76 y/o man affected by a mitochondrial myopathy with multiple mtDNA deletions. He presented limb asthenia and bilateral SNHL on PTA. The other 2 were a 82 y/o female patient that presented hypoacusia, weakness, and scoliosis and her 55 y/o daughter with a lipid storage myopathy. Muscle MRI was done in every patient. We observed an adipose tissue substitution in posterior muscle thigh of patients 1 and 3 while in patient 2 the muscles more compromised were Sartorius and Gracilis. We also found a significative increase of circulating level of miR-34a in all patients compared to the controls while an up-regulation of miR-29b was present only in patient 3. All patients showed altered responses in the DPOAE.

**Conclusion:** Circulating microRNAs are non-invasive and useful biomarkers that may represent an accessible window to visualize changes in mitochondrial disorders.

**Disclosure:** Nothing to disclose

## EPO2305

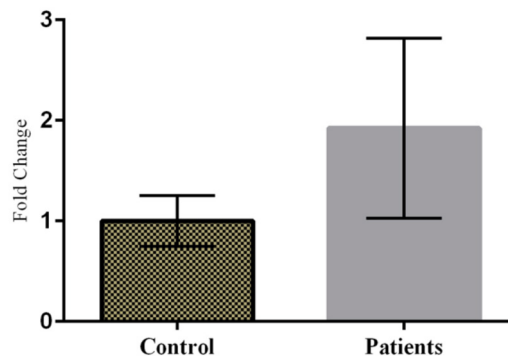
### Assessment of cryptochrome gene expression in multiple sclerosis patients

S. Bayat<sup>1</sup>, S.A. Sajedi<sup>2</sup>, S. Nabavi<sup>3</sup>

<sup>1</sup>Genetics, NIGEB, Tehran, Iran, Islamic Republic of, <sup>2</sup>Neurology, Golestan University, Golestan, Iran, Islamic Republic of, <sup>3</sup>Regenerative Biomedicin, Royan institute for stem cell biology, Tehran, Iran, Islamic Republic of

**Background and aims:** Multiple Sclerosis and Geomagnetic Disturbances: Investigating a Potentially Important Environmental Risk Factor

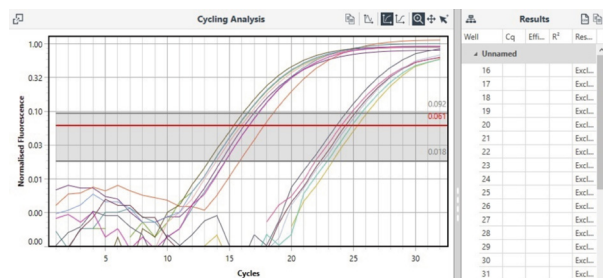
**Methods:** In this study we examined the expression levels of CRY2 gene in patients with MS and compared with controls has been discussed, RNA was extracted from blood samples of 35 patients with MS and 35 healthy controls. Patient complimentary information form in order to equality of the age status of the disease and patients' examination of migration and change of residence was also completed by patients After Cdna synthesis, gene expression by using Real-Time PCR technique was evaluated.



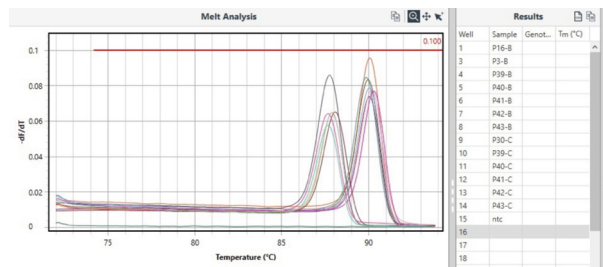
Comparative graph

**Conclusion:** Our pilot study result didn't show a significant difference in CRY expression among MS and healthy controls. It indicates this gene product is not the basis of MS patient possible sensitivity to geomagnetic field disturbance and other candidate should be considered for future studies.

**Disclosure:** Nothing to disclose



Duplication curve



Melting curve

**Results:** The results showed that CRY2 expression levels in patients compared to controls is not significant, since the value of the p (p value) obtained from the statistical analysis is 0.78 which is more than 0.05.

## EPO2306

**Non-motor features in carriers of intermediate alleles in the huntingtin gene with Parkinson's disease**

E.Y. Bragina<sup>1</sup>, D. Gomboeva<sup>1</sup>, M.A. Nikitina<sup>2</sup>, N.G. Zhukova<sup>2</sup>, V.M. Alifirova<sup>2</sup>

<sup>1</sup>*Tomsk National Research Medical Center of the Russian Academy of Sciences, Research Institute of Medical Genetics, Tomsk, Russian Federation*, <sup>2</sup>*Department of neurology and neurosurgery, Siberian State Medical University, Tomsk, Russian Federation*

**Background and aims:** Huntington's disease (HD) is a neurodegenerative disorder caused by a mutation in the huntingtin gene (HTT) of 36 or more CAG repeats. Intermediate alleles (IA) of HTT gene are in range 27-35 CAG repeats and have been associated to a normal phenotype. A growing body of evidence has emerged that individuals with IA have clinical symptoms similar to HD. The goal is to carry out research of a prevalence of CAG repeats in the IA range of the HTT gene in patients with Parkinson's disease (PwPD) in Tomsk, Russia.

**Methods:** We studied 64 unrelated Europeans PwPD (mean age 66.2±8.3, PD duration 7.6±5.6, H&Y stage 2.86±2.64, MDS-UPDRS-III 33.2±16.3). Clinical assessments were conducted using the UPDRS, H&Y Scale, MoCA-test, Hospital Anxiety and Depression Scale, Apathy Scale, Epworth Sleepiness Scale, QUIP-RS, PDQ-39, C-SSRS. Genomic DNA was extracted from peripheral blood. HTT CAG repeats genotyping was determined by a PCR with 5'-fluorescence labeled primers (Bastepe&Xin, 2015). The number of repeats was determined by capillary electrophoresis using the ABI 3730.

**Results:** HTT alleles with 13-18 CAG-repeats were the most observed. IA 27 CAG repeats were identified in 2 PwPD with 2 H&Y stage, severe cognitive impairment (15&13 points according to MOCA-test, compared with 24.4±7.8 in 62 PwPD equivalent by sex, age, education, stage) and suicidal thoughts/behavior (it was observed in only 4 PwPD: 100% PwPD with IA and 3.2% PwPD without IA).

**Conclusion:** The individuals with IA demonstrate non-motor features characteristic of PwHD (more pronounced and early manifesting cognitive and psychotic disorders). This study shows the need for further research of IA and clinical features in PwPD.

**Disclosure:** This work was supported by Council on grants of the President of the Russian Federation (№ MK-813.2019.7, "Clinical and epidemiological features of neurodegenerative diseases of the Tomsk region").

## EPO2307

**A biallelic GDAP2 loss-of-function variant in a patient with adult-onset cerebellar ataxia**

M. Breza<sup>1</sup>, T. Bourinaris<sup>2</sup>, S. Efthymiou<sup>2</sup>, R. Maroofian<sup>2</sup>, A. Athanasiou-Fragkouli<sup>2</sup>, J. Tzartos<sup>1</sup>, G. Velonakis<sup>3</sup>, E. Karavasilis<sup>3</sup>, G. Angelopoulou<sup>1</sup>, D. Kasselimis<sup>1</sup>, C. Potagas<sup>1</sup>, L. Stefanis<sup>1</sup>, G. Karadima<sup>1</sup>, G. Koutsis<sup>1</sup>, H. Houlden<sup>2</sup>

<sup>1</sup>*1<sup>st</sup> Department of Neurology, National and Kapodistrian University of Athens, Athens, Greece*, <sup>2</sup>*Molecular Neuroscience, UCL, London, United Kingdom*, <sup>3</sup>*Research Unit of Radiology & Medical Imaging, 2<sup>nd</sup> Dpt. of Radiology, National and Kapodistrian University of Athens, Medical School, Athens, Greece*

**Background and aims:** Recently, a new autosomal recessive cerebellar ataxia subtype (ARCA27) caused by biallelic mutations in the GDAP2 was described, a gene previously not linked to any diseases. The authors reported 2 unrelated cases with late-onset ataxia, progressive spasticity and dementia. Herein, we report a 3rd patient with a homozygous frameshift variant in GDAP2 and thus confirm the causality of this gene.

**Methods:** Exome data from a large UCL cohort of patients with ataxia were re-analyzed. This study was approved by the ethics committee of UCL Hospital NHS Foundation Trust (UCLH) and the Eginition Hospital.

**Results:** We identified a Greek patient carrying an ultra-rare homozygous 1-bp-deletion (NM\_017686.4;c.134delC), resulting in a frameshift and premature termination (p. Pro45LeufsTer22) in GDAP2, validated by Sanger sequencing. The patient was a 58-year-old male of Greek origin presenting with a progressive cerebellar syndrome starting at the age of 33 years with mild gait imbalance, ataxia and dysarthria. On examination at the age of 58, severe gait disturbance, dysmetria, dysdiachokinesia and brisk deep tendon reflexes were noted. Brain MRI revealed marked cerebellar atrophy, mild cortical atrophy, midbrain and pons atrophy (hummingbird sign), and thinning of corpus callosum as well as lentiform hemosiderin depositions.

**Conclusion:** Our patient is in line with the patients previously reported, presenting with a progressive cerebellar syndrome complicated with pyramidal features, dementia and dysexecutive syndrome. Our study provides a novel GDAP2 mutation in this Greek family, expanding the spectrum of causative mutations and further confirming the pathogenicity of GDAP2 mutations in ARCA.

**Disclosure:** Nothing to disclose

## EPO2308

**Spastic paraplegia 48 (SPG48): expanding the spectrum of AP5Z1 mutations – a phenotypic, genotypic and functional analysis**

M. Breza<sup>1</sup>, J. Hirst<sup>2</sup>, V. Chelban<sup>3</sup>, T. Bourinaris<sup>3</sup>, C. Mariotti<sup>4</sup>, G. Stevanin<sup>5</sup>, C. Blackstone<sup>6</sup>, J. Vandrovcova<sup>3</sup>, G. Velonakis<sup>7</sup>, E. Karavasilis<sup>7</sup>, C.-J. Lee<sup>8</sup>, S. Alikhwan<sup>8</sup>, J.S. Tzartos<sup>1</sup>, C. Kartanou<sup>1</sup>, L. Stefanis<sup>1</sup>, N.W. Wood<sup>3</sup>, G. Karadima<sup>1</sup>, H. Houlden<sup>3</sup>, G. Koutsis<sup>1</sup>

<sup>1</sup>School of Medicine, Eginition Hospital, National and Kapodistrian University of Athens, Athens, Greece,

<sup>2</sup>University of Cambridge, Cambridge Institute for Medical Research, Cambridge, United Kingdom, <sup>3</sup>UCL Institute of Neurology, London, United Kingdom, <sup>4</sup>Unit of Genetics of Neurodegenerative and Metabolic Diseases, Fondazione IRCCS, Istituto Neurologico Carlo Besta, Milan, Italy,

<sup>5</sup>Institut du Cerveau et de la Moelle épinière, INSERM, Paris, France, <sup>6</sup>NINDS, Bethesda, USA, <sup>7</sup>Research Unit of Radiology & Medical Imaging, <sup>2nd Dpt. of Radiology, National and Kapodistrian University of Athens, Medical School, Athens, Greece, <sup>8</sup>UCL, London, United Kingdom</sup>

**Background and aims:** Biallelic mutations in the AP5Z1 gene are known to cause a very rare complex form of hereditary spastic paraplegia (HSP) referred to as SPG48. SPG48 follows an autosomal recessive inheritance pattern. To date, only 4 confirmed pathogenic mutations in the AP5Z1 gene have been reported. The aim of this study was to investigate a Greek HSP cohort for mutations in the AP5Z1 gene.

**Methods:** We performed whole exome sequencing (WES) in 38 probands with HSP phenotype negative for variants in common HSP genes. Functional studies were conducted on fibroblast cell lines derived from the patient identified.

**Results:** We identified a Greek patient carrying a novel homozygous frameshift pathogenic variant c.1719delG (p. Gly573fs\*) in the AP5Z1 gene (NM\_014855.2), confirmed by Sanger sequencing. The patient was a 65-year-old man with known epileptic seizures (generalized tonic-clonic) since he was 30 years old that presented at the age of 48 years with a progressive spastic gait disorder, complicated by peripheral neuropathy. Brain MRI findings included thinning of corpus callosum and ears-of-the-lynx. Functional studies performed on fibroblast cell lines support and expand previous findings from SPG48 cell lines showing defects in endosome/lysosome homeostasis.

**Conclusion:** Insights from the present report expand the clinical and genetic spectrum of SPG48 and our understanding of the underlying pathomorphological processes. The exact pathomechanism of AP5Z1-associated complicated HSP remains, however, to be elucidated.

**Disclosure:** Nothing to disclose

## EPO2309

**Late-onset familial amyloid polyneuropathy (FAP): A Case Report and Literature Review of a rare entity**

M. Breza<sup>1</sup>, D. Karathanasis<sup>1</sup>, C. Kartanou<sup>1</sup>, A. Daponte-Dimitrakopoulou<sup>1</sup>, V.E. Papadopoulos<sup>1</sup>, P. Kokotis<sup>1</sup>, V. Zouvelou<sup>1</sup>, L. Stefanis<sup>1</sup>, G. Karadima<sup>1</sup>, E. Kastritis<sup>2</sup>, G. Koutsis<sup>1</sup>, M. Rentzos<sup>1</sup>

<sup>1</sup>*1<sup>st</sup> Department of Neurology, National and Kapodistrian University of Athens, Athens, Greece, <sup>2</sup>Department of Clinical Therapeutics, National and Kapodistrian University of Athens, Athens, Greece*

**Background and aims:** Transthyretin (TTR) Val30Met familial amyloid polyneuropathy (FAP ATTR Val30Met) is the most common form of FAP, emerging usually in patients' 3rd or 4th decade. It is characterized by ATTR amyloid deposits in various tissues and organs, like peripheral nerves, heart, gastrointestinal tract, kidneys, and eyes. A late-onset form of TTR-FAP involving both large and small sensory fibers and more severe motor involvement has been recently identified. Here, we report a late-onset case of hereditary ATTR amyloidosis and review the literature of late-onset FAP ATTR Val30Met cases.

**Methods:** DNA-sequencing of the TTR gene was performed, identifying a Val30Met mutation. Literature searches were conducted on MEDLINE (PubMed), Scopus and clinicaltrials.gov, using several key words and their combinations. Subjects were selected with symptom onset at age  $\geq 50$  years (late-onset).

**Results:** We describe a 67-year-old who developed a progressive axonal sensorimotor polyneuropathy with autonomic and gastrointestinal involvement at the age of 64. Family history was initially negative but the origin of the patient was from an endemic FAP area of Sweden. Abdominal fat biopsy showed the presence of amyloid deposits. The patient did not have any renal, ocular, leptomeningeal or cardiac symptoms caused by amyloidosis. An affected 1st cousin of the proband was later identified. He was initiated on treatment with tafamidis.

**Conclusion:** Late-onset FAP Val30Met is a fatal, progressive disorder with varying penetrance difficult to diagnose, and may occur in cases without family history. Increased characterization of these cases may assist earlier recognition and improve patient therapeutic outcomes.

**Disclosure:** Nothing to disclose

## EPO2310

### Deletion in HSPB8 gene leads to dilated cardiomyopathy with impaired autophagy worsened by immunosuppressive drugs: characterization of a new phenotype.

G. Bruno, F. Napolitano, S. Sampaolo, G. Di Iorio  
 Department of Advanced Medical and Surgical Sciences,  
 University of Campania "Luigi Vanvitelli", Naples, Italy

**Background and aims:** Mutations in genes encoding for small heat shock proteins such as HSPB8, are associated to distal hereditary motor neuropathies (dHMN) and distal rimmed vacuoles myopathy. We characterize a new phenotype in a family with a novel mutation in HSPB8 gene and we support the role of peripheral blood smear (PBS) as a simple and effective tool for screening in vacuolar autophagic myopathies (AVMs).

**Methods:** A 52-year-old man complained about distal muscle weakness, persistent hyperkalemia and severe dilated cardiomyopathy. Familial history revealed one sister with mild cardiomyopathy and his mother deceased for heart failure. A complete neuromuscular protocol was carried out, including whole exome sequencing (WES). 3 months later he received heart transplant and started treatment with cyclosporine.

**Results:** WES identified a novel heterozygous deletion in HSPB8 (c.266del/p.Pro89HisfsTer12), also detected in his affected sister. PAS-positive vacuoles were evident in lymphocytes such as on muscle samples. Immunofluorescence study conducted using LC3 and P62 antibody confirmed an impaired autophagy on both tissues (Fig.1). After one year follow-up, a severe muscle weakness of axial and proximal districts was noticed.

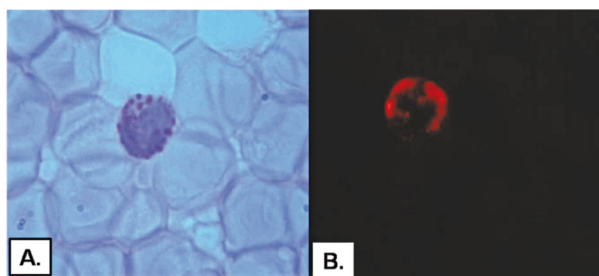


Fig. 1 Peripheral blood smear. a) Lymphocyte with Pas positive granules b) Impaired autophagy demonstrated by LC3 spots on lymphocytes of the patient.

**Conclusion:** We expanded the phenotypic spectrum of HSPB8 mutations describing for the 1st time a familial dilated cardiomyopathy related to a deletion in this gene. Moreover it is well known that HSPB8 silencing exhibited blocking effects on the autophagosome-lysosome fusion and we suppose that cyclosporine could have worsened muscle weakness due to his effect on autophagic flux. An adequate use of drugs that induces autophagy should be considered in patients with AVMs.

**Disclosure:** Nothing to disclose

## EPO2311

### Phenotypic variability in two patients with GLUT1 mutations

V. Carvalho, C.A. Cruto

Neurology, Hospital Pedro Hispano, Matosinhos, Portugal

**Background and aims:** Glut-1 deficiency is a heterogeneous metabolic disorder. Phenotypic presentations range from infantile epilepsy with developmental delay and microcephaly to a myriad of movement disorders.

**Methods:** case report.

**Results:** Patient 1: 34-year-old female followed since childhood due to epileptic encephalopathy. Family history was unremarkable. On examination she presented microcephaly, cognitive impairment, face and upper limb dystonia with action myoclonus, and spastic-ataxic gait. She was on levetiracetam 2000mg, zonisamide 200mg, clonazepam 1mg and baclofen 20mg. Brain-MRI showed mild atrophy. EEG showed normal background activity with no epileptic discharges during myoclonus. The spinal tap showed CSF glucose of 39mg/dl. Genetic testing disclosed the c.1097\_1100del in the SLC2A1 gene, not previously described. She started ketogenic diet, with clinical improvement. Patient 2: 20-year-old female with idiopathic generalized absence epilepsy from age 6. She also presented painful paroxysmal events of involuntary movements in her legs, usually occurring during exercise, compatible with a possible exercise-induced paroxysmal dyskinesia. A paternal aunt had epilepsy. She was on ethosuximide 250mg. Examination was normal. EEG showed normal background activity with paroxysmal 3-4Hz spike-and-wave activity. Ethosuximide was then increased and clonazepam was introduced. The seizure frequency improved, and complete dyskinesia remission was achieved. Spinal tap showed low glucose of 41mg/dl. Genetic testing revealed c.458G>A variant in SLC1A1.

**Conclusion:** Glut-1 presents a wide spectrum of phenotypes, often overlapping. Variability might contribute, as in our patients, to delayed diagnosis – depriving patients of timely treatment. Reporting and raising awareness for this variability might help improve diagnosis acuity.

**Disclosure:** Nothing to disclose

## EPO2312

### Rare cause of Hypomyelinating Leukodystrophy type 7: “Gly672Glu homozygous variant of the POLR3A gene”

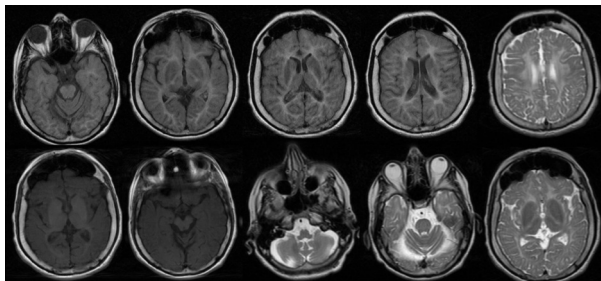
G. Carvalho Monteiro<sup>1</sup>, B. Povedano Margarit<sup>1</sup>, J.M. Celi Celi<sup>1</sup>, D.E. Barbero Jiménez<sup>1</sup>, J. Hernandez Cristobal<sup>1</sup>, A. Yusta Izquierdo<sup>1</sup>, A. Pujol<sup>2</sup>, M. Ruiz Sales<sup>2</sup>

<sup>1</sup>Neurology, Guadalajara University Hospital, Spain, Guadalajara, Spain, <sup>2</sup>Clinical Molecular Geneticist, Institut D'investigación Biomedica de bellvitge, Barcelona, Spain

**Background and aims:** We present the 1<sup>st</sup> Spanish patient report with a rare Hypomyelinating Leukodystrophy of autosomal recessive (AR) inheritance by homozygous p.gly672Glu in the POLR3A gene.

**Methods:** A 34-year-old male patient present progressively since childhood, psychomotor retardation, appendicular and trunk ataxia with negative romberg, accompanied in the last years of a spastic tetraparesis with aquileo clone and Babinski, severe dysarthria, limitation of ocular extrinsic motility and dystonic cephalic movements. Subsequently, the patient develops mild cognitive impairment and dysphagia. On examination, there are objective tooth separation and hypogonadism.

**Results:** Cerebral MRI visualizing Hyperintensity of white substance, cortico-subcortical and cerebellar atrophy. Metabolic, autoimmune, enzymatic, infectious were normal. Genetic Study: Homozygous pathogenic variant p. GLY672Glu in the POLR3A GEN compatible with type 7 hypomyelinating leukodystrophy with hypogonadotropic hypogonadism of AR inheritance.



**Conclusion:** Hypomyelinating leukodystrophy 7 described by Wolf is an AR neurodegenerative disorder characterized by the appearance of progressive motor impairment in childhood that manifests as spasticity, ataxia, tremor and cerebellar signs, as well as mild cognitive regression. Other features may include hypodontia or oligodontics and hypogonadotropic hypogonadism. Brain MRI is typical of a hypomyelinating leukoencephalopathy (hyper or isointense appearing white matter on T1 and concomitant hyperintense white matter structures on T2), corticosubcortical and cerebellar atrophy. The protein encoded by the POLR3A gene is the largest subunit of the RNA polymerase III complex, the pathogenic mechanism being the loss of function of this protein. As far as we know, this is also the first report of the missense pathogenic variant p.Gly672Glu in homozygosis in Spain

**Disclosure:** Nothing to disclose

## EPO2313

### Amyotrophic Lateral Sclerosis, genetics and ambient risk factors, a cohort epidemiologic study

B. Conde<sup>1</sup>, P. Canedo<sup>2</sup>, N. Martins<sup>3</sup>, J.C. Winck<sup>3</sup>  
<sup>1</sup>Medicina, FMUP, Vila real, Portugal, <sup>2</sup>Diagnosis, IPATIMUP, Porto, Portugal, <sup>3</sup>Medicina, FMUP, Porto, Portugal

**Background and aims:** Amyotrophic Lateral Sclerosis (ALS) is a rare and progressive neurodegenerative disease, involving upper and lower motor neurons. The real cause of this motoneuron diseases (MND) remains unknown. More than 100 autosomes genes have already been described, and some factors associated with radiations, heavy metals and repetitive motor neuron trauma, associated with work or sports have been related to ALS.

**Methods:** An epidemiologic study was conducted, with application of an epidemiologic questionnaire and a genetic exome analysis to 30 ALS patients, with probable or confirmed diagnosis by El Escorial criteria, consecutively enrolled from October 2017 to March 2018.

**Results:** Of the 30 ALS patients enrolled, 70% (n=21) were males, with a mean age of 65.2±9.8 years. Spinal onset ALS was predominant (60%; n=18), and almost cases were sporadic (1 family ALS). In 6 (20%) patients all risk factors were excluded, and gamma radiation was associated with 8 (26.7%) ALS patients. For these patients, the whole exome sequencing was also performed, and a phenotype-genotype analysis was developed using the GenIO software, and the variants were classified according to the American College of Medical Genetics (ACMG) classification. In this study, Senataxin (SEXT) and Neurofilament heavy polypeptide (NEFH) gene mutations were the most prevalent as dominant mutations. The SEXT mutation was associated with a better prognosis even in bulbar onset ALS patients, and, mainly when the SEXT mutation was the only mutation identified.

**Conclusion:** SEXT mutation alone interferes positively in ALS disease progression.

**Disclosure:** Nothing to disclose

## EPO2314

**A novel variant in DNAJC13 gene associated with Parkinsonism syndrome.**A.-G. Corbille<sup>1</sup>, P.G. Damier<sup>1</sup>, J. Chelly<sup>2</sup><sup>1</sup>Neurology, *hopital Laennec, Nantes, France*, <sup>2</sup>Genetics, *CHU, Strasbourg, France*

**Background and aims:** Genetic involvement accounts for approximately 5-10% of patients with Parkinson's disease (PD). DNAJC13 p.Asn855Ser mutation was identified in a large Canadian family by exome sequencing and seems to be involved in the pathogenic process. Other rare variants in the gene have also been identified as PD susceptibility factor but their causative role remains to be demonstrated.

**Methods:** We analyzed a panel of 127 genes involved in Parkinson and related disorders in a patient who has developed a neurological disease with parkinsonism features, and in her two siblings.

**Results:** The patient is a 65-year-old woman who has progressively developed a cerebellar syndrome associated with choreic movements, intermittent myoclonus with postural tremor, cognitive alteration mostly affecting executive and praxic functions, and hyperreflexia. After 15 years, she developed a severe resting tremor, markedly improved by levodopa. Cerebral MRI showed parietal predominant cortical atrophy. Electrophysiological study of the tremor found a regular 4.5Hz resting tremor.

**Conclusion:** This observation supports the potential role of p.His1789Arg variant in DNJC13 in parkinsonism syndrome.

**Disclosure:** Nothing to disclose

## EPO2315

**Recognition of some genetic diseases in cerebral palsy cases**L. Cuznetz<sup>1,2</sup>, S. Hadjiu<sup>1,2</sup>, C. Căclii<sup>1,2</sup>, N. Lupusor<sup>1,2</sup>, C. Griu<sup>1</sup>, L. Feghiu<sup>1,3</sup>, R. Eremea<sup>1</sup>, M. Sprincean<sup>1,2</sup>, N. Revenco<sup>1,2</sup><sup>1</sup>State University of Medicine and Pharmaceutics „Nicolae Testemițanu”, *Chisinau, Republic of Moldova*, <sup>2</sup>Municipal Scientific and Practical Institute Mother and Child, *Republic of Moldova*, <sup>3</sup>National Centre of Epileptology

**Background and aims:** We set out to conduct a study to analyze children with CP in order to elucidate some distinct phenotypes. To conduct differential diagnosis between CP and some Neurogenetic pathologies by analyzing the phenotype of patients suspected for PC, with the purpose of assessing the prognosis and improving the care of patients.

**Methods:** A retrospective study was conducted to analyze the history and disease records of children admitted to the neurology sections of the IMSP Institute of Mother and Child of the Republic of Moldova during 2014–2018. All 200 children underwent a complex clinical-paraclinical examination, in addition to performing brain MRI and genetic-molecular examinations.

**Results:** The following pathologies were confirmed among patients suspected of CP: (1) neuronal ceroid lipofuscinosis (1 case), (2) childhood Krabbe disease (1 case), (3) Dopa-responsive dystonia (1 case), (4) deficiency glucose transport type 1 (1 case), (5) mitochondrial encephalopathy with lactic acidosis and stroke-like episodes (MELAS) (1 case), (6) Hereditary spastic paraplegia (1 case), (7) spinal amyotrophy (2 cases), (8) hereditary myopathy (1 case), (9) Gaucher disease (1 case), (10) Rett syndrome (1 case).

**Conclusions:** Children with CP should be evaluated for some neurogenic disorders, which may mimic a PC. Neuroimaging and molecular-genetic examinations are the ones that help us elucidate the diagnosis. Recognition of the underlying causes of neuro-motor disability will allow improvement in the prognosis, treatment and care of these patients. Specialists in the field should remain cautious in all cases when a PC is suspected, in order to discover the causes of disability.

**Disclosure:** Nothing to disclose

## EPO2316

**Ubiquilin 2 gene mutation presenting with adult-onset ataxia and spasticity; report of a novel phenotype case.**

T. Stardeli<sup>1</sup>, T. Afrantou<sup>1</sup>, G. Xiromerisiou<sup>2</sup>, S.-A. Sintila<sup>1</sup>, S. Kitmeridou<sup>1</sup>, M. Karatzikou<sup>1</sup>, M. Dimitriou<sup>1</sup>, N. Smirni<sup>1</sup>, N. Grigoriadis<sup>1</sup>  
<sup>1</sup>2<sup>nd</sup> Department of Neurology, AHEPA University Hospital, Thessaloniki, Greece, <sup>2</sup>Department of Neurology, Neurogenetics Unit, Medical School, University of Thessaly, Larissa, Greece

**Background and aims:** Ubiquitin-positive inclusions are considered a hallmark of ALS pathology. Ubiquilin 2 (UBQLN2) is a member of the ubiquitin-like protein family for which studies have revealed a pathogenic role in X-linked ALS with/without frontotemporal dementia.

**Methods:** We present a 35-year-old female with unremarkable history that presented with oscillopsia, dizziness and gait instability with subacute onset and gradual progression.

**Results:** The neurological examination revealed mild cognitive impairment (MCI), diplopia, dysarthria, tendon reflex hyperexcitability, marked limb and gait ataxia. During the first two years the patient evolved dysphagia, incontinence, fasciculations and required bilateral assistance for walking. CSF analysis, blood, autoimmune, metabolic and genetic exams for common modalities causing ataxia and spasticity showed no pathology. Brain and spinal MRI as well as investigation for underlying malignancy were normal. Needle EMG was consistent with mild denervation in the first dorsal interosseous muscle. Immunotherapies were administered with no response. Whole Exome Sequencing revealed a mutation in UBQLN2 gene [c.1019G>T (p.Ser340Ile)]. The patient's parents underwent genetic testing and the same mutation was found in her 65-year old father, who is asymptomatic with the same needle EMG findings. The patient after initial deterioration has a stable course in a 5-year follow-up receiving symptomatic treatment.

**Conclusion:** UBQLN2 mutations have been associated with ALS with spasticity, muscle weakness, dysphagia and dysarthria. Women tend to manifest milder phenotypes with late onset and decreased penetrance. In our case the predominant clinical features are MCI, motor neuron involvement (mostly upper) along with evident ataxia that is not previously described for UBQLN2 gene mutations.

**Disclosure:** Nothing to disclose

## EPO2317

**A14696G HOMOPLASMIC MUTATION IN THE MITOCHONDRIAL tRNAGlu GENE - CASE REPORT**

F.U. Dogan<sup>1</sup>, S. Omerhoca<sup>2</sup>, T. Gunduz<sup>1</sup>, M. Kürtüncü<sup>1</sup>, M. Eraksoy<sup>1</sup>  
<sup>1</sup>Neurology, Istanbul University, Istanbul Faculty of Medicine, Istanbul, Turkey, <sup>2</sup>Neurology, İstanbul Bağcılar Research and Training Hospital, Istanbul, Turkey

**Background and aims:** Mitochondrial diseases have a wide clinical spectrum. After the 1st reporting of pathological mutations in mitochondrial DNA in the late 1980s, many mitochondrial genomic mutations have been identified to date. Herein, we report a case with a mutation in the pseudouridine loop stem of mitochondrial tRNAGlu.

**Methods:** A 35-year-old male patient presented with bilateral visual loss, speech impairment, and difficulty in walking at the age of 7. Over the past 5 years, he has been complaining of hearing loss and difficulty in swallowing. His mother and his father were cousins and his mother's uncle had a history of progressive vision loss. Neurological examination revealed cognitive impairment, dysarthria, bilateral vision and sensorineural hearing loss, bilateral muscle weakness and spasticity of the lower extremities, increased deep tendon reflexes. Laboratory tests were normal except for high serum lactate levels. Brain MRI showed bilateral T2 hyperintense and T1 hypointense lesions in the putamen. Electromyography demonstrated myogenic involvement in the proximal muscles. The Alexander Practical Intelligence test was consistent with severe mental retardation.

**Results:** Whole-mitochondrial genome analysis revealed homoplasmic A14696G mutation in the mt-tRNAGlu gene  
**Conclusion:** The mutation A14696G changes the nucleotide 51 of the pseudouridine loop of the canonical tRNA molecule to create a new base pair and reduces wobble. In the A14696G mutation, the phenotype is expressed only in cases with elevated mutant mitochondrial DNA ratio. Interestingly, our case was homoplasmic, although this mutation was reported as only heteroplasmic in the literature.

**Disclosure:** Nothing to disclose



## EPO2318

**The study of arteriovenous malformations in the residents of Russia**

S. Erkinova<sup>1</sup>, E. Sokolova<sup>2</sup>, E. Voronina<sup>3</sup>, M. Filipenko<sup>4</sup>

<sup>1</sup>Department of clinical neurology, Novosibirsk State Medical University, Novosibirsk, Russian Federation,

<sup>2</sup>Institute of Chemical Biology and Fundamental Medicine, Siberian Division, Novosibirsk, Russian Federation,

<sup>3</sup>Laboratory Of Pharmacogenomics, Institute of Chemical Biology and Fundamental Medicine, Siberian Division, Russian Academy of Sciences, , Novosibirsk, Russian Federation,

<sup>4</sup>Siberian Division of Russian Academy of Sciences, Institute of Chemical Biology and Fundamental Medicine, Novosibirsk, Novosibirsk, Russian Federation

**Background and aims:** Brain arteriovenous malformations (BAVMs) are vascular lesions characterized by a tangle of abnormal arteries and veins that directly shunt blood from the arterial to venous circulation. The combination of some external (smoking, alcohol consumption) and internal (the influence of polymorphic variants of genes) factors can lead to BAVM. In our study we aimed to investigate the influence of SNPs involved in BAVM and their influence on clinical cases: VEGFA, VEGFR2(rs2010963, rs2305949), CDKN2B-2A(rs1333040, rs7865618), TNF-a(rs1800629), IL-1a(rs1800587), IL6(rs1800795) genes, which were associated with BAVMs.

**Methods:** Clinical trial included 361 patients with BAVMs confirmed with Magnetic Resonance Imaging in clinical centers in Novosibirsk. The control group consisted of 380 individuals without BAVM. Determination of polymorphic variants of genes was performed by Real Time qPCR using TaqMan-competing probes.

**Results:** For the SNP rs1800795 of IL6 gene is shown the risk of BAVM for patients with genotype GG (OR=1.372, p=0.004) is 2 times higher than for patients with genotype CC and GC. For the SNP rs7865618 of CDKN2A gene the risk of BAVM with genotype GG (OR=1.132, p=0.02) is 2 times higher than for patients with genotypes GA and AA.

**Conclusion:** Thus, the GG genotype of IL6 gene and GG genotype of CDKN2A gene may be a risk factor for Russian population, result of the clinical course and lead to complications of patients with BAVM. As for the other studied polymorphic loci, any statistically significant differences weren't found in the frequency of alleles and genotypes in the control group and the group of patients.

**Disclosure:** Nothing to disclose

## EPO2319

**A retrospective observational study looking at phenotype and genotype in a cohort of HSP patients in a specialist neurology centre**

J. Fulton, A. Marcerollo, J. Somerset, J. Farah,

M. Bonello

The Walton Centre NHS Foundation Trust, Liverpool, United Kingdom

**Background and aims:** Hereditary spastic paraplegia (HSP) is a phenotypically diverse condition with at least 60 genes shown to be associated with the condition resulting in difficult genotypic diagnosis and diagnostic uncertainty.

**Methods:** We conducted a retrospective review of the case notes of patients with a diagnosis of HSP at the Walton Centre focusing on clinical characteristics such as gender; age at onset; simple or complicated; clinical signs and symptoms; genetics and management.

**Results:** A total of 19 patients were identified, of which 1 had inadequate information available. 15 patients were male and overall 13 were classified as simple HSP (72%). The age of symptom onset was spread evenly between infancy up to 49 years. All patients had a degree of lower limb spasticity, with additional features including dysarthria, cognitive impairment, seizures, upper limb weakness and global development delay. 2 patients had an SPG4 mutation, whilst 1 had an SPG11 mutation and 1 an SPG11 and 15 mutation. 2 patients declined genetic testing and 12 were unknown. 11 (67%) went on to have IT baclofen and 1 underwent elective dorsal rhizotomy.

**Conclusion:** The relationship between symptoms and genetics is complex as age of symptom onset, disease severity and response to treatment are variable and additional symptoms in complicated HSP are diverse. HSP can pose a diagnostic dilemma due to the heterogenous phenotype and broad genotype.

**Disclosure:** Nothing to disclose

## EPO2320

**The Involvement of Humanin in Development of Parkinson's disease**

B. Zapala<sup>1</sup>, O. Chmura<sup>1</sup>, J. Koper<sup>1</sup>, A. Spychałowicz<sup>2</sup>,  
B. Solnica<sup>1</sup>, J. Gawlik<sup>1</sup>

<sup>1</sup>*Department of Clinical Biochemistry, Collegium Medicum Jagiellonian University, Cracow, Poland, <sup>2</sup>Department of Rehabilitation, The Center of Movement Organ Rehabilitation "KRZESZOWICE" SP ZOZ, Krzeszowice, Poland*

**Background and aims:** Humanin (HN) was identified in the brain of a patient diagnosed with Alzheimer's disease (AD). This 24-amino acid peptide was shown to suppress the neuronal cell loss caused by amyloid- $\beta$  (A $\beta$ ) and by amyloid precursor protein (APP) mutations associated with early onset familial Alzheimer's disease (FAD). Recent studies revealed that HN activity is not confined only to neurons, but it also involves other compartments of the brain as well as extraneural tissues. These results suggest that HNs may influence other neurodegenerative disorders such as Parkinson's disease (PD).

**Methods:** DNA was isolated from peripheral blood from 214 patients with diagnosed PD and 193 healthy adult individuals. Genotyping was performed on the 3130xl Genetic Analyzer (Applied Biosystems).

**Results:** We genotyped the not-known polymorphic variants of 13Thr- and 13Ile-HN10b (with threonine or isoleucine in amino acid position 13), encoded by HN gene in PD-diagnosed patients. Genotyping results have not shown any significant association between identified 13Thr- and 13Ile-HN10b polymorphic variants (38C>T) in control as well in PD-diagnosed individuals. However we demonstrated higher frequency of C/T and C/C genotypes in comparison to T/T in patient with dementia (MMSE). Similar relation were observed in patients with severe symptoms of PD progression (basing on Hoehn and Yahr as well as UPDRS rating scale).

**Conclusion:** Our results suggested that 13Thr- and 13Ile-HN10b polymorphic variants (38C>T) is not associated in development of PD. However we can speculate that T/T genotype could be considered as a protective factor during the development of PD.

**Disclosure:** The study was financially supported by the Ministry of Science and Higher Education (grant No: K/PBP/000318). i to coś na koniec abstraktu

## Neuroimaging 2

## EPO2321

**Cerebro-cerebellar structural covariance in temporal lobe epilepsy with hippocampal sclerosis**

V. Marcián<sup>1</sup>, R. Mareček<sup>2</sup>, M. Pail<sup>3</sup>, M. Brázdil<sup>3</sup>

<sup>1</sup>Department of Neurology, University Hospital Ostrava, Ostrava, Czech Republic, <sup>2</sup>Behavioral and Social Neuroscience Research Group, CEITEC (Central European Institute of Technology), Masaryk university, Brno, Czech Republic, <sup>3</sup>1<sup>st</sup> Department of Neurology, St. Anne's University Hospital and Medical Faculty of Masaryk University, Brno, Czech Republic, Brno Epilepsy Center, Brno, Czech Republic

**Background and aims:** To evaluate the relationship between the cerebral and cerebellar morphological changes in temporal lobe epilepsy with hippocampal sclerosis (TLE-HS). We focused on vermis because it is an anatomically well-defined structure and within the majority of its substructures significantly different in patients as compared to controls in which the interconnection with the amygdala and hippocampus were experimentally demonstrated and the effect of stimulation on hippocampal seizures was studied. Structural covariance, as a measure of the degree to which studied gray matter volumes are associated, is considered to reflect both structural and functional connectivity.

**Methods:** The study cohort included 21 intractable TLE-HS patients (14 left-sided, 7 right-sided) and 38 healthy controls (HC). All patients later underwent anteromedial temporal lobe resection. All subjects were examined using 1.5T MRI. The structural covariance of temporal lobe structures, insula, and thalamus with cerebellar substructures was examined using partial least squares regression.

**Results:** The structural covariance differed significantly between left and right TLE-HS patients as compared to healthy controls. The analysis revealed significant negative covariance between anterior vermis and the right amygdala-hippocampal complex in the left TLE-HS group. No significance was observed for the right TLE-HS group.

**Conclusion:** The observed structural covariance between the cerebellum and supratentorial structures in TLE-HS suggests associations beyond the mesial temporal lobe structures and thalamus. Our data confirmed the anterior vermis to be an integral part of this system of interconnected changes.

**Disclosure:** Nothing to disclose

## EPO2322

**Painful diplopia: Do not forget Thyroid-Associated Ophthalmopathy.**

T. Mavridis<sup>1</sup>, G. Velonakis<sup>2</sup>, A. Kallergi<sup>3</sup>, E. Vogiatzi<sup>3</sup>, E. Zapanti<sup>3</sup>, V. Zouvelou<sup>1</sup>

<sup>1</sup>1<sup>st</sup> Department of Neurology, Eginition Hospital, Medical School, National and Kapodistrian University of Athens, Athens, Greece, <sup>2</sup>Research Unit of Radiology and Medical Imaging, University of Athens, Athens, Greece, <sup>3</sup>1<sup>st</sup> Endocrine Section, Diabetes Center, Alexandra Hospital, Athens, Greece

**Background and aims:** Thyroid-Associated Ophthalmopathy (TAO), is part of an autoimmune process caused by antibodies directed against receptors present in thyroid cells, extraocular muscles and soft tissue of the orbit. TAO is generally associated with hyperthyroidism (~90% of the cases). However, ~10% of patients with TAO present with euthyroidism or hypothyroidism. We present a rare case of painful ophthalmoplegia attributed to euthyroid TAO.

**Methods:** Case Report

**Results:** A 45-year-old male presented with 3 days history of painful diplopia. Clinical examination revealed right exophthalmos, increased resistance and pain to retro-pulsion, bulbar conjunctival injection with associated lacrimation, eye lid edema and weakness of the right external rectus muscle. MRI of the orbits revealed extensive fusiform enlargement of the right medial rectus, superior rectus and superior oblique muscles with gadolinium enhancement and sparing of their myotendinous junction. The above clinical and radiological presentation suggested a retractive ophthalmopathy with tendon sparing; thus the diagnosis of TAO was made. Endocrinological examination confirmed diagnosis of TAO, in the presence of normal thyroid function tests. Anti-Tg, anti-TPO and TRAbs were within normal range. Interestingly, spontaneous clinical remission was noted a month after the onset. Spontaneous remission of TAO is rare and requires regular monitoring.

**Conclusion:** TAO is not always associated with hyperthyroidism and in cases where anti-thyroid autoantibodies are also negative, diagnosis is challenging. Clinical and radiological findings remain the best diagnostic tools for painful ophthalmopathy. Exclusion of other causes of orbital muscle swelling (e.g. inflammatory orbitopathy, granulomatous diseases, caroticocavernous fistula, tumors and idiopathic myositis) is mandatory for the diagnosis of TAO.

**Disclosure:** Nothing to disclose

## EPO2323

**Idiopathic thoracic spinal cord herniation (ITSCH) with minimal neurological deficit: report of two cases**K. Mazurenka<sup>1</sup>, A. Likhachova<sup>2</sup><sup>1</sup>Neurology and Neurosurgery, Belarusian Medical Academy of Postgraduate Education, Minsk, Belarus, <sup>2</sup>Neurological Department, Minsk City Clinical Hospital 5, Minsk, Belarus

**Background and aims:** ITSCH is a rare but serious pathology causing progressive thoracic myelopathy. Symptoms typically include back pain, progressive spastic paraparesis and sphincter dysfunction. We report 2 cases of ITSCH with minimal neurological symptoms, which were initially misdiagnosed.

**Methods:** Case 1. A 41-year-old women presented with burning pain in her right leg for the last 6 months. Neurological examination showed impaired pain and temperature sensation in the right leg without any other neurological deficit. Case 2. A 53-year-old man presented with a 2-month history of abdominal pain radiating to the back in left T9-T10 dermatome. His neurologic examination was normal. Patients didn't have the history of spinal surgery, trauma and back pain. They underwent MRI of the thoracic spine.



Fig-1

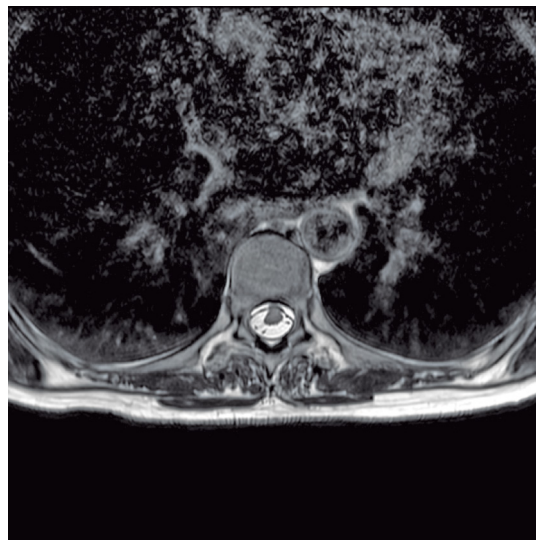


Fig-2

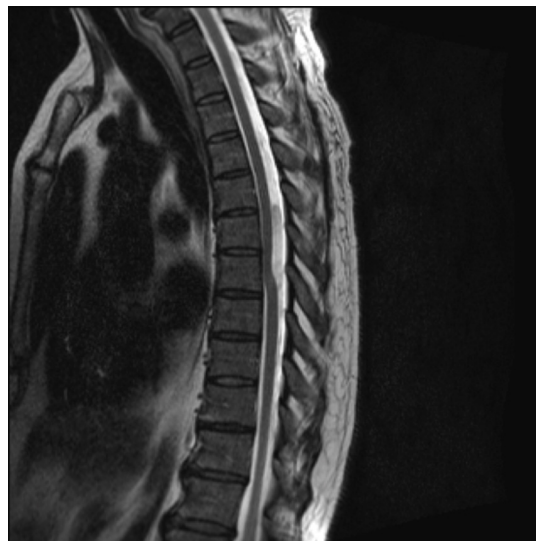


Fig-3

**Results:** In the 1st case, MRI revealed ventral displacement of the spinal cord with a C-shaped dorsal indentation and small anterior dural defect at the level of the T7-8 disk. Subarachnoid space posterior to the cord was enlarged (Fig-1 Sagittal T2-WI, Fig-2 Axial T2-WI). In the 2nd case, MRI shows focal dorsal indentation and anterior displacement of the thoracic cord at T6-7 with positive "Scalpel Sign", consistent with dorsal thoracic arachnoid web (Fig-3 Sagittal T2-WI). Association of ITSCH with a dorsal arachnoid cyst has been reported. The patients were treated conservatively with clinical improvement and remained neurologically stable during 1-month follow-up.

**Conclusion:** ITSCH is a frequently misdiagnosed pathology that can manifest with minimal clinical symptoms. MRI is an excellent tool for diagnosing this rare entity.

**Disclosure:** Nothing to disclose

## EPO2324

**Application of Diffusion Tensor Imaging (DTI) in Demyelinating White Matter Disease (MS)**

W. Mustafa<sup>1</sup>, L. El-Serougy<sup>2</sup>

<sup>1</sup>Neurology, Mansoura University Hospital, Mansoura, Dakahliya, Egypt, <sup>2</sup>Radiology, Mansoura University Hospital, Mansoura, Dakahliya, Egypt

**Background and aims:** Highlight the clinical utility of qualitative and quantitative DTI parameters in diagnosis, prognosis and follow up of demyelinating white matter disease (MS).

**Methods:** 40 patients (17 males and 23 females) were included with (mean age 33.6 years, range: 17-49 years and mean disease duration, 35 months). 20 healthy controls (8 males and 12 females), were recruited (mean age: 30.3, range: 18-47 years). All patients underwent routine pulse sequences, including axial fast spin echo T1, T2 and 3D high resolution T2 FLAIR images. Also delayed post-Gadolinium T1 images were obtained in MS cases for assessment of plaque activity. DTI was acquired after the routine sequences using single-shot EPI sequence.

**Results:** In this study all MS patients have shown significant increase of the MD and to less extent decrease of FA of NAWM compared to NWM of the control group (p-value 0.003 for MD and 0.012 for FA). Also, this study revealed high significant differences of all DTI indices between active and inactive plaques (p-value <0.001). On using cut off value of FA  $\leq 0.23$ , ADC  $\geq 1.31$ , AD  $\geq 1.63$  and RD  $\geq 1.05$ , we get the highest sensitivity, specificity and accuracy. So, these results suggest the relevance of DTI utility as additional quantitative parameter for assessment of plaque activity.

**Conclusion:** Diffusion tensor imaging has promising role in addition to conventional MR imaging in early diagnosis, prognosis and follow up of MS cases. Also, characterizes intrinsic damage of each individual major WM tract, and study damage topography among MS patients

**Disclosure:** Nothing to disclose

## EPO2325

**Role of Diffusion Tensor Imaging in Patients with Cervical Myelopathy**

W. Mustafa<sup>1</sup>, L. El-Serougy<sup>2</sup>, S. Abd-Allah<sup>2</sup>

<sup>1</sup>Neurology, Mansoura University Hospital, Mansoura, Dakahliya, Egypt, <sup>2</sup>Radiology, Mansoura University Hospital, Mansoura, Dakahliya, Egypt

**Background and aims: Background:** Myelopathy is a neurological deficit of the spinal cord, which is usually due to compression of the cord most commonly by osteophyte or herniated disk substance into the spine. Aim of the Work: To highlight the role of DTI in evaluating patients with cervical myelopathy.

**Methods:** This study included 21 patients who were referred to the radiology department at Dar Al Shifaa hospital. It had a contract with a private radiology center where 15 cases had their studies done, while the remaining 6 cases were referred to the radiology department at Mansoura university hospitals from neurology & neurosurgery departments during years of residency between March 2016 and April 2018, and all cases underwent a protocol of imaging including conventional MR imaging and DTI.

**Results:** In our study we correlated the FA & ADC values of the cervical cord in normal and pathology with patients' demographic data and degree of cord affection. The mean normal FA in our study was 0.55. We found high statistically significant results correlating the reduction in FA values with the cord affection i.e. the more severe the cord affection, the more reduction in FA values will occur.

**Conclusion:** DTI parameters can improve the clinical outcome and help in treatment plans.

**Disclosure:** Nothing to disclose

## EPO2326

### Different brain activation could explain the success of the bariatric surgery in morbid obesity

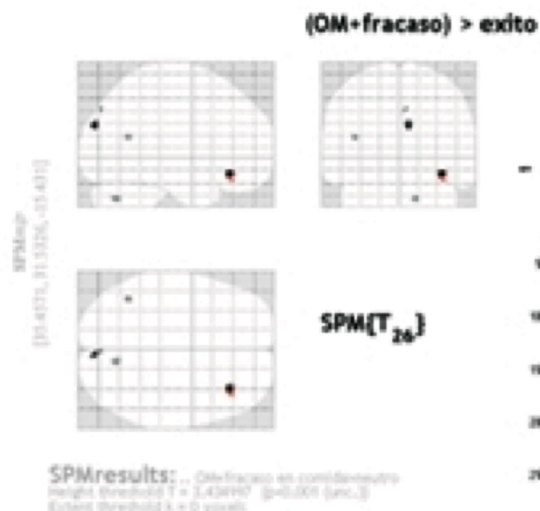
C. Oreja-Guevara<sup>1</sup>, M. Martín García-Almenta<sup>2</sup>, E. Martín García-Almenta<sup>3</sup>, A. Torres García<sup>4</sup>, A. Sánchez Pernaute<sup>4</sup>, M. Yus<sup>5</sup>, M. Ríos Lagos<sup>6</sup>  
<sup>1</sup>Department of Neurology, Complejo Universitario de San Carlos, Madrid, Spain, <sup>2</sup>Surgery, Hospital Central de la Cruz Roja, Madrid, Spain, <sup>3</sup>Surgery, Hospital Clínico San Carlos, Madrid, Spain, <sup>4</sup>Hospital Clínico San Carlos, Madrid, Spain, <sup>5</sup>Radiology, Hospital Clínico San Carlos, Madrid, Spain, <sup>6</sup>Neuropsychology, Hospital Beata María Ana, Madrid, Spain

**Background and aims:** Morbid obesity has markedly increased in the last years. Despite adequate bariatric surgery (BS) some patients increased the weight after the surgery again. It seems that neuropsychological factors could influence in the success of the surgery.

**Aim:** To identify brain activation areas to explain the success or failure of the BS in MO patients

**Methods:** Cross-sectional study. 3 groups of 10 patients each: morbid obese MO patients (A), patients undergoing BS with weight loss success (B), patients undergoing BS with failure (C) 2 years after surgery underwent a fMRI study using a visual block paradigm with different high and low calories food pictures. Data were analyzed with SPM12, threshold  $p < 0.001$  was applied in all cases.

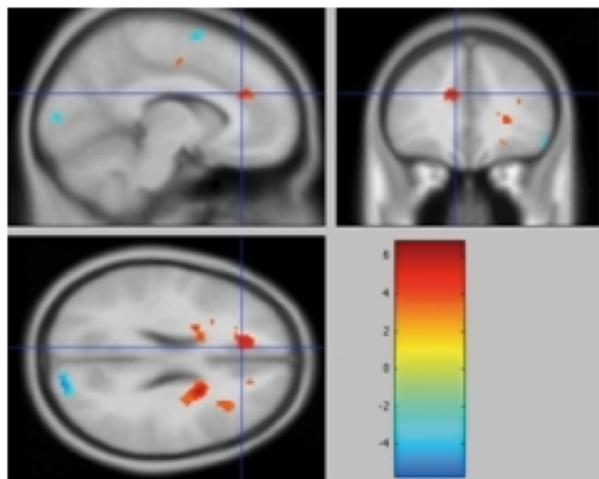
**Results:** 29 patients (22 women) were studied. High and low calorie pictures were found to show no differences in the BOLD signal. Looking at food pictures was found a significant great activation in cingulate area and insula in Group B as compared to MO patients and in visual areas in MO patients in comparison with group A (Fig.1). Moreover a greater activation in the visual areas and right fronto-parietal areas was shown comparing group C to B (Fig.2).



Group MO + C > B seeing food

**Conclusion:** Only the “success” group showed activity in the dorsolateral frontal cortex, possibly associated to an appropriate “conflict resolution”. MO and failure group showed a significant increased activity in visual areas seeing food. These findings could help to a better selection of surgery patients and to perform behavioural psychotherapy in some of them.

**Disclosure:** Nothing to disclose



Red: Group B > OM ; Blue: OM > Group B

Group B versus MO patients seeing food

## EPO2327

**Transient global amnesia (TGA) radiological assessment of the hippocampus**

J. Chojdak-Lukasiewicz<sup>1</sup>, E. Dziadkowiak<sup>1</sup>, A. Zimny<sup>2</sup>, B. Paradowski<sup>1</sup>

<sup>1</sup>Department of Neurology, Wrocław Medical University, Wrocław, Poland, <sup>2</sup>Department of General Radiology, Interventional Radiology and Neuroradiology, Wrocław Medical University, Wrocław, Poland

**Background and aims:** Transient global amnesia (TGA) is a rare condition characterized by a sudden deficit of anterograde and retrograde memory that lasts up to 24 hours. The episode is sudden, transient, benign and is not accompanied by any other neurological symptoms. Pathogenesis is unknown and complex. TGA has been correlated with hippocampal abnormalities on Diffusion Weighted Imaging (DWI) sequence but neuroimaging findings in TGA are heterogeneous and most of them report the lack of obvious abnormalities. The aim of this study is to identify and describe the MRI findings in patients with TGA, specifically on DWI sequence and in a control group.

**Methods:** We evaluated 25 patients (17 women and 8 men, mean age 65 yrs) with a diagnosis of TGA hospitalized at the Department of Neurology in Wrocław between 2017 and 2019. The control group consisted of 25 healthy persons (19 women and 6 men, mean age 66 yrs). The most common risk factor was hypertension (16/25). A brain 1.5-T MRI was performed including conventional sequences: T1, T2-weighted, axial fast fluid attenuated inversion recovery and diffusion-weighted imaging at 24-48 hours after symptom onset. We also assessed hippocampal volumes.

**Results:** None of the TGA patients showed DWI lesions. There was no significant difference between the TGA patients and the controls in volume of hippocampus.

**Conclusion:** Conclusion TGA remains a clinical diagnosis without MRI visible abnormalities

**Disclosure:** Nothing to disclose

## EPO2328

**Bilateral asymmetric ptosis: when to consider a vascular cause?**

L.M. Pérez Navarro, I. Martín Santana, I. Sánchez-Miranda Román, R. Malo de Molina Zamora, J. Castellano Santana, R. Jiménez Bolaños  
Neurology, Complejo Hospitalario Universitario Insular Materno-Infantil, Las Palmas de Gran Canaria, Spain

**Background and aims:** Ptosis is a neurological sign that can be explained through multiple causes: mechanical, aponeurotic, myogenic, neurogenic or neuromuscular junction disease. Only 4% of ptosis are bilateral. Lesions in the central nervous system affecting the oculomotor nerve can lead to bilateral ptosis in case of frontoparietal or midbrain lesions. We report a case of sudden bilateral ptosis in a patient with cardiovascular risk factors.

**Methods:** A 45-year-old woman with personal history of poorly controlled hypertension and type 2 diabetes, was admitted to hospital for hypertensive crisis and headache episode, followed by gait instability, photophobia and ptosis. Physical examination revealed high blood pressure and an isolated bilateral asymmetric ptosis, more evident on the left side. No pupillary or ocular movement abnormalities were present, neither fatigability.

**Results:** Brain CT showed a dubious left thalamus-mesencephalic lesion and MRI confirmed diffusion restriction in left paramedian midbrain. Thus, the diagnosis of left lacunar mesencephalic stroke was established. Infectious, metabolic, autoimmune and neurovascular causes were excluded in additional studies. However, hypertensive heart disease was identified on echocardiography. After ptosis' improvement, the patient was discharged with acetylsalicylic acid and adjustment of antihypertensive treatment.

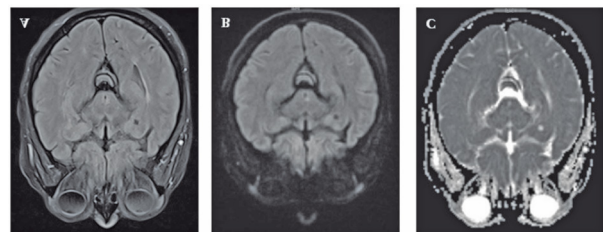


Figure 1. Isolated midbrain signal abnormality. MR scan of brain: (A) axial T2, (B) axial diffusion-weighted B1000 hyperintensity and (C) axial corresponding low signal on ADC. These show an isolated left paramedian midbrain signal abnormality, ventral to the aqueduct.

**Conclusion:** Midbrain infarctions represent a minority of strokes. Paramedian lesions associated with oculomotor nuclei involvement can cause an incomplete bilateral ptosis due to an infarct on the single central caudal subnucleus, which controls the levator palpebrae superioris muscles. A sudden onset of bilateral ptosis, especially in patients with cardiovascular risk factors and no other oculomotor symptoms, might suggest a vascular cause in this location.

**Disclosure:** Nothing to disclose

## EPO2329

**Changes in resting state functional networks of the brain in patients with tension headaches (TH) after osteopathic manipulation**

T. Bukkueva<sup>1</sup>, D. Piskovatskov<sup>2</sup>, A. Lepekhina<sup>3</sup>, M. Pospelova<sup>4</sup>, A. Efimtsev<sup>5</sup>, A. Levchuk<sup>3</sup>, T. Alekseeva<sup>6</sup>, G. Trufanov<sup>7</sup>

<sup>1</sup>MRI-centre, Federal Almazov North-West Medical Research Centre, Saint-Petersburg, Russian Federation, <sup>2</sup>Neurology, Research Institute of obstetrics, gynecology and reproduction. D. O. Otta, Saint-Petersburg, Russian Federation, <sup>3</sup>Radiology, Almazov National Medical Research Centre, Saint Petersburg, Russian Federation, <sup>4</sup>Neurology, Almazov National Medical Research Centre, Saint Petersburg, Russian Federation, <sup>5</sup>MRI-center, Almazov National Medical Research Centre, Saint-Petersburg, Russian Federation, <sup>6</sup>Almazov National Medical Research Centre, Saint Petersburg, Russian Federation, <sup>7</sup>Radiology, Almazov National Medical Research Centre, Saint Petersburg, Russian Federation

**Background and aims:** Resting state functional magnetic resonance imaging (rs-fMRI) is a promising technique for detecting initial changes of the functional connectivity in the brain in patients with TH for diagnosis the cognitive and psychoneurological symptoms and for a more detailed study of the pathogenesis. The effectiveness of osteopathy in the treatment of patients with TH has been proven. Studying the effectiveness of the 1st osteopathic manipulation on the state of functional connections of the brain in patients with TH is relevant.

**Methods:** Rs-fMRI was performed on 1.5 T MR-scanner on 18 patients (female, age 32±5.6 years) with TH twice (before and immediately after first osteopathic manipulation).

**Results:** According to the results of an intergroup statistical analysis (2-sample t-test), when comparing the functional connectivity of the brain at rest before and immediately after osteopathic manipulation, a weakening of the negative functional connection of the medial prefrontal cortex with the left upper parietal lobe was revealed ( $p < 0.005$ ).

**Conclusion:** The results of the study indicate that patients with tension headaches before and after 1st osteopathic manipulation have minimal differences in the functional activity of the brain, this is often correlated with the clinical picture (reduction of headaches often occurs after a series of osteopathic manipulations), so now an analysis of functional connectivity after a full course of osteopathy is being conducted. The obtained can serve as a basis for studying the pathogenetic mechanisms of tension headache, assessing the impact of osteopathic manipulation on the functional connections of the brain.

**Disclosure:** Nothing to disclose

## EPO2330

**Resting state functional magnetic resonance imaging in detecting changes of functional connectivity of the brain in patients after radical mastectomy**

T. Bukkueva<sup>1</sup>, D. Piskovatskov<sup>2</sup>, M. Pospelova<sup>3</sup>, A. Efimtsev<sup>4</sup>, G. Trufanov<sup>4</sup>, O. Fionik<sup>3</sup>

<sup>1</sup>MRI-centre, Federal Almazov North-West Medical Research Centre, Saint-Petersburg, Russian Federation, <sup>2</sup>Neurology, Research Institute of obstetrics, gynecology and reproduction. D. O. Otta, Saint-Petersburg, Russian Federation, <sup>3</sup>Neurology, Almazov National Medical Research Centre, Saint Petersburg, Russian Federation, <sup>4</sup>MRI-center, Almazov National Medical Research Centre, Saint-Petersburg, Russian Federation

**Background and aims:** Different neurological and psychiatric disorders such as vertebrobasilar insufficiency, chronic pain syndrome, anxiety and depression are observed in more than 90% of patients after total mastectomy. These disorders can cause impaired functional connectivity in the functional brain networks. Resting state functional magnetic resonance imaging (rs-fMRI) is a promising technique for detecting initial changes of the functional connectivity in the brain in these patients.

**Methods:** Rs-fMRI was performed on 3.0T MR-scanner to 15 patients with neurological disorders in the late postoperative period (>6 months) after radical mastectomy for breast cancer. All patients were pre-examined by neurologist and had complaints of chronic pain, dizziness, headaches, and/or tinnitus. Quality of life in these patients was assessed using the SF-36 scale, anxiety and depression – using STAI and Zung scales.

**Results:** According to the intergroup statistical analysis, there were differences in functional connectivity of the brain in all 15 patients ( $p < 0.01$ ), with the increased functional connectivity in the default mode network in 12 patients. All 15 patients had the significant decline in quality of life on the SF-36 scale, 7 had high anxiety level, 6 showed depression on the Zung scale.

**Conclusion:** The use of rs-fMRI in patients after total mastectomy allows us to identify changes of functional connectivity in the brain caused by neurological disorders, which correlated with anxiety, depression and decreased quality of life in these patients.

**Disclosure:** Nothing to disclose



## EPO2331

**Why a clinical sign does not always correlate with lesion size?**

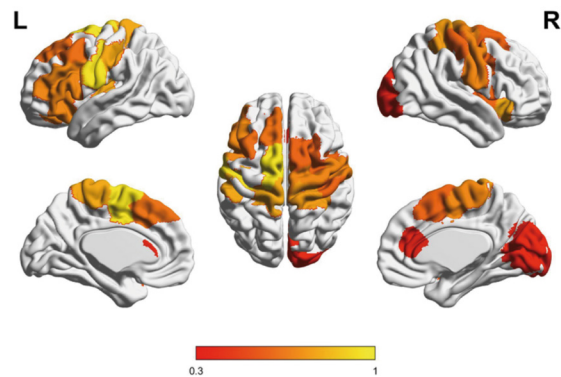
S. Ray Panda<sup>1</sup>, R. Panda<sup>2</sup>, I.D. Bhagavatula<sup>3</sup>,  
R.D. Bharath<sup>4</sup>

<sup>1</sup>Department of Electronic Science, Barrackpore Rastraguru Surendranath College, Kolkata, India, <sup>2</sup>GIGA-Consciousness, University of liege, Liege, Belgium, <sup>3</sup>Department of Neurosurgery, National Institute of Mental Health and Neurosciences, Bangalore, India, <sup>4</sup>Department of Neuroimaging and Intervention Radiology, National Institute of Mental Health and Neurosciences, Bangalore, India

**Background and aims:** Very often in routine clinical practice we see some patients with very small lesion having a gross neurological deficit whereas some others with a large lesion have little or no deficits. To explore this, we analysed whole brain connectivity and there topological characteristic in patients without deficits and compared them with a group of clinically matched patients with clinical deficits.

**Methods:** Resting state functional MRI (rsfMRI) data were recorded for 26 patients with high grade glioma located in the dominant left frontal lobe involving eloquent motor or brocas areas were retrospectively selected for the study. There were 10 patients with deficits (moderate motor and language deficits) (Tumor-D) and 16 patients without deficits (Tumor-WD). The rsMRI data were pre-processed, then brain parcellation to functional brain regions (N=256) were carried out using Shen atlas. Brain connectivity were computed based on phase synchronisation. The brain topological properties were assessed using graph theory measures of brain segregation (clustering coefficient) integration (participation coefficient) and dynamic integration (Ignition-driven mean integration) methods. Between group differences were estimated using '2-sample t-test' with FDR corrected  $p < 0.05$ .

**Results:** Tumor-D had diffuse decreased connectivity in several brain regions also involving the sensory motor network in comparison with Tumor-WD and healthy control. Tumor-WD had widespread increased connectivity involving bilateral frontal, motor and motor association cortices. Apart from brain connectivity, increased brain dynamic integrity was noted in Tumor-WD compare to Tumor-D.



Brain region having increased dynamic Integration difference in Tumor-WD compare to Tumor-D

**Conclusion:** Whole brain synchronicity and dynamic integrity may explain clinical manifestation of a focal deficit apart from the anatomical location.

**Disclosure:** Nothing to disclose

## EPO2332

### External Cerebral Artery Stenting – A Good Strategy to Preserve Cerebral Circulation in a Patient with Ipsilateral Internal Carotid Artery Occlusion

A.C. Ribigan<sup>1</sup>, R.S. Badea<sup>1</sup>, B. Dorobat<sup>2</sup>, A. Dimitriade<sup>2</sup>, A. Carp<sup>2</sup>, O.C. Ioghen<sup>1</sup>, D. Dumitrascu<sup>1</sup>, F. Antochi<sup>1</sup>, O. Bajenaru<sup>1</sup>

<sup>1</sup>Neurology, University Emergency Hospital Bucharest, Bucharest, Romania, <sup>2</sup>Interventional Neuroradiology, University Emergency Hospital Bucharest, Bucharest, Romania

**Background and aims:** In patients with internal carotid artery (ICA) occlusion the ipsilateral external carotid artery (ECA) may supply the cerebral circulation through collateral vessels.

Although endarterectomy for ECA stenosis has been described in the literature, stenting has rarely been reported. The aim of our paper is to present the case of a patient with ECA stenosis and ipsilateral ICA occlusion in whom stenting of ECA was performed.

**Methods:** A 73-year-old male was admitted for the 1st time in our Neurology Department 3 years ago for angiographic examination of carotid and vertebral artery stenoses (VAS). The patient had medical history of a right frontal and insular ischemic stroke, arterial hypertension and dyslipidemia. Digital subtraction angiography of the cervical and cerebral arteries (DSA-CCA) revealed the presence of a right ICA occlusion, 60% right ECA stenosis, 80% left ICA stenosis and 90% VAS with intracerebral filling of right middle and anterior cerebral arteries (rMCA, rACA) from left ICA. Left ICA stenting was performed. 1 year later DSA-CCA showed progression of right ECA stenosis under best medical treatment with intracerebral filling of rMCA from right ECA. ECA stenting was decided.

**Results:** 1 year later the ultrasonographic exam of the cervical arteries showed increased velocities and endothelial proliferation at the ECA stent site and balloon angioplasty was performed.

**Conclusion:** We chose to present this case in order to highlight the importance of revascularization therapy and follow-up in patients with cervical arteries stenoses this way maintaining the patency of these arteries and preventing further ischemic events and vascular cognitive impairment.

**Disclosure:** Nothing to disclose

## EPO2333

### Hypoparathyroidism and Fahr syndrome

R. Laamouri<sup>1</sup>, M. Messelmani<sup>2</sup>, M. Mansour<sup>1</sup>, R. Mrissa<sup>1</sup>, J. Zaouali<sup>2</sup>

<sup>1</sup>TUNIS, Tunisia, <sup>2</sup>Department of neurology, Military hospital, Tunis, Tunisia

**Background and aims:** Hypoparathyroidism is an uncommon pathology. It can cause multiple neurological disorders that can be associated with Fahr syndrome.

**Methods:** It is a cross-sectional study including patients with hypoparathyroidism who were followed in the Military Hospital of Tunis. The patients were assessed by phosphocalcic markers, parathormone and vitamin D assays and a computed tomography (CT) scan of the brain.

**Results:** 8 patients were included. The average age was 53.9 years old with a male predominance. The hypoparathyroidism was autoimmune in 1 case while it is secondary to the removal of the glands during thyroid surgery in 7 patients. The average duration of hypoparathyroidism was 12.5 years. 4 patients reported paraesthesia. Convulsions were present in 2 patients, tetany in 3 patients, isolated headaches in 7 cases. Depressed mood was detected in 4 patients and 3 cases had memory disorder. A parkinsonian syndrome was found in 3 patients. The lowest corrected calcemia was 1.76mmol/l. Hypovitaminosis D was found in 3 cases and hypomagnesemia in 1 case.

4 patients had calcifications of the basal ganglia on brain scan. The treatment was carbonate of calcium and 1-OH vitamin D, cholecalciferol and magnesium if deficiency.

**Conclusion:** It is important to detect Fahr syndrome especially if there is a resistant hypoparathyroidism. Treatment based on the vitamin-calcium substitution or even synthetic PTH must be started early to avoid the development of this syndrome.

**Disclosure:** Nothing to disclose

## EPO2334

**Clinical and cerebral MRI findings in acute carbon monoxide intoxication**

M. Messelmani<sup>1</sup>, Y. Abida<sup>1</sup>, R. Ben Sassi<sup>2</sup>, A. Ouerdiane<sup>1</sup>, M. Mansour<sup>1</sup>, H. Gharsallah<sup>2</sup>, R. Mrissa<sup>1</sup>, J. Zaouali<sup>1</sup>  
<sup>1</sup>Neurology, Military Hospital, Tunis, Tunisia, <sup>2</sup>Centre for Hyperbaric Oxygen, Military Hospital, Tunis, Tunisia

**Background and aims:** Carbon monoxide intoxication is a common cause of morbidity and mortality. Several neuropsychiatric features and cerebral magnetic resonance imaging (MRI) findings were found in this patients. The aim of our study was to describe clinical and radiological features of CO intoxication

**Methods:** A retrospective study of 3 years was performed, including patients who presented an acute carbon monoxide intoxication. Clinical, cerebral magnetic resonance imaging findings were collected and analysed.

**Results:** 15 patients were included (9 men and 6 women). The average age was 42.4 years old (11-82 years old). All patients presented with mental status change with different severity. Repeated clinical examination revealed cortical visual impairment in 3 patients. 6 patients had memory loss and 3 had extrapyramidal syndrome. Cerebral MRI had shown restricted diffusion of the bilateral globi pallidi in 6 patients. Cerebral cortex, cerebral fronto-parieto-occipital white matter were also involved in 3 patients. 1 patient had bilateral lesions of hippocampi. Occlusion of the cerebral posterior artery with ischemic stroke lesion was observed in another case. 6 patients had normal cerebral MRI.

**Conclusion:** Several clinical features may be caused by acute CO poisoning. Cerebral MRI with diffusion-weighted imaging (DWI) play an important role to detect the damage caused by acute CO intoxication. Bilateral globi pallidi, cerebral cortical and cerebral white matter with restricted diffusion may be a characteristic MRI feature in this patients.

**Disclosure:** Nothing to disclose

## EPO2335

**The role of semi-quantification of 123I-FP-CIT SPECT scans in improving the quality of reporting**

A.-A. Roussakis<sup>1</sup>, N.H. Patel<sup>2</sup>, M. Gennaro<sup>1</sup>, C. Bowen<sup>2</sup>, J. Phillips<sup>2</sup>, P. Piccini<sup>1</sup>  
<sup>1</sup>Brain Sciences, Imperial College London, London, United Kingdom, <sup>2</sup>Radiological Sciences Unit, Imperial College Healthcare NHS Trust, London, United Kingdom

**Background and aims:** 123I-FP-CIT SPECT is increasingly used to assist the diagnosis of Parkinson's disease (PD). In clinical practice, visual assessment is quite reliable. Semi-quantification of FP-CIT data is more informative; however its use is conventionally used in research. Aiming to improve current care, we designed this audit to value the role of semi-quantification of 123I-FP-CIT SPECT in improving the quality of clinical reporting.

**Methods:** 44 subjects who had 123I-FP-CIT SPECT twice at Imperial College Healthcare NHS Trust over the past 10 years. Anonymised clinical and imaging data were analysed at Imperial by 2 teams of experienced researchers, who were blinded to each other's results. Firstly, the outcome of each scan report was recorded in a normal/abnormal/inconclusive basis. Following that, semi-quantification was applied on all SPECT data using HERMES BRASS software to generate specific-to-nonspecific binding ratios (SBRs) for striatal regions, with the occipital lobe as the reference region. Regional SBR values were compared to a group of age-matched healthy controls in order to categorise each scan as normal/abnormal. Differences between visual assessments and semi-quantification results were sought for each scan at each time-point.

**Results:** For 26 out of 44 subjects (total 88 scans), the visual clinical report did not agree with the interpretation based on the SBR values. Of the 88 scans, 8 were inconclusive following the 1st assessment. With quantification, those 8 scans could have been significantly more conclusive.

**Conclusion:** Semi-quantification combined with visual assessment may remove doubts from inconclusive cases, and significantly improve reporting, thereby reducing the unjustified procedures and incurred costs.

**Disclosure:** Nothing to disclose

## EPO2336

**MRI features of patients with autosomal dominant optic atrophy mutation and Multiple Sclerosis**

F. Tazza, C. Lapucci, G. Novi, M. Inglese  
 Department of Neuroscience, Rehabilitation, Ophthalmology, Genetics, Maternal and Child Health, University of Genova and IRCCS AOU San Martino IST, Genoa, Italy

**Background and aims:** Co-occurrence of OPA1 mutations (Dominant Optic Atrophy, DOA) and Multiple Sclerosis (MS)-like disease have been described. The nature of this association is a matter of debate. Here we studied 2 patients with concomitant DOA and MS-like disease by conventional and advanced MRI techniques.

**Methods:** Case presentation:

1) A 26-year-old woman was diagnosed with MS due to the occurrence of facial palsy and hypoesthesia associated with MRI T2-weighted (T2w) hyperintense lesions in the right pons. Spinal cord MRI showed a T2w hyperintense lesion in the C2-C4 tract. Furthermore, the patient showed a progressive visual impairment since 2005, associated with acute episodes of visual acuity worsening. Lack of response to immunomodulatory treatment led to the genetic test with the detection of a mutation in OPA1 gene (c.58C>T/p.His20Tyr).

2) A 27-year-old man was diagnosed with MS due to the onset of right limb hypoesthesia with the detection of multiple T2w lesions on brain MRI associated with central nervous system restricted oligoclonal bands. He had also been suffering from a severe visual impairment since childhood, as his mother. Genetic test revealed OPA1 gene mutation (c.3G>A, p.Met1Ala).

**Results:** Brain and spinal cord MRI of both patients fulfilled criteria for dissemination in space (DIS) and time (DIT) for MS. Central vein sign (CVS) analysis performed on 2), detected 33% of lesions positive for (CVS), similarly to typical MS.

**Conclusion:** Pathophysiology of MS concomitant with DOA is unclear. Advanced MRI techniques (i.e.: CVS) may be helpful to shed light on this issue.

**Disclosure:** Nothing to disclose

## EPO2337

**Pre- and Post-treatment Diffusion Tensor Imaging and Fiber Tractography in Marchiafava-Bignami Disease**

B.G. Yoo, W.G. Lee  
 Busan, Korea, Republic of

**Background and aims:** Marchiafava-Bignami disease (MBD) is a rare alcohol-related disorder that results in progressive demyelination and necrosis of the corpus callosum. Diffusion tensor imaging (DTI) could be employed for studying the clinical correlates of MBD and the recovery process.

**Methods:** Case report

**Results:** A 33-year-old male presented with an insidious decrease in consciousness level. He had a history of heavy alcohol intake for 4 years and his nutritional status was very poor. He was unable to perform any daily activities and had been bedridden since 2 months prior to admission. On the day of admission, he was confused and delirious state. He was cachexic. Diffusion-weighted and fluid-attenuated inversion recovery MRI showed high signal intensities in the corpus callosum and bilateral frontotemporal cortical and subcortical areas. He was diagnosed MBD. 4 days after admission, DTI showed normal corticospinal tracts, thinning of corpus callosum on fiber tractography and focal area of decreased anisotropy of the corpus callosum with FA (fractional anisotropy) value of 0.5451. Patient was treated with intravenous vitamin B complex and methylprednisolone. His consciousness level and general condition gradually improved. Follow-up DTI performed 39 days after admission showed thickening of corpus callosum on fiber tractography and increased anisotropy with FA value of 0.5870.

**Conclusion:** DTI and fiber tractography may be useful in assessing the degree of regional abnormalities and clinical recovery in MBD.

**Disclosure:** Nothing to disclose

## Neuroimmunology 2

## EPO2338

**Nivolumab induced-encephalitis**

G. Cabral<sup>1</sup>, F. Serrazina<sup>1</sup>, J.P. Marto<sup>1</sup>, F. Ladeira<sup>2</sup>, S.L. Calado<sup>1</sup>, M. Baptista<sup>1</sup>

<sup>1</sup>Neurologia, Hospital Egas Moniz, Lisbon, Portugal,

<sup>2</sup>Neurologia, Hospital dos Capuchos, Lisbon, Portugal

**Background and aims:** Immune checkpoint inhibitors have emerged as new treatments for numerous types of cancers. However, those patients are at increased risk of life-threatening developing neurological complications such as encephalitis.

**Methods:** Case report and review of literature.

**Results:** A 75-year-old woman with metastatic lung cancer developed a nivolumab-induced seronegative encephalitis (presented with seizure and cognitive dysfunction) after 4 weeks of treatment. Brain MRI was normal, CSF showed mild pleocytosis and EEG revealed diffusely slow tracing. She was treated with steroids and nivolumab therapy was discontinued. The patient's neurological status improved after 2 months. We identified more 20 cases of nivolumab induced-encephalitis in the literature (13 men and 7 women) with a median age of 63 years (range 50-78). Median time to onset of symptoms since drug initiation was 64 days (range 4-293). Most frequent clinical manifestations were: decrease in level of consciousness (35%), confusional state (20%), memory dysfunction (15%), aphasia (15%), extrapyramidal symptoms (15%) and memory dysfunction (15%). CSF study showed lymphocytic pleocytosis in 12 patients. 9 patients have positive autoantibodies (Anti-AGNA, -NMAR, -HU, -Ma2 or -GAD 65). 13 patients had T2-weighted hyperintensities in MRI (65%) and 9 had EEG changes (45%). Patients were treated with steroids alone or with other agents. Mortality rate was 30%.

**Conclusion:** Nivolumab-induced encephalitis presents with diverse symptoms and nonspecific changes on image, CSF and EEG studies. The relation between nivolumab administration and subsequent onset of symptoms is key for diagnosis. Early recognition and prompt treatment are important to prevent significant morbidity and mortality.

**Disclosure:** Nothing to disclose

## EPO2339

**ANTI-TUMOUR NECROSIS FACTOR- $\alpha$  RELATED DEMYELINATING DISEASES. CAUSE, TRIGGER OR COINCIDENCE?**

N.L. Ciano Petersen, V. Reyes Garrido,

P. Urbaneja Romero, A.M. Alonso Torres, M. Guerrero,

P. J. Serrano-Castro

Neurology, Hospital Regional Universitario de Málaga, Málaga, Spain

**Background and aims:** Anti-tumour necrosis factor- $\alpha$ (anti-TNF- $\alpha$ ) agents are frequently used in the treatment of gastroenterological and rheumatological autoimmune diseases. Despite its good tolerance, in the last years an increasing number of reports are associating Adalimumab(ADA) with new-onset demyelinating diseases.

**Methods:** We present 3 cases of anti-TNF- $\alpha$  related demyelinating diseases:

- 29-year-old woman, previous history of pulmonary, ocular and cutaneous sarcoidosis in treatment with ADA since 5 months before. Presented a 6th cranial nerve palsy and numerous lesions on MRI in the medulla, pons, periventricular and subcortical white matter, some of them with gadolinium-enhancement. Normal ACE in blood and CSF and no other evidence of active sarcoidosis.

- 26-year-old woman, previous history of coeliac disease, Hashimoto thyroiditis and psoriatic seronegative spondyloarthritis, for which she had started ADA 36 months before. She presents lower-limb numbness and acute myelitis on MRI, as well as typical periventricular lesions.

- 55-year-old man, family history of Multiple Sclerosis(MS) and previous personal history of recurrent bilateral intermediate uveitis and ADA treatment since 14 months before.

**Results:** All the patients were treated with ADA from 5 to 36 months (mean time of 18 months). All the patients fulfilled McDonalds criteria of MS. All patients discontinued ADA and were started on Rituximab or Dimethylfumarate.

**Conclusion:** Anti-TNF- $\alpha$  agents seem to be associated with demyelinating diseases. Their role in the pathogenesis is not clear, but their use as disease-modifying treatment have been proved to worsen disease activity in MS. Physicians should be careful when using them in patients with heavy immunological background or family history of MS.

**Disclosure:** Nothing to disclose

## EPO2340

### Immune-reconstitution inflammatory syndrome in multiple sclerosis, are all severe cases associated with a bad prognosis?

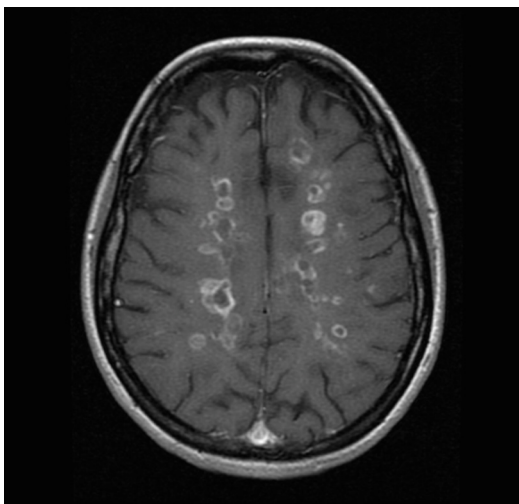
N.L. Ciano Petersen<sup>1</sup>, V. Reyes Garrido<sup>1</sup>,  
P. Urbaneja Romero<sup>2</sup>, A.M. Alonso Torres<sup>3</sup>, M. Guerrero<sup>2</sup>,  
P.J. Serrano-Castro<sup>4</sup>

<sup>1</sup>MÁLAGA, Spain, <sup>2</sup>H.Regional Málaga, Málaga, Spain,  
<sup>3</sup>Neurology, Hospital Regional Universitario de Málaga,  
Málaga, Spain, <sup>4</sup>Almeria, Spain

**Background and aims:** Immune-Reconstitution Inflammatory Syndrome (IRIS) is a well-known immunological reaction to the withdrawal of an immunosuppressive state. It was described in advanced HIV-patients who started triple-antiretroviral treatment. In neurology it has been associated with Natalizumab, and less frequently Fingolimod, especially if acute withdrawal or plasma-exchange is used in Progressive Multifocal Leucoencephalopathy (LMP). We present a severe case of IRIS and analyze its clinical course, neuroimaging features and prognosis.

**Methods:** A 35-year-old woman, diagnosed with relapsing-remitting multiple sclerosis (RRMS) at 19 years-old. Her disease was very active despite many disease-modifying therapies, so Natalizumab was started a year before, with a basal Expanded Disability Status Scale (EDSS) of 2.5. She was brought to our Emergency Room due to altered level of consciousness in the last 24h. She had interrupted the treatment by own-decision 2 months before. She was started on intensive steroids and recovered completely after a month, presenting EDSS at discharge of 3.

**Results:** MRI showed approximately 100 white matter ovoid lesions with open-ring enhancement suggestive of IRIS. In control MRI she presented a total brain volume loss of 3% compared to previous neuroimaging. Between 2012 and 2019 the volume loss was 4.4%.



Multiple white matter ovoid lesions with open-ring enhancement suggestive of IRIS

**Conclusion:** IRIS has a variable prognosis, usually fatal when associated with advanced LMP but may have a good outcome if not present or early-diagnosis is made. The average brain volume loss in RRMS is estimated to be 0.5-1%, which correlates with our patient. However, IRIS induced in a few months a volume loss 3 to 6 times more than expected in a year.

**Disclosure:** Nothing to disclose

## EPO2341

**Anti-NMDA receptor encephalitis: suspicion in clinical practice and mimics.**

D. Costa<sup>1</sup>, A. Sardoeira<sup>1</sup>, P. Carneiro<sup>2</sup>, E. Neves<sup>2</sup>, E. Santos<sup>1</sup>, A. Martins Da Silva<sup>1</sup>, R. Samões<sup>1</sup>

<sup>1</sup>Neurology Department, Centro Hospitalar Universitário do Porto, Porto, Portugal, <sup>2</sup>Immunology Department, Centro Hospitalar Universitário do Porto, Porto, Portugal

**Background and aims:** Anti-NMDA receptor (anti-NMDAR) encephalitis is currently the most well-characterized autoimmune encephalitis (AIE). Despite the existence of well-established diagnostic criteria, there are diseases capable of mimicking it which require distinct therapeutic approaches. We sought to retrospectively evaluate the reasons for testing and the final diagnosis of patients admitted to the Neurology ward who were tested for anti-NMDAR antibodies in CSF.

**Methods:** Using the Immunology Department database of our hospital, we identified patients admitted to the Neurology ward who were tested for anti-NMDAR antibodies in CSF between November 2012 and July 2019. The clinical information was then retrospectively reviewed.

**Results:** 124 patients were identified, of which 39 (31%) met the criteria for possible AIE. Among these we identified 26 mimics (21%), with the predominance of new-onset epilepsies (6), toxic-metabolic encephalopathies (5) and viral meningoencephalitis (5). 85 patients (69%) did not meet the criteria for possible AIE, and the main reasons for antibody testing were isolated or protracted cognitive deterioration (31), isolated or protracted neuropsychiatric condition (21), and new-onset epilepsies (11). 3 patients (2%) had the final diagnosis of definite anti-NMDAR encephalitis - only 1 fulfilled the criteria for possible AIE and none fulfilled the criteria for probable anti-NMDAR encephalitis.

**Conclusion:** In clinical practice, the threshold for testing anti-NMDAR antibodies was lower than that of the prevailing diagnostic criteria, which allowed for the diagnosis of 2 seropositive patients who did not fulfil those criteria. The proportion of mimics was high, reinforcing the pivotal importance of the search for alternative diagnoses.

**Disclosure:** Nothing to disclose

## EPO2342

**Stability of antibody titers to JCV in patients under treatment with natalizumab**

I. De Lorenzo, I. Puertas Muñoz, L. Lacruz, A. Tallon, B. Chamorro, E.M. Alba Suarez

Neurology, Hospital Universitario La Paz, Madrid, Spain

**Background and aims:** Progressive Multifocal Leukoencephalopathy (PML) associated to Natalizumab has been related to prolonged exposure to this treatment and to high levels of anti-JCV. Furthermore, the variation of anti-JCV index could influence in treatment decisions.

**Methods:** A retrospective longitudinal study of anti-JCV index measurements, analyzed before starting and after 1 and 2 years of treatment with natalizumab, using STRATIFY, in patients with recurrent relapsing multiple sclerosis (RRMS) attended at our Multiple Sclerosis Unit.

**Results:** 52 patients (63.5% women). Average age: 39.12 years old (SD 8.67). Time since MS diagnosis: 7.38 years (SD 6.19) and EDSS 2.61 (SD 1.71). An increase of index average has been registered from baseline: 1.30 (SD1.27), to 2 years-treatment: 1.55 (SD 1.25) [ $p < 0.05$ ]. At baseline, 27 patients were anti-JCV positive (51.9%). According to grouped values, before treatment, index JCV was  $< 0.4$  in 37.8%; 0.4-0.9 in 13.5%; 0.9-1.5 in 10.8%; and  $> 1.5$  in 37.8%. After 12 months (N:21):  $< 0.4$ : 52.4%; 0.9-1.5: 4.8%;  $> 1.5$ : 42.9%. And after 24 months (N:29):  $< 0.4$ : 24.1%; 0.4-0.9: 6.9%; 0.9-1.5: 24.1%;  $> 1.5$ : 44.8%. In 44.1% of patients, baseline JCV index was maintained  $< 0.9$  after 2 years. 9.6% increase levels above 0.9. No patient with  $> 1.5$  index decreases below  $< 0.9$ .

**Conclusion:** Titers of anti-JCV antibodies  $> 1.5$  before starting natalizumab, predicts stable positive values after 1 or 2 years of treatment. It is important to measure periodically JCV index in cases with low value, as there is a considerable percentage of variation that could modify the risk of PML and could influence in therapeutic decisions.

**Disclosure:** Nothing to disclose

## EPO2343

**Parry Romberg: neurological manifestations after 20 years**

A.I.F. Gonçalves<sup>1</sup>, J. Vitor<sup>1</sup>, R. Armindo<sup>2</sup>, A. Arraiolos<sup>1</sup>, R.A.M.V. Simões<sup>3</sup>, J. Vale<sup>1</sup>

<sup>1</sup>Loures, Portugal, <sup>2</sup>Neuroradiology, Hospital Beatriz Ângelo, Loures, Portugal, <sup>3</sup>Lisbon, Portugal

**Background and aims:** Parry-Romberg syndrome (PR), is characterized by slow and progressive atrophy of 1 side of the face, primarily involving the subcutaneous tissues and fat. There have been reports of associated neurological complications, such as epilepsy, trigeminal neuralgia, facial pain, migraine, facial palsy, and ipsilateral cerebral hemiatrophy. Neurological involvement is unknown, but it has been described in 10% to 20% of the cases.

**Methods:** Case Report

**Results:** 36-year-old female with medical past history of autoimmune thyroiditis, presented with right hemifacial atrophy (V1 territory) beginning at age 16. The facial atrophy progressed during the 1st 10 years. Neurological symptoms were never reported till the age of 36, when she developed right trigeminal pain in V1 territory. Brain MRI showed right cerebral hemiatrophy, multiple white matter hyperintensities predominantly in the right hemisphere, and no morphostructural changes along the course of the trigeminal nerve. Pain remitted with carbamazepine. At the age of 37 she was admitted by binocular horizontal diplopia. Examination revealed right eye exotropia and hypotropia, with restricted adduction and supraduction. Neuroimaging didn't disclose new changes. The CSF showed oligoclonal bands corresponding to intrathecal IgG synthesis. She was treated with intravenous methylprednisolone, with no clinical benefit.

**Conclusion:** To our knowledge, this is the 1st PR case with neurological symptoms presenting 20 years after disease onset, when skin atrophy was already stable for the previous 10 years. In our patient, the autoimmune background (thyroiditis) and the presence of oligoclonal bands suggest that an autoimmune mechanism may contribute to the PR pathogeny.

**Disclosure:** Nothing to disclose

## EPO2344

**Progressive encephalomyelitis with rigidity and myoclonus with multiple autoantibodies as a first manifestation of thymoma**

A. Florea<sup>1</sup>, A. Matei<sup>2</sup>, C.E. Mitu<sup>2</sup>, B.O. Popescu<sup>3</sup>

<sup>1</sup>Neurology, 'Carol Davila' University of Medicine and Pharmacy, Bucharest, Romania, <sup>2</sup>Department of Neurology, Colentina Clinical Hospital, Bucharest, Romania, <sup>3</sup>Laboratory of Ultrastructural Pathology, 'Victor Babes' National Institute of Pathology, Bucharest, Romania

**Background and aims:** Thymoma is frequently associated with paraneoplastic diseases, myasthenia gravis being the most common. Rarely, progressive encephalomyelitis with rigidity and myoclonus (PERM) is encountered and it is usually associated with anti-glycine receptor antibodies (GlyR).

**Methods:** We report the case of a 32-year-old male diagnosed with PERM with multiple antibodies as a paraneoplastic manifestation of thymoma

**Results:** The patient had a 6-day history of trismus, and progressive asymmetrical inferior limbs rigidity, associated with spontaneous and sleep induced hyperekplexia and piloerection, responsible for insomnia. Brain and spine MRI and electroencephalography were unremarkable. Cerebrospinal fluid (CSF) analysis showed mild pleocytosis (7elem/mL). Electroneuromyography (ENMG) emphasized rare fibrillations without neuromyotonic phenomena. Anti GlyR, anti-GAD and anti CV2 antibodies came back positive. Thoracic CT with iodine findings were consistent with thymoma. Initially, the symptoms improved after thymectomy and under treatment with immunoglobulins and methylprednisolone. He suffered a relapse a month after surgery with bilateral eyelid ptosis. Myasthenia gravis was excluded. He improved under immunosuppressive treatment. At 6-month and 1-year follow-up the patient is stable, the antibodies titer decreased progressively, and he currently has no immunosuppressive treatment.

**Conclusion:** A rapidly progressive stiff person syndrome in a young patient should be a red flag for PERM and it should not be tested only for GlyR antibodies. To conclude, PERM in the presence of multiple autoantibodies should always raise the suspicion of thymoma.

**Disclosure:** Nothing to disclose



## EPO2345

**Thrombin Activity Measurement in Human Cerebrospinal Fluid**

A. Gerasimov, J. Chapman, N. Maggio, E. Shavit-Stein  
*Neurology, Sheba Medical Center, Ramat Gan, Israel*

**Background and aims:** In many neurological manifestations coagulation proteins are known to be involved. Either being synthesized locally in the brain or penetrate from the systemic circulation- their presence and effects are well established. Thrombin is a central blood coagulation serine protease which affects in a dose-dependent manner neurons and glia cells in the central and peripheral nervous systems through protease activated receptors

**Methods:** We have developed a new method for thrombin direct quantitative measurement in cerebrospinal fluid (CSF). Thrombin activity was measured by a fluorescent substrate in the CSF of 32 patients from 6 groups: multiple sclerosis (MS), acute and chronic inflammatory demyelinating diseases of peripheral nervous system (CIPD/AIDP), non-inflammatory degenerative and cerebrovascular disorders (NI), CNS infection (CNSI), chronic and acute primary headache (CH and AH). Prolyl-endopeptidase and aminopeptidases were inhibited to ensure the specificity of the assay for thrombin detection.

**Results:** Significant increased thrombin levels were found in AH ( $179.1 \pm 111.3 \mu\text{U}/\text{mg}$ ) and CNSI ( $319.4 \pm 104.3 \mu\text{U}/\text{mg}$ ) groups in comparison to NI ( $8.4 \pm 3.2 \mu\text{U}/\text{mg}$ ,  $p < 0.05$  and  $p < 0.002$ , respectively). An interesting finding is the significant higher activity in the AH in comparison to the CH group ( $p < 0.003$ ).

**Conclusion:** We have established a novel sensitive method for measuring thrombin activity in human CSF that allows to study the thrombin mediated pathology in various neurological disorders in humans. The differential thrombin activity found in the studied neurological disorders may indicate its potential as a prognostic factor and possible therapeutic target. Further study is needed in order to better characterize the CSF coagulation proteins levels during neurological manifestations.

**Disclosure:** Nothing to disclose

## EPO2346

**Brain volumetric analysis using Volbrain and comparative analysis with SIENA in patients with NMDA encephalitis**

E. Gomez Figueroa, A. Casallas Vanegas,  
C.A. García Estrada, I.A. Zabala Angeles,  
V. Rivas Alonso, J.D.J. Flores Rivera  
*CDMX, Instituto Nacional de Neurología y Neurocirugía  
Manuel Velasco Suárez, CIUDAD DE MEXICO, Mexico*

**Background and aims:** Autoimmune anti-NMDAR encephalitis is an antibody-mediated disorder characterized by psychiatric symptoms followed by decreased consciousness, dysautonomia and seizures. Some reports suggest the existence of cerebral atrophy in the follow-up of these patients, with conflicting evidence regarding its presence and usefulness as a marker of prognosis.

**Aim:** The aim of this study is to define if there is sustained brain atrophy in patients with NMDA encephalitis.

**Methods:** In a longitudinal retrospective study, all patients with the diagnosis of anti-NMDAR autoimmune encephalitis with initial and control MRI study were included. Automated brain segmental analysis was performed using Volbrain and automated comparative analysis using SIENA. Parametric and nonparametric statistics were performed. Statistical mean and frequencies were calculated. T Student or  $\chi^2$  was performed to see the mean difference for volume changes analyzed.

**Results:** The mean time between the studies was 24 (4-84) months. Significant volume loss were identified in the white matter ( $p = 0.001$ ), gray matter ( $p = 0.001$ ), total brain volume ( $p \leq 0.001$ ), cerebellar volume ( $p = 0.035$ ), putamen volume ( $p = 0.01$ ), thalamic volume ( $p = 0.019$ ) and hippocampal volume ( $p = 0.001$ ). In the simultaneous comparative analysis conducted by SIENA the mean brain volume loss is 334% (-3.65-5.60, SD 2.42).

**Table III.**  
**Brain volume differences by region in the follow-up**

	Minimum	Maximum	Mean	Standard deviation	p
White matter difference	-139,73	354,53	28,9528	94,83093	,001
Grey matter difference	-66,26	210,03	9,1212	61,73685	,001
Brain difference	-114,71	123,28	19,2896	51,18562	<,001
Cerebellum difference	-7,30	699,97	46,9840	166,41816	,035
Brainstem difference	-4,64	79,43	4,2020	15,91088	,514
Caudate nucleus difference	-2,82	10,66	,1956	2,35606	,417
Putamen difference	-4,40	1,05	-,3608	1,07637	,001
Thalamus difference	-5,26	1,53	-,2620	1,37576	,019
Globus pallidus difference	-,91	8,00	,4196	1,64584	,795
Hippocampus difference	-2,56	2,28	,3404	1,20452	,001
Amygdala difference	-1,47	5,59	,2604	1,23363	,336

Segmental volumetry loss

**Conclusion:** Patients with antiNMDAR encephalitis have total brain volume loss and volume loss in certain brain regions. Various clinical manifestations seem to be the cause of this predilection by zones and indirectly we can infer that the most severe cases (dysautonomies, epileptic status) are the main factor that contributes to this finding.

**Disclosure:** Nothing to disclose

## EPO2347

**The neuropathological features of neurosarcoidosis are more widespread than imaging suggests**

D. Kidd<sup>1</sup>, F. Jabeen<sup>2</sup>, M. Galloway<sup>3</sup>

<sup>1</sup>London, United Kingdom, <sup>2</sup>Neuroradiology, Royal Free Hospital, London, United Kingdom, <sup>3</sup>Clinical pathology, Royal Free Hospital, London, United Kingdom

**Background and aims:** To demonstrate the neuropathological appearances of a patient who died of severe leptomeningeal neurosarcoidosis and to compare with the antemortem imaging features.

**Methods:** A clinical case study is provided with antemortem imaging and brain autopsy examination.

**Results:** A 47-year-old man presented with a subacute encephalopathy with ataxia and ophthalmoparesis, uveitis, weight loss and cough. Investigations led to the diagnosis of systemic sarcoidosis. The brain imaging revealed a basal leptomeningitis involving the diencephalon and midbrain, but not elsewhere.

He was treated with steroids and azathioprine but deteriorated and died. His brain was donated to the centre for neurosarcoidosis for research.

At autopsy a marked and widespread granulomatous inflammation was seen which involved all parts of the brain, including those in which imaging had been normal antemortem. There was a vasculocentric granulomatous inflammation with invasion of surrounding parenchyma. In the areas in which there was MRI evidence for inflammation these features were more striking and included active vasculitis with fibrinoid necrosis.

**Conclusion:** These findings suggest that the leptomeningeal form of neurosarcoidosis is a more severe and more extensive disease than imaging suggests. A more aggressive form of treatment may lead to more favourable outcomes.

**Disclosure:** Nothing to disclose

## EPO2348

**White matter lesions in a patient with sarcoidosis: a diagnostic challenge.**

M. Leal Rato, M. Santos, F. Falcão, L. Albuquerque

*Department of Neurology, Centro Hospitalar Universitário Lisboa Norte, Lisbon, Portugal*

**Background and aims:** Neurosarcoidosis may present as granulomatous parenchymal inflammation or meningeal involvement. TNF-inhibitors may cause secondary demyelination.

**Methods:** Case report of a white matter disease (WMD) of the central nervous system (CNS).

**Results:** A 41-year-old female patient presented with a progressive diffuse headache with photophobia. Her past medical history was positive for systemic sarcoidosis and Crohn disease treated with prednisolone and infliximab for the last 4 years. Lumbar puncture revealed polymorphonuclear pleocytosis (64cells/mm<sup>3</sup>), 111mg/dL proteins, normal glucose and angiotensin-converter enzyme levels, and a negative microbiologic investigation including JCV-PCR. MRI showed a bilateral temporal T2/FLAIR hyperintense and T1 hypointense lesion, without restricted diffusion or enhancement after gadolinium. The headache subsided after IV methylprednisolone, and a mild cognitive impairment persisted. A presumptive diagnosis of neurosarcoidosis (aseptic meningitis) was made and oral prednisolone (1mg/kg/day) was started. Serum anti-MOG and anti-AQP4 determination was negative. After 4 months, MRI revealed extension of the lesions. CSF and blood infliximab titers were low and drug antibodies were not present. Anti-TNF therapy was stopped assuming a disorder secondary to infliximab, and prednisolone was slowly tapered. The patient remained stable (20 points on MoCA; no signs of progression on MRI). Repeated CSF analysis revealed normalization of cell count and chemistry, no oligoclonal bands, and a persisting negative PCR for JCV. She remained treated with prednisolone 40mg/day and vedolizumab.

**Conclusion:** This case seems to be an inflammatory disorder of the CNS associated with infliximab. The differential diagnosis between neurosarcoidosis and drug-induced meningitis associated with WMD is particularly difficult.

**Disclosure:** Nothing to disclose

## EPO2349

**To examine the impact of Multiple Sclerosis on bone health and explore mechanisms for this association.**

S. Leddy<sup>1</sup>, B. Meir Jacobs<sup>2</sup>, G. Giovannoni<sup>2</sup>, R. Dobson<sup>1</sup>  
<sup>1</sup>Preventative Neurology Unit, Queen Mary, University of London, London, United Kingdom, <sup>2</sup>Blizard Institute, Queen Mary University of London, London, United Kingdom

**Background and aims:** People with MS (PwMS) have an increased risk of osteoporosis and fractures. This may be due to shared risk factors such as low vitamin D and smoking.

**Methods:** We investigated associations with heel Bone Mineral Densitometry (BMD) and fractures in PwMS in UK Biobank, using BMD from 960 people with MS and 278,138 controls, and 47,466 fractures in 502,583 individuals. Multivariate linear (BMD) or logistic (fracture) regression adjusting for age, sex, ethnicity and current deprivation status was performed.

**Results:** Demographic characteristics were representative of the broader MS population. The odds ratio of fracture in MS was 1.4. 234/1781 PwMS in UK Biobank (13.1%) reported fractures. BMD T-scores were lower among PwMS (mean  $-0.649 \pm 1.3$  vs  $-0.336 \pm 1.24$ ). Lower BMD was associated with smoking (beta  $-0.1$ ), alcohol consumption (beta  $-0.03$ ), later menarche (beta  $-0.03$ ), post-menopausal status (beta  $-0.18$ ), epilepsy (beta  $-0.28$ ), and vitamin D supplementation (beta  $-0.1$ ).

In a model incorporating all individually-significant predictors, the effect of MS on BMD attenuated slightly (beta  $-0.11$ , 95%CI  $-0.19$  to  $-0.02$ ) while the effect of MS on fracture risk reversed (OR 0.81, 95% CI 0.69-0.95). After adjustment for falls, the effect of MS on fracture attenuated (OR 0.90, 95% CI 0.78 to 1.04). No other exposures altered this association.

**Conclusion:** These results confirm in a large cohort that MS is associated with lower BMD and higher risk of fractures. Factors associated with BMD do not fully explain lower BMD in MS; increased rates of fracture appear to be driven by both decreased BMD and increased frequency of falls.

**Disclosure:** Nothing to disclose

## EPO2350

**Foramen Magnum Meningioma Presenting as Cervical Myelopathy in a Patient with Seronegative Neuromyelitis Optica Spectrum Disorder Overlap with Primary Sjögren's Syndrome**

A. Lefter<sup>1</sup>, C. Predoiu<sup>1</sup>, A. Danau<sup>1</sup>, A. Nicolau<sup>2</sup>, M. Craciun<sup>3</sup>, A. Bastian<sup>4</sup>, L. Dumitrescu<sup>5</sup>, D. Luca<sup>1</sup>, R. Tanasescu<sup>6</sup>, B.O. Popescu<sup>7</sup>

<sup>1</sup>Department of Neurology, Colentina Clinical Hospital, Bucharest, Romania, <sup>2</sup>Department of Internal Medicine, Colentina Clinical Hospital, Bucharest, Romania, <sup>3</sup>Department of Neurosurgery, Colentina Clinical Hospital, Bucharest, Romania, <sup>4</sup>Department of Pathology, Colentina Clinical Hospital, Bucharest, Romania, <sup>5</sup>Department of Clinical Neurosciences, Neurology Division, Colentina Clinical Hospital, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania, <sup>6</sup>Division of Clinical Neuroscience, Academic Clinical Neurology, University of Nottingham, Queen's Medical Centre, Nottingham, United Kingdom, <sup>7</sup>Laboratory of Molecular Medicine, "Victor Babe" National Institute of Pathology, Bucharest, Romania

**Background and aims:** Meningiomas are the most common primary tumours of the central nervous system (CNS). They are mainly benign and cause symptoms by compression. Foramen magnum meningiomas account for 1.8-3.2% of all meningiomas. Neuromyelitis optica spectrum disorder (NMOSD) is an inflammatory disease of the CNS primarily targeting the optic nerves and spinal cord, with a prevalence as high as 10 per 100000. Systemic autoimmune disorders including Sjögren's syndrome (SS) may coexist with NMOSD.

**Methods:** We report the case of a 52-year-old man with inflammatory disease of the CNS compatible with seronegative NMOSD overlap with primary SS, with a history of recurrent cervical and thoracic myelitis, in sustained clinical remission following immunosuppressive therapy with cyclophosphamide 8 years prior, and continuing oral corticotherapy with methylprednisolone. He was readmitted for persisting bilateral cervical paresthesia for a month and neurological examination revealed hypoesthesia in the C2 region bilaterally, tetramelic hypopallesthesia, slight motor deficit in the upper limbs and paraparesis 4/5 MRC.

**Results:** We performed magnetic resonance imaging of the cervical spine which showed a contrast-enhancing epidural mass compressing the spinal cord in the C1-C2 region and the medulla, raising the suspicion of a foramen magnum meningioma. The patient underwent complete excision of the mass and histopathological evaluation was consistent with a benign meningioma, i.e. WHO grade I.

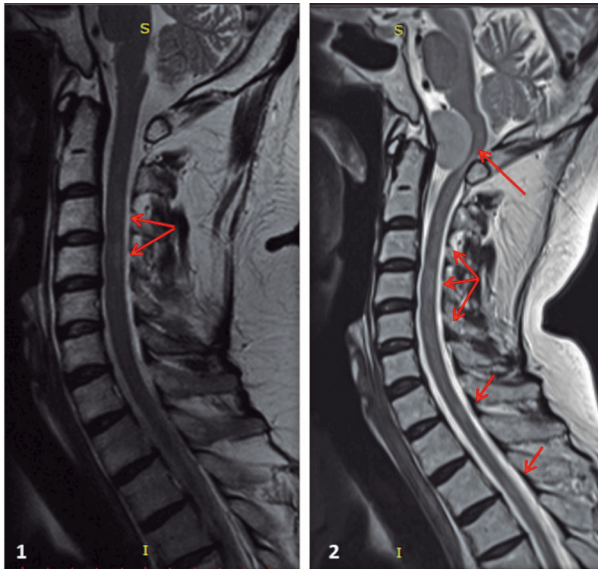


Figure 1. Cervical and thoracic spine MRI. Sagittal T2-weighted images showing T2-hyperintense lesions of myelitis in 2008 (1) and 2019 (2), with a contrast-enhancing epidural mass at the cervicomedullary junction, typical for meningioma (2).

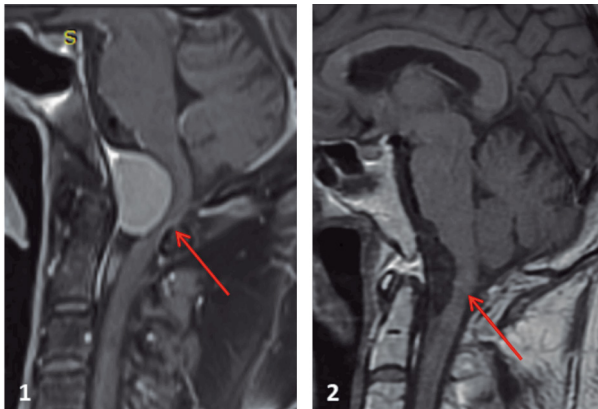


Figure 2. Cervical spine MRI. Sagittal T1-weighted image showing a contrast-enhancing epidural mass compressing the cervical spine in the C1-C2 region and the medulla (1) and postoperative T1-weighted image (2).

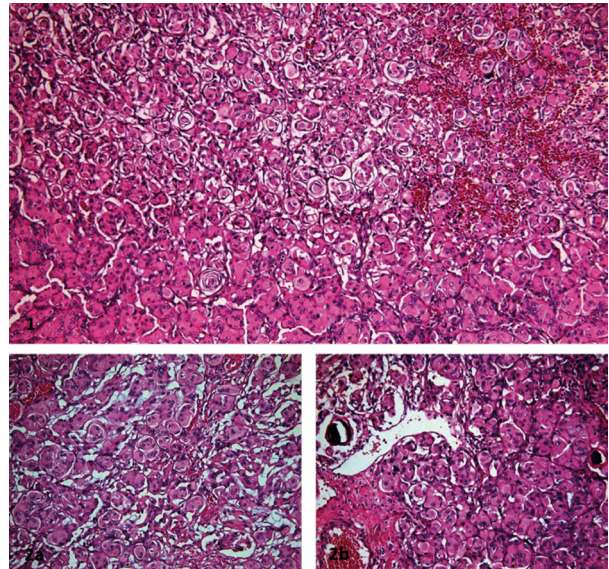


Figure 3. Histopathological specimens hematoxylin and eosin stained, 100 times enhanced (1) and 200 times enhanced (2a, 2b) showing proliferation of meningeal cells arranged in large lobules and nests of medium-sized epithelioid and spindle cells, numerous meningeal whorls and psammoma bodies, some calcified.

**Conclusion:** This case involved diagnostic difficulties before the current criteria for NMOSD were defined and we discuss here the differential diagnosis. The discovery of a foramen magnum meningioma was all the more surprising in the aforementioned background.

**Disclosure:** Nothing to disclose

## EPO2351

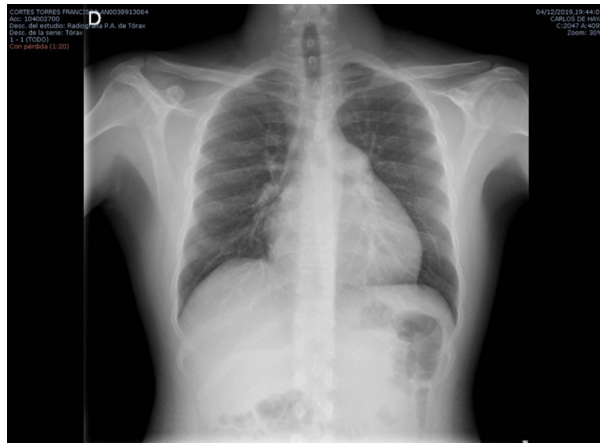
## Secondary pulmonary hypertension in a patient with multiple sclerosis treated with teriflunomide: a case report.

Y. López Moreno, N L. Ciano Petersen, V. Reyes Garrido, P. Urbaneja, M.M. Guerrero Fernández, A.M. Alonso Torres  
*Neurology, Malaga's Regional and University Hospital, Málaga, Spain*

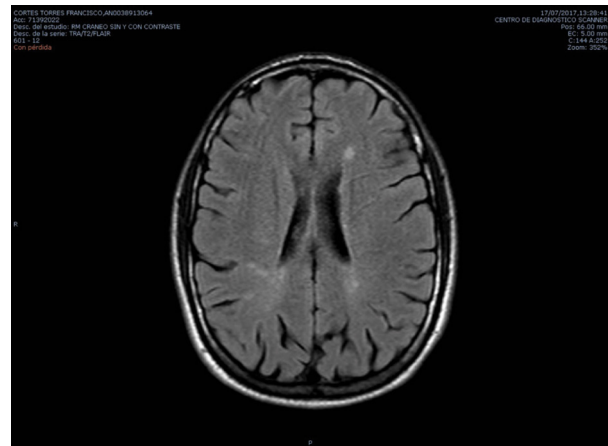
**Background and aims:** Teriflunomide is a disease-modifying drug approved for Multiple Sclerosis (MS). Its an overall well-tolerated treatment with an 11% rate of discontinuation due to side effects, such as hepatotoxicity, high blood pressure, headache and gastrointestinal disorders. Pulmonary hypertension (PH) is a chronic disease characterized by increased pulmonary vascular resistance (PVR) at the pulmonary arterioles, which causes a progressive overload and subsequent dysfunction of the right ventricle. Primary pulmonary hypertension has been described in patients with leflunomide, but teriflunomide has only been associated with secondary causes as lung interstitial disease.

**Methods:** We present the case of a 26-year-old man, diagnosed of MS in 2008, who presented an acute right-heart failure due to primary pulmonary hypertension. 8 months before he as started on teriflunomide because of IFNB-1A intolerance.

**Results:** Echocardiogram showed a severe pulmonary hypertension associated to a severe tricuspid insufficiency, without left heart disease. Chest angioCT ruled-out pulmonary thromboembolism and parenchyma abnormalities. Other diseases associated to HP were exclude as well. Teriflunomide was discontinued during the admission and the patient initiated treatment for primary pulmonary hypertension upon discharged.



Chest radiography



MR

**Conclusion:** We believe that pulmonary hypertension could be caused by the exposure to teriflunomide, as other causes were ruled-out and it has been previously described with leflunomide. Therefore, we consider that physicians should keep in mind this side effect, especially in patients with personal or family history of heart disease or pulmonary hypertension.

**Disclosure:** Nothing to disclose

## EPO2352

**Vogt-Koyanagi-Harada syndrome – Characterization of an 11 patient cohort**

M.J. Malaquias<sup>1</sup>, H. Mota Doria<sup>2</sup>, M.J. Furtado<sup>3</sup>,  
A. Martins Da Silva<sup>1</sup>, E. Santos<sup>1</sup>

<sup>1</sup>Neurology Department, Centro Hospitalar Universitário do Porto, Porto, Portugal, <sup>2</sup>Neuroradiology Department, Centro Hospitalar Universitário do Portugal, Porto, Portugal, <sup>3</sup>Ophthalmology Department, Centro Hospitalar Universitário do Porto, Porto, Portugal

**Background and aims:** Vogt-Koyanagi-Harada syndrome (VKHS) is a rare multiphasic inflammatory disorder, characterized by panuveitis, associated with neurological and cutaneous manifestations. To characterize a cohort of VKHS patients, concerning clinical, laboratorial and imagiological data.

**Methods:** Retrospective analysis of patients attending uveitis and/or neuroimmunology clinics, from 2008 to 2019, that fulfilled the diagnostic criteria for complete or incomplete VKHS (by the American Uveitis Society).

**Results:** 11 patients (8 women, mean age at onset 38±13,57 years), 7 had incomplete and 4 complete VKHS. All developed neurological manifestations: headache was the most common symptom (n=10), associated with nausea, stiffness of the neck and/or fever (n=7). In 3 patients the neurological involvement began in the prodromal phase (time to ocular disease 1 week to 3 months) and in other 6 patients in the acute ocular phase. 7 patients performed lumbar puncture, all had lymphocytic pleocytosis (median of 113 leucocytes, 1 case with high protein level). Brain MRI showed bilateral choroidal thickening in 4 patients, without involvement of the optic nerves. In the acute phase all patients were treated with corticosteroids and in the chronic phase immunosuppressive treatment was started: azathioprine (n=5), methotrexate (n=2), cyclosporine (n=1), corticosteroids (n=2) and adalimumab (n=1). The neurological symptoms recurred in 2 cases, one with transitory focal deficits (aphasia and right hemiparesis).

**Conclusion:** Neurological involvement was common and related to the beginning of ocular impairment, constituting a marker of disease activity. Neurological signs can precede the ocular disease and should be considered by the neurologist approaching an uveo-meningeal syndrome.

**Disclosure:** Nothing to disclose

## EPO2353

**An unusual association of chronic inflammatory demyelinating polyneuropathy (CIDP) and anti-contactin-associated protein-2 (anti-Caspr2) syndrome**

S. Maldonado Sloohtjes, N. Ackermans, C. Bouvy,  
F. Piéret, M.-P. Rutgers, M. Gille  
Neurology, Europe Hospitals, Brussels, Belgium

**Background and aims:** Anti-Caspr2 syndrome may present with several phenotypes including peripheral nerve hyperexcitability (e.g., cramps, fasciculations, myokomia, and neuromyotonia), central nervous system manifestations (e.g., insomnia, seizures, and limbic encephalitis) and dysautonomia (e.g., hyperhidrosis, labile arterial blood pressure and cardiac arrhythmias). It is due to the presence of antibodies that target the contactin-associated protein-2, a membrane protein of the juxtaparanodal region. Herein we report a CIDP patient who later developed an anti-Caspr2 syndrome.

**Methods:** Case report and literature review.

**Results:** A 73-year-old patient had been treated for CIDP with polyvalent intravenous immunoglobulins (IVIg, 1g/kg every 6 weeks) for 2 years when he developed insomnia, hyperhidrosis, labile blood pressure, diarrhea, weight loss, cramps, and stiffness. Electroneuromyography revealed fasciculation potentials, myokymia and neuromyotonic discharges at rest, in addition to a multifocal, predominantly motor axonal and demyelinating neuropathy with multiple conduction blocks. Anti-ganglioside antibodies were not detected in the serum. High-titer serum anti-Caspr2 antibodies were found. Cerebrospinal fluid examination showed a mildly increased protein level at 0.47g/L. Full body PET-scan was unremarkable. Symptom control was achieved with increased doses of IVIg (2g/kg for 5 days followed by courses of 1g/kg every 3 weeks).

**Conclusion:** Peripheral neuropathy is not a known feature of anti-Caspr2 syndrome. While the association of peripheral nerve hyperexcitability and CIDP has rarely been reported, this patient is, to our knowledge, the first case of anti-Caspr2 with CIDP.

**Disclosure:** Nothing to disclose

## EPO2354

**Stiff person syndrome: a case report**

E. Marín Conesa<sup>1</sup>, J. Marín Marín<sup>2</sup>, E. Gómez López<sup>2</sup>,  
M. Martínez Zarco<sup>3</sup>, I. Pellicer Espinosa<sup>4</sup>,  
E. Giménez López<sup>1</sup>, J.M. Rodríguez García<sup>2</sup>,  
M.L. Martínez Navarro<sup>2</sup>, J.A. Iniesta Valera<sup>2</sup>

<sup>1</sup>General University Hospital Reina Sofía de Murcia,  
Murcia, Spain, <sup>2</sup>Neurology, Hospital General Universitario  
Reina Sofía, Murcia, Spain, <sup>3</sup>Neur, Hospital General  
Universitario Reina Sofía, Murcia, Spain, <sup>4</sup>Murcia, Spain

**Background and aims:** Stiff person syndrome is a rare disease of the central nervous system, characterized by progressive stiffness and muscle spasms in the extremities and axial musculature. 60-80% have positive anti GAD antibodies and 10% have amphiphysin antibodies.

**Methods:** A 58-year-old woman from Equatorial Guinea started with weakness of lower limbs, stiffness and pain of the axial musculature that progresses over the time, with many accidental falls, leading to the need of using crutches for walking. On physical examination, she presented hyperlordosis with stiffness and hypertrophy of the dorsal-lumbar paravertebral muscles and painful muscle spasms of spinal and abdominal muscles, bilateral Hoffmann sign, bilateral incoordination of upper limbs and gait ataxia (more instability than expected due to slight rigidity of lower limbs).

**Results:** Analysis disclosed positive anti-GAD, anti-thyroperoxidase and anti-gastric ATPase antibodies. The EMG showed continuous motor activity. Diagnosis of stiff person with cerebellar involvement was made. Immunoglobulin and plasmapheresis treatment was unsuccessful, some improvement was observed with 1g/day of methylprednisolone for 5 days. However, the symptoms persisted, associating dysphonia and dyspnea with a restrictive pattern in spirometry (due to thoracic stiffness). Finally, it was decided to start treatment with rituximab with a great improvement of symptoms.

**Conclusion:** Stiff person syndrome with cerebellar component is rare. This patient had poor response to usual treatments, which requires finding therapeutic alternatives although its effectiveness has not been completely studied. We have to take in account that symptomatology guides the physician to take the decision and not the presence of positive antibodies.



Hyperlordosis with hypertrophy of the lumbar paraspinal muscles



Inability to bend down and touch their toes.

**Disclosure:** Nothing to disclose

## EPO2355

**The Clinical Efficacy of Intravenous Immunoglobulin in Neurology - A Retrospective Cohort Study at the Mater Misericordiae University Hospital**

A. McDonnell<sup>1</sup>, P. Moloney<sup>1</sup>, S. Smyth<sup>1</sup>, D. Murphy<sup>2</sup>, J. Brown<sup>2</sup>, C. Meegan<sup>2</sup>

<sup>1</sup>Dublin, Ireland, <sup>2</sup>Pharmacy, Mater Misericordiae University Hospital, Dublin, Ireland

**Background and aims:** Intravenous Immunoglobulins (IVIg) are blood-derived medicinal products prescribed for various medical conditions. Clinical evidence strongly supports the use of IVIg as 1st-line therapy in Chronic Inflammatory Demyelinating Polyneuropathy (CIDP), Guillain-Barré syndrome (GBS) and Multifocal Motor Neuropathy. There are an increasing number of other neurological conditions where IVIg has been used despite limited evidence-based data. Careful consideration of the efficacy of IVIg in each indication is required as it is a limited resource.

To review clinical indications for IVIg use in neurology patients at the MMUH. To compare prescribing practices to international evidence-based guidelines.

**Methods:** All neurology patients treated with IVIg between 2016 and 2018 were retrospectively reviewed. Data collected included indication, dose, total number of IVIg courses, use of alternative therapies before IVIg and documentation of clinical benefit. Results were compared to international evidence-based guidelines and verified by a neurology consultant/registrar.

**Results:** 67 patients were included. IVIg was prescribed for 15 indications. The most common were GBS, Myasthenia Gravis and CIDP. 31 patients received IVIg for licensed indications, whereas 36 patients received IVIg for unlicensed indications. The level of evidence from international evidence-based guidelines supported the use of IVIg for most indications.

**Conclusion:** IVIg is prescribed for a range of neurological conditions at the MMUH, the majority of which are unlicensed. IVIg use was supported for most indications when compared to international evidence-based guidelines. However IVIg was prescribed for several indications despite limited evidence of efficacy. This study highlights the need for evidence-based clinical guidelines for IVIg use at the MMUH and Ireland.

**Disclosure:** Nothing to disclose



## Infectious diseases 1

## EPO2356

**Varicella zoster virus (VZV) reactivation-induced myelomeningoradiculitis and cranial neuropathy without skin lesions**

M. Cánovas Iniesta<sup>1</sup>, M. Morales de la Prida<sup>2</sup>,  
M.T. Alba Isasi<sup>1</sup>, J. Vazquez Lorenzo<sup>2</sup>,  
M.O. Lozano Caballero<sup>3</sup>, V.M. Pérez Navarro<sup>3</sup>,  
G.D. De Paco Tudela<sup>4</sup>, J. Díaz Pérez<sup>5</sup>, E. García Molina<sup>6</sup>,  
F.R. Luna<sup>3</sup>

<sup>1</sup>Murcia, Spain, <sup>2</sup>Neurology, Virgen de la Arrixaca University Hospital, Murcia, Spain, <sup>3</sup>Neurology, Hospital Clínico Universitario Virgen de la Arrixaca, Murcia, Spain, <sup>4</sup>Radiology, Hospital Clínico Universitario Virgen de la Arrixaca, Murcia, Spain, <sup>5</sup>Neurology, Hospital Universitario Virgen de la Arrixaca, Murcia, Spain, <sup>6</sup>Blanca, Spain

**Background and aims:** Reactivation of varicella zoster virus (VZV) from latently infected human ganglia usually produces herpes zoster, characterized by dermatomal distribution pain and rash, often followed by postherpetic neuralgia. But it can also cause several neurologic dysfunctions such as meningoencephalitis, cerebellitis, isolated or multiple cranial nerve palsies, vasculopathy or myelopathy, even without skin lesions.

**Methods:** We present the case of a 72-year-old patient with myelomeningoradiculitis caused by VZV reactivation.

**Results:** A 72-year-old man with hepatocellular carcinoma treated with chemoembolization, presented to the emergency department with a 10-day history of urinary retention, lumbar pain and weakness of lower limbs. Upon admission, neurological exam revealed right facial palsy, weakness of lower limbs (grade 2/5) and bilateral Babinski sign. Ankle and knee jerk reflexes were abolished bilaterally and decreased sensation to vibration and touch was noticed with T10 sensitive level. Magnetic resonance imaging showed leptomeningeal and cauda equina contrast enhancement, hyperintense lesions in thoracic spinal cord (T2-T12) and subacute putaminal infarction. Cerebrospinal fluid (CSF) testing showed lymphocytic pleocytosis and elevated proteins, without malignant cells. PCR assay in CSF for VZV was positive. The remaining tests were negative. From these data, the diagnosis of VZV reactivation-induced myelomeningoradiculitis, facial palsy and ischemic stroke was made, without associated skin lesions. The patient was treated with intravenous acyclovir for 21 days and dexamethasone for ten days followed by oral tapering, with clinical improvement.



Image 1

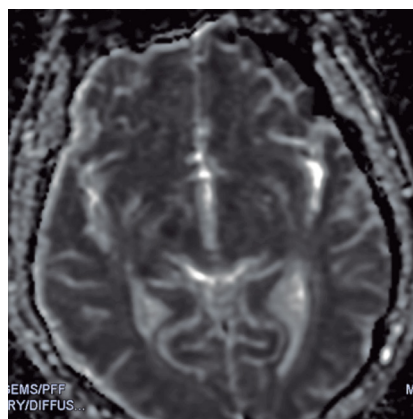


Image 2



Image 3

**Conclusion:** This case emphasizes the importance of considering VZV reactivation in patients (particularly immunocompromised) presenting with a constellation of symptoms of neurologic dysfunction, even in the absence of rash.

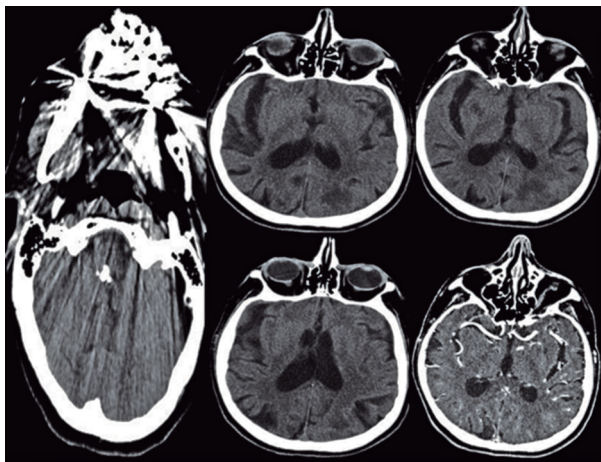
**Disclosure:** Nothing to disclose

## EPO2357

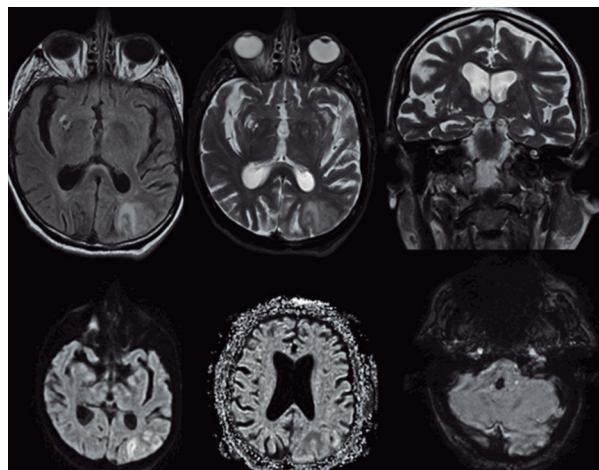
### “Unusual presentation of cryptococcus neoformans: bilateral sublenticular invasion and meningoencephalitis”

G. Carvalho Monteiro<sup>1</sup>, B. Povedano Margarit<sup>1</sup>, J. Hernandez Cristobal<sup>1</sup>, J.M. Celi Celi<sup>1</sup>, D.E. Barbero Jiménez<sup>1</sup>, F. Romero Delgado<sup>1</sup>, A. Garcia-Puente Garcia<sup>2</sup>, M. Torralba González de Suso<sup>1</sup>, A. Yusta Izquierdo<sup>1</sup>  
<sup>1</sup>Neurology, University Hospital of Guadalajara, Guadalajara, Spain, <sup>2</sup>Family Medicine, University Hospital of Salamanca, Salamanca, Spain

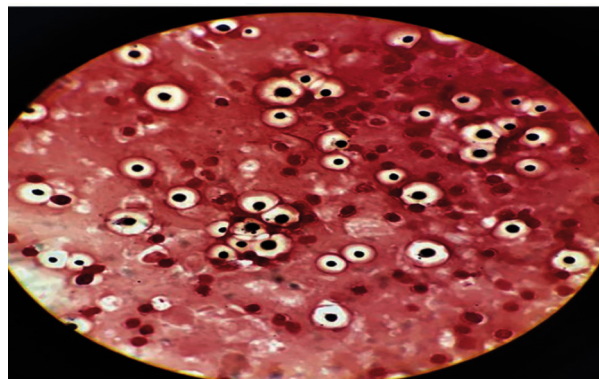
**Background and aims:** Disseminated cryptococcosis is a serious fungal infection with a high mortality rate in patients with AIDS and the 4<sup>th</sup> opportunistic disease that causes pneumonia and meningitis. Its most frequent form of presentation is Pulmonary but in the CNS the most common form is meningitis but less frequently it can occur as meningoencephalitis and/or pseudotumoral lesion (perivascular or cryptococomas gelatinous forms). The Neoformans cryptococcus has been isolated in excreta of pigeons, parrots and chickens being considered a zoonosis.



**Methods:** A 74-year-old male who presented abruptly about 7 am in the morning episode of language disturbance and temporo-spatial disorientation, activating stroke code. After assessment at 11:45h, past >4.5h since the beginning of the episode, presents NIHSS: 5 (Aphasia + mild right hemiparesis). Cranial CT and Angio CT are performed, visualizing hypodense area in the left parietooccipital border region without occlusion of large vessels, dismissing fibrinolysis and thrombectomy. Subsequently, it presents a 38° febrile peak. Performing lumbar puncture (33 leukocytes, 95% monocytes, Proteins 150, Glucose 50). Serum glucose 175. Visualization of yeast with Chinese ink. Positive CSF PCR for Cryptococcus Neoformans. HIV 1 positive and 50CD4.



**Results:** Fungal Meningoencephalitis is confirmed by initiating induction therapy with Liposomal Amphotericin B + Flucytosine and subsequently consolidation therapy with Fluconazole + antiretrovirals. In cerebral MRI, left parietooccipital meningoencephalitis with leptomeningeal thickening and vasogenic edema is described, in addition to gelatinous pseudocysts in sublenticular perivascular spaces.



**Conclusion:** We present a rare case of Cryptococcus Meningoencephalitis and unusual involvement of sublenticular pseudocysts.

**Disclosure:** Nothing to disclose

## EPO2358

**Dorsal myelopathy secondary to spondylodiscitis caused by streptococcus agalactiae in an adult with known underlying disease.**

J.M. Celi Celi<sup>1</sup>, G. Carvalho Monteiro<sup>1</sup>,  
B. Povedano Margarit<sup>1</sup>, D.E. Barbero Jiménez<sup>1</sup>,  
E. Orts Castro<sup>1</sup>, J. Hernandez Cristobal<sup>1</sup>,  
I. Mendez Meson<sup>2</sup>, A. Yusta Izquierdo<sup>1</sup>

<sup>1</sup>Neurology, Guadalajara University Hospital, Guadalajara, Spain, <sup>2</sup>Traumatology, Guadalajara University Hospital, Guadalajara, Spain

**Background and aims:** We present a case of dorsal myelopathy secondary to spondylodiscitis caused by streptococcus agalactiae in an adult with known underlying disease.

**Methods:** 46-year-old female with a history of diabetes mellitus (DM) of undetermined evolution and abandonment of antidiabetic treatment. Go to emergency department due to acute urinary retention, temperature 38°C, proximal predominance flaccid paraplegia, areflexia in lower limbs, bilateral Babinski, tactile and algic hypoesthesia level D5, neck stiffness and meningeal signs. Cerebrospinal fluid compatible with acute bacterial meningitis. Espine MRI with left paravertebral abscess with extension to the spinal canal and extrinsic compression of the medullary cord (D4-D6), signs of myelopathy (D4-D7) and spondylodiscitis (D5-D6). Initially, empiric antibiotic therapy is prescribed and evacuating surgery and laminectomy are performed. Blood culture and paravertebral abscess culture were positives for *S. agalactiae*. After specific antibiotic treatment the clinical evolution is favorable.

**Results:** *S. agalactiae* is an asymptomatic colonizer of the organism that can infect the spine primarily by hematogenous spread. Adults who are at risk of infection are women in gestational and peripartum periods and patients with severe underlying diseases. In the few cases of spondylodiscitis due to *S. agalactiae* reported in adults, there is a predominance of the male sex, lumbosacral location, extravertebral extension in the form of paravertebral or epidural abscesses with spinal cord compression, and the existence of a predisposing factor of infection, highlighting DM among them.

**Conclusion:** Spondylodiscitis due to *S. agalactiae* outside the gestational and peripartum period most often affects adults with predisposing factors, highlighting DM among them.

**Disclosure:** Nothing to disclose

## EPO2359

**Diagnostic reliability and cost of routine determination of adenosine deaminase levels in cerebrospinal fluid.**

E. De Celis Ruiz<sup>1</sup>, M. Fernandez-Fournier Ferna<sup>1</sup>,  
S. Pastor<sup>1</sup>, M. Sastre<sup>1</sup>, M.J. Alcaide Martín<sup>2</sup>,  
B. Fernandez Puntero<sup>2</sup>, B. Fuentes<sup>2</sup>

<sup>1</sup>Madrid, Spain, <sup>2</sup>Hospital Universitario La Paz, Madrid, Spain

**Background and aims:** High levels of adenosine deaminase (ADA) in cerebrospinal fluid (CSF) along with other biochemical alterations suggest tuberculosis. We aim to evaluate diagnostic reliability and cost of measuring ADA routinely in CSF samples.

**Methods:** Observational retrospective descriptive study analyzing reason for requesting, final diagnosis and biochemistry of all CSFs in which ADA was requested from January 2017 until December 2018 at La Paz University Hospital.

**Results:** 201 CSFs with ADA determination were analyzed. Only 89 (44.3%) were requested due to a suspected CNS infection. ADA levels in CSF were considered high (>8U/L) in 26 (12.9%) samples; 25 (96.15%) of them pertaining to patients with possible CNS infection. Of the 26 samples with high ADA levels, 22 (84.61%) had other biochemical abnormalities and only 5 of these belonged to patients with final diagnosis of CNS tuberculosis. There was no CSF sample with normal levels of ADA from which a tuberculosis diagnosis was made. Sensitivity and specificity of ADA determination were 100% and 90%, respectively. Test positive predictive value was of 19%. The price of ADA determination in a single sample of CSF is 12€. In our study, the extra cost of ADA determination when CNS infection is not suspected is of 1164€, and it ascends to 1476€ taking into account cases of suspected CNS infection but lack of biochemical abnormalities in CSF.

**Conclusion:** Due to the low incidence of CNS tuberculosis in our environment, routine CSF ADA determination does not seem profitable unless CNS infection is suspected and CSF is abnormal.

**Disclosure:** Nothing to disclose

## EPO2360

**Rhino-orbital mucormycosis causing multiple cranial nerve palsies: a case report**

M. Dimitriou<sup>1</sup>, I. Koutroulou<sup>1</sup>, T. Stardeli<sup>1</sup>,  
A.-N. Terzakis<sup>1</sup>, T. Karapanagiotidis<sup>1</sup>, K. Kouskouras<sup>2</sup>,  
N. Grigoriadis<sup>1</sup>

<sup>1</sup>2<sup>nd</sup> Department of Neurology, Aristotle University of Thessaloniki, AHEPA University Hospital of Thessaloniki, Thessaloniki, Greece, <sup>2</sup>Department of Radiology, Aristotle University of Thessaloniki, AHEPA General Hospital, Thessaloniki, Greece

**Background and aims:** Mucormycosis is a rapidly progressive fungal infection frequently seen in diabetic and immunosuppressed patients. Rhino-orbital mucormycosis is the commonest form presenting with chemosis, ptosis, proptosis, ophthalmoplegia and visual loss.

**Methods:** We report a patient with multiple cranial nerve palsies.

**Results:** A 55-year-old man known for diabetes mellitus, chronic renal insufficiency on dialysis, diabetic peripheral neuropathy and left foot diabetic ulcer, presented with diplopia. He complained of unilateral headache starting 4 days earlier. Upon admission he had normal vital signs and an isolated abducens nerve palsy. Laboratory findings included high glucose levels, ketoacidosis and high C-reactive protein. Cranial CT scan showed opacification of the left ethmoid, sphenoid and maxillary sinuses and the patient was put on antibiotics. The following day the patient evolved ptosis and complete external and internal ophthalmoplegia on the left, hypoesthesia of the left half of the face and unilateral visual loss. Brain MRI depicted edema and diffusion restriction of the oculomotor muscles of the left eye and of the optic disk, periorbital soft tissue gadolinium enhancement, and opacification of the nasal and paranasal cavities. Rhinoscopy revealed multiple necrotic lesions and the biopsy yielded *Rhizopus arrhizus*. Isavuconazole was promptly initiated and the patient was transferred to the maxillofacial surgery department for treatment.

**Conclusion:** Mucormycosis is a medical emergency and rapidly evolving multiple cranial nerve palsies in a diabetic patient should raise suspicion of this condition. Necrotic lesions in the oral maxillary or nasal mucosa could be easily missed unless specifically looked for. Early radical surgical treatment may be life-saving.

**Disclosure:** Nothing to disclose

## EPO2361

**Stroke in HIV-infected patient due to thrombosed cerebral aneurysm leading to diagnosis of aneurysmal vasculopathy**

N. Ionita<sup>1</sup>, C. Dumitrescu<sup>1</sup>, C. Tronaru-Ilie<sup>1</sup>,  
C. Apostolescu<sup>2</sup>, S. Nica<sup>1</sup>, B.O. Popescu<sup>3</sup>  
<sup>1</sup>Department of Neurology, Colentina Clinical Hospital, Bucharest, Romania, <sup>2</sup>National Institute for Infectious Disease "Prof. Dr. Matei Bals", Bucharest, Romania, <sup>3</sup>Laboratory of Ultrastructural Pathology, "Victor Babes" National Institute of Pathology, Bucharest, Romania

**Background and aims:** HIV – associated cerebral aneurysmal vasculopathy is a rare complication of HIV-infection among other vascular changes such as vasculitis, stenosis, aneurysms and accelerated atherosclerosis.

**Methods:** We report a case of a 29-year-old patient with AIDS who suddenly developed left hemiplegia and left central facial palsy during hospitalization in the Department of Infection Diseases for measles.

He was 1st diagnosed with HIV at the age of 5, being one of the children who acquired an HIV infection parenterally more than 25 years ago (Romanian "1987-1990 cohort"). The initial workup included lumbar puncture that showed protein level of 60mg/dl, fluid glucose level of 40mg/dl (blood glucose level of 95mg/dl), 2/mm<sup>3</sup> white cells, negative cryptococcal latex antigen fixation, negative rapid plasma reagin and negative cultures for bacteria, fungi and tuberculosis.

He was transferred to the Neurology Department for further investigation. He underwent an MRI and angiography (MRI-MRA) that showed acute infarction in the distribution of right MCA deep territory, bilateral multiple fusiform aneurysms and thrombosed cerebral aneurysm arising from the intracranial segment of the internal carotid artery (M1, M2 segments).

**Results:** In collaboration with a neurosurgeon and an interventional neuroradiologist, the surgical/endovascular treatment options were inappropriate considering potential risks, particularly bleeding in the brain or loss of blood flow to the brain.

**Conclusion:** Although cerebral aneurysmal vasculopathy in adult patients with AIDS is a rare condition, it should be properly considered in the differential diagnosis in patients with AIDS who developed stroke or intracranial hemorrhage.

**Disclosure:** Nothing to disclose

## EPO2362

**An unusual presentation of sciatic neuropathy after influenza A virus infection**L.M. Gonçalves Ribeiro<sup>1</sup>, D. Silva<sup>2</sup>, A. Monteiro<sup>1</sup><sup>1</sup>Neurologia, Hospital Pedro Hispano, Porto, Portugal,<sup>2</sup>Medicine, Hospital Pedro Hispano, Porto, Portugal

**Background and aims:** Peripheral neuropathies caused by infectious agents have a complex pathophysiology. They can be classified as postinfectious or parainfectious neuropathies. The 1st usually appears several weeks after the onset of the disease and is thought to be an autoimmune reaction. The latter develops during the acute infection or shortly after, and is either a direct consequence of the infection or an unusual hyperimmune response.

**Methods:** A previously healthy 45-year-old woman was admitted to intensive care for complicated influenza A virus pneumonia. 10 days after admission, the patient began experiencing excruciating pain with neuropathic characteristics (allodynia, hyperalgesia and dysesthesia) in the left leg, along with motor limitation involving tibial and peroneal nerve territories. Blood workup was unremarkable (including CK, cryoglobulins, antiganglioside antibodies, infectious serologies and immune study). Lumbar puncture was normal, with negative oligoclonal bands. Lumbar and dorsal MRI were normal, but an MRI directed to the sacred plexus showed marked thickening and hyperintensity of the left sciatic nerve with diffuse contrast enhancement. Nerve conduction studies revealed axonal sensory-motor neuropathy of the left sciatic nerve. (figure-1)

**Results:** A 3-day trial with methylprednisolone (1g endovenous), along with 1200mg gabapentin, 30mg baclofen, 35mg amitriptyline and 20mg subcutaneous morphine daily resulted in gradual pain and motor deficit improvement. The patient is currently on physical rehabilitation program.

**Conclusion:** Neuropathies can result directly from bacterial/viral infections, but also from indirect/parainfectious autoimmune responses to the infection. In this patient, parainfectious influenza A neuropathy was the most likely mechanism. To our knowledge, is the first reported case.

**Disclosure:** Nothing to disclose

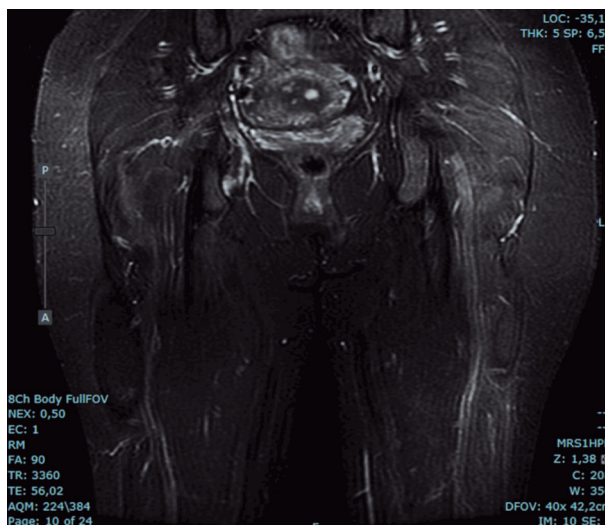


Figure 1- Hyperintensity of the left sciatic nerve

## EPO2363

**Severe human herpesvirus 7 (HHV-7) encephalitis in a patient with rheumatoid arthritis**

A. Gonzalez Martinez<sup>1</sup>, S. Trillo Senín<sup>1</sup>,  
A.C. Espiño Álvarez<sup>2</sup>, L. Casado Fernández<sup>1</sup>,  
I. Muro García<sup>1</sup>, J. Vivancos Mora<sup>1</sup>

<sup>1</sup>Neurology, Hospital Universitario de La Princesa, Madrid, Spain, <sup>2</sup>Internal Medicine, Hospital Universitario de La Princesa, Madrid, Spain

**Background and aims:** HHV-7 encephalitis is a rare cause of encephalitis in both immunocompetent and immunosuppressed patients. The reported symptoms in HHV-7 encephalitis are seizures, cognitive problems or abnormal electroencephalogram (EEG) and the pathogenic role is controversial. Therapeutic experience is derived from isolated cases, “in vitro” antiviral efficacy studies. Ganciclovir, foscarnet and cidofovir inhibit the replication of HHV-7 but therapeutic indications are still poorly defined.

**Methods:** We present the case of a patient with rheumatoid arthritis under immunosuppressive treatment who developed severe HHV-7 encephalitis with torpid evolution despite of foscarnet treatment.

**Results:** 69-year-old woman with a history of rheumatoid arthritis with a positive centromeric pattern under treatment with prednisone and leflunomide, deep vein thrombosis in chronic treatment with acenocoumarol, hypertension and morbid obesity. She presents with 2 generalized tonic-clonic seizure, followed by sensitive aphasia, inattention and psychomotor restlessness. The EEG showed left frontotemporal epileptic activity and antiepileptic treatment with levetiracetam, lacosamide, valproic acid, carbamazepine and clobazam was subsequently initiated. The brain MRI showed left frontoparietal cortex enhancements compatible with meningoencephalitis in diffusion sequence. The cerebrospinal fluid (CSF) showed 88leukocytes/mm<sup>3</sup> with and 96.3mg/dL proteins. Empirical treatment with Acyclovir and Ampicillin was initiated and changed to foscarnet after C-reactive protein (CRP) in CSF resulting in HHV-7. She had a torpid evolution and after 19 days died.

**Conclusion:** The pathogenic role of HHV-7 in encephalitis is controversial but it should be considered and aggressively treated in immunosuppressed patients. The current case reports the evolution of HHV-7 encephalitis which can contribute to the current knowledge of this serious disease.

**Disclosure:** Nothing to disclose

## EPO2364

**Empyema due to *Listeria monocytogenes* presented as “stroke-mimic”**

A. Gonzalez Martinez<sup>1</sup>, G. Zapata Wainberg<sup>2</sup>,  
A. Garrido García<sup>3</sup>, M.P. López Martín<sup>4</sup>, I. Muro García<sup>2</sup>,  
L. Casado Fernández<sup>2</sup>, J. Vivancos Mora<sup>2</sup>

<sup>1</sup>Madrid, Spain, <sup>2</sup>Neurology, Hospital Universitario de La Princesa, Madrid, Spain, <sup>3</sup>Oncology, Hospital Universitario de La Princesa, Madrid, Spain, <sup>4</sup>Oncology Department, Hospital Universitario de La Princesa, Madrid, Spain

**Background and aims:** Subdural collection as meningitis by *Listeria monocytogenes* is a rare complication that occasionally requires surgery. So far, a case of subdural empyema caused by *Listeria monocytogenes* infection has been reported with good evolution after only medical treatment using combined antibiotic therapy. The presentation as stroke-mimic has not been reported so far.

**Methods:** We present the case of a 78-year-old male with metastatic colon adenocarcinoma in active treatment with chemotherapy, who presents with a “stroke-mimic” consisting of right hemispheric syndrome secondary to subdural collection due to *Listeria monocytogenes* induced meningitis, showing excellent evolution after antibiotic treatment and surgical treatment.

**Results:** 78-year-old male with colorectal adenocarcinoma with liver metastases surgically treated and active chemotherapeutic treatment, presents with right hemispheric syndrome showing right oculocephalic preference, left hemiplegia and heminegligence and fever. Multimodal CT did not show any anomalies. Brain MRI identified a right parietal subdural collection and meningoencephalitis with leptomeningeal uptake. The patient was empirically covered with acyclovir, cefotaxime, vancomycin, ampicillin and metronidazole and underwent right frontoparietal craniectomy. *Listeria* was detected in CSF and brain biopsy and Ampicillin was administered for 6 weeks due to the presence of cerebritis and ventriculitis associated with meningitis. The patient had a complete recovery with physiotherapy and is currently under chemotherapeutic treatment again, Eastern Cooperative Oncology Group(ECOG) 0.

**Conclusion:** This is, to our knowledge, the 1st case of subdural collection as a complication of *Listeria monocytogenes* undergoing surgical treatment and antibiotic therapy with an excellent evolution, which may suggest that surgical treatment could be a good option for these patients.

**Disclosure:** Nothing to disclose

## EPO2365

**A case of Bannwarth syndrome with acute onset of severe tetraparesis**I. Goursky<sup>1</sup>, Y. Brant<sup>2</sup>, A. Astapenko<sup>1</sup>, S. Likhachev<sup>1</sup><sup>1</sup>Department of Neurology, Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus, <sup>2</sup>Neurological department, Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus

**Background and aims:** Lyme disease is endemic in Belarus. Bannwarth syndrome is a rare variant of neuroborreliosis, which is characterized by painful radiculopathy, neuropathy, limb weakness and facial palsy, as well as lymphocytic CSF pleocytosis. Here we describe our own observation of Bannwarth syndrome, to highlight the possibility of acute onset of profound neurologic deficit in Lyme disease.

**Methods:** Medical records were analyzed of the female patient, who admitted our facility 01.10.2018.

**Results:** At 15.10.2018 the patient developed lower back pain, irradiating to the right leg. Lumbar spine MRI at 26.09.2018 was unremarkable (small disc protrusions). Physical examination on admission was consistent with a diagnosis of sciatica, and during the first 3 days treatment was successful in relieving pain. Beginning from the 4th day, the patient experienced increasing pain, demanding narcotics; also neck pain emerged. At the 7th day the patient developed progressively headache, left facial and abducens palsy, and severe distal tetraparesis, neck stiffness. CSF examination demonstrated protein 1.6g/l, glucose 1.8mM, and lymphocytic pleocytosis of 96/ul. Aciclovir, ceftriaxone and dexamethasone were started. Brain MRI demonstrated no other findings, but contrast enhancement of the left facial nerve. During the following day, the symptoms subsided, and a positive serology result for *B. burgdorferi* was received. The patient was transferred to the infection hospital, and was asymptomatic after 3 weeks.



Brain MRI (T1), demonstrating contrast enhancement of the left facial nerve.

**Conclusion:** This case demonstrates a possibility of neurologic emergency in Lyme disease. Other remarkable feature of this case is the absence of history of tick bites and erythema migrans.

**Disclosure:** Nothing to disclose

## EPO2366

### Progressive multifocal leukoencephalopathy of the cerebellar peduncle in a patient with Myasthenia gravis immunosuppressed with azathioprine: Case report and review of the literature

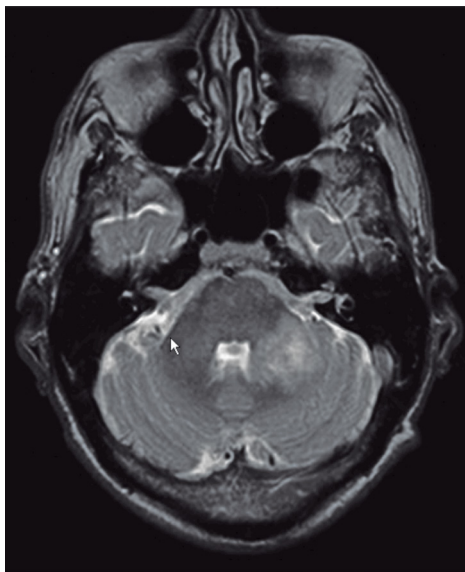
U. Hofstadt-van Oy<sup>1</sup>, F. Mujanovic<sup>1</sup>, P. Ritter<sup>2</sup>, S. Zechel<sup>3</sup>, C. Stadelmann<sup>3</sup>, U. Cleff<sup>1</sup>

<sup>1</sup>Klinik für Neurologie, Klinikum Westfalen, Dortmund, Germany, <sup>2</sup>Klinik für Hämato-Onkologie, Klinikum Westfalen, Dortmund, Germany, <sup>3</sup>Institute for Neuropathology, University Medical Center Göttingen, Göttingen, Germany

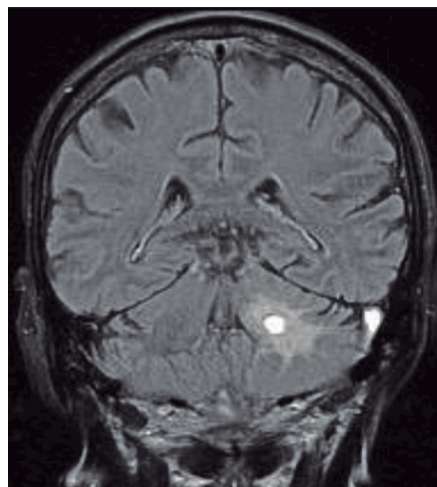
**Background and aims:** Progressive multifocal leucoencephalopathy (PML) is a rare opportunistic infection of the central nervous system with JC-polyomavirus affecting most often patients with hematological malignancies, HIV infection or treatment with monoclonal antibodies or immunosuppressants.

**Aims:** To present an unusual presentation of PML and treatment course including pembrolizumab

**Methods:** A 71-year-old patient with generalized myasthenia gravis with acetylcholine-receptor antibodies (AchR-gMG) and resected thymoma 20 years earlier presented with a progressive unilateral cerebellar syndrome. In addition to symptomatic therapy he was treated with low dose steroids and azathioprine since 2009. 2014 a slight pancytopenia occurred, which was tolerated. A brain MRI showed a T1-hypointense, T2-hyperintense lesion of the left cerebellar peduncle without contrast enhancement, the cerebrospinal fluid (CSF) displayed no pleiocytosis or other routine pathologies.

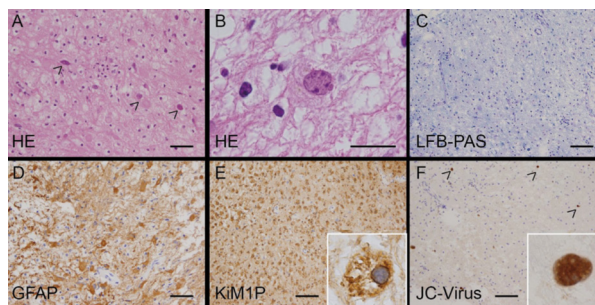


MRI T2-weighted image before biopsy



MRI coronar FLAIR image one month later

**Results:** Biopsy of the lesion proved demyelination with JC-virus in astrocytes and oligodendrocytes, 24,000 viral copies/ml were detected in the CSF. After withdrawal of immunosuppressants viral copies dropped to 360/ml, clinical deficits remained unchanged and MRI lesions progressed. Pembrolizumab (2mg/kg) was given, the patient died 3 weeks later.



Neuropathological findings: F: JC-virus in astrocytes and oligodendrocytes (SV40-staining)

**Conclusion:** Our patient suffered from a biopsy proven PML while being immunosuppressed with azathioprine for AchR-gMG. Immunosuppressants were discontinued, CSF JC-Virus copies dropped quickly and pembrolizumab was given, but he died 14 weeks after symptom onset. PML caused by azathioprine is rarely reported, though analysis from the US Adverse event reporting system calculated on reporting odds ratio of 15 for this drug. When hematological adverse events like pancytopenia occur, like in our patient, discontinuation of azathioprine seems advisable.

**Disclosure:** Nothing to disclose



## EPO2367

**Neurological manifestations of Mycetoma**

A.M. Hussein<sup>1</sup>, A. Ali<sup>2</sup>, N. Motasim<sup>13</sup>,  
R. Tofaha Alhusseini<sup>4</sup>, M. Fadel<sup>5</sup>,  
K. Mohamed Ahmed Abbasher<sup>6</sup>, M. Abbashar<sup>7</sup>,  
H. Abbashar<sup>8</sup>, A. Siddig<sup>9</sup>, M.A.Ibrahim<sup>10</sup>, E. Elbahi<sup>3</sup>,  
M.M. Aldar<sup>3</sup>

<sup>1</sup>Department of Neurology, Faculty of medicine, University of Khartoum, Khartoum, Sudan, <sup>2</sup>Medicine, University Of Khartoum, Khartoum, Sudan, <sup>3</sup>Medicine, Omdorman Hospital, Khartoum, Sudan, <sup>4</sup>Medicine, Alzaiem Alazhari University, Khartoum, Jordan, <sup>5</sup>Medicine, University Of Bakht Alrida, Khartoum, Sudan, <sup>6</sup>Medicine, Uniiversity Of Khartoum, Khartoum, Sudan, <sup>7</sup>Medicine, Alnileen University, Khartoum, Sudan, <sup>8</sup>Medicine, Alyarmouk College, Khartoum, Sudan, <sup>9</sup>Community, Alnileen University, Khartoum, Sudan, <sup>10</sup>Medicine, Bahri University, Khartoum, Sudan

**Background:** Daoud Research Group, khartoom, Sudan.

**Introduction:** Mycetoma is a chronic specific granulomatous progressive and disfiguring subcutaneous inflammatory disease. It is caused by true fungi (Euomycetoma) or by higher bacteria (Actinomycetoma), in 2015 Mycetoma was named as one of the neglected tropical diseases by the WHO. It mainly affects lower limbs, upper limbs, back and rarely head and neck and other sites. It's mainly transmitted through trauma with infected sharp objects.

**Objectives:** To determine the neurological manifestations of mycetoma.

**Methodology:** A cross-sectional community based study.

**Results:** Almost 160 patients were included in the study, 90% of them were male. 2 patients presented with entrapment neuropathy, 1 presented with proximal neuropathy, 1 patient has peripheral neuropathy, 1 patient has dorsal spine involvement presented with spastic paraplegia with sensory level, 1 of our patients has cervical cord compression, and 1 patient has repeated attacks of convulsion due to tumor like mass caused by fungal infection affecting the right cerebral hemisphere.

**Conclusion:** Although it is rare clinicians should highly suspect neurological involvement in mycetoma patients. Mycetoma infection (with bacterial or fungal) can cause peripheral or central nervous system damage at the level of formation of papule and discharging sinuses which can lead to entrapment neuropathy, or direct destruction of the bone which can cause nerve damage or cord compression. A rare manifestation due to spread of infection from the skull to the brain causing convulsion or hemiplegia.

**Disclosure:** Nothing to disclose

## EPO2368

**Herpes simplex encephalitis in a patient treated with tofacitinib**

J. Lapeña Motilva<sup>1</sup>, G. Ogando<sup>1</sup>, S. Gómez Enjuto<sup>1</sup>,  
P. Manrique de Lara Cadiñanos<sup>1</sup>, E. De Celis<sup>1</sup>,  
L. Matesanz Canencia<sup>2</sup>

<sup>1</sup>Neurology, H.U. Severo Ochoa, Leganés, Spain, <sup>2</sup>Intensive Care Unit, H.U. Severo Ochoa, Leganes, Spain

**Background and aims:** Tofacitinib is a JAK-1 and JAK-3 inhibitor used to treat rheumatoid arthritis and is known to increase the risk of herpes zoster infections but there is little known about herpes simplex infections.

**Methods:** We present a case where a 62-years-old patient was treated with tofacitinib due to rheumatoid arthritis and psoriasis. Previously, he has been treated with infliximab and methotrexate which were discontinued after a Hodgkin lymphoma was diagnosed. He also had a herpes virus simplex encephalitis 19 years before.

**Results:** The patient was admitted due disorientation symptoms preceded by fever. A lumbar puncture was performed were a slightly increase in proteins and an increase un white blood cells (mononuclear predominance) were objectivated. A PCR show positivity for HSV-1

The tofacitinib treatment were discontinued and acyclovir treatment was started (10mg/kg/8h) with a satisfactory evolution. After his discharge, he started acyclovir 200mg every 12h and the immunosuppression was changed to pimecrolimus.

**Conclusion:** The use of tofacitinib was related with an increase of the cutaneous herpes zoster affection and rarely with HZV encephalitis. This is thought to be related with a decrease in interferon- $\gamma$  and a diminished CD4 T-cell proliferation. The HVS may be underreported due the benignity of the cutaneous affection but in patients with previous CNS infection, this drug should be used with caution.

**Disclosure:** Nothing to disclose

## EPO2369

**A case of multiple tuberculous brain abscesses with pulmonary miliary tuberculosis**

H. Lee, E.H. Jeong, M.K. Sunwoo, J. Seo, Y.K. Park, B.-S. Kim, H.-J. Yu

*Department of Neurology, Bundang Jesaeng General Hospital, Seongnam-si, Korea, Republic of*

**Background and aims:** Tuberculous brain abscess is a rare manifestation of central nervous system tuberculosis. It resembles a pyogenic brain abscess clinically and radiologically, and poses a problem in diagnosis and treatment.

**Methods:** A 57-year-old male patient visited to the emergency room with fever and general weakness for four days. Physical examination showed a blood pressure of 169/98mmHg, a body temperature of 38.1°C. Chest computed tomography showed peribronchial centrilobular nodules and small consolidations with ground-glass opacities in the both upper lungs, suggestive of the possibility of active pulmonary miliary tuberculosis.

**Results:** The patient was initiated with a 4-drug anti-tuberculous therapy. On the 3rd day of admission, he showed drowsiness with decreased verbal responses, global aphasia, and right hemiparesis with motor grade 1 on upper extremity and grade 2 on lower extremity. Brain magnetic resonance imaging (MRI) showed multiple and variable sized round T2 high signal intensity lesions with marked diffusion restriction and rim enhancement with perilesional edema in the both cerebral hemispheres, suggestive of multiple brain abscesses. To differentiate tuberculous from pyogenic abscesses, magnetic resonance spectroscopy (MRS) was done and revealed large lipid peak around 1.3ppm, suggestive of high possibility of tuberculous abscess. Therefore, anti-tuberculous therapy was maintained, and the patient's neurological symptoms and signs were slowly improved.

**Conclusion:** We report a case of multiple tuberculous brain abscesses with pulmonary miliary tuberculosis. As in our case, it is possible to differentiate tuberculous from pyogenic abscesses by using MRS, which could be of value in influencing the management of such cases.

**Disclosure:** Nothing to disclose

## EPO2370

**Severe tick-borne meningoencephalomyeloradiculitis successful treatment with high dose intravenous immunoglobulin.**

K. Liuke<sup>1</sup>, Z. Daneviča<sup>1</sup>, G. Karelis<sup>2</sup>

*<sup>1</sup>Jekabpils, Latvia, <sup>2</sup>Neurology and neurosurgery department, Riga, Latvia*

**Background and aims:** Tick borne encephalitis is widespread viral neuroinfection with no specific therapy to date in Europe, Russia and North Asia. High dose intravenous immunoglobulins (IVIg) has not been tested systematically for treating severe cases of tick borne encephalitis. Although there are increasing number of case reports successfully treating other arboviral encephalitides with high dose IVIg, it is suspected that it may be beneficial for tick-borne encephalitis as well.

**Methods:** Case report

**Results:** We present 31-year-old male with acute onset progressive flacid tetraparesis, respiratory malfunction and bladder and bowel dysfunction. Cerebrospinal fluid (CSF) showed elevated protein and pleocytosis. Anti-TBEV IgM were positive in CSF, anti-TBEV IgG- neg. Other neuroinfections were excluded. Magnetic resonance imaging scans showed T2 weighted rhombencephalitis, longitudinal cervical and thoracic myelitis with gray matter involvement and cervical polyradiculoneuritis. Patient was further admitted to the intensive care unit with diagnosis of acute tick-borne meningoencephalomyeloradiculitis. Due to respiratory malfunction patient was put on artificial lung ventilation. On 5th day of illness patient received high dose IVIg (0.4g/kg) for 3 days. After that neurological deterioration stopped and gradually patients neurological status improved. On the 14th day of illness he was able to breathe spontaneously, started to develop movements in extremities. At the moment muscle strength in legs proximally and distally is 5/5, proximally arm muscle strength on the left side 2-3/5, on the right side 3/5, distally 4/5. He continues to receive rehabilitation.

**Conclusion:** Early intervention with high dose IVIg may pose a potentially successful treatment for severe tick-borne encephalitis.

**Disclosure:** Nothing to disclose

## Neurological manifestations of systemic diseases; Neuro-oncology

### EPO2372

#### Pathogenic implication of HOX transcript antisense intergenic RNA (HOTAIR) in gliomas: a systematic review of pre-clinical and clinical evidence

E. Angelopoulou<sup>1</sup>, Y.N. Paudel<sup>2</sup>, C. Piperi<sup>1</sup>

<sup>1</sup>Department of Biological Chemistry, Medical School, National and Kapodistrian University of Athens, Athens, Greece, <sup>2</sup>Neuropharmacology Research Laboratory, Monash University Malaysia, Bandar Sunway, Malaysia

**Background and aims:** Gliomas present the most heterogeneous and aggressive primary tumors of the CNS with a very poor prognosis. Given the complexity of their pathogenesis, elucidation of the underlying molecular pathways and identification of diagnostic and prognostic biomarkers is important for effective personalized therapeutic strategies. HOX transcript antisense intergenic RNA (HOTAIR) is a long non-coding RNA with a pivotal pathogenic and prognostic role in several cancers, including gliomas.

**Methods:** A systematic literature search was performed on pre-clinical and clinical studies published in MEDLINE between 01/2000 and 11/2019, investigating the role of HOTAIR in gliomas, using the keywords “HOTAIR”, “gliomas”, “glioblastoma”, “HOX RNA” in various combinations.

**Results:** 32 articles were selected that demonstrate the role of HOTAIR in glioma pathogenesis, by promoting proliferation and invasiveness. HOTAIR inhibited apoptosis of glioma cells by regulating the activity of transcription factors (MXI1, E2F1, ATF5 and ASCL1), modulating the expression of cell-cycle-associated genes and related axes, such as Wnt/ $\beta$ -catenin pathway, as well as by interacting with miRNAs (miR-326, miR-141, miR-148b-3p, miR-15b and miR-126-5p). HOTAIR was shown to enhance angiogenesis by upregulating VEGF expression, and affect the permeability of blood tumor barrier, altering the efficacy of chemotherapeutic agents. Clinical evidence suggests that increased serum and tissue HOTAIR levels of glioma patients have been associated with more malignant phenotype, poorer prognosis and reduced overall survival.

**Conclusion:** Accumulating evidence highlights the emerging pro-oncogenic role of HOTAIR in gliomas, and its potential use as a promising molecular prognostic biomarker, paving the way for future research regarding its therapeutic potential.

**Disclosure:** Nothing to disclose

### EPO2373

#### Cerebrospinal fluid interleukin-10: a useful biomarker for atypical primary central nervous system lymphoma relapse.

L. Autier<sup>1</sup>, M. Le Garff-Tavernier<sup>2</sup>, M. Costopoulos<sup>2</sup>, B. Mathon<sup>3</sup>, K. Mokthari<sup>4</sup>, N. Martin Duverneuil<sup>5</sup>, V. Touitou<sup>6</sup>, K. Hoang-Xuan<sup>7</sup>, C. Houillier<sup>7</sup>

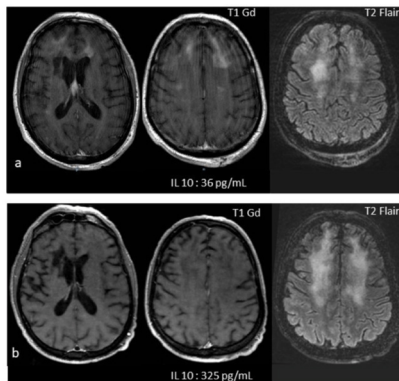
<sup>1</sup>Department of Neurology, Angers University Hospital, Angers, France, <sup>2</sup>Department of biological Hematology, Pitié-Salpêtrière University Hospital, Paris, France, <sup>3</sup>Neurosurgery, La Pitié-Salpêtrière Hospital, Paris, France, <sup>4</sup>Department of Neuropathology, Pitié-Salpêtrière University Hospital, Paris, France, <sup>5</sup>Department of Neuroradiology, Pitié-Salpêtrière University Hospital, Paris, France, <sup>6</sup>Department of Ophthalmology, Pitié-Salpêtrière University Hospital, Paris, France, <sup>7</sup>Department of Neurology, Pitié-Salpêtrière University Hospital, Paris, France

**Background and aims:** Diagnosis of relapsing primary central nervous system lymphoma (PCNSL) is challenging as it may occur with atypical neuroradiological features.

**Methods:** We report on a 58-year-old man treated for a cerebral diffuse large B-cell lymphoma (DLBCL).

**Results:** After a 3rd line treatment consisting in Rituximab, Ifosfamide, Carboplatin and Etoposide was started, the neurologic status rapidly worsened with fever, epileptic seizures and coma, requiring a transfer to intensive care. Brain MRI showed a marked decrease of the enhanced lesions but an increase of bi-frontal Flair hypersignal, without diffusion hypersignal.

Blood tests revealed no metabolic, infectious or hematological disturbances. Body CT scan and spine MRI were normal. Electroencephalography showed slow activity but no sign of seizure. Results of the lumbar puncture were normal except from the cytokine assay which showed a major increase in IL10 (325pg/ml) while IL6 level remained low (14pg/ml). A brain biopsy performed in the right frontal lobe, in an area with Flair hypersignal but no contrast enhancement confirmed the progression of the lymphoma, with a typical form of DLBCL.



T1-weighted gadolinium-enhanced and T2 Flair brain MRI before (a) and after (b) Rituximab, Ifosfamide, Carboplatin and Etoposide (RICE) treatment failure, and CSF IL10 level (pg/ml).

T1-weighted gadolinium-enhanced and T2 Flair brain MRI before (a) and after (b) Rituximab, Ifosfamide, Carboplatin and Etoposide (RICE) treatment failure, and CSF IL10 level (pg/ml).

**Conclusion:** Interleukin-10 is well known in ocular lymphoma where its value in the aqueous humor allows the diagnosis of the disease. By analogy, certain studies have confirmed its diagnostic and prognostic capacity in PCNSL. In our case, even in the absence of clear MRI progression, the major elevation of CSF IL10 level, directed us towards the diagnosis of progression, which was confirmed by a brain biopsy. Larger studies are needed to confirm CSF IL10 level diagnostic value in atypical PCNSL relapses

**Disclosure:** Nothing to disclose

## EPO2374

### MAPK signalling pathway inhibition allows long-term tumour control in adult gliomas

G. Berzero<sup>1</sup>, L. Bellu<sup>1</sup>, M. Touat<sup>1</sup>, C. Baldini<sup>2</sup>, F. Ducray<sup>3</sup>, D. Guyon<sup>4</sup>, M. Eoli<sup>5</sup>, A. Silvani<sup>5</sup>, C. Dehais<sup>1</sup>, A. Idbah<sup>1</sup>, S. Gaillard<sup>4</sup>, C. Villa<sup>4</sup>, K. Mokhtari<sup>1</sup>, F. Bielle<sup>1</sup>, M. Sanson<sup>1</sup>, A.L. Di Stefano<sup>4</sup>

<sup>1</sup>AP-HP Hopital de la Pitié-Salpêtrière, Paris, France,

<sup>2</sup>Institut Gustave Roussy, Villejuif, France, <sup>3</sup>Hospices Civils de Lyon, Lyons, France, <sup>4</sup>Hopital Foch, Suresnes, France,

<sup>5</sup>Fondazione I.R.C.C.S Istituto Neurologico C. Besta, Milan, Italy, Milan, Italy

**Background and aims:** The aim of this study was to identify predictors of response to RAF inhibitors in adult patients with BRAF-mutant primary brain tumours.

**Methods:** We performed a retrospective research in 5 institutional databases for all adult patients with BRAF-mutant primary brain tumours treated with RAF/MEK inhibitors (February 2012-September 2019). The clinical data and MRI scans of patients identified through this research were collected from referring centres and centrally reviewed.

**Results:** 29 patients were included in the study, 15 receiving RAF inhibitors as single agents and 14 receiving a combination of RAF/MEK inhibitors. 9 patients developed treatment-related adverse events (9/21, 43%), including one grade 3 toxicity (CTCAEv5.0). Best RANO response was partial response (PR) in 13 cases (13/27, 48%), stable disease (SD) in seven (7/27, 26%) and progressive disease in seven (7/27, 26%). Patients achieving PR experienced prolonged tumour control (median response duration: 13 months) together with clinical improvement (median increase in Karnofsky Performance Status: 10 points). Median tumour shrinkage in the whole cohort, measured using RANO criteria, was -38%. Predictors of response included younger age ( $p < 0.01$ ), ganglioglioma/pleomorphic xanthoastrocytoma histology ( $p = 0.015$ ) and early treatment ( $p = 0.018$ ). Median progression-free survival in the whole cohort was 5.9 months, differing based on histology ( $p < 0.001$ ) and grade ( $p = 0.0017$ ). 6 patients were rechallenged with different RAF/MEK inhibitors at progression, 4 of which achieved a novel long-lasting condition of tumour control.

**Conclusion:** Treatment with RAF/MEK inhibitors allowed long-lasting tumour control, especially in younger patients with gangliogliomas or pleomorphic astrocytomas.

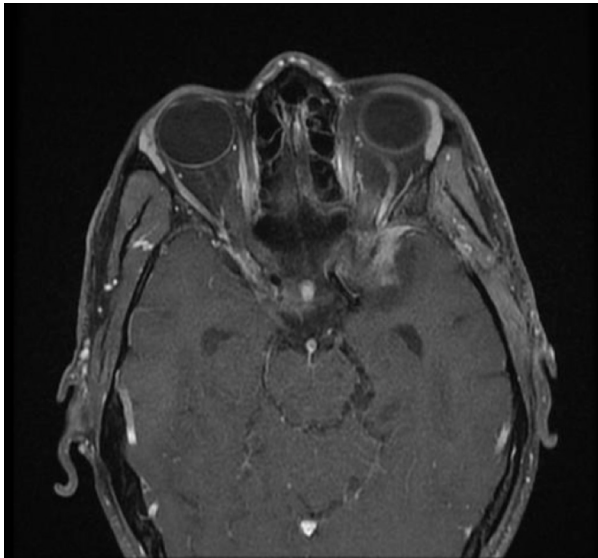
**Disclosure:** Nothing to disclose

## EPO2375

### A case report of a patient with T-lymphoblastic leukemia / lymphoma

M. Cholakova, I. Staikov  
Sofia, Bulgaria

**Background and aims:** T-lymphoblastic lymphoma (T-LBL) is neoplasm of immature T-cell precursors. T-LBL that was localized only at central nervous system, represent less than 5% of cases, and did not had the subsequent evolution for a systemic usual acute lymphoblastic leukemia.



MRI of the brain- tumor in the left cavernous sinus

**Methods:** Somatic and neurological status, laboratory tests: flow cytometric (FCM) immunophenotyping of cerebrospinal fluid, antiphospholipid antibody, rapid plasma reagin (RPR) test, HIV-testing, computed tomography (CT) of chest and abdomen, magnetic resonance tomography of the head (MRI), lymphocytic choriomeningitis testing, trepan biopsy of bone marrow.



CT of chest

**Results:** We present a clinical case of a 44-year-old patient admitted to the emergency department with complaints of progressively increased headache, stiffness of the neck. The patient was admitted with meningo radicular irritation syndrome, with MRI data for tumor in the left cavernous sinus. Patient was with history for peripheral facial nerve palsy and MRI with data for extraaxial tumour formation in the same area. Biopsy was performed 3 months earlier and the histology showed partially hyalinized connective tissue. Slightly increased troponinI-marker was found in the blood tests-1761.4 and C-reactive protein 25.4, normal X-ray on thorax. Examination of cerebrospinal fluid showed lymphocytic pleocytosis. Trepan biopsy of bone marrow was without pathological changes. CT of the chest and abdomen showed mediastinal tumor, lymphadenomegaly, infiltration of the left ventricular myocardium. FCM immunophenotyping of cerebrospinal fluid gave the diagnose T-LBL. Intrathecal chemotherapy was started.



MRI of the brain

**Conclusion:** CNS T-LBL is a rare disease with incidence approximately 51 cases per 10,000,000 per year. Differential diagnose include different conditions like aseptic meningitis, granulomatous angiitis, neurological infections. FCM immunophenotyping of cerebrospinal fluid could help to make the right diagnose.

**Disclosure:** Nothing to disclose

## EPO2376

**Pathophysiology and mechanism of ischemic stroke in cancer patients.**

A. Esmael<sup>1</sup>, M. Abu-Hegazy<sup>1</sup>, M. Abdelsalam<sup>1</sup>, H. El-Hadaad<sup>2</sup>, H. Wahba<sup>2</sup>, H. Egila<sup>1</sup>

<sup>1</sup>Department of Neurology, Faculty of Medicine, Mansoura University, Egypt, Mansoura, Egypt, <sup>2</sup>Clinical Oncology and Nuclear Medicine, Faculty of Medicine, Mansoura University, Egypt, Mansoura, Egypt

**Background and aims:** Numerous types of cancer are accompanied by ischemic stroke. The purpose of this study is to assess the risk factors, bio-markers of stroke and the mechanism of cerebral infarction among cancerous diseases.

**Methods:** 156 patients presented by acute ischemic stroke were divided into 2 groups: the 1<sup>st</sup> group included 78 ischemic stroke patients associated with different types of cancer and the 2<sup>nd</sup> group (control group) included 78 ischemic stroke patients not associated with cancer. Both groups were compared regarding the risk factors, previous thrombotic activity, sub-types and the bio-markers of stroke.

**Results:** Cancer patients presented by acute ischemic stroke were accompanied by a significantly less incidence of diabetes mellitus, hypertension, dyslipidemia, and coronary heart disease and atrial fibrillation than non-cancer patients ( $p < 0.001$ ). While, levels of bio-markers of inflammation like erythrocyte sedimentation rate and C-reactive protein, and stroke bio-markers like fibrinogen, and D-dimer, all together were highly elevated in cancerous disease group of patients presented by cerebral infarction than in non-cancerous group ( $p < 0.01$ ). The prevalence of deep vein thrombosis, pulmonary embolism, and myocardial infarction was significantly higher in patients with cancer than in control patients without cancer ( $p = 0.008$ ,  $p < 0.01$  and  $p < 0.01$  respectively). The most common stroke etiologies were atherosclerosis of large arteries and stroke of undetermined cause in a cancerous group of patients.

**Conclusion:** Pathophysiology and mechanism of ischemic stroke in cancerous disease patients were due to different risk factors, bio-markers of stroke, and sub-types in comparison with non-cancer patients.

**Disclosure:** Nothing to disclose

## EPO2377

**Pembrolizumab-induced demyelinating cranial nerves neuropathy and neuromuscular junction disorder: a case report**

F. Franchino, A. Pellerino, F. Bruno, R. Palmiero, E. Pronello, R. Soffietti, R. Rudà

Division of Neuro-Oncology, Department of Neuroscience, University and City of Health and Science Hospital of Turin, Turin, Italy

**Background and aims:** Introduction. Checkpoint inhibitors are widely used in the treatment of solid tumors and new classes of immune-related adverse events (IRAEs) are reported. Pembrolizumab is an anti-PD1 agent, that has been related to cases of encephalitis, neuromuscular junction disorders, and demyelinating polyradiculopathy. Here we describe a case of a patient presenting a complex neurological disorder following treatment with pembrolizumab.

**Methods:** Case report. A 72-year-old patient was treated with pembrolizumab for a lung adenocarcinoma (EGFR-, ALK-, PDL1 90%). After 3 administrations he presented with fatigue, ptosis, ophthalmoplegia, dysarthria, and dysphagia. MRI of the brain and spine ruled out SNC progression. Electromyography (EMG) did not display axonal or demyelinating neuropathy, nor myopathy. Patterns of myasthenia or Lambert-Eaton disease were not seen in repetitive nerve stimulation, even if increased jitter was registered in frontal muscle in single-fibre EMG. The concomitant evidence of an altered Blink reflex was helpful in suggesting a demyelinating neuropathy (DN) of cranial nerves. A drug-related neuroimmunological disorder was suspected, pembrolizumab was stopped and patient underwent 2 subsequent cycles of intravenous immunoglobulins, with a slow improvement of ocular motion, dysarthria and partial normalization of Blink reflex. The patient finally died after 8 months for an aggressive local tumor progression.

**Results:** Discussion. IRAEs from anti-PD1 agents are very rare conditions. Thus far, only 1 case of DN following pembrolizumab was described, but this is the 1st report responding to IVIg.

**Conclusion:** Conclusion. Neurological IRAEs are insidious conditions, requiring a prompt diagnosis to avoid any delay of treatment which could modify the course of disease.

**Disclosure:** Nothing to disclose

## EPO2378

**Paraneoplastic Neurological Syndrome with unidentified onconeural antibodies**

D. Garcez<sup>1</sup>, M. Valente Fernandes<sup>1</sup>, M.F. Coimbra<sup>2</sup>, M.C. Lourenço<sup>3</sup>, E. Gouveia<sup>4</sup>, J. Marques<sup>1</sup>, I. Costa<sup>1</sup>  
<sup>1</sup>Neurology, Instituto Português de Oncologia de Lisboa, Lisbon, Portugal, <sup>2</sup>Instituto Português de Oncologia de Lisboa, Lisbon, Portugal, <sup>3</sup>Clinical Pathology, Instituto Português de Oncologia de Lisboa, Lisbon, Portugal, <sup>4</sup>Oncology, Instituto Português de Oncologia de Lisboa, Lisbon, Portugal

**Background and aims:** The definition of Paraneoplastic Neurological Syndrome (PNS) is based on the combination between existence of cancer, “classic” PNS and “well characterized” onconeural antibodies. However, in recent years new antibodies have been described that are not included in the most available panels. On the other hand, other antibodies remain to be characterized.

**Methods:** We describe 2 case reports of PNS with unidentified antibodies.

**Results:** An 83-year-old man with Merkel cell carcinoma treated with pembrolizumab in the past developed subacute cerebellar degeneration. The restaging revealed cancer relapse. A 60-year-old man with inguinal melanoma who underwent surgery and focal radiotherapy developed paraparesis and sensitive ataxia. The MRI showed longitudinal myelitis with lateral columns predominance. In both cases, it was possible to identify by indirect immunofluorescence assay (IFA) a positive staining of granular and molecular layer of rat cerebellum. The subsequent analysis with immunoblot (anti-Hu, Yo, Ri, CV2, amphiphysin, PNMA2/Ma2/Ta, recoverin, SOX1, titin, Zic4, GAD65, Tr/DNER) and transfected cells (anti-CASPR2, LGI1, NMDA receptors, AMPA1, AMPA2, GABAB) were negative. Further analyses made by an outside laboratory complemented the study with anti-AQ4, MOG, IgLON5 and DPPX which were negative. The antigens CARPVIII, rGlycine, mGluR1, mGluR5, rGABA-A, GLURD2, flotillin, RhoGTPase activating protein 26, ITPR1, Hommer 3 and neurochondrine were also investigated, all negative.

**Conclusion:** In both cases, a definitive PNS diagnosis could be established without a positive onconeural antibody finding. However, there were positive IFA staining pattern which were not followed by positive line blot typing assay. These could mean that some antibodies are still waiting to be discovered.

**Disclosure:** Nothing to disclose

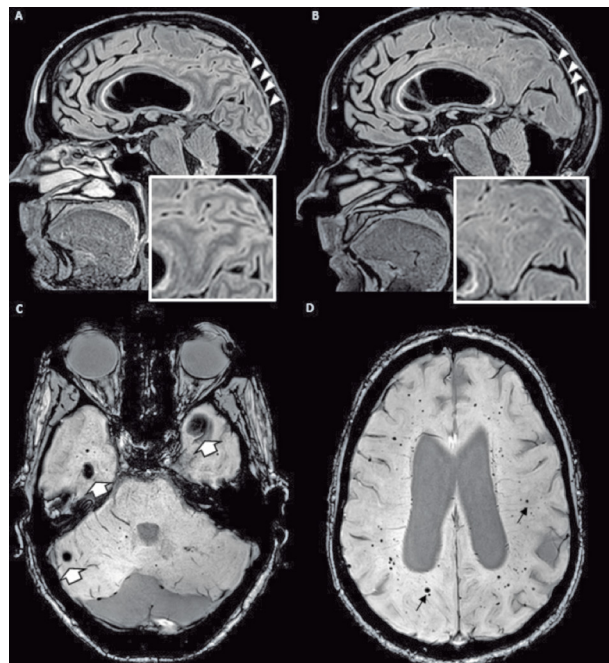
## EPO2379

**Challenging diagnosis of SMART syndrome with non-enhancing cortical lesion**

F. Garri<sup>1</sup>, L. Caumo<sup>1</sup>, D. Simonato<sup>2</sup>, A. Antonini<sup>1</sup>  
<sup>1</sup>Department of Neurosciences, University of Padua, Padua, Italy, <sup>2</sup>University of Padua, Padua, Italy

**Background and aims:** SMART syndrome often presents as a diagnostic challenge since no established criteria are available and clinical presentation may be quite varied.

**Methods:** A 49-year-old male with a remote history of medulloblastoma (29 years old), treated with surgical resection followed by chemotherapy and radiation therapy, presented to the emergency department because of a 3 days history of sudden onset of homonymous left hemianopia, confusion, significant postural instability and refractory migraine. Prior to this presentation he had rare episodes of migraine. At neurological examination he was disoriented with left homonymous hemianopia. The fundoscopic examination was also unremarkable. Brain CT scan showed multiple scattered calcifications in occipital and cerebellar lobe. Detailed haemato-immunological screenings and CSF examination was unremarkable. Electroencephalogram disclosed slowing activity in right hemisphere, but not epileptiform activity was detected. A brain MRI performed on day 3 showed gyriform cortical T2 hyperintensity with a correspondent T2 shine-through effect on DWI in the right parietal-occipital region (Figure 1 A). No cortical gadolinium enhancement was detected. Post-surgical changes were seen in the posterior cranial fossa. Several foci of reduced signal intensity were visible in SWI sequences, in line with radiation induced cavernous haemangiomas/cavernomas (Figure 1-C,D). A follow-up brain MRI performed 3 months (1B) later and EEG showed reversal of the previous abnormalities.



**Results:** SWI-sequence has a key-role in detecting radiation induced cavernous haemangiomas/cavernomas, highly suggestive of SMARTs, especially when other neuroradiological clues are lacking or unrevealing.

**Conclusion:** This case emphasizes the importance of performing a complete MRI-protocol in order to make a more rapid diagnosis, avoiding unnecessary procedures.

**Disclosure:** Nothing to disclose

## EPO2380

### Benign and malignant paragangliomas: clinical presentation and treatment outcomes in 38 patient

P. Filimonova<sup>1</sup>, E. Gromova<sup>2</sup>, M. Orifi<sup>2</sup>, A. Dubskikh<sup>1</sup>, A. Tarkhanov<sup>3</sup>

<sup>1</sup>Neurosurgery department, Sverdlovsk Region Oncology Center, Yekaterinburg, Russian Federation, <sup>2</sup>Neurology, neurosurgery and medical genetics, Ural State Medical University, Yekaterinburg, Russian Federation,

<sup>3</sup>Interventional radiology, Sverdlovsk Region Oncology Center, Yekaterinburg, Russian Federation

**Background and aims:** Paragangliomas are tumors from cells of the neuroendocrine system. The incidence of paragangliomas is difficult to assess because of their rarity and complexity of diagnostics due to scarce symptoms. We aimed to study the clinic, the diagnostic methods, surgical risk and treatment outcomes among patients with paragangliomas.

**Methods:** Retrospective review of patients. The study included 38 patients with a diagnosis of paraganglioma treated in the Sverdlovsk Regional Oncology Center. Research was conducted epidemiological parameters, clinical presentation, tumor classification, Karnowski Index; classification of glomus tumors by U.Fisch and D. Mattox.

**Results:** More often paragangliomas was observed among women (76.3%). Malignant paraganglioma was rare tumor (7.9%). Most paragangliomas were localized (92.1%) in brachiocephalic area. Jugular, tympanic, yugulotympanic paragangliomas is characterized disacusia and dysphonia. Carotid paragangliomas was characterized a visible tumor formation or absence of clinic. The external carotid artery, especially the ascending pharyngeal artery is more often involved tumor's perfusion. The tumors of group C and D to the classification of U.Fisch and D.Mattox are prevailed. Interventional methods and surgical removal of the tumor were used. Embolization was complicated by the development of facial paresis and ischemic stroke in the basilar artery circulation. After open surgical removal, 31.3% patients have some complications: hypesthesia of trigeminal nerve, facial paresis, dysphonia, etc. 3-year patient survival was 96.7%.

**Conclusion:** The clinical symptoms of paragangliomas are variable and depended on localization. The main treatment for paragangliomas is the methods of microvascular and open surgery, which were successfully transferred by most patients.

**Disclosure:** Nothing to disclose



## EPO2381

**Optochiasmatic glioma - a rare, yet aggressive disease in adulthood**

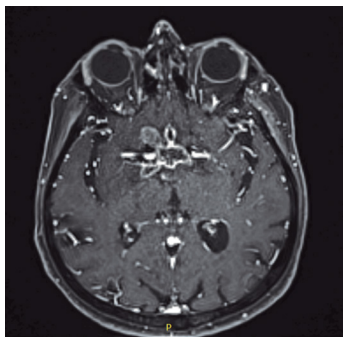
O.C. Ioghen<sup>1</sup>, P.A. Ioan<sup>1</sup>, D. Dumitrescu<sup>2</sup>, R.S. Badea<sup>1</sup>, D. Dumitrascu<sup>1</sup>, A. Ciocan<sup>1</sup>, A.C. Ribigan<sup>1</sup>, F. Antochi<sup>1</sup>, O.A. Bajenaru<sup>1</sup>

<sup>1</sup>Neurology, University Emergency Hospital Bucharest, Bucharest, Romania, <sup>2</sup>General Surgery IV, University Emergency Hospital, Bucharest, Romania

**Background and aims:** Optic pathway glioma (OPG) is a type of tumor that occurs more frequently in children, having a favourable course and is often associated with neurofibromatosis type 1 (NF1). In the rare cases when OPG occurs in adulthood, the progression is aggressive, without an association with NF-1.

**Methods:** We report a clinical case of an optochiasmatic glioma in a 78-year-old female.

**Results:** The patient reported progressive vision loss in the right eye and temporal visual field loss in the left eye over 1 month. Brain MRI revealed the enlargement of the intracranial portion of the optic nerve, chiasm and right optic tract, with involvement of the hypothalamus. The lesion was described as T1 isointense, T2 and FLAIR hyperintense, with peripheral gadolinium enhancement, suggesting either an aggressive tumor with central necrosis or a granulomatous process. Extensive serum tests including quantiferon tuberculosis test, antinuclear antibodies panel, rapid plasma reagin, HIV, Toxoplasma, Borrelia, cANCA, pANCA antibodies, angiotensin converting enzyme were normal. Lumbar puncture was performed and the cerebrospinal fluid (CSF) tests including cytology, microbiological examination, angiotensin converting enzyme, VDRL, oligoclonal bands, Mycobacterium tuberculosis PCR were normal. Chiasmatic biopsy was performed and the histopathologic examination revealed a low-grade astrocytoma. The patient was referred to an oncology department for evaluation and oncologic treatment.



Axial T1 C+ (Gd): Optochiasmatic tumor with peripheral gadolinium enhancement

**Conclusion:** Although very rare in adults, OPG should not be missed in the differential diagnosis of progressive loss of vision accompanied by a chiasmatic lesion.

**Disclosure:** Nothing to disclose

## EPO2382

**The anxiety characteristics of newly diagnosed glioblastoma patients: preliminary results from the IMAGE study.**

D. Maillot<sup>1</sup>, P. Narme<sup>2</sup>, C. Belin<sup>1</sup>, V. Menard<sup>1</sup>, M. Larieu<sup>1</sup>, A. Carpentier<sup>1</sup>

<sup>1</sup>Service de Neuro-oncologie, Hôpital Saint-Louis, Paris, Paris, France, <sup>2</sup>Laboratoire Mémoire Cerveau et Cognition (EA7536), Institut de Psychologie, Université de Paris, Boulogne-Billancourt, Paris, France

**Background and aims:** Few studies have focused on the anxiety level (Bunevicius et al., 2017; Kilbride et al., 2007). Underestimating anxiety may have several consequences: a low treatment compliance, exacerbation of somatic symptoms or side effects of treatment, difficulties with understanding medical information and lower cooperation with the medical staff (Spencer, 2010). In the present study, we aimed assessing the characteristics of anxiety in a cohort of newly diagnosed glioblastoma patients.

**Methods:** At the beginning of their cycle of temozolomide cure and after radio-chemotherapy, 50 patients with glioblastoma were included. Inclusion criteria were: Karnofsky index (IK)  $\geq 70\%$  and absence of cognitive disorder that could interfere with the completion of questionnaires. The characteristics of patients were as follows: mean age of 56.6 years  $\pm 12.5$  (70% were more than 50 years old); 20% were women. Anxiety level was assessed using the State-Trait Anxiety Inventory.

**Results:** The preliminary results showed that – at baseline – 21% of our sample reported high levels of anxiety. Correlation analyses showed that state anxiety was correlated with trait anxiety ( $\rho=0.799$ ,  $p<0.001$ ), quality of life (QoL) ( $\rho=0.678$ ,  $p<0.001$ ) and memory complains ( $\rho=0.618$ ,  $p<0.001$ ). Women had higher state anxiety scores than men ( $t(27)=-2.4$ ,  $p=0.02$ ). Any correlation was found with age, education level, lesional lateralization or depressive symptoms.

**Conclusion:** These preliminary results suggest that after radio-chemotherapy, few patients have a high level of anxiety. Moreover, the level of anxiety does not seem to be predictable by a specific factor, including the presence of depressive symptoms, age or education level.

**Disclosure:** Nothing to disclose

## EPO2383

**Wernicke's Encephalopathy Secondary to Malnutrition in Inflammatory Bowel Disease**

L. Popa<sup>1</sup>, S. Petrescu<sup>1</sup>, M. Popa<sup>2</sup>, I. Holbea<sup>1</sup>,  
A. Moldovan<sup>1</sup>, C. Panea<sup>1</sup>

<sup>1</sup>Neurology, Elias Emergency University Hospital, Bucharest, Romania, <sup>2</sup>Endocrinology, Diabetes, Nutrition and Metabolic Diseases, Elias Emergency University Hospital, Bucharest, Romania

**Background and aims:** Wernicke's encephalopathy is an acute condition that requires urgent recognition and treatment to prevent neurological complications. Usually associated with thiamine deficiency due to chronic alcoholism, it can also appear in other cases of poor dietary intake, malabsorption, increased metabolic requirement or increased loss of thiamine in renal dialysis.

**Methods:** We present the case of a 26-year-old, non-alcoholic patient, diagnosed 1 year earlier with gastrointestinal inflammatory disease and pernicious anemia (under treatment), admitted to the neurology ward because of acute onset of walking disorder, nausea and vomiting. The patient presented intermittent confusion, ophthalmoparesis, horizontal nystagmus in both directions of gaze, appendicular and truncal ataxia.

**Results:** Laboratory tests revealed anemia and hypoproteinemia. Inflammatory tests were normal. Magnetic resonance imaging study of the brain revealed medial bythalamic lesions with petechial contrast enhancement, specific to Wernicke's encephalopathy. After intravenous nutrition (amino acids, electrolytes, dextrose and lipid injectable emulsion) with thiamine, cobalamine and pyridoxine supplements, the clinical status improved rapidly. We were able to dose the vitamins levels after 3 days of treatment and the results were in low normal range. Intrinsic factor, anti parietal cell and anti-gliadin antibodies were negative. Hystopathologic results from the gastrointestinal tract revealed chronic non-specific inflammation.

**Conclusion:** Wernicke's encephalopathy is a curable complication of inflammatory bowel disease if the treatment is started in early phases. Pregnancy and breastfeeding can increase the risk of thiamine deficiency in patients with history of malabsorption.

**Disclosure:** Nothing to disclose

## EPO2384

**The Third Side To A Coin: Hypophosphatemia Induced Myopathy**

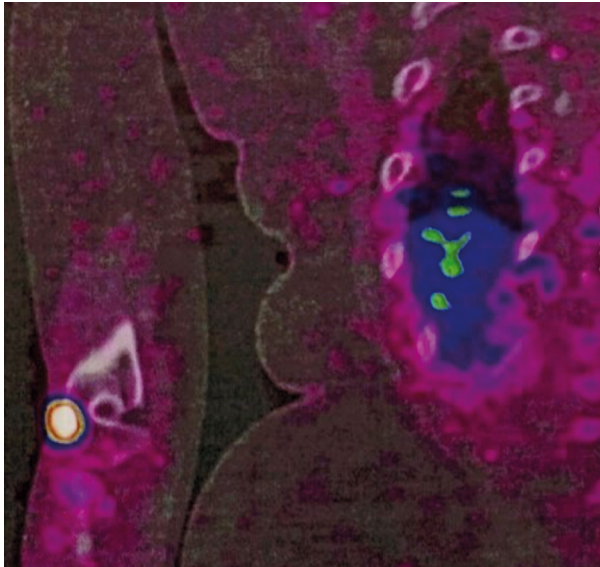
R. Ramesh<sup>1</sup>, S. Mahadevan<sup>2</sup>, B. Archana<sup>3</sup>,  
S. Venkatasubramanium<sup>1</sup>

<sup>1</sup>Neurology, Sri Ramachandra Institute of Higher Education and Research, Chennai, India, <sup>2</sup>Endocrine, Sri Ramachandra Institute of Higher Education and Research, Chennai, India, <sup>3</sup>Pathology, Sri Ramachandra Institute of Higher Education and Research, Chennai, India

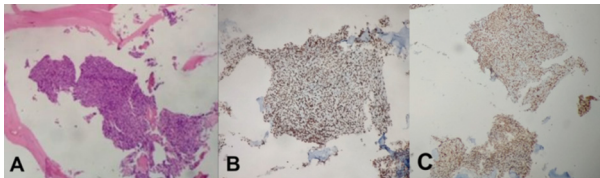
**Background and aims:** Endocrine myopathies represent a heterogenous group of disorders, which if identified early, are potentially treatable. When a patient presents with features suggestive of an endocrine myopathy the focus is usually on disorders of calcium homeostasis, including vitamin D deficiency and parathyroid imbalances, thyroid disorders or adrenal syndromes. We present this case to highlight, that disorders of phosphorus metabolism also present with a similar depiction, and can be easily overlooked.

**Methods:** We describe a 29-year-old female with diffuse myalgia, joint tenderness associated with insidious onset gradually progressive symmetrical proximal predominant weakness of lower limbs followed by upper limbs, with no wasting, spasticity, fasciculations, without higher mental, cranial nerve, sensory, or cerebellar involvement. Examination confirmed the proximal predominant weakness with reflexes being exaggerated and flexor plantar.

**Results:** Laboratorial evaluation revealed isolated hypophosphatemia with normal levels of calcium, parathyroid, and vitamin D. After endocrine consult, 24 hour urine phosphorus values done were found to be high. Simultaneous evaluation for presence of phosphatonins and tumour was initiated. FGF 23 levels were found to be elevated, with Dotanoc Galium Pet CT showing an FDG avid tumour in the lateral epicondyle of the right humerus. Histopathology confirmed SATB2, FL1 and vimentin positive phosphaturic tumour. Post excision and supplementation with phosphorus the patient improved significantly.



Dotanoc gallium PET CT showing tumour in the right lateral epicondyle.



A. Section shows bony trabeculae enclosing spindle cell lesion composed of bland looking spindled cells arranged in fascicles. B. Section shows tumour cells positive for SATB2. C. Section shows tumour cells positive for FL1.

**Conclusion:** The case describes a young woman presenting with diffuse myalgia and gradually progressive proximal predominant weakness of all four limbs who eventually was diagnosed to have tumour induced hypophosphatemia. After management her symptoms improved, highlighting the necessity to be cognizant about this amendable cause.

**Disclosure:** Nothing to disclose

## EPO2385

### Subacute myelopathy with axonal neuropathy: think about Acquired Copper Deficiency

A. Riahi, J. Zaouali, H. Derbali, Z. Miladi, M. Mansour, R. Mrissa

*Department of Neurology, Military Hospital of Tunis, Tunis, Tunisia*

**Background and aims:** Acquired copper deficiency (ACD) is a rare condition usually seen after bariatric surgery. In addition to hematological disorders, patients with ACD can present central and peripheral neurological impairments.

The aim of our study is to describe the clinical, MRI and electrophysiological characteristics of neuromyelopathy due to ACD.

**Methods:** We assessed retrospectively the clinical, biological, spinal MRI and electrophysiological data of patients presenting in our patient with signs and symptoms of myelopathy associated with peripheral neuropathy with low plasmatic copper level.

**Results:** 2 female patients (age: 56 and 70 years old) with no medical history were included. Both patients presented for progressive paraparesis evolving for 3 and 6 months associated with urinary dysfunction. Examination showed proximal and distal muscular weakness in lower limbs, deep sensory impairment, Babinski sign, and absent ankle jerk. Spinal MRI revealed extensive cervicothoracic myelitis with no gadolinium enhancement. Nerve conduction studies showed an axonal sensory-motor neuropathy. Etiological assessment including CSF analysis, viral and bacterial serologies, vitamin B12 level and immunological tests was negative in both cases. Trial treatment with corticosteroids and vitamin B12 supplementation did not improve the symptoms. Subsequently, serum copper level revealed a plasmatic copper deficiency (Copper levels were 0.24 and 0.40 µg/mL respectively, normal range higher than 0.8 µg/mL). Copper supplementation and physiotherapy led to a clinical and radiological improvement in one patient and to symptom stabilization in the other.

**Conclusion:** ACD is a rare metabolic disorder mimicking Biermer disease. Physicians should remind this diagnosis facing an atypical myelitis associated with peripheral neuropathy since early copper supplementation could improve the prognosis.

**Disclosure:** Nothing to disclose

## EPO2386

**CNS Immunoglobulin G4-related disease: more than hypertrophic meningitis**

F. Dourado Sotero, M. Rosário, R. Roque, F. Falcão, L. Albuquerque

*Neurology Department, Hospital de Santa Maria, Lisbon, Portugal*

**Background and aims:** Immunoglobulin G4-related disease (IgG4-RD) is an immune-mediated, fibro-inflammatory systemic condition that can affect a wide variety of organs mimicking a large number of disorders. The CNS involvement is characterized by hypertrophic pachymeningitis, with rare cases of leptomeningitis being described.

**Methods:** We report a case of leptomeningitis due to IgG4-RD.

**Results:** A 67-year-old woman, with past-medical history of pericardial effusion and chronic kidney disease.

1 month before hospital admission, she developed involuntary movements of the left lower limb that appeared only with sustained postures. 2 weeks later she noticed similar movements on left upper limb. Patient examination disclosed tremor and myoclonus of left limbs, both arising in posture, action and orthostatic positioning and disappearing at rest. The back-averaged EEG showed no epileptiform activity. However a levetiracetam trial led to complete cessation of movements. Brain-MRI showed dural and leptomeningeal gadolinium enhancement in the right high convexity. CSF revealed lymphocytic pleocytosis (64cel/mm<sup>3</sup>). Blood tests showed CPR and ESR elevation, p-ANCA, c-ANCA and IgG4 elevated titers. Thoracic-abdomen-pelvic-CT and PET/CT documented proximal aortitis and pericardial effusion. Meningeal biopsy confirmed aspects of IgG4-RD: circumferential fibrosis and IgG4 lymphoplasmacytic infiltration with IgG4/IgG ratio of 49%. She was treated with corticoids, azathioprine and later rituximab, with laboratory and imaging improvement.

**Conclusion:** The phenotype of IgG4-RD has been broadening. A neurological presentation including leptomeningitis is highlighted and may represent a different form of IgG4-RD. We emphasize the importance of considering the disease on differential diagnosis of unclear leptomeningeal disease.

**Disclosure:** Nothing to disclose

## EPO2387

**Recurrent posterior reversible encephalopathy syndrome in focal segmental glomerulosclerosis caused by NPHS2 mutations**

A. Sardoeira<sup>1</sup>, J. Tavares<sup>2</sup>, A. Rodrigues<sup>2</sup>, C. Andrade<sup>1</sup>

*<sup>1</sup>Neurology, Centro Hospitalar Universitário do Porto, Porto, Portugal, <sup>2</sup>Nephrology, Centro Hospitalar Universitário do Porto, Porto, Portugal*

**Background and aims:** Posterior reversible encephalopathy syndrome (PRES) is a clinical-radiological entity with yet unclear pathophysiological mechanisms. We aim to describe the occurrence of relapsing PRES in a patient with focal segmental glomerulosclerosis associated with NPHS2 mutations.

**Methods:** Descriptive analysis of clinical, laboratory, imaging and genetic data.

**Results:** A 20-year-old woman was admitted with new-onset seizures and decreased consciousness. She had a 13-year history of chronic renal disease, presenting as corticoreistant nephrotic syndrome caused by 2 heterozygous variants in NPHS2 gene. At admission, she was under no immunosuppression and was considering options for renal replacement therapy. CT revealed bilateral parietal and right occipital, diencephalic and striatocapsular vasogenic oedema. Emergency dialysis and blood pressure control were initiated. Due to condition severity, steroids were added. There was gradual improvement. 4 weeks later, after a blood pressure fluctuation, a recurrence of PRES was seen, with clinical-radiological worsening. Again, with antihypertensive therapy and a short course of steroids, the patient improved. 9 months later, she was readmitted for uncontrolled blood pressure, headache and nausea. CT showed marked posterior fossa oedema with acute hydrocephalus. Aggressive blood pressure control resulted in symptomatic improvement and resolution of imaging findings. She is currently on peritoneal dialysis awaiting renal transplantation.

**Conclusion:** Recurrent PRES is a rare recognized complication of end-stage renal disease. To our knowledge, there are no reported cases of PRES in patients with NPHS2 mutations. We speculate whether genetically determined vascular changes contribute to disrupted blood-brain barrier function and increased susceptibility to recurrent PRES in this patient.

**Disclosure:** Nothing to disclose

## EPO2388

### Longitudinal Extensive Transverse myelopathy as a very rare presentation of Mixed Connective Tissue Disease: a case report

A. Scarafino, V. Felica, S. Tagliente, G. Manobianca, A. Miccoli, G. Della Corte, F. Tamma  
*Neurology, General Regional Hospital "F.Miulli", Acquaviva delle Fonti, Italy*

**Background and aims:** Mixed Connective Tissue Disease (MCTD) is an autoimmune systemic disease characterised by positivity of anti-U1 ribonucleoprotein (RNP) antibodies and mixed clinical features typical of other rheumatological diseases (to which it owes its name). In some rare cases, neurological manifestations are described.

**Methods:** A 80 years old man came to our attention for a story of low-back pain and subacute progressive lower limb numbness (D10 level) with moderate weakness resulting in a severe ataxia. Bisphinteric retention completed the clinical picture. Spinal Cord MRI showed an extensive lesion from D9 to the medullary cone Gadolinium enhanced and DWI negative. CSF analysis revealed high level of proteins, 10 leucocytes/uL and oligoclonal band syntesis, PCR for neurotropic micro-organisms was negative. Serological differential diagnostic work-up led to the finding of a fine-speckled ANA positivity and high-titer anti-RNP positivity. MCTD diagnosis was made and IVIG treatment was administered, with weakness and numbness improvement. The patient is now undergoing rehabilitation.

**Results:** Myelopathy in MCTD is very rare and, for its features, can be confused with similar neurological entities. Anyway, finding a high titre of RNP when other ANA specificities are absent is highly predictive of MCTD, even though the full range of clinical involvement is not apparent that time.

**Conclusion:** Spinal cord involvement in MCTD is a challenging diagnosis due to its rarity, so an active case signaling of this entity has to be pursued, to improve our ability to promptly recognize and treat these patients. To our best knowledge this is the first case described of MCTD with myelopathy as presenting feature.

**Disclosure:** Nothing to disclose

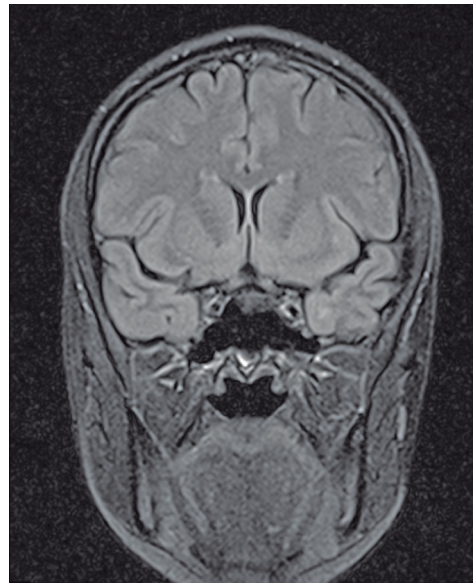
## EPO2389

### Severe neurology symptoms after desmopressin administration

L. Szigeti<sup>1</sup>, Z. Fekete<sup>2</sup>  
<sup>1</sup>Budapest, Hungary, <sup>2</sup>Neurology, Flor Ferenc Hospital, Kistarcsa, Hungary

**Background and aims:** Desmopressin is a synthetic analog of vasopressin. It is mainly used in diabetes insipidus, patient with coagulation problems - for e.g. thrombocyte disfuncion, von Willebrand disease. - and in nocturnal enuresis. In coagulation problems, desmopressin usually used only before an operation. Desmopressin is known to reduce free water elimination and produce hyponatraemia, but its extent and rate of development in these patients were surprising.

**Methods:** We present 2 patients - a pregnant woman with von Willebrand disease and another young woman with thrombocyte dysfunction - who, both used the medication only occasionally and developed severe neurological symptoms - generalized tonic-clonic seizure and cerebral oedema - and serious hyponatraemia over 24 hours of use of desmopressin.



Diffuse cerebral oedema

**Results:** We will compare the 2 cases in a timeline, to highlight the differential diagnosis algorhytm, the similarities and the differences; to show the course of the disease, the management and the result.

**Conclusion:** Since the „dramatic” symptomts of the hyponatraemia are mainly neurological the 1st consultant at ER is usually a neurologist.

These cases show that how important to be aware of the mediacations side affects, mainly if it is not an „everyday” drug and complications manifested several hours after the administration.

**Disclosure:** Nothing to disclose

## Neurorehabilitation 1

## EPO2390

**The use of transcutaneous electroneurostimulation in the treatment of children with enuresis.**

M. Al Zamil<sup>1</sup>, N. Kulikova<sup>2</sup>, O. Bezrukova<sup>2</sup>, I. Volkova<sup>2</sup>  
<sup>1</sup>Amman, Jordan, <sup>2</sup>Physiotherapy, RUDN, Moscow, Russian Federation

**Background and aims:** To study the effectiveness of various TENS modalities in the treatment of primary monosymptomatic nocturnal enuresis (PMNE) in children.

**Methods:** We observed 20 children aged 10 to 13 years old with a diagnosis of PMNE. The 1<sup>st</sup> group (10 children) underwent a course of high-frequency low-amplitude TENS (HL TENS) of the tibial nerves in tarsal canal using a current with a frequency of 100Hz, a duration of 100µs and an amplitude reaching a comfortable sensory response. The 2nd group (10 children) underwent a course of low-frequency high-amplitude TENS (LH TENS) of the tibial nerves in tarsal canal using a current with a frequency of 1Hz, a duration of 200µs and an amplitude reaching a comfortable motor response.

**Results:** Before treatment, the frequency of wet nights per week in 2 groups averaged 4.7±1.4. After treatment frequency of wet nights decreased in the 1st group to 3.5±1.6 and in the 2nd group, to 1.4±1.1. A decrease in theta index was observed on the EEG activity in 2nd group, on average, by 39% with the absence of significant changes in 1st group. A full recovery was noted only after a LH TENS in 2 patients.

**Conclusion:** Direct TENS of tibial nerve is effective in the treatment of PMNE in children. A more significant effect was found after applying a direct LH TENS, which was 1.7 times more effective than after using a HL TENS.

**Disclosure:** Nothing to disclose

## EPO2391

**Efficiency of transcutaneous electroneurostimulation in treatment of patients with Anxiety Disorders**

M. Al Zamil<sup>1</sup>, N. Kulikova<sup>2</sup>, O. Bezrukova<sup>2</sup>, I. Volkova<sup>2</sup>  
<sup>1</sup>Amman, Jordan, <sup>2</sup>Physiotherapy, RUDN, Moscow, Russian Federation

**Background and aims:** To study the dynamics of anxiety disorders with the use of a direct transcutaneous electroneurostimulation

**Methods:** 35 patients with autonomic dystonia syndrome accompanied by anxiety disorders were examined. In all patients ranges of Generalized Anxiety Disorder Scale-7 (GAD-7) were higher than 10 scores and averaged 16±0.5 scores. Quality of life were investigated by SF-36 questionnaire 12 patients underwent low-frequency high-amplitude direct transcutaneous electroneurostimulation (LH TENS) of the right median nerve 11 patients have been treated by high-frequency low-amplitude direct transcutaneous electroneurostimulation (LH TENS) of the right median nerve 12 patients received a course of LH TENS of the right tibial nerve.

**Results:** The decrease in the severity of anxiety disorders was most of all after LH TENS of the median nerve and averaged 45±3%, in second place - after LH TENS of the tibial nerve and averaged 28±5% and least of all after HL TENS of the median nerve (14±6%). There was also an improvement in the quality of life identified using SF-36 by 35% in patients after LH TENS of the median nerve, by 20% in patients after LH TENS of the tibial nerve and by 11% in patients after HL TENS of the median nerve.

**Conclusion:** Direct LH TENS is more effective than direct HL TENS in the treatment of patients with anxiety disorders. Stimulation of the median nerve was found to be more effective than stimulation of the tibial nerve by 66% in decreasing anxiety disorders and by 75% in improving quality of life.

**Disclosure:** Nothing to disclose

## EPO2392

**Improvement of bioelectrical activity of the brain with the use of direct transcutaneous electroneurostimulation of the right median nerve.**

M. Al Zamil<sup>1</sup>, N. Kulikova<sup>2</sup>, O. Bezrukova<sup>2</sup>, I. Volkova<sup>2</sup>  
<sup>1</sup>Amman, Jordan, <sup>2</sup>Physiotherapy, RUDN, Moscow, Russian Federation

**Background and aims:** To study the dynamics of bioelectric activity of the brain in patients with Insomnia after treatment by direct transcutaneous electroneurostimulation (TENS) of the right median nerve.

**Methods:** 19 patients with insomnia accompanied by increased slow EEG activity were studied. Patients were between 20 and 40 years old. All patients showed signs of an increased theta activity index in the posterior and parietal regions. Registration was carried out using ipsilateral ear referential montage. The theta activity index exceeded 25% and averaged 38%. All patients underwent direct transcutaneous electroneurostimulation of the right median nerve (TENS). 10 patients were managed by Low-frequency High-amplitude TENS (1Hz, 200mcs, 15mA). 9 patients underwent a course of high-frequency low-amplitude TENS (100Hz, 100mcs, 5mA).

**Results:** Theta activity index decreased in patients who underwent a course of low-frequency high-amplitude TENS by an average of 39%. In patients after high-frequency low-amplitude TENS, indicators of slow activity did not significantly change. A decrease in the severity of paroxysms of slow activity was also noted against the background of low-frequency and high-amplitude TENS with the absence of such dynamics after the application of high-frequency low-amplitude TENS.

**Conclusion:** The low-frequency high-amplitude TENS, in contrast to the high-frequency low-amplitude TENS, can improve the EEG indices in patients with insomnia. This improvement is manifested by a significant decrease in the index of theta activity in the posterior and parietal regions and a decrease in the severity of paroxysmal activity of the theta rhythm.

**Disclosure:** Nothing to disclose

## EPO2393

**Visuospatial therapy of a child with stroke: case report**

N. Anochina<sup>1</sup>, S. Kiselev<sup>2</sup>

<sup>1</sup>Clinical Psychology, Ural Federal University, Yekaterinburg, Russian Federation, <sup>2</sup>Psychology and Psychophysiology, Ural Federal University, Yekaterinburg, Russian Federation

**Background and aims:** It is known that stroke has a devastating power for the future of child. The aim of this study was to describe the visuospatial therapy findings of a child with hemorrhagic stroke in the right fronto-parieto-temporal area, showing the progress after 8 months of therapy initiated early after acquired neurological injury.

**Methods:** Boy of 8 years suffered a sudden illness and was referred to the emergency hospital and diagnosed with hemorrhagic stroke in the right fronto-parieto-temporal area. Surgical procedures were performed. At the time of hospital discharge, there was guidance about the need for therapy care. Neuropsychological assessment revealed the severe deficit in visuospatial abilities in this child.

**Results:** A total of 62 visuospatial therapy sessions lasting 50 minutes were performed for 8 months. This therapy trains the child to do different visuospatial exercises both on motor and cognitive level. This training is built on the conceptual framework derived from the work of Luria's theory of restoration of neurocognitive functions (Luria, 1963, 1974). Neuropsychological assessment of child has revealed apparent progress in performance of 4 subtests which are designed to assess visuospatial abilities (copying of a table, mental rotation task, Head subtest, reconstruction of 3-dimensional designs).

**Conclusion:** According to result of this case report it can be assumed that visuospatial therapy can be used as a prospective treatment approach for children with stroke in the right fronto-parieto-temporal area.

**Disclosure:** Nothing to disclose

## EPO2394

**Botulinum Toxin Treatment for Cervical Dystonia – A Nation's Perspective**S. Azzopardi<sup>1</sup>, T. Dalli<sup>2</sup>, D. Cauchi<sup>3</sup>, M. Mallia<sup>1</sup><sup>1</sup>Department of Neuroscience, Mater Dei Hospital, Msida, Malta, <sup>2</sup>Mater Dei Hospital, Msida, Malta, <sup>3</sup>Outpatients Physiotherapy Department, Karen Grech Rehabilitation Hospital, Pieta, Malta**Background and aims:** The aim of this study was to analyse the cohort of cervical dystonia (CD) patients at the Maltese Botulinum Toxin (BoNT) Treatment Clinic.**Methods:** All CD patients being actively followed-up were included. Demographic data including treatment frequency, toxin formulation, dose administered and time interval between visits were recorded using the local database and medical records. The Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS) score was obtained prior to, and six weeks after treatment. Qualitative data regarding patients' expectations prior to treatment initiation and impact on quality of life (QoL) was gathered via questionnaire.**Results:** 16 patients (female=12, male=4) were treated. BoNTA was used in all patients; with a mean dose of 100U at an average of 4-monthly intervals. There was a statistically significant improvement in TWSTRS scores at 6 weeks, with the most significant change occurring in pain scores. Most patients entered treatment aiming to relieve pain. 66% reported a major impact of CD on their QoL, with BoNT having a moderately positive impact. However, 19% noted a decrease in efficacy of treatment over time. 31.3% made use of additional oral medications. All patients were referred for physiotherapy, with 58% complying with prescribed exercises. 25% were referred for assessment for deep brain stimulation. 19% were discharged due to clinical improvement.**Conclusion:** CD has a marked effect on QoL. BoNT is the treatment of choice; its efficacy is however neither sufficient nor enduring for a number of patients. Our data suggests it has a greater impact on pain control rather than functional ability.**Disclosure:** Nothing to disclose

## EPO2395

**An Efficiency Of The Electrophoresis With Mumiyo In The Complex Treatment Of Patients With Osteochondrosis Of The Cervical Spine**B. Bakhriev, Y. Madjidova, M. Baxramov  
Tashkent, Uzbekistan**Study aim:** To study effectiveness of mumiyo in patients with pain syndromes of osteochondrosis of the cervical spine.**Material:** We analyzed the treatment in 52 patients (male-23, female-29), treated in the neurological and physiotherapeutic departments with lesions of peripheral nervous system, including with cervical osteochondrosis: primary -22 and secondary – 30 (with plexitis – 69.2%, with brachial nerve neuritis – 31.8%). The age of patients from 26 to 60 years old; To evaluate all indicators, we used: visual analogue scale (VAS), neck disability index (NDI). The VAS was used to measure the degree of pain on a scale of 0 to 10 points. The NDI is a 6-point scale (0, 1, 2, 3, 4, 5), with a score of 0 indicating no pain or disability and 5 indicating insufferable pain or complete disability.**Results:** Patients with acute pain syndrome (plexalgia, pain in the cervical spine) were prescribed mumiyo electrophoresis from the 1<sup>st</sup> day of admission. From 4-5 days of admission to the treatment complex, additional physical therapy and massage were prescribed. According to the results of the VAS scale, pain after treatment decreased from 4.95±1.55 to 2.28±1.37 score. Agree to the results of the NDI scores declined from 12.50±4.55 to 7.10±4.18.**Conclusion:** Thus, analysis of the material showed that differentiated complex treatment of patients with lesions of the peripheral nervous system using mumiyo electrophoresis, massage and exercise therapy gives good results, which allows them to be widely used in the rehabilitation of these patients.**Disclosure:** Nothing to disclose



## EPO2396

### EFFICIENCY OF EXARTA KINESIOTHERAPEUTIC TECHNOLOGY IN PATIENTS WITH OSTEOCHONDROSIS OF THE Lumbar spine

M. Baxramov<sup>1</sup>, Y. Madjidova<sup>1</sup>, M. Usmanov<sup>2</sup>

<sup>1</sup>Tashkent, Uzbekistan, <sup>2</sup>Neurology, Tashkent Pediatric Medical Institute, Tashkent, Uzbekistan

**Study aim:** To study the effectiveness of the Exarta kinesiotherapeutic technology (EKT) in the treatment of patients with pain syndromes of osteochondrosis of the lumbar spine.

**Material:** We studied 30 patients with back pain (male-11; female-19), aged 28 to 56 years, in 2 groups: the main group "A" - 15 (male-5; female-10) who took medication with EKT; control group "B" - 15 (male-6; female-9) patients who received only drug therapy (DT).

**Results:** As a result of studies, it was found that the joint use of DT with EKT is more effective in the treatment of osteochondrosis of the lumbar spine. According to the results of the VAS scale, pain after DT and EKT decreased to  $2 \pm 1.42$  points, in the control group to  $3 \pm 1.09$  points. The Mann-Whitney U test (Uac) is 62.5. The critical value of the Mann-Whitney U-criterion (Ucr) for a given number of compared groups ( $n_1=15$ ;  $n_2=15$ ) is 64.  $Uac \leq Ucr$  64, therefore, differences in the level of trait in the compared groups are statistically significant  $p < 0.05$ .

SABS results in the main group are  $6 \pm 1.38$  points; in the control group,  $5 \pm 1.49$  points. The Mann-Whitney U-test is  $Uac \leq Ucr$  64 ( $p < 0.05$ ).

**Conclusion:** The obtained data show that usage of EKT with DT leads to a significant reduction of pain and improved function in short time compared to classical therapy without usage of EKT.

**Disclosure:** Nothing to disclose

## EPO2397

### Low-frequency Transcranial Magnetic Stimulation; a Potential Therapeutic Tool in the Treatment of Autism Spectrum disorders

O. Bell

Department of health Sciences, University of Bristol, Bristol, United Kingdom

**Background and aims:** Autism Spectrum disorders are a group of early-onset neurodevelopmental pervasive disorders defined by a core triad of symptoms: qualitative abnormalities in reciprocal social interaction, communication and restricted, repetitive and stereotyped behaviours. Affecting 1% of the population and accounting for 58 disability-adjusted life-years (DALYs) per 100,000 population, autism causes a significant burden to health and social services. The heterogeneous nature of autism has impeded effective targeting. The prefrontal cortex (PFC), pivotal in socio-emotional processing, is thus proposed as a target, to modulate implicated regional dysfunction in connectivity and excitability. Repetitive transcranial magnetic stimulation (rTMS) is an emerging tool in psychopathology. Data suggests low-frequency stimulation-induced inhibition of the PFC could mediate the elevated excitation/inhibition imbalance. Consequent interneuron attenuation causes functional reorganisation of the PFC, resulting in core symptom alleviation. The aims of the report are to establish the evidence behind rTMS to design an effective proposal to further establish the therapeutic benefits of rTMS in autism.

**Methods:** A literature review was conducted using search terms: 'rTMS', 'ASD', 'Autism', 'LFS' and 'PFC'. PubMed, google scholar and Omid were used to identify appropriate data.

**Results:** Data suggests low-frequency stimulation-induced inhibition of the PFC could mediate the elevated excitation/inhibition imbalance. Consequent interneuron attenuation causes functional reorganisation of the PFC, resulting in core symptom alleviation.

**Conclusion:** Although available TMS studies in autism are preliminary, they provide promising evidence for therapeutic benefit including reductions in repetitive behaviours, attentional-processing and Event-Related Potential (ERP) normalisation.

**Disclosure:** Nothing to disclose

## EPO2398

**Effects of electrothermophototherapy on spasticity in pediatric patients with neuromotor dysfunction**

J.M. Brandet, H.L. Borges

*Centro Universitário Filadélfia, Londrina, Brazil*

**Background and aims:** Spasticity is a motor disorder characterized by velocity-dependent increase in muscle tone associated with exacerbation of the myotactic reflex. Cryotherapy and thermotherapy provide an effective, practical means to reduce spasticity of muscles resulting from a central nervous system dysfunction. This study aims to analyze the effects of cryotherapy and thermotherapy on spasticity.

**Methods:** Cross-sectional study with intentional sampling consisting of 20 pediatric patients with spasticity of Instituto Londrinense de Educação para Crianças Excepcionais (ILECE/Centro – Londrina/PR). It was evaluated the passive amplitude of motion (goniometry) and the level of spasticity by the Modified Ashworth Scale, before and after the physiotherapeutic intervention in muscles with spasticity. The physiotherapeutic treatment (cryotherapy/30min; UST) was managed in 15 sessions during 5 weeks, lasting 50 minutes each session. The ice pack (cryotherapy) was applied to the muscle belly to be treated, with a duration of 30 minutes at 15°C, and in the same session, continuous therapeutic ultrasound (Sonopulse, IBRAMED – Brazil) was applied with a frequency of 1MHz and intensity of 0,5w/cm<sup>2</sup> in the tendon of the analyzed muscle. The temperature of the thermal agents before, during and after the physiotherapeutic intervention was constantly monitored by the infrared thermometer. The Spearman correlation was used for the analysis of the non-parametric variables and the Pearson correlation for the parametric variables.

**Results:** The results found indicates increased muscle flexibility and reduced the degree of spasticity.

**Conclusion:** This study was effective in decreasing muscle spasticity with consequent improvement in the amplitude of joint movement.

**Disclosure:** Nothing to disclose

## EPO2399

**Probiotics and aerobic physical activity improve symptoms of MetS, muscle and nerves structure and posture in overweight patients.**R. Bubnov<sup>1</sup>, L. Kalika<sup>2</sup>, M. Spivak<sup>3</sup>

*<sup>1</sup>Kiev, Ukraine, <sup>2</sup>New York Dynamic Neuromuscular Rehabilitation & Physical Therapy <https://nydnrehab.com/>, New York, USA, <sup>3</sup>Interferon, Zabolotny Institute of Microbiology and Virology, National Academy of Sciences of Ukraine, Kiev, Ukraine*

**Background and aims:** Metabolic syndrome (MetS) can be associated with neuropathy, muscle wasting and postural imbalance. Modulating gut microbiome and exercises can improve MetS, nerve and muscle health.

The aim: was to study lifestyle-modifying interventions efficacy on MetS manifestations according to ultrasound markers of neuromuscular and metabolic health.

**Methods:** We included 20 overweight patients (age 37-65 years), BMI>30, waist circumference (WC)>110. 6 patients underwent lifestyle modification – increased physical activity and aerobic exercises (yoga, plank and walking 10K steps daily); 6 patients were given probiotics (L. casei IMV B-7280/B. animalis VKB/B. animalis VKL strains (108 CFU/day, 10 days); 8 remained controls. All patients underwent general clinical, lab tests; multiparameter abdominal, neuromuscular ultrasound (US), measuring visceral fat (VF), liver elastography; dynamic US of postural stability.

**Results:** We detected increasing visceral fat (to 26±6mm), liver size and stiffness (to 175mm and 7.5kPa accordingly), muscle and nerve lesions on US; pelvic floor hypomotility in obese patients. Weight, BMI, WC and VF decreased after probiotic administration. Aerobic physical activity improved postural parameters, decreased BMI and WC, did not decrease VF. Muscle impairment in overweight manifested as follows: increased echogenicity, smaller hypoechoic bands (3-6cm vs 5-10cm); lower motility, contractility; improved after treatment. Neuropathy was in 10 patients with MetS; US demonstrated decreasing fascicles diameter from 1.9 to 0.5-1mm after both intervention. Liver size and stiffness decreased in all patients.

**Conclusion:** Probiotics and aerobic physical activity improve symptoms of MetS, muscle and nerves structure and posture in overweight patients.

**Disclosure:** Nothing to disclose

## EPO2400

## Arm crank ergometry with blood flow restriction technique as a feasible strategy for improving hand function in chronic stroke survivors - A randomized controlled study

N. Choudhary

Physiotherapy, Government Physiotherapy College (Dr. S.N. Medical College), Jodhpur, India

**Background and aims:** Arm function has been significantly related with muscle strength and improves activity after stroke. Low intensity aerobic exercise combined with blood flow restriction (BFR) can facilitate improvements in muscular strength. The objective of this study was to determine the effectiveness of combined arm crank ergometry with BFR to improve arm strength and function in stroke survivors.

**Methods:** Participants with stroke were randomised into experimental and control groups and performed arm crank ergometry with and without BFR respectively daily once, 4 days/week for 10 weeks. Vascular occlusion was achieved using blood pressure cuffs inflated to 60% of brachial artery occlusion pressure just below the shoulder joint (Fig1). After 3 minutes of warmup at self selected pace the participants were instructed to maintain the cadence between 50 to 60 r.min<sup>-1</sup> for 12 minutes. Data was collected from 10 participants at baseline, 5th and at the end of 10th week. The Fugl-Meyer (FM) motor assessment for upper extremity was the primary outcome measure.



Figure 1. Participant performing arm crank ergometry with blood flow restriction to the arm.



Blood flow restriction strap.

**Results:** 1 way ANOVA between the groups at the end of 10th week showed highly significant improvement in the scores of FM ( $F=17.883$ ,  $p<0.05$ ). Correlation in linear model between scores of FM with progressive weeks showed positive correlation in both experimental ( $r^2=0.9508$ ) and control group ( $r^2=0.9908$ ). Compared to the control group FM scores in the experimental group showed a net improvement of 7.29%.

**Conclusion:** Arm crank ergometry with BFR is a feasible strategy for stroke rehabilitation to strengthen upper limb.

**Disclosure:** Nothing to disclose

## EPO2401

**Role of Home based Targeted-CASP therapy in post stroke rehabilitation.**

A. Deshmukh, R. Bansal, S. Pradhan  
Neurology, SGPPI, Lucknow, India

**Background:** There is a need for a low cost, easy to apply, non-institutional regimen for significant functional recovery in post-stroke patients.

**Aim:** To study the effectiveness Targeted-Corrected-Assisted-Synchronised-Periodic therapy (T-CASP) in post-stroke rehabilitation.

**Methods:** This was a prospective quasi-randomised double-blind control study. The study was conducted in tertiary-care centre. Post stroke-Patients recruited on OPD-1 (Monday) and OPD-2 (Friday) were grouped under cases and controls respectively. All patients were assessed for power, spasticity, cognition, depression, functional level at baseline, 3 months and 6 months using standard tools of assessment. Caregivers were trained in T-CASP therapy and asked to carry it out at their homes as per protocol.

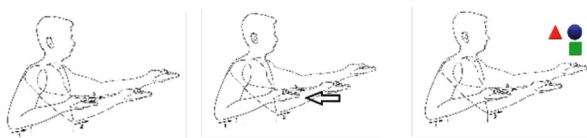


Figure 1: A) Passive Phase: Passive moment by examiner. B) Resistance Phase: Movement against Resistance. C) Cognitive Phase: Targeted movements towards different objects while naming them. Targeted CASP Therapy (Corrected-Assisted-Synchronized-Periodic) therapy.

**Results:** Baseline patient characteristics and outcome parameters were comparable between 2 groups. Significant difference was seen at 3 and 6 months between the 2 groups in Ashworth scale score for spasticity ( $p=0.012$  &  $0.001$ ), MRC score for power ( $p=0.021$  and  $0.0001$ ), Adden-Brookes score (Hindi) for cognition ( $p=0.025$  &  $0.010$ ), BDI score for depression ( $p=0.001$  &  $0.001$ ). Barthel scores were higher in T-CASP group but the difference was not significant ( $p=0.219$  &  $0.080$ ). However, on subcomponent analysis percentage of people who were able to walk (93.3 vs 76.7 %), transfer to/from bed/chair (80 % vs 70%) and climb stairs (63.3% vs 50%) independently at 6 months was significantly higher in T-CASP group.

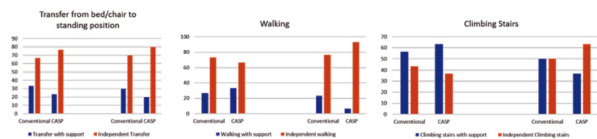


Fig 2 Percentage of people able to A) Transfer, B) Walk, C) Climb Stairs independently at 0 and 6 months in Conventional and CASP group.

**Conclusion:** Targeted-CASP therapy is a low cost, home based post stroke physiotherapy regimen which benefits all the aspects of post stroke rehabilitation.

**Disclosure:** Nothing to disclose

## EPO2402

**Bilateral recurrent ischemic stroke, Foix-Chavany-Marie Syndrome and tachycardia-induced cardiomyopathy – case report of an unusual course**

A.M. Dimache<sup>1</sup>, D. Salaru<sup>2</sup>, L. Mariuta<sup>1</sup>, R. Barzoi<sup>3</sup>, I. Nitica<sup>3</sup>, D. Baltag<sup>1</sup>

<sup>1</sup>Department of Medical Neurology Rehabilitation, Clinical Hospital of Recovery Iasi, Iasi, Romania, <sup>2</sup>Cardiology, Institute of Cardiovascular Diseases “Prof. Dr George I. M. Georgescu”, Iasi, Romania, <sup>3</sup>Department of Neuromotor Rehabilitation, Clinical Hospital of Recovery Iasi, Iasi, Romania

**Background and aims:** The heart may have an impact on the recovery process after stroke.

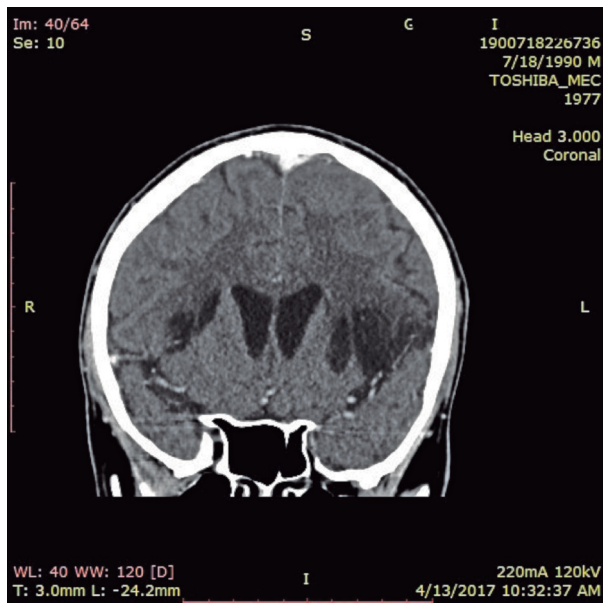
Foix-Chavany-Marie Syndrome (FCMS)- paralysis of the facial, tongue, pharynx, larynx and masticatory muscles with automatic-voluntary dissociation due to lesions of the opercular regions of descending fibres.

Tachycardia-induced cardiomyopathy is a reversible cause of heart failure and dilated cardiomyopathy.

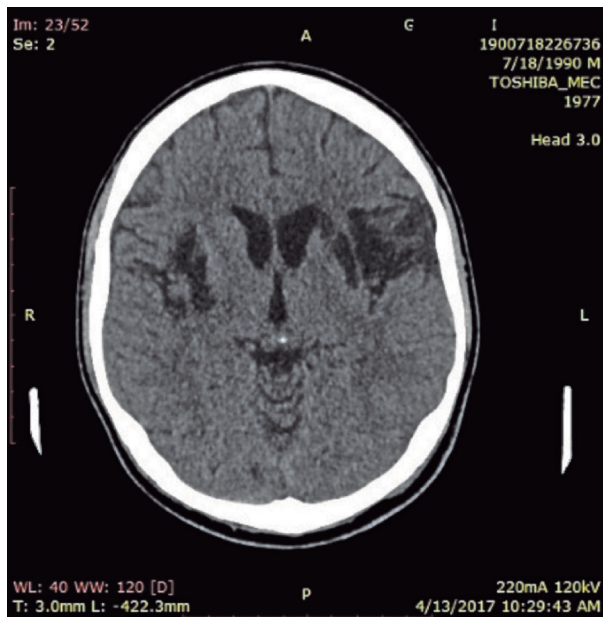
We report a 3 years follow-up of a patient with bilateral recurrent ischemic stroke and the above mentioned clinical features.

**Methods:** Case report

**Results:** A 27-year-old man, daily consumer of energizing beverage and alcohol, developed right faciobrachial monoplegia (MRC 2/5) and speech disturbances. After one week he becomes sleepy, mute and unable to swallow in addition to left complete hemiplegia. EKG revealed fast atrial fibrillation (ventricular rate 165/min) and dilated cardiomegaly (ejection fraction 38 %) by echocardiography. CT scan showed lesions in the left frontoparietal lobe, left lenticular nucleus and capsular lenticular on the right. He went under a gradual rehabilitation program, with a multidisciplinary approach, under EKG monitoring because of the high risk of cardiovascular events during the exercises, including speech therapy, kinetotherapy, robotic devices and psychological support. After 2 months right motor deficit recovered and the left hemiplegia improved significantly, including after 2 years from the event. Regarding FCMS, only mild dysarthria and hypophonia, but no dysphagia was noticed. The cardiomegaly and ventricular functions returned to normal within 1 year.



CT scan - 6 months after the stroke



CT scan- 6 months after the stroke

**Conclusion:** Into our best knowledge, this is the first case of FCMS with a cardiac abnormality that with multidisciplinary rehabilitation program recovered significantly from his neurological deficit and cardiac malfunction.

**Disclosure:** Nothing to disclose

## EPO2403

### How a vibro-tactile brain-computer interface paradigm can affect the Coma Recovery Scale-Revised in patients with disorders of consciousness?

N. Murovec<sup>1</sup>, F. Fernandes<sup>1</sup>, R. Xu<sup>2</sup>, R. Spataro<sup>3</sup>, V. La Bella<sup>4</sup>, C. Guger<sup>1</sup>

<sup>1</sup>*g.tec medical engineering GmbH, Schiedlberg, Austria,* <sup>2</sup>*Guger Technologies OG, Graz, Austria,* <sup>3</sup>*IRCCS Centro Neurolesi Bonino Pulejo, Palermo, Italy,* <sup>4</sup>*ALS Clinical Research Center, Bi.N.D., University of Palermo, Palermo, Italy*

**Background and aims:** Persons diagnosed with disorders of consciousness (DOC) typically suffer from motor disabilities, although their cognitive abilities might be intact, they are difficult to assess, but brain-computer interface (BCI) technology can help.

**Methods:** 20 DOC patients performed 10 vibro-tactile P300 BCI sessions over 10 days with 8-12 runs on each day. Patients were in a stable chronic stage, 11 were diagnosed with a minimally conscious state (MCS) and 9 with unresponsive wakefulness syndrome (UWS) based on the Coma Recovery Scale-Revised (CRS-R). Changes of the BCI classification accuracy were investigated over the 10 days, and the changes of the CRS-R score before and after 10 vibro-tactile P300 sessions. Stimulators were fixed on both wrists and one foot, instruction was to mentally count either the stimuli on the left or right wrist, which induces the P300.

**Results:** The grand average accuracy of the BCI paradigm in the 1st session for all patients was 40%, in the best session it was 88% and the median accuracy of all sessions was 21%. In the 1st run 10 patients had a classification accuracy above chance level (>23%). In the best run every patient reached an accuracy  $\geq 60\%$ . 12 out of 20 patients showed an improvement of 1 to 7 points in the CRS-R score after the VT3 BCI sessions. 6 patients didn't show change in the CRS-R and 2 patients showed a decline in the score for 1 point.

**Conclusion:** The improvement of the CRS-R score after the 10 vibro-tactile sessions is an important fact for future studies.

**Disclosure:** The research for this study is partly funded by g.tec medical engineering GmbH and Guger Technologies OG.

### EPO2404

#### Reliability of H-reflex as a paraclinical measure in neurorehabilitation of progressive multiple sclerosis patients with leg spasticity and gait problems

S. Filipović<sup>1</sup>, T. Knezevic<sup>2</sup>, S. Rodić<sup>3</sup>, S. Milanović<sup>1</sup>, J. Drulovic<sup>4</sup>, L. Konstantinović<sup>3</sup>

<sup>1</sup>Department for Human Neuroscience, Institute for Medical Research - University of Belgrade, Belgrade, Serbia,

<sup>2</sup>Physical Medicine and Rehabilitation, University Children's Clinic, Belgrade, Serbia, <sup>3</sup>Department for Physical Medicine and Rehabilitation, University of Belgrade Faculty of Medicine, Belgrade, Serbia, <sup>4</sup>Belgrade, Serbia

**Background and aims:** Leg spasticity (LS) and gait impairments (GI) are common problems in progressive multiple sclerosis (PMS).

The study aim was to check whether H-reflex can be a reliable measure in the setting of physiotherapy for LS/GI.

**Methods:** 50 PMS patients (age 22-65 years, mean 45.3±9.4; duration 2-24 years, mean 10.6±6.9; EDSS 1.5-6.5, mean 5.3±1.4; leg spasticity 0-10 NRS 1-10, mean 7.0±2.0) enrolled into an inpatient physiotherapy program for LS/GI were studied. Modified Ashworth Score (MAS), Timed 25-Foot Walk (T25-FW), and the Barthel index (BI) together with soleus H-reflex (H/M ratio) were taken at the beginning and after a 4-week physiotherapy program.

**Results:** Before the therapy, there was no correlation between H/M ratios and clinical measures (EDSS, duration, NRS, MAS). Only T25-FW and total H/M correlated marginally (p=0.04). Following the physiotherapy program, there was a significant improvement in spasticity (p<0.00001) and gait (p=0.0004) measures, while BI did not change (p=0.60). In spite of the improvements, the H/M ratios did not change following therapy. The baseline H/M ratios did not correlate with change in clinical measures. The change in clinical measures did not correlate with change in H/M ratios too.

**Conclusion:** Regarding level of impairment, therapy-associated change or prediction of therapy effects, within the setting of physiotherapy for LS/GI in PMS patients, the H-reflex does not seem to be a reliable measure.

**Disclosure:** Nothing to disclose

### EPO2405

#### Induced neuroplasticity via TMS in subjects with ischemic stroke.

A. Gasnas

Neurology no.<sup>2</sup> Department, State University of Medicine and Pharmacy "Nicolae Testemitanu", Chisinau, Moldova

**Background and aims:** Stroke is the leading cause of disability and the third most common cause of death. Between 55% and 75% of the subjects who have suffered a stroke have functional motor limitations present even 3-6 months after the event. In the last 2 decades, significant progress has been made in understanding the mechanisms of brain plasticity.

**Purpose of the study:** To underlie the peculiarities of cerebral plasticity in patients with ischemic stroke during the acute phase and to investigate the rs6265 polymorphism of the BDNF gene under the influence of transcranial magnetic stimulation (TMS).

**Methods:** We conducted a controlled clinical study on subjects with ischemic stroke, in the territory of the middle cerebral artery. All the subjects received a neurological complex evaluation and DNA sequencing (Sanger method) for rs6265 BDNF.

**Results:** The dynamics of the TMS group was statistically better compared to the control group according to all the applied scales: mRS, NIHSS, Barthel, Orpington, 9-peg-hole test, Mini-Mental State Examination. The Spearman correlation confirmed that the presence of the motor evoked potential (MEP) is a significant factor for the rehabilitation of patients with ischemic stroke. The subjects without the rs6265 polymorphism had better results than those with the polymorphism, according to all the used clinical scales.

Table 1. The correlation between MEP and the 9 Peg Hole test, TMS group

	mRS dynamics		9 Peg Hole test dynamics				
	Mean	Abs. value	From N/A to „value”	Positive dynamics	Negative dynamics	N/A-N/A	From „value” to N/A
MEP present at both visits	-1,03	32	0	29	3	0	0
MEP absent at 1st visit, and present at the 2nd one	-1,00	5	5	0	0	0	0
MEP present at 1st visit, and absent at the 2nd one	0,80	5	0	0	0	0	5
MEP absent at both visits	-0,40	5	0	0	0	5	0

Table 1. The correlation between MEP and the 9 Peg Hole test, TMS group

**Table 2. Distribution of 9-Peg Hole test values by sex, age and hemispheres affected by stroke during the acute period**

Gender	Age	Paretic hand (1st visit)			Paretic hand (2nd visit)			Non-paretic hand (1st visit)			Non-paretic hand (2nd visit)		
		Valid N	Mean, sec	SD	Valid N	Mean, sec	SD	Valid N	Mean, sec	SD	Valid N	Mean, sec	SD
Female	30-39	1	22.10		1	18.70		1	15.80		1	14.50	
	40-49	1	24.30		1	19.60		1	16.80		1	18.40	
	50-59	2	39.55	21.43	2	41.15	27.79	2	17.25	0.50	2	17.80	0.85
	60-69	10	31.34	9.51	12	34.58	19.20	10	18.72	1.65	12	19.45	2.52
	70-79	11	43.64	19.89	10	34.95	17.98	11	25.02	4.07	10	25.44	4.54
	80-89	3	33.97	1.10	4	34.31	11.72	3	29.03	0.46	4	29.23	0.42
	90-99	0			1	30.30		0			1	45.70	
	<b>Femai</b>		<b>36.46</b>	<b>15.46</b>	<b>31</b>	<b>33.95</b>	<b>17.05</b>	<b>28</b>	<b>22.02</b>	<b>4.93</b>	<b>31</b>	<b>23.19</b>	<b>6.54</b>
	Male	30-39	0			0			0			0	
40-49		1	39.56		1	23.50		1	17.45		1	17.80	
50-59		5	54.57	26.20	3	44.21	33.25	5	20.59	3.37	3	22.97	2.25
60-69		24	42.85	22.17	19	34.35	19.42	24	21.80	2.88	19	21.81	3.08
70-79		10	55.69	24.97	13	45.25	24.03	10	28.11	4.15	13	27.82	3.89
80-89		1	32.10		2	34.40	18.10	1	29.30		2	28.35	2.62
90-99		0			0			0			0		
<b>Barbañi</b>		<b>41</b>	<b>47.07</b>	<b>23.12</b>	<b>38</b>	<b>38.57</b>	<b>21.77</b>	<b>41</b>	<b>23.26</b>	<b>4.43</b>	<b>38</b>	<b>24.20</b>	<b>4.44</b>

Table 2. Distribution of 9-Peg Hole test values by sex, age and hemispheres affected by stroke during the acute period

**Table 3. Genotypic distribution according to the presence / absence of the BDNF rs6265 polymorphism (abs., %)**

		%	ABS.
<b>CONTROL GROUP</b>	G/G (no polymorphism)	70	33
	G/A+A/A (polymorphism)	30	14
<b>TMS GROUP</b>	G/G (no polymorphism)	71	34
	G/A+A/A (polymorphism)	29	14
<b>TOTAL</b>	G/G (no polymorphism)	71	67
	G/A+A/A (polymorphism)	29	28

NUCLEOTIDES: G – GUANINE, A - ADENINE

Table 3. Genotypic distribution according to the presence / absence of the BDNF rs6265 polymorphism (abs., %)

**Conclusion:** We recommend the application of the TMS method in all subjects with ischemic stroke during the acute period. Genotyping the subjects with stroke, based on the rs6265 polymorphism, should be further used in studies regarding neuroplasticity after stroke for subsequent modulation of the personalized neuro-recovery interventions.

**Disclosure:** Nothing to disclose

## EPO2406

### Pilot Study: Dry needling for treat the spasticity in multiple sclerosis.

M. Gonzalez Platas<sup>1</sup>, M.D.P. Perez Trujillo<sup>2</sup>, M.Y. Perez Martin<sup>1</sup>, J. Plata Bello<sup>1</sup>, M.C. Revert Gironés<sup>2</sup>  
<sup>1</sup>Service of Neurosurgery, Complejo Hospitalario Universitario de Canarias, La Laguna, Spain, <sup>2</sup>Medicina física y Farmacología, universidad de La Laguna, San Cristobal de La Laguna, Spain

**Background and aims:** Dry needling is semi-invasive technique physiotherapy where work on trigger points causing spastic patterns of patients. MS is a disease that presents spasticity by lesions in the pyramidal pathway, conditioning alteration in ambulation, balance, sphincter control, motor weakness. The object is to assess the decrease in the taking of medications for spasticity in patients with MS as a consequence of dry needling; and observe the effectiveness of this according to the scales of assessment of spasticity.

**Methods:** Patients with MS (McDonald criteria 2010) without the use of steroids during the month before inclusion.EDSS>2.5. After a detailed explanation of the study, 20 subjects provided written informed consent for their participation Assessment sessions (questionnaires, explorations and medication log diary) conducted, as well as treatment sessions once a week for a period of 4 months. There were reassessments 1 months after having performed the therapies. The questionnaires carried out through a personal QR code for each subject of the study. There were 18 sessions in total that included 12 treatment sessions (puncture, stretching and reeducation) and 6 assessment sessions

**Results:** Of the patients analyzed so far, it is observed that 75% have decreased the pyramidal score on the EDSS scale, after the sessions. Also, a high percentage of improvement was found in the analysis of the quality of life questionnaire MSQol54.

**Conclusion:** Dry puncture in patients with multiple sclerosis reduces spasticity, and could improve the quality of life, being a technique to be considered in patients with spasticity.

**Disclosure:** Nothing to disclose

## ePoster Sessions

**Monday, May 25 2020**

Ageing and dementia 3

**EPO3001**

### **Atypical mutations in patients with clinical Alzheimer's disease: report of three emblematic cases**

*L. Sacchi, L. Ghezzi, T. Carandini, G.G. Fumagalli, F. Sorrentino, C. Fenoglio, D. Galimberti, E. Scarpini, A. Arighi*

*University of Milan, Milan, Italy*

**Background and aims:** Apart from well known mutations in APP and Presenilin genes, additional hereditary factors in early-onset Alzheimer's disease (EOAD) remain largely tentative. We describe 3 cases of early-onset dementia clinically suggestive of AD with concurrent detection of mutations in SQSTM1, PRNP, and NPC2.

**Methods:** 3 patients presented in their 50s with a slowly-progressive history of episodic memory impairment, leading to the loss of their functional autonomy. They all performed neuropsychological evaluation, brain-MRI, fluorodeoxyglucose (FDG)-18F-PET, lumbar puncture, amyloid-PET. In keeping with the early onset of symptoms, genetic analysis with next generation sequencing (NGS) covering the spectrum of common and rare dementias was performed.

**Results:** Neuropsychological evaluation outlined an amnesic syndrome of hippocampal type in all patients. MRI showed brain atrophy in temporal-mesial lobes, with FDG-PET hypometabolism in the same areas in patients #1-#2, while patient #3 had minimal brain atrophy, but fronto-temporal and right-parietal hypometabolism. Low CSF beta-amyloid levels with concurrent evidence of amyloid deposition at the amyloid-PET were found in patients #2-#3, only. 3 unexpected mutations were detected in patients #1-2-3, respectively: SQSTM1 (P392L), PRNP (R208H), and NPC2 (V30M).

**Conclusion:** While a causal link between mutations in SQSTM1, PRNP and NPC2 and other neurodegenerative diseases - fronto-temporal dementia and amyotrophic lateral sclerosis, prion disease and Niemann-Pick type-C, respectively - has been uncovered, the role of these genetic variants in AD pathogenesis remains undefined. Larger studies are needed to define whether they play a specific causal role or are risk factors for the development of AD.

**Disclosure:** Nothing to disclose

**EPO3002**

### **Measuring benefit of cognitive rehabilitation in Alzheimer's disease**

*E. Salmon<sup>1</sup>, S. Kurth<sup>2</sup>*

*<sup>1</sup>GIGA Cyclotron Research Centre, University of Liege, Liege, Belgium, <sup>2</sup>Neurology -Memory Clinic, CHU Liege, Liege, Belgium*

**Background and aims:** Assessing the benefit of cognitive rehabilitation (CR) for patients and caregivers remains difficult

**Methods:** An observational, prospective study was conducted in 33 patients with AD and their caregiver during a clinical, individualized CR program, compared to 17 patients with AD who benefited from standard follow-up. CR consisted of 1 weekly session during 3 months at home, followed by one monthly contact for 9 months. Usual follow-up consisted in 2 counselling sessions in 1 year at the memory clinic and a few phone contacts. Evaluation of patient's dependence in activities and objective and subjective caregiver's burden was performed with a research quantitative scale at one year follow-up.

**Results:** Analyses with repeated measure ANOVA showed decreased patient's dependence for adapted activities at 1 year in the CR group compared to the control one. Subjective percentage of caregiver's burden was also decreased after one year in the CR group with our research functional scale. Global cognition slightly decreased in both groups over 1 year.

**Conclusion:** This observational study in a clinical setting is in line with the benefit of CR for patients with mild to moderate AD reported in most recent randomized controlled trials. The benefit obtained for adapted activities remained after 1 year, even if global cognition declined. More importantly, caregiver's subjective burden related to all individually relevant daily activities evaluated within the CR program was decreased after 1 year. Those results emphasize CR efficacy for AD patients and their caregivers in a clinical setting.

**Disclosure:** Nothing to disclose



## EPO3003

**Accelerated neuroaxonal retinal thinning in Alzheimer's disease**

R. Santangelo<sup>1</sup>, S.C. Huang<sup>1</sup>, M.P. Bernasconi<sup>1</sup>, G. Magnani<sup>2</sup>, M. Filippi<sup>1</sup>, G. Comi<sup>1</sup>, M. Falautano<sup>1</sup>, L. Leocani<sup>1</sup>

<sup>1</sup>Neurology, Institute of Experimental Neurology (INSPE) - University Vita Salute San Raffaele, IRCCS-San Raffaele Hospital, Milan, Italy, <sup>2</sup>Department of Neurology and INSPE, Ospedale San Raffaele - Vita-Salute San Raffaele University, Milan, Italy

**Background and aims:** A significant reduction of neuroretina thickness in Alzheimer's Disease (AD) has been demonstrated. Longitudinal studies investigating neuroaxonal thinning rates over time in AD and age-matched cognitively unimpaired subjects (CS) and possible correlations with disease progression are still lacking. Here, we assessed the neuroaxonal retinal thinning rate in AD, Mild Cognitive Impairment (MCI) and CS.

**Methods:** 68 consecutive subjects (16CS, 24MCI, 28AD) underwent OCT with measurement of peripapillary RNFL and macular GCL at baseline and at a mean follow up time of 2.5 years. Neuropsychological tests, both at baseline and follow-up, were available in AD and MCI groups. Group differences in yearly thinning rates were tested with one-way ANCOVA with age, sex and RNFL/GCL baseline values as covariates

**Results:** AD showed a significantly higher yearly thinning rate of RNFL global thickness (mean  $\pm$ S.D.) than CS (-1.66 $\pm$ 0.58 vs -0.62 $\pm$ 0.4 $\mu$ m, p=0.037) and a higher thinning rate of the RNFL superior quadrant thickness than both CS (-3.57 $\pm$ 1.21 vs 0.07 $\pm$ 0.74 $\mu$ m, p= 0.001) and MCI (-1.28 $\pm$ 0.45 $\mu$ m, p=0.01). MCI patients with pathological CSF A $\beta$ 42 and p-tau values showed a higher decay in GCL volume than MCI with normal values (p=0.032). RNFL and GCL thinning over time was positively associated with worsening in cognition.

**Conclusion:** Our findings prompt further studies to validate neuro-retinal OCT as a cost-effective, objective and easy to handle neurodegeneration marker in AD, for monitoring the disease course and to test the effects of neuroprotective interventions

**Disclosure:** This work was carried out within the framework of the Ivascomar project of the Italian Ministry of Research (CTN01\_00177\_165430), Cluster Tecnologico Nazionale Scienze della Vita "Alisei", Italian Ministry of Research and partially supported by Regione Lombardia (POR FESR 2014-2020) within the framework of the NeOn project (ID 239047)

## EPO3004

**Changes in antidiabetic drug prescription among patients with dementia and diabetes mellitus: Longitudinal analyses using Swedish national registers over 14-years.**

J. Secnik<sup>1</sup>, H. Xu<sup>1</sup>, E. Schwertner<sup>1</sup>, N. Hammar<sup>2</sup>, M. Alvarsson<sup>3</sup>, B. Winblad<sup>1</sup>, M. Eriksdotter<sup>1</sup>, S. Garcia-Ptacek<sup>1</sup>, D. Religa<sup>1</sup>

<sup>1</sup>Department of Neurobiology, Care Sciences and Society (NVS), H<sup>1</sup>, Karolinska Institutet, Stockholm, Sweden,

<sup>2</sup>Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden, <sup>3</sup>Molecular Medicine and Surgery, Karolinska Institutet, Stockholm, Sweden

**Background and aims:** Dementia may impact self-management of diabetes mellitus (DM), but it's unclear how it affects antidiabetic drug prescription. Herein we investigated the long-term changes in antidiabetic drug prescription among DM patients with and without dementia.

**Methods:** We performed an open-cohort study using 5 Swedish national registers – the Swedish Dementia Registry (SveDem), Prescribed Drug Register, Cause of Death Register, Patient Register and Total Population Register (TPR). We identified 13,483DM - dementia patients registered in SveDem from May 1st, 2007 until October 16th, 2018 and propensity-score matched 13,483DM patients without dementia (controls) extracted from the TPR. Matching criteria included age, sex, comorbidity score, and index date (dementia diagnosis date). Yearly proportions of 7 antidiabetic drug classes (insulin, metformin, sulfonylurea derivatives, thiazolidinediones, dipeptidyl-peptidase-4 inhibitors (DPP-4i), glucagon-like peptide-1 agonists and sodium-glucose co-transporter-2 inhibitors) were determined from the total yearly antidiabetic drug usage, in years 2005 to 2018. Regression analyses were used to analyze the slope ( $\beta$  coefficients with 95% confidence intervals) of yearly changes in drug proportions.

**Results:** With one-year increments, DM-dementia patients had steeper percent increase in insulin use ( $\beta$  1.65% [95% CI 1.35%;1.94%] vs 1.32% [1.19%;1.45%]), steeper decline in metformin

(-1.25% [-1.56%;-0.93%] vs -0.77% [-0.98%;-0.56%]) and less pronounced increase in DPP-4i use (0.42% [0.34%;0.50%] vs 0.76% [0.67%;0.84%]). Difference in average insulin usage was particularly high after dementia diagnosis (67% in dementia vs 58% in dementia-free).

Table 1. Beta coefficients for percent change in antidiabetic drug usage with yearly increments

	Dementia Cases $\beta$ (95% CI)	Dementia-Free Controls $\beta$ (95% CI)
Insulin	1.65 (1.35; 1.94)*	1.32 (1.19; 1.45)*
Metformin	-1.25 (-1.56; -0.93)*	-0.77 (-0.98; -0.56)*
Sulfonylurea derivates	-1.22 (-1.42; -1.03)*	-1.07 (-1.15; -0.99)*
TZD	-0.18 (-0.21; -0.15)*	-0.13 (-0.19; -0.08)*
DPP4i	0.42 (0.34; 0.50)*	0.76 (0.67; 0.84)*
GLP1a	0.1 (0.07; -0.12)*	0.29 (0.22; -0.36)*
SGLT2i	0.06 (0.05; -0.08)*	0.18 (0.15; -0.21)*

TZD, thiazolidinediones; DPP4i, dipeptidyl-peptidase-4 inhibitors; GLP1a, glucagon-like peptide-1 agonists; SGLT2i, sodium-glucose co-transporter-2 inhibitors; Beta coefficients represent slope of percent change in antidiabetic drug usage with advancing time (one-year increments) derived from the linear regression analysis. \*p-value<0.001

Table 1. Beta coefficients for percent change in antidiabetic drug usage with yearly increments

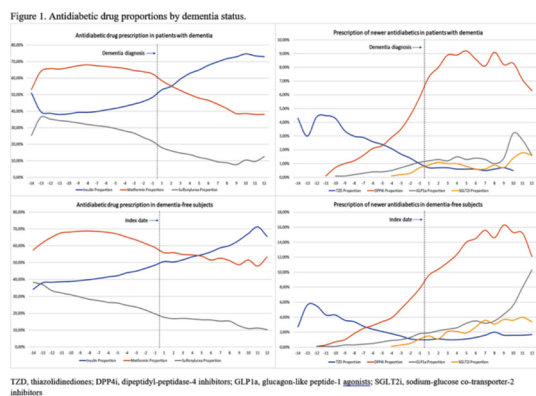


Figure 1. Antidiabetic drug proportions by dementia status

**Conclusion:** Compared to dementia-free subjects, dementia patients experienced more frequent insulin prescription, less frequent metformin and DPP-4i prescription, suggesting lower likelihood of receiving more modern antidiabetic drugs in dementia patients.

**Disclosure:** This work has been supported by the Swedish Brain Power, Swedish Research Council (2012-2291, 2016-02317, 2018-02843), Alzheimerfonden, CIMED, Stockholm County Council, the Swedish Associations of Local Authorities and Regions, the Swedish Order of Saint John/Johanniterorden, Swedish Society for Medical Research, FORTE (the Swedish Council for Health, Working Life and Welfare, dnr: 2017-01646), the Swedish Stroke Association, Margaretha af Ugglas Foundation and the Stiftelsen för Gamla Tjänarinnor.

## EPO3005

## Kinesin, amyloid precursor protein (APP)-vesicle transport motor interacts with Rab effector, EHBP1L1 via the tetratricopeptide repeat domain of KLC1.

D.-H. Seog<sup>1</sup>, S.W. Park<sup>2</sup>, M.K. Seo<sup>3</sup>, J.G. Lee<sup>4</sup>

<sup>1</sup>Biochemistry, Inje University College of Medicine, Busan, Korea, Republic of, <sup>2</sup>Convergence Biomedical Science, College of Medicine, Inje University, Busan, Korea, Republic of, <sup>3</sup>Paik Institute for Clinical Research, Inje University, Busan, Korea, Republic of, <sup>4</sup>Psychiatry, College of Medicine, Haeundae Paik Hospital, Inje University, Busan, Korea, Republic of

**Background and aims:** Mutations of the amyloid precursor protein (APP) cause for the formation of amyloid- $\beta$  peptides. These peptides play a key role in Alzheimer's diseases. The tetratricopeptide repeat (TPR) domain of kinesin light chain 1 (KLC1) may be responsible for binding APP either directly or via interaction with C-jun N-terminal kinase-interacting protein 1 (JIP1). However, the binding partners of the TPR domain of KLCs have not yet been fully identified.

**Methods:** We were used the yeast 2-hybrid system to identify the binding proteins that interact with the TPR domain of KLC1. The binding affinity was quantified by measuring  $\beta$ -galactosidase activity. Direct interaction between binding proteins and KLC1 in mammalian cells as well as in vitro was assayed using the co-immunoprecipitation with the antibodies. The cellular co-localization in cells was used the immunocytochemistry.

**Results:** We revealed an interaction between the TPR domain of KLC1 and EH domain-binding protein 1-like 1 (EHBP1L1), which is Rab8/10 effectors that associates with Bin1 to generate membrane curvature to excise the vesicle at the endocytic recycling compartment and accumulate on Rab8-positive enlarged lysosomes. EHBP1L1 bound to the six TPR motif-containing regions of KLC1 and did not interact with KIF5B (a motor subunit of kinesin-1) and KIF3A (a motor subunit of kinesin-2). The carboxyl (C)-terminal the coiled-coil domain of EHBP1L1 is essential for interaction with KLC1. When co-expressed in HEK-293T cells, EHBP1L1 co-localized with KLC1 and co-immunoprecipitated with KLC1, but not KIF5B.

**Conclusion:** These results suggest that kinesin 1 motor protein may transport of EHBP1L1-associated cargo in cells.

**Disclosure:** Nothing to disclose

## EPO3006

### Diagnostic whole-exome sequencing and C9orf72 repeat expansion testing in an Austrian cohort with early onset dementia

S. Silvaiech<sup>1</sup>, T. Koenig<sup>1</sup>, E. Berger-Sieszkowski<sup>1</sup>, T. Parvizi<sup>1</sup>, R. Wurm<sup>1</sup>, G.G. Kovacs<sup>2</sup>, F. Zimprich<sup>1</sup>, A. Zimprich<sup>1</sup>, E. Stoegmann<sup>1</sup>

<sup>1</sup>Department of Neurology, Medical University of Vienna, Vienna, Austria, <sup>2</sup>Toronto, Canada

**Background and aims:** Early-onset dementias (EODs, disease onset <age 65) are thought to be mainly genetic in origin, although a large proportion has no family history. High-penetrant mutations explain only few EOD cases. Whole-exome sequencing (WES) is a powerful diagnostic tool to detect pathogenic sequence variants in Mendelian conditions. We aimed to investigate the diagnostic yield in unrelated EOD patients.

**Methods:** WES and C9orf72 repeat expansion testing performed in 45 EOD patients: 38 AD, 4 FTD, 1 Lewy-body dementia and 2 cerebral amyloid-angiopathy patients. Exomes were enriched with the SureSelect Human All Exon v6 kit. DNA libraries were sequenced on a HiSeq 4000 instrument. Single nucleotide and copy number variants were screened in validated dementia genes. C9orf72 repeat expansion was conducted using a 2-step protocol with fragment length analysis and repeat primed PCR method

**Results:** 2 AD patients carried APP-duplications with 1 occurring de-novo (parents tested negative for the mutation). Furthermore, 1 FTD patient had a MAPT-mutation (c.1853C>T,p.Pro618Leu) and 2 AD patients carried PSEN1-mutations (c.617G>A,p.Gly206Asp; c.356C>T,p.Thr119Ile). 4 patients were homozygous for APOE4. No C9orf72 repeat expansion was found.

**Conclusion:** In 5 out of 45 patients a pathogenic variant meeting the American College of Medical Genetics and Genomics criteria for disease causation was revealed (diagnostic yield: 11.1%). 1 patient with a pathogenic variant and 1 homozygous for APOE4 (16.7%; 25%) had no family history. This emphasizes the importance of genetic testing in patients with negative family histories, particularly regarding homozygous APOE4 carriers having a lifetime-risk of 50-70 %.

**Disclosure:** Nothing to disclose

## EPO3007

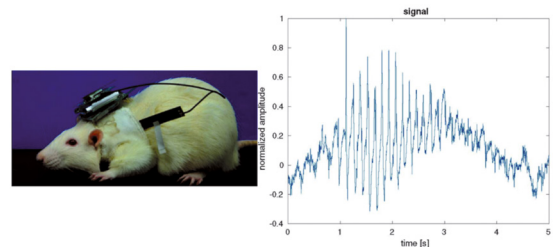
### A smart closed-loop deep-brain stimulation system

R. Souriau, V. Vigneron, J. Lerbet

Computer science, University Paris-Saclay, Evry, France

**Background and aims:** The Deep Brain Stimulation (DBS) has been found efficient to relieve patients from the symptoms of the Parkinson's disease (PD). Dejean, C. et al show the onset of the PD's symptoms can be predicted by detecting the presence of High-Voltage Spindles (HVS) waves in the brain Local Field Potentials (LFPs). The HVS is a synchronous spike-and-wave patterns in LFPs oscillating in the 5-13Hz frequency band. Suppressing HVS signals is found useful for delaying the progress of PD and deleting symptoms.

Controlling DBS is a promising solution trail for reducing the side effects induced by the DBS: this is our main objective in animal experiment context.

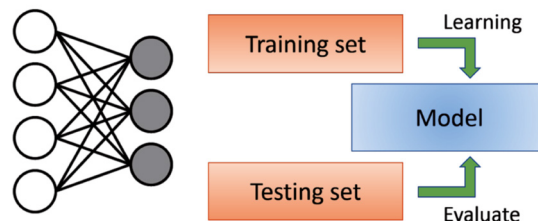


(a) Rat with neural prosthesis. (b) Signal recorded in LFPs.

Data extraction. Signal are extracted from rats with the PD.

**Methods:** A bipartite graph named Restricted Boltzmann Machine (RBM) is used to detect identify HVS signal. The 1st layer is fed with the observation and the hidden layer form a more significative latent representation.

We train one model for each PD rat with a session of 60s and we test each RBM with a second session of the same rat to evaluate it.



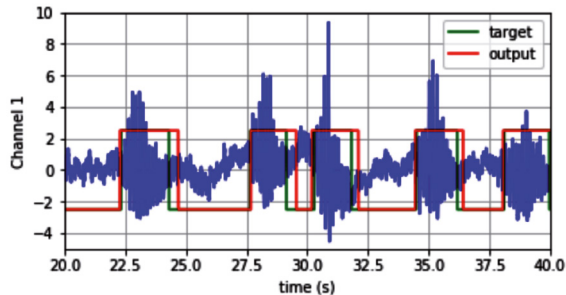
(a) The model.

(b) The method.

2a is a graph structure of a RBM with 4 visible neurons (white) and 3 hidden neurons (gray). Learning the cRBM consists in learning the weight of each links. 2b illustrate the method. We use data from a training set to learn the model and verify if the model remains efficient for new data of the testing set.

**Results:** The ground truth is heuristically defined to compare with the model prediction. Fig.3 gives the result for one rat with 6 hidden neurons.

The RBM succeed in detecting the HVS earlier than the ground truth for most rats by adapting automatically the detection of HVS for each rat.



Detection of the HVS. The result of the classifier is given in red and the green line is the ground truth to evaluate the model.

**Conclusion:** The model is fast, robust, capable to learn automatically from the data on real time.

The next step is the electrical implementation of the algorithm in the stimulator.

**Disclosure:** This work is supported by the doctoral school of Université Paris-Saclay and the Ministry of Science and Technology of Taiwan (MOST).

## EPO3008

### CSF/serum glucose ratio in Frontotemporal Dementia

C. Sousa Fernandes<sup>1</sup>, M. Pereira<sup>1</sup>, I. Cunha<sup>1</sup>, J. Durães<sup>1</sup>, D. Duro<sup>1</sup>, M. Lima<sup>1</sup>, H. Gens<sup>1</sup>, B. Santiago<sup>1</sup>, M.J. Leitão<sup>2</sup>, I. Baldeiras<sup>3</sup>, I. Santana<sup>1</sup>

<sup>1</sup>Neurology Department, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal, <sup>2</sup>Center for Neuroscience and Cell Biology, University of Coimbra, Coimbra, Portugal, <sup>3</sup>Laboratório de Neuroquímica, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal

**Background and aims:** Neurodegenerative diseases affect cerebral glucose metabolism and induce inflammation. One such condition is amyotrophic lateral sclerosis (ALS), which is known to be characterized by a state of hypermetabolism that is associated with disease severity. Recently, it was demonstrated an increased resting energy expenditure and a state of hypercatabolism in Frontotemporal Dementia (FTD), an ALS' spectrum neurodegenerative disease. Although there is a relationship between cerebral glucose metabolism and dementia, serum and CSF glucose levels are less used biomarkers in its investigation, including in Frontotemporal Dementia (FTD). Our aim is to determine the relationship between CSF/serum glucose ratio and age of onset, disease duration, CSF biomarkers and MoCA score in patients with FTD.

**Methods:** Patients with FTD followed in a dementia outpatient clinic in a tertiary center and who did simultaneous CSF A $\beta$ 42, Tau, glucose and serum glucose analysis were included. To study the associations between the investigated variables, Spearman's correlations and linear regressions were applied.

**Results:** 153 patients were included (mean age 63.3 $\pm$ 9.2 years, 50.3% female). The CSF/serum glucose ratio correlates with MoCA score ( $r=0.29$ ,  $p=0.028$ ). Multivariate analysis showed independent associations between CSF/serum glucose ratio and MoCA ( $\beta=0.006$ , 95%CI=[0.001, 0.011],  $p=0.019$ ), between age of onset ( $\beta=0.004$ , 95%CI=[0.002,0.006],  $p<0.001$ ) and CSF glucose ( $\beta=0.007$ , CI=[0.004,0.009],  $p<0.001$ ).

**Conclusion:** CSF/serum glucose ratio is lower in patients with early age of onset and lower MoCA scores, possibly associating an increased energy expenditure with a more aggressive disease.

**Disclosure:** Nothing to disclose

## EPO3009

**Driving behavior in Alzheimer's disease (AD) and amnesic Mild Cognitive Impairment (aMCI) carriers of the apolipoprotein e4 allele (APOE4)**

E. Stanitsa<sup>1</sup>, I. Beratis<sup>1</sup>, D. Kontaxopoulou<sup>1</sup>, S. Fragkiadaki<sup>1</sup>, V. Papastefanopoulou<sup>2</sup>, D. Pavlou<sup>3</sup>, P. Papantoniou<sup>3</sup>, C. Kroupis<sup>2</sup>, A. Economou<sup>4</sup>, J. Papatriantafyllou<sup>1</sup>, L. Stefanis<sup>5</sup>, G. Yannis<sup>3</sup>, S.G. Papageorgiou<sup>1</sup>

<sup>1</sup>Cognitive Disorders/Dementia Unit, <sup>2</sup>nd Department of Neurology, Attikon University Hospital, National and Kapodistrian University of Athens, Greece, Athens, Greece, <sup>2</sup>Department of Clinical Biochemistry, Attikon University Hospital, National and Kapodistrian University of Athens, Athens, Greece, <sup>3</sup>School of Civil Engineering, Department of Transportation Planning and Engineering, National Technical University of Athens, Athens, Greece, <sup>4</sup>Department of Psychology, National and Kapodistrian University of Athens, Greece, Athens, Greece, <sup>5</sup>1st Department of Neurology, Aiginiteio University Hospital, National and Kapodistrian University of Athens, Greece, Athens, Greece

**Background and aims:** Although patients with AD and aMCI have driving difficulties, the literature regarding their severity remains inconclusive. 1 of the well documented genetic factors that affects cognitive functions is the APOE4. Cognitive functions play a major role for driving behavior. Our aim was to compare the driving behavior of carriers and non-carriers of the APOE4 in the clinical stages of mild AD or aMCI.

**Methods:** N=18 active drivers with aMCI or mild AD (M=71.61±9.25) carriers of the APOE4 and N=18 (M=73.89±8.10) non-carriers matched for clinical diagnosis. The 2 groups had no significant differences in age, years of education (carriers M=11.78±3.90, non-carriers M=11.56±4.69), general cognitive ability based on Mini Mental State Examination (carriers M=25.78±5.16, non-carriers M=25.61±3.31), and driving experience (carriers M=42.92±11.69, non-carriers M=45.73±8.57). All the patients undergone thorough neurological and neuropsychological assessment and participated in a driving simulation experiment including low and high traffic volume conditions.

**Results:** In low traffic volume conditions carriers of the APOE4 did not indicate any significant differences from the non-carriers. However, in high traffic volume conditions the APOE4 carriers drove significantly slower and with lower speed variation than non-carriers. No other significant differences were found.

**Conclusion:** Driving behavior of the APOE4 carriers seems to be affected in demanding driving scenarios even within the clinical stages of mild AD and aMCI.

**Disclosure:** Funding: This research was carried out within the framework of the Operational Program "Education and Lifelong Learning" of the National Strategic Reference Framework namely the Research Funding Program: THALES investing in knowledge society through the

European Social Fund, co-financed by the European Union and Greek national funds. The authors have no conflict of interest to report. The authors received no other funding for this study.

## EPO3010

**MiR-204-3p/Nox4 mediates memory deficits in a mouse model of Alzheimer's disease**W. Tao<sup>1</sup>, L. Yu<sup>1</sup>, X. Zhu<sup>1</sup>, Y. Xu<sup>2</sup>, J. Chen<sup>3</sup><sup>1</sup>*Drum Tower Hospital, Nanjing, China, <sup>2</sup>Nanjing, China,*<sup>3</sup>*Department of Neurology, Drum Tower Hospital of Nanjing University Medical School, Nanjing, China, Nanjing, China*

**Background and aims:** Oxidative stress plays a critical role in the pathogenesis of Alzheimer's disease (AD), and microRNAs (miRNAs) contributes to the oxidative stress and memory deficits in AD.

**Methods:** MiRNA microarray was performed using the hippocampus of 6-month-old APPswe/PS1dE9 (APP/PS1) mice. The miR-204-3p overexpression lentivirus (Lv-miR-204) was injected into bilateral hippocampus of APP/PS1 mice. The memory function was examined by Open field, New-object reorganization, Fear condition and Morris water maze tests. The beta-amyloid (A-beta) levels were determined by immunofluorescence and ELISA. The potential targets of miR-204-3p were predicted by Targetscan, and confirmed by luciferase assay and western blotting. Long-term potentiation (LTP) was recorded to evaluate the synaptic functions. The levels of 4-hydroxynonenal, 3-nitrotyrosine, and 8-hydroxy-2'-deoxyguanosine were detected by ELISA and the level of H<sub>2</sub>O<sub>2</sub> was examined by spectrophotometry. Reactive oxygen species (ROS) was determined by fluorescence assay.

**Results:** MiR-204-3p was significantly downregulated in the hippocampus and plasma of 6-month-old APPswe/PS1dE9 (APP/PS1) mice and in the plasma of AD patients. MiR-204-3p overexpression attenuated memory and synaptic deficits in APP/PS1 mice. Lv-miR-204 treatment decreased amyloid levels and oxidative stress in the hippocampus. NADPH oxidase 4 (Nox4) was a target of miR-204, and Nox4 inhibition protected neuronal cells against A-beta induced neurotoxicity. Furthermore, GLX351322 treatment rescued synaptic and memory deficits, and inhibit oxidative stress and amyloid levels in the hippocampus of APP/PS1 mice.

**Conclusion:** MiR-204-3p attenuated synaptic and memory deficits and inhibit oxidative stress in APP/PS1 mice by targeting Nox4, and miR-204-3p overexpression and/or Nox4 inhibition might be a potential therapeutic strategy for AD treatment.

**Disclosure:** This study was supported by the National Natural Science Foundation of China and the Key Research and Development Program of Jiangsu Province of China.

## EPO3011

**Chronic somatic diseases increase mortality in dementia: a national registry-based cohort study**L. Taudorf<sup>1</sup>, A. Nørgaard<sup>1</sup>, H. Brodaty<sup>2</sup>, T.M. Laursen<sup>3</sup>, G. Waldemar<sup>1</sup><sup>1</sup>*Danish Dementia Research Centre, Department of Neurology, Rigshospitalet, Department of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark,*<sup>2</sup>*Dementia Centre for Research Collaboration and Centre for Healthy Brain Ageing, School of Psychiatry, UNSW, Sydney, Sydney, Australia,*<sup>3</sup>*The National Centre for Register-based Research, Department of Economics and Business Economics, Aarhus BSS, Aarhus University, Aarhus, Denmark*

**Background and aims:** Mortality is known to be markedly increased in people with dementia. However, the association between multiple chronic conditions and mortality in dementia is not well clarified. The aim of this study was to investigate the impact of somatic diseases on mortality in dementia compared with the general elderly population.

**Methods:** In a cohort design, we linked data from nationwide registries on dementia status and somatic diagnoses from the Charlson Comorbidity Index (CCI). Our population comprised all Danish residents age  $\geq 65$  years from January 1, 2006 to December 31, 2015. We assessed mortality rate ratios (MRR) by comparing people with and without dementia stratified by CCI. The reference was defined as people without dementia with a CCI score of zero.

**Results:** Our population consisted of 1,558,015 people aged  $\geq 65$  years of whom 439,205 died. Of the 114,112 people with dementia, 77,409 died. MRRs were significantly higher in people with dementia and increased with higher CCI score. When comparing people with similar comorbidity load, the mortality was still significantly higher in people with dementia. After adjusting for CCI, age, sex and calendar year the mortality was 2.62 (95% CI: 2.59-2.64) times higher in dementia.

**Conclusion:** The comorbidity load was associated with increased mortality in both people with and without dementia. The increased mortality in dementia, even after adjustment for CCI, suggests that a dementia disorder in and by itself contributes with excess mortality, which may be further accentuated by increased frailty, disadvantageous risk factor profiles, and improper or insufficient treatment of other diseases.

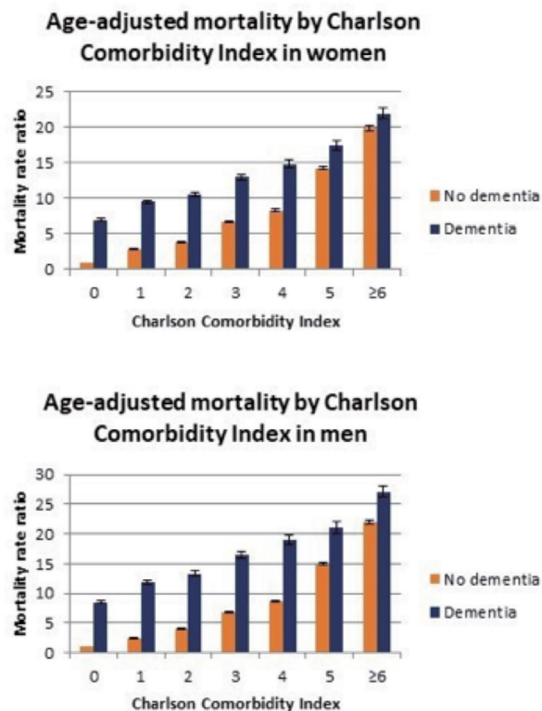


Figure 1. Mortality rate ratios adjusted for age and calendar year for women and men stratified by Charlson Comorbidity Index. Error bars represent 95% confidence intervals.

**Disclosure:** LT, AN, and GW reported grants received from the Danish Ministry of Health to the Danish Dementia Research Centre while conducting the study. TML reports no conflicts of interests.

## EPO3012

### Electrocortical Signal Complexity as Potential Biomarker of Cognitive Decline Progression from Normal Aging to Alzheimer's Disease through Mild Cognitive Impairment

G. Mostile, R. Terranova, A. Luca, L. Giuliano, G. Portaro, G. Donzuso, C. Rascunà, C.E. Cicero, A. Nicoletti, M. Zappia  
 Department "G. F. Ingrassia", Section of Neurosciences, University of Catania, Catania, Italy

**Background and aims:** Pathophysiology beyond dementia is far from being understood. Non-linear analysis of EEG signal has been proposed as neurophysiological tool to assess cortical functioning in patients with cognitive impairment. We investigated changes in fractal properties of EEG signals by analyzing self-similarity of electrocortical activity through different levels of cognitive decline.

**Methods:** We analyzed data of patients with Alzheimer's disease ("AD"; N=24; age 68.4±9) and Mild Cognitive Impairment ("MCI"; N=21; age 65.6±9.9), group-matched by age, who underwent a standardized EEG. We selected also a group of healthy controls (N=27; age 68.8±6.2), age-matched with patients, with normal EEG. Power spectrum was calculated by applying a Welch's periodogram to selected electroencephalographic signal epochs using a standardized protocol. To investigate self-similarity of electrocortical activity, the power law exponent  $\beta$  was computed for each recording coordinate as minus the slope of the power spectrum vs frequency of signals in a Log-Log scale.

**Results:** We found significant lower  $\beta$  values among temporal-parietal-occipital sites of recordings in MCI subjects as compared to controls, while overall significant lower  $\beta$  values were observed in AD subjects as compared to controls among almost all site of recordings, except for the left frontal electrode. For each site of recording, an incremental gradient from AD to controls through MCI was observed in average  $\beta$  values.

**Conclusion:** We found a progressive decrease in  $\beta$  values from physiological conditions to dementia through MCI. Changes in fractal organization of EEG signal could represent an early electrophysiological biomarker of cognitive decline progression in AD.

**Disclosure:** Nothing to disclose

# EPO3013

## Rate of age-related cognitive decline and socioeconomic indicators in ageing population sample

A. Titarenko<sup>1</sup>, S. Shishkin<sup>1</sup>, L. Scherbakova<sup>1</sup>, E. Verevkin<sup>1</sup>, J. Hubacek<sup>2</sup>, M. Bobak<sup>3</sup>, S. Malyutina<sup>1</sup>  
<sup>1</sup>Research Institute of Internal and Preventive Medicine – Branch of the Federal Research Center Institute of Cytology and Genetics, Siberian Branch of Russian Academy of Sciences, Novosibirsk, Russian Federation, <sup>2</sup>Institute of Clinical and Experimental Medicine, Prague, Czech Republic, <sup>3</sup>University College London, London, United Kingdom

**Background and aims:** The objective of the study was to investigate the relationship between socioeconomic indicators and age-related dynamics of cognitive functions in an ageing Russian population.

**Methods: Design:** Longitudinal study. A random population subsample (3,153 people, initial age 47-74 years, prospective age 55-84 years) was formed from cohort of Novosibirsk residents (n=9,360, project HAPIEE). Repeated serial examinations of cognitive functions included the assessment of memory indicators (immediate and delayed recall), executive function (semantic verbal fluency) and processing speed (letter cancellation). Level of education and economic activity status were determined by standardized questionnaires. Economically active included participants with paid work in the past 12 months. Those who did not have paid work or who retired considered economically inactive. The mean follow-up period was 9.2 years (Median =9.3; SD=0.7).

**Results:** Persons with primary education had steeper rate of regress in memory (men: p<0.001; 0.025; women: <0.001 for delayed recall), than those with university education, independently of age. The accelerated decline in semantic verbal fluency among women with university education (p<0.001) is probably due to processing speed at initial examination in participants with primary education was relatively low. The termination of economic activity in men was associated with steeper rate of decline in memory indicators (p<0.001 and 0.001) compared to economically active participants, independently from age and education level.

Variables*	Wave 2		Wave 3	
	Men	Women	Men	Women
Observed, n (%)	1198 (38)	1955 (62)	1198 (38)	1955 (62)
Age*, years	60,0 (6,9)	60,6 (6,8)	69,2(7,0)	69,7(6,9)
Education, n (%)				
Primary	65 (5)	128 (7)	65 (5)	128 (7)
Vocational	283 (24)	593 (30)	283 (24)	593 (30)
Secondary	369 (31)	620 (32)	369 (31)	620 (32)
University	481 (40)	614 (31)	481 (40)	614 (31)
Economic activity, n (%)				
Active	898 (75)	1011 (52)	403 (34)	383 (20)
Inactive (retired persons)	294 (25)	938 (48)	786 (66)	1548 (80)
Cognitive functions, score				
Immediate recall	7,5 (1,3)	7,9 (1,2)	6,7 (1,6)	7,3 (1,4)
Delayed recall	8,1 (1,7)	8,6 (1,5)	6,9 (2,1)	7,7 (2,0)
Semantic verbal fluency	22,9 (8,0)	21,7 (7,6)	17,1 (5,5)	16,5 (4,9)
Letter cancellation	17,9 (4,7)	18,8 (5,0)	15,5 (5,4)	17,3 (5,7)
Hypertension, n (%)	795 (69)	1405 (74)	929 (78)	1621 (83)
Diabetes, n (%)	66 (9)	124 (10)	240 (20)	403 (21)
CVD **, n (%)	156 (13)	196 (10)	279 (23)	359 (19)
BMI **, kg/m <sup>2</sup>	27,0 (4,1)	30,2 (5,4)	27,7 (4,6)	30,6(5,7)
Total cholesterol, mmol/l	5,5 (1,0)	6,0 (1,1)	5,2 (1,1)	5,6 (1,2)
Smoking status, n (%)				
Current smoker	364 (31)	80 (4)	454 (38)	113 (6)
Ex-smoker	469 (39)	125 (6)	326 (27)	79 (4)
Never-smoker	359 (30)	1744 (90)	411 (35)	1743 (90)
Marital status, n (%)				
Single/ divorced	122 (10)	805 (41)	186 (16)	1086 (56)
Married/ cohabiting	1070 (90)	1144 (59)	1006 (84)	851 (44)

\*Values are presented as mean and standard deviation - M(SD) or n (%); \*\*CVD - cardiovascular disease, BMI – body mass index.

Table 1. Characteristics of the population subsample of subjects who participated in two examinations (9 years of follow-up period, men and women, Novosibirsk, n=3153)

Education	Men, n=1198				Women, n=1955			
	Immediate recall	Delayed recall	Semantic verbal fluency	Letter cancellation	Immediate recall	Delayed recall	Semantic verbal fluency	Letter cancellation
(1) Primary	-161 (-197; -125)	-205 (-258; -152)	-474 (-678; -271)	-329 (-467; -192)	-086 (-111; 061)	-162 (-197; -128)	-290 (-423; -158)	-161 (-272; -050)
(2) Vocational	-089 (-107; -072)	-139 (-164; -113)	-619 (-716; -522)	-282 (-347; -217)	-063 (-074; 051)	-103 (-119; -087)	-585 (-645; -524)	-174 (-223; -125)
(3) Secondary	-084 (-099; -069)	-115 (-137; -093)	-606 (-691; -521)	-262 (-319; -204)	-058 (-069; -047)	-100 (-115; -085)	-581 (-640; -522)	-175 (-223; -127)
(4) University	-082 (-095; -069)	-123 (-142; -104)	-703 (-778; -628)	-242 (-292; -193)	-056 (-068; -045)	-078 (-093; -063)	-619 (-678; -559)	-169 (-217; -121)
P<0.01	<.001	.025	.229	.999	.208	<.001	<.001	.999
P<0.05	.999	.999	.999	.999	.999	.156	.999	.999
P<0.001	.999	.999	.556	.999	.999	.292	.999	.999

\*Values are presented as Mean (95% CI); \*\*Estimates of association are adjusted for age

Table 2. The association\*\* between the rate of changes per year of cognitive function indicators\* and education level (population sample, initial age 47-74 years, prospective age 55-84 years)

Economic activity status	Men, n=1183				Women, n=1925					
	n	Immediate recall	Delayed recall	Semantic verbal fluency	Letter cancellation	n	Immediate recall	Delayed recall	Semantic verbal fluency	Letter cancellation
(1) Active W2W3	399	-065 (-080; -049)	-096 (-118; -113)	-662 (-750; -574)	-251 (-308; -194)	381	-053 (-068; -038)	-078 (-099; -057)	-632 (-714; -549)	-188 (-253; -123)
(2) Active W2, inactive W3	512	-105 (-118; -092)	-148 (-167; -129)	-629 (-702; -557)	-265 (-313; -217)	651	-072 (-083; -061)	-105 (-120; -089)	-587 (-647; -528)	-170 (-217; -123)
(3) Inactive W2W3	272	-095 (-114; -076)	-141 (-169; -113)	-614 (-722; -505)	-272 (-347; -197)	893	-055 (-065; -045)	-099 (-113; -085)	-545 (-600; -491)	-166 (-210; -121)
P<0.01		<.001	.001	.999	.999		.128	.112	.999	.999
P<0.05		.071	.066	.999	.999		.999	.406	.333	.999
P<0.001		.999	.999	.999	.999		.109	.999	.999	.999

\*Values are presented as Mean (95% CI); W2- wave2, data were collected from 2006 to 2008; W3- wave3, data were collected from 2015 to 2017; \*\*Estimates of association are adjusted for age and level of education

Table 3. The association\*\* between the rate of changes per year of cognitive function indicators\* and economic activity status (population sample, initial age 47-74 years, prospective age 55-84 years)



**Conclusion:** The obtained results suggest that, higher education and continuous economic activity positively effect on cognitive decline in ageing. These results are consistent with cognitive reserve theory.

**Disclosure:** The reported study was funded by RFBR according to the research project № 19-013-00681.

## EPO3014

### **Biomarkers based definition of limbic predominant long-lasting amnesic Mild Cognitive Impairment**

G. Tondo<sup>1</sup>, G. Carli<sup>1</sup>, R. Santangelo<sup>2</sup>, M.V. Mattoli<sup>3</sup>, L. Presotto<sup>4</sup>, M. Filippi<sup>2</sup>, G. Magnani<sup>2</sup>, S. Iannaccone<sup>5</sup>, C. Cerami<sup>6</sup>, D. Perani<sup>1</sup>

<sup>1</sup>*In vivo human molecular and structural neuroimaging Unit, Division of Neuroscience, IRCCS San Raffaele Scientific Institute, Vita-Salute San Raffaele University, Milan, Italy,*

<sup>2</sup>*Department of Neurology, San Raffaele Scientific Institute, Vita-Salute San Raffaele University, Milan, Italy,*

<sup>3</sup>*Department of Neuroscience, Imaging and Clinical Science, G. d'Annunzio University of Chieti-Pescara, Chieti, Italy,*

<sup>4</sup>*Vita-Salute San Raffaele University, Milan, Italy,*

<sup>5</sup>*Department of Clinical Neurosciences, San Raffaele Scientific Institute, Vita-Salute San Raffaele University,*

*Milan, Italy, <sup>6</sup>Istituti Universitario di Studi Superiori IUSS, Pavia, Italy*

**Background and aims:** Previous reports described amnesic Mild Cognitive Impairment (aMCI) subjects with slow rate of cognitive decline, benign disease course associated to FDG-PET brain hypometabolism in the medial temporal lobe structures [1]. Clinical and post-mortem studies suggested the presence of both Alzheimer's disease (AD) and non-AD pathology [2]. The identification of aMCI with benign course has relevant consequences for both prognosis and treatment.

**Methods:** We selected 80 aMCI (Cohort1) using the following criteria: disease duration  $\geq 4$  years; available clinical follow-up; baseline CSF for amyloid- $\beta$ 42, total-tau and phosphorylated-tau; FDG-PET assessed for individual brain hypometabolism [3] showing a selective medial temporal involvement, thus a non-AD brain pattern. We added 42 aMCI-due-to-AD with similar baseline clinical features and biomarker measurements, and both CSF positive for amyloidopathy and FDG-PET showing the typical AD temporo-parietal brain hypometabolism (Cohort2).

**Results:** Cohort1: disease duration  $8.45 \pm 3.37$  years, no decline in MMSE, only 7% conversion to AD dementia. Cohort2: 81% conversion to AD dementia. The FDG-PET single subject analysis predicted stability in Cohort1 and progression in Cohort2, with high accuracy (AUC=0.88), sensitivity (0.85) and specificity (0.90). In Cohort1, the CSF biomarkers showed great variability as reflected in AT(N) classification, with lack of accuracy in predicting stability or conversion.

**Conclusion:** The specific brain hypometabolism pattern in Cohort1 was associated with clinical stability and slow rate of memory deficit progression at difference with Cohort 2 with AD metabolic pattern. These findings underline the key role of FDG-PET brain metabolism as a fundamental biomarker in the diagnostic and prognostic challenge of aMCI.

**Disclosure:** Nothing to disclose

## EPO3015

### A deficit in visual short-term memory distinguishes MCI and Alzheimer's patients from healthy aging

S. Toniolo<sup>1</sup>, M.R. Maio<sup>1</sup>, Y.A. Tabi<sup>1</sup>, E. Slavkova<sup>1</sup>, O. Plant<sup>1</sup>, Y. Saleh<sup>1</sup>, B. Attaallah<sup>1</sup>, I. Idris<sup>1</sup>, J. Peixoto<sup>1</sup>, C. Preul<sup>2</sup>, A. Srowig<sup>2</sup>, S. Joedecke<sup>2</sup>, C. Butler<sup>3</sup>, S. Thompson<sup>3</sup>, S. Manohar<sup>1</sup>, K. Finke<sup>2</sup>, M. Husain<sup>1</sup>  
<sup>1</sup>NDCN, University of Oxford, Oxford, United Kingdom, <sup>2</sup>Neurology clinic, Friedrich-Schiller-University Jena, Jena, Germany, <sup>3</sup>Cognitive Clinic, University of Oxford, Oxford, United Kingdom

**Background and aims:** To assess Short-Term Memory (STM) in Mild Cognitive Impairment (MCI) and Alzheimer's Disease (AD) using a novel delayed reproduction task, which obtains a continuous measure of localization error and is potentially more sensitive than conventional correct/incorrect memory tasks.

**Methods:** 44 MCI and 41 AD patients plus 109 healthy elderly controls (EHCs) were recruited from clinics in Oxford, UK and Jena, Germany. They performed a "What was where?" task (Figure 1). Identification Accuracy (percentage correctly identified items) and Absolute Localization Error were measured. In addition, Misbinding Rate (erroneously localizing an item to the remembered location of another item in the memory array) was determined and errors modeled so that, for example, guessing response rate could be established.

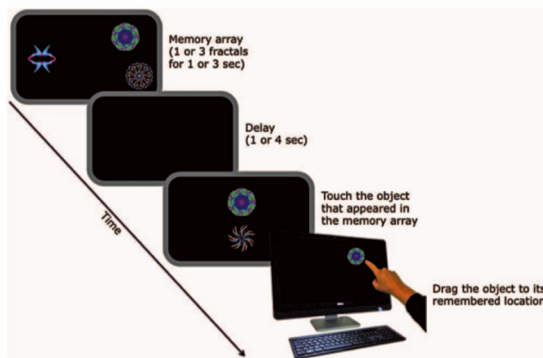


Figure 1 | "What was where?" Short-Term Memory task Participants were presented with either 1 or 3 fractals located randomly on the screen. After a 1- or 4-seconds delay, two fractals appeared at the center of the screen and participants were required to drag the remembered object to its original location.

**Results:** Both MCI and AD patients had significantly greater mislocalization ( $p < 0.001$ ) and misbinding errors ( $p < 0.001$ ) than EHCs. Importantly, no significant difference between AD and MCI cases was found on these measures. However, MCI cases were significantly more accurate at identifying objects ( $p < 0.001$ ) and showed less guessing compared to AD ( $p = 0.003$ ). EHCs identified the correct object more often ( $p < 0.001$ ) and guessed less ( $p < 0.001$ ) than MCI patients

**Conclusion:** STM deficits can be identified in AD. The sensitive memory measure used here was also able to detect STM impairment in MCI cases. This type of task might be a useful index of memory for future clinical trials in AD in its earliest stages.

**Disclosure:** Nothing to disclose

## EPO3016

**Management of idiopathic normal pressure hydrocephalus (iNPH) - a retrospective study**

K.I. Tudor<sup>1</sup>, J. Nemir<sup>2</sup>, G. Pavliša<sup>3</sup>, G. Mrak<sup>2</sup>, E. Bilic<sup>1</sup>, F. Borovečki<sup>1</sup>

<sup>1</sup>Department of Neurology, University Hospital Center Zagreb, School of Medicine, University of Zagreb, Zagreb, Croatia, <sup>2</sup>Department of Neurosurgery, University Hospital Center Zagreb, School of Medicine, University of Zagreb, Zagreb, Croatia, <sup>3</sup>Department of Diagnostic and Interventional Radiology, University Hospital Center Zagreb, School of Medicine University of Zagreb, Zagreb, Croatia

**Background and aims:** Idiopathic normal pressure hydrocephalus (iNPH) is communicating hydrocephalus characterised by normal intraventricular pressures. The aim of this study was to assess the prevalence and management of iNPH in our institution.

**Methods:** This was a retrospective study carried out at a tertiary health care center. Retrospective case series analysis was conducted using the existing electronic medical record data (2009-2017) on patients with hydrocephalus.

**Results:** 42 (6.7%) patients with iNPH were identified, mean age 71.5±8.8 years, 21 male (mean age 71.5±9.3 years) and 21 female (mean age 71.5±8.5 years). Ataxia was recorded in 39, symptoms of dementia in 31, and urinary incontinence in 29 patients. 40 patients were treated surgically by placing a ventriculoperitoneal (VP) shunt. 1 of the 2 patients treated by endoscopic 3rd ventriculostomy (ETV) was subsequently treated by placing a VP shunt due to clinical deterioration. Significant improvements were noticed in cognitive and urinary symptoms, in the triad symptom sum score on the Japanese NPH scale, as well as in Evans' index and callosal angle (CA) on brain MRI ( $p < 0.05$ ). Significant positive correlation was found between age and gait disturbance (Spearman's  $\rho = 49.86\%$ ,  $p = 0.0017$ ), age and incontinence (Spearman's  $\rho = 35.22\%$ ,  $p = 0.0351$ ), age and triad symptom sum score (Spearman's  $\rho = 44.67\%$ ,  $p = 0.0056$ ), female gender and dementia (Spearman's  $\rho = 34.94\%$ ,  $p = 0.0367$ ), and among all three variables on the Japanese NPH scale ( $p < 0.0001$ ).

**Conclusion:** Treatment of iNPH with VP shunt showed significant improvement. A properly designed study is required to address the efficacy of ETV in the treatment of iNPH.

**Disclosure:** Nothing to disclose

## EPO3017

**Epidemiology of dementia in the very young and the oldest old - insights from prescription claims**

R. Wurm<sup>1</sup>, B. Reichardt<sup>2</sup>, T. König<sup>1</sup>, S. Silvaieh<sup>1</sup>, T. Parvizi<sup>1</sup>, T. Stamm<sup>3</sup>, E. Stögmann<sup>1</sup>

<sup>1</sup>Department of Neurology, Medical University of Vienna, Vienna, Austria, <sup>2</sup>Unit for healthcare economics, Regional Sickness Fund for the county of Burgenland, Eisenstadt, Austria, <sup>3</sup>Section for Outcomes Research, Center for Medical Statistics, Informatics, and Intelligent Systems, Medical University of Vienna, Vienna, Austria

**Background and aims:** The epidemiology of dementia is shifting rapidly. Diagnostic improvements increase the identification of early onset disease while longevity increases dementia cases late in life.

This development will challenge health care systems in the near future, however, only little data is available on these cohorts. We use a prescription claims database to analyse the changing relationship of age and dementia incidence.

**Methods:** Insurance claims data covering 98% of the Austrian population were used. We identified patients aged <65 years (early onset) or  $\geq 85$  years (oldest age) that started treatment with an approved antedementive drug in the period of 2014-2015. Prescription incidence was calculated for 5-year groups using census data, and mortality was recorded through vital registries.

**Results:** 1076 people below the age of 65 were started on an antedementive drug, and 10414 above the age of 85. In the early onset group, 50% were female compared to 72% in the oldest old group (Figure 1). Cumulative incidence was 0.5/1000 person years in early onset and 33.9/1000 in the oldest old (Figure 2). During a median observation of one year, 5% in the early onset and 30% in the oldest old died (Figure 3).

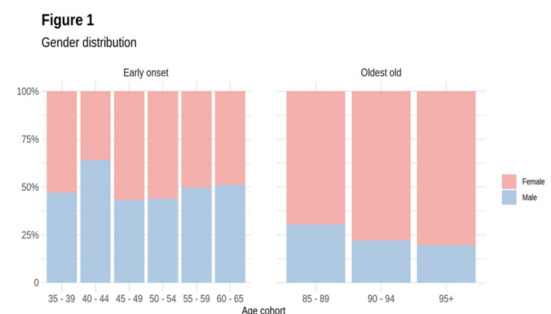


Figure 1 - Gender distribution

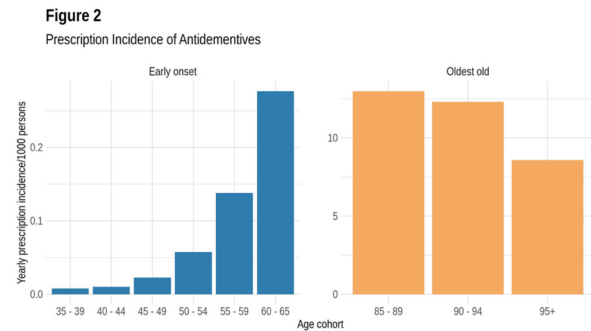


Figure 2 - Incidence

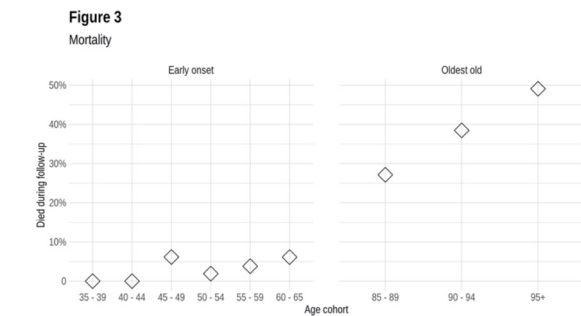


Figure 3 - Mortality

**Conclusion:** Antidementive medication is frequently started in the oldest old. Prescription in young people is rare but increases linearly with age, suggesting an interplay of age and heritable risk. Gender did not appear to confer substantial risk in this cohort, following the overall distribution in the population.

**Disclosure:** Nothing to disclose

## EPO3018

### Amyloid Imaging Findings in Familial and Sporadic Patients with Alzheimer's Disease

M. Sanlier, Y. Yilmaz, B. Topcular  
Istanbul, Turkey

**Background and aims:** Alzheimer's disease CAD is a multifactorial dementing disorder characterized by amyloid- $\beta$ , tau deposition and neurodegeneration. There are differences between Familial and Sporadic AD in terms of age of onset as well as cognitive profile and patients' clinical presentation. In this study, we aimed to analyze difference of amyloid- $\beta$  burden's brain locations between Familial and Sporadic Alzheimer's patients.

**Methods:** Clinical and imaging data of 17 familial and 18 sporadic Alzheimer's patients, that have no difference between the 2 groups in terms of sociodemographic characteristics and disease duration, from Alzheimer's Disease Neuroimaging Initiative (ADNI) were included in the study. Early-onset FAD (EOFAD), 17 patients, based on the underlying genetic mechanism are: 4 patients have mutation of APP, 11 patients have mutation of PSEN1, 2 patients have mutation of PSEN2. Flutemetamol radionuclide (F-18) marking amyloid PET images were used and analyzed with VINCI ("Volume Imaging in Neurological Research, Co-Registration and ROIs included").

**Results:** There was no significant difference between the 2 groups in terms of total amyloid burden. In the familial group, the amyloid burden was higher in the insular cortex, striatum, supra marginal gyrus, orbitofrontal cortex and cingulate cortex than in the sporadic group.

**Conclusion:** The findings of our study support other studies suggesting that frontal and extrapyramidal amyloid burden is higher in familial AD cases compared to sporadic cases.

**Disclosure:** Nothing to disclose

## EPO3019

**Deep Proteomic Profiling of CSF from Subjects with Alzheimer's disease Using DIA Mass Spectrometry**

H. Yu<sup>1</sup>, Y. Feng<sup>1</sup>, N. Dupuis<sup>2</sup>, D. Heinzmann<sup>1</sup>, L. Reiter<sup>1</sup>, R. Bruderer<sup>1</sup>

<sup>1</sup>Biognosys AG, Schlieren, Switzerland, <sup>2</sup>Biognosys AG, Boulder, Switzerland

**Background and aims:** The need for better biomarkers and biological understanding for neurodegeneration is evidenced by the lack of success in developing disease-modifying drugs. Here, we seek to address this unmet need by applying an optimized data-independent acquisition mass spectrometry (DIA-MS) workflow, to deeply characterize the proteomes of cerebral spinal fluids (CSF) from subjects with Alzheimer's disease (AD).

**Methods:** CSF samples were obtained from AD patients and healthy control subjects, and processed with in-solution digest. A sample specific spectral library was generated by shotgun mass spectrometric acquisition of fractions from the pooled sample. Quantification was performed with DIA-MS using 2hr LC gradients on a Thermo Scientific Q Exactive HF-X mass spectrometer. Data analysis was conducted using Spectronaut software (Biognosys AG).

**Results:** A CSF protein inventory was generated covering 4,390 proteins. Across all samples, 1,924 proteins were identified and quantified in single-shot acquisitions. The pool of quantified proteins comprises well-characterized biomarkers associated with AD and other neurological disorders including BACE1, APP, MAPT (Tau), SNCA, TREM2, YKL-40, and NEUG. Moreover, the depth and breadth of protein quantification cover numerous pathological mechanisms. Differential expression analysis identified 41 proteins that are significantly dysregulated between AD and control groups. We observed several classes of proteins both up/down-regulated in AD samples including apolipoproteins, components of the complement system, regulators of synaptic functions and markers for oxidative stress.

**Conclusion:** Optimized DIA-MS enables simultaneous quantitative characterization of close to 2,000 proteins, covering >90% of developmental markers, from CSF with a workflow that is scalable to 100s of samples.

**Disclosure:** Nothing to disclose

## Cerebrovascular diseases 7

## EPO3020

**Wake up stroke: is its characteristics different from that of stroke with known onset time?**

R. Ojha, R. Karn, B. Gajurel, R. Rajbhandari  
*Neurology Department, Tribhuvan University Teaching Hospital, Kathmandu, Nepal*

**Background and aims:** There is still treatment dilemma in many centers worldwide in the management of Wake up stroke (WUS). Both thrombolysis and mechanical thrombectomy have been recently started for acute stroke management in Nepal and these interventions are found to improve clinical outcome in WUS. Since WUS has not been previously studied in Nepal, we aim to study prevalence and clinical characteristics of WUS.

**Methods:** We prospectively evaluated all the admitted patients of ischemic stroke from 2019 September 1 to 2019 October 30 in Neurology department of Tribhuvan University Teaching Hospital, Kathmandu, Nepal.

**Results:** Among total 60 patients (31 female and 29 male), 15 patients (25%) were of WUS with no significant difference in age ( $66.2 \pm 14.7$  years vs  $61.5 \pm 19.4$  years) and gender variation (male: 53.3% vs 45.9%, and female 46.7% vs 54.1%) from stroke with known onset time (SKOT). 10 patients were young stroke group ( $\leq 45$  years), and all were under SKOT group. 6 patients presented with hypertensive crisis, and were all from SKOT group. Among risk factors, Smoking (66.7%) followed by hypertension (46.7%) was common in WUS, and Hypertension (51.1%) followed by smoking (48.6%) was common in SKOT. Cardioembolism was the most common stroke etiology in both WUS (33.3%) and SKOT (46.6%).

**Conclusion:** In our study, elderly patients are more prone to WUS than younger group. Hypertension and smoking are risk factors of stroke in both WUS and SKOT group, but SKOT group are likely to present with hypertensive crisis.

**Disclosure:** Nothing to disclose

## EPO3021

**Digging into stroke etiologies in young patients: A 20-year perspective**

M. Oses, A. Andrés López, L. Maure, I. Zamarbide, A. Herranz, L. Olivie, I. Navas Vinagre, A. García Torres  
*Neurology, Hospital Universitario Fundación Jiménez Díaz, Madrid, Spain*

**Background and aims:** Ischemic stroke (IS) in young adults has rising incidence in recent years with lifelong consequences and socioeconomic burden. A high proportion of this patients remain of undetermined etiology, limiting access to personalized preventive treatments.

We present a series of young patients with IS, with the aim of describing the clinical and epidemiological characteristics, risk factors, outcomes and etiologies.

**Methods:** Retrospective and descriptive study including all patients between 18 and 50 years with IS from a tertiary hospital in Madrid, Spain, during January 2009 – 2019 period.

**Results:** We identified 194 patients with IS (130 men, 64 women), 31 were 35 years old or less. Hypertension was the most important traditional risk factor (TRF) in the older group (45%) but was scarce like rest of TRF in the younger group (<15%).

MRI was performed in most of the patients (90%) and showed anterior circulation infarction in 51% of them. After extensive work-up, around 30% of IS remained of undetermined etiology. PFO with or without ASA was present in 10% of the patients. In the younger group, up to 50% of the strokes were classified as “other determined etiology”. Some of these unusual causes were: dissection, vasculitis, antiphospholipid syndrome, illicit drugs, pregnancy and puerperium.

**Conclusion:** IS in young adults remains a clinical challenge. The lack of TRF and the implication of unusual etiologies, more evident in the very young (less than 35 years old), reaffirms that further investigation and identification of risk factors in this population group is needed.

**Disclosure:** Nothing to disclose

## EPO3022

**Stroke etiology involvement in the occurrence of post-stroke seizures**

A. Ouerdiene, M. Messelmani, F. Oukhai Chtourou, M. Mansour, R. Mrissa, J. Zaouali  
*Neurology department, Military Hospital of Tunis, Tunis, Tunisia*

**Background and aims:** Nowadays, stroke is considered the leading cause of epilepsy in the elderly, ahead of degenerative diseases, tumors and head trauma. Post-stroke seizures (PSS) are a common complication of stroke constituting a serious morbidity. Many risk factors (RF) have been studied, the involvement of the different etiologies of stroke in the occurrence of epileptic seizures was discussed, but a disparity in different studies was noted.

**Methods:** A retrospective study was performed from 2009 to 2019 including patients who presented PSS after an ischemic stroke. Diagnostic workup consisted of anamnesis, neurologic examination, and radiologic exams. Multiple data have been collected. A complete etiological workup was performed and stroke etiology was determined using TOAST classification.

**Results:** 50 patients were included (36 men, 14 females) with a median age of 60 years, and of 55 years at the onset of PSS. In cardio-embolic stroke, PSS was observed in 18 cases (36%), and it was noted in 17 with atherosclerosis (34%). Other determined etiologies were seen in 6 cases (12%), arterial dissection in 3 cases (6%), and small-vessel disease in only one case. However, 5 cases (10%) remained unexplained with the diagnosis of cryptogenic ischemic stroke.

**Conclusion:** The implication of stroke etiology in the occurrence of PSS was discussed in different studies and results differ suggesting mostly a higher risk in cardio-embolic etiology in some, or in atherosclerosis in others. But more studies need to be performed.

**Disclosure:** Nothing to disclose

## EPO3023

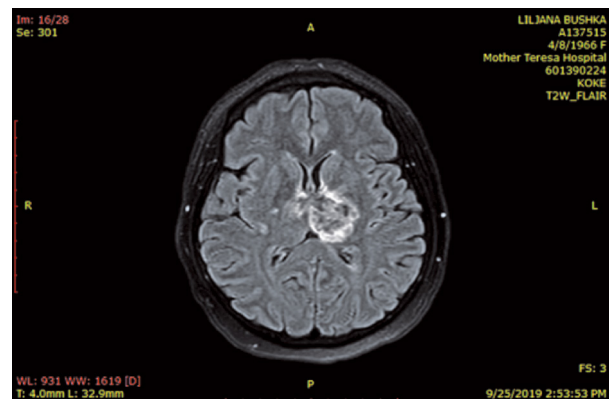
**Bilateral Thalamic Infarct : A presentation of DCVT in basal veins of Rosenthal**

M. Papajani<sup>1</sup>, E. Muharremi<sup>1</sup>, M. Xhelili<sup>2</sup>, F. Pasho<sup>3</sup>, S. Grabova<sup>2</sup>, D. Qirinxhi<sup>3</sup>, A. Rroji<sup>4</sup>, J. Kruja<sup>2</sup>  
<sup>1</sup>Neurology, Mother Teresa University Hospital, Tirane, Albania, Albania, <sup>2</sup>Tirana, Albania, <sup>3</sup>NEUROLOGY, QSUT, Tirana, Albania, <sup>4</sup>Neuro-Radiology, Mother Tereza, Hospital Center, Tirana, Tirana, Albania

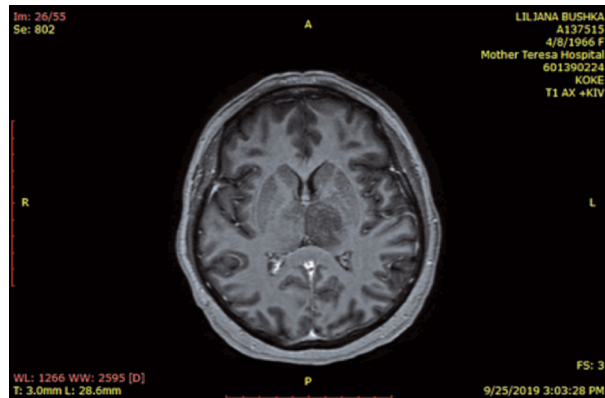
**Background and aims:** Deep Cerebral Vein Thrombosis (DCVT) is a term used for thrombosis of internal cerebral vein, vein of Galen and basal vein of Rosenthal. It is an uncommon cause of stroke. The diagnosis of DCVT is often missed. Hyperhomocysteinemia may be responsible about 40% of cerebrovascular diseases. We present the case of a 53-year-old woman with headache, vertigo, nausea and vomiting, diarrhea and a temperature of 37.5 degree Celsius for the last 2 days. She refers for frequent occipital headache during the last 10 years. MRI two days before was normal. It was initially thought to be meningoencephalitis.

**Methods:** This is a case report with literature review of a patient in our clinic.

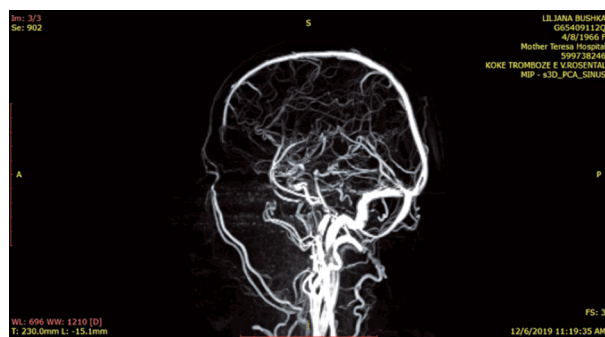
**Results:** The patient made multiple seizures with alteration of consciousness which were confirmed on EEG. MRI with contrast showed bilateral thalamic lesions. There was no visualization of vv. Rosenthal and hemosiderin was present, suggesting venous infarct with hemorrhagic transformation. Hyperhomocysteinemia was detected which is the possible cause of this thrombosis.



T2 -FLAIR: Bilateral thalami and basal ganglia hyperintensity on FLAIR images



T1 + IV contrast: Image showing hypointensity in bilateral thalami and basal ganglia



MPI s3D PCA Sinus

**Conclusion:** In our case just like most cases of deep cerebral venous thrombosis, the thalamus is affected bilaterally. Even though the prognosis in such cases is worse, compared to unilateral lesions, our patient recovered completely. A high index of suspicion is needed for early diagnosis of DCVT. It has favourable outcome, if recognized and treated early. MRI brain should be done early in cases of unexplained altered sensorium. If MRI is suggestive of DCVT, then MRV should be done for confirmation.

**Disclosure:** Nothing to disclose

## EPO3024

### The relationship between immature platelet fraction and TOAST classification in acute ischemic stroke

S. Im<sup>1</sup>, H. Park<sup>1</sup>, H. Jang<sup>2</sup>

<sup>1</sup>Department of Neurology, Wonkwang University School of Medicine, Institute of Wonkwang Medical Science, Iksan, Korea, Republic of, <sup>2</sup>Department of Neurology, Wonkwang University School of Medicine, Gunsan, Korea, Republic of

**Background and aims:** Immature Platelet Fraction (IPF) is the indicator reflecting platelet production and the rate of platelet turnover. The increase of IPF means the increase of platelet activation. IPF is increased in the patient of acute coronary syndrome. It is caused by the elevation of thrombotic ability due to platelet activation. But the role of IPF in the patient of ischemic stroke is still unknown. We investigated the usefulness of IPF as the biomarker in the ischemic stroke.

**Methods:** This was a single-center study recruiting 285 acute ischemic stroke patients who had visited our hospital from March 2018 to March 2019. Whole blood samples were quantified via Sysmex XE-2100 hematology analyzer within 30min of blood sampling. High IPF was defined as more than 3.38%, it was set as above upper level of 95% confidence interval of all enrolled participants.

**Results:** We divided patients with cardiogenic ischemic stroke (CE, 87 patients, 30.5%) and with non-cardiogenic ischemic stroke (non-CE, 198 patients, 69.5%) by diagnostic criteria of TOAST classification. In this study, The mean [95% confidence interval] of IPF was 2.44 [2.17-2.74] in CE group, and 2.00 [1.83-2.17] in non-CE group. High IPF was significantly higher in CE group than that observed in non CE-group (21.8% vs 11.6%,  $p=0.025$ ), but the its difference between 2 groups was not significant after multivariate logistic regression analysis.

**Conclusion:** CE group have a high IPF compared to non-CE group, but we should further demonstrate clinical significance of IPF in ischemic stroke classification.

**Disclosure:** Nothing to disclose



## EPO3025

**New outcome predictors in cerebral venous sinus thrombosis-case series**

N. Popovic<sup>1</sup>, S. Popovic<sup>1</sup>, D. Hajder<sup>2</sup>, J. Milojkovic<sup>3</sup>,  
A. Lučić<sup>4</sup>, D. Vlahovic<sup>1</sup>, Z. Zivanovic<sup>2</sup>

<sup>1</sup>Novi Sad, Serbia, <sup>2</sup>Department of neurology, Clinical Centre of Vojvodina, Novi Sad, Serbia, <sup>3</sup>Emergency Neurology, Emergency Center, Clinical Center of Vojvodina, Novi Sad, Serbia, <sup>4</sup>Clinic of Neurology, Clinical Center of Vojvodina, Novi Sad, Serbia

**Background and aims:** Cerebral venous sinus thrombosis (CVST) is a rare case of stroke, usually affecting young people. During last decades outcome of CVST improved a lot, but predictors of outcome are still being analyzed, such as use of oral contraceptives. Most accepted score is based on findings of large International Study on Cerebral Vein and Dural Sinus Thrombosis (ISCVT), but in recent years some studies analyzed other factors as prognostic inflammatory markers, most of which are derived from full blood count analysis. Aim of this study was to evaluate association between outcome in patients with CVST and certain blood parameters.

**Methods:** We analyzed case series of patients with CVST admitted to Clinic of Neurology, of Clinical Centre of Vojvodina in Novi Sad, during the last 2 years. Admission values of platelet to lymphocyte ratio (PLR), neutrophil to lymphocyte ratio (NLR), lymphocyte to monocyte ratio (LMR), and ICSVT score were calculated in 2 groups of patients based on modified Rankin Score (<3) three months after discharge.

**Results:** During 2 year period, 7 patients were admitted, 4 women, average age was 46 years. Only patient with unfavorable outcome that was admitted died during hospitalization. Patient with poor outcome had higher ISVCT Score (4 vs 1). LMR was lower in the poor outcome patient (4.07 vs 1.05), while PLR (132,3 vs 170) and NLR (4,72 vs 11) were higher.

**Conclusion:** Although underpowered, our analysis shows that simple full blood count subanalysis may be a useful prognostic marker in CVST

**Disclosure:** Nothing to disclose

## EPO3026

**Posthypoxic encephalopathy in patients after coronary artery bypass grafting: clinical and neuroimaging features**

O. Portik<sup>1</sup>, Y. Tsarevskaya<sup>1</sup>, T. Alekseeva<sup>2</sup>, A. Efimtsev<sup>3</sup>,  
G. Trufanov<sup>4</sup>

<sup>1</sup>V.A. Almazov National Medical Research Center, Ministry of Health of Russia, Saint-Petersburg, Russian Federation, <sup>2</sup>Almazov National Medical Research Centre, Saint Petersburg, Russian Federation, <sup>3</sup>MRI-center, Almazov National Medical Research Centre, Saint-Petersburg, Russian Federation, <sup>4</sup>Radiology, Almazov National Medical Research Centre, Saint Petersburg, Russian Federation

**Background and aims:** Posthypoxic encephalopathy is a frequent complication after coronary artery bypass grafting (CABG), including stroke, delirium of the early postoperative period, postoperative cognitive dysfunction (POCD). Its more pronounced prevalence and severity during the operation with the cardiopulmonary bypass (CPB) still deserves discussion.

Purpose. To analyze the characteristics of various types of cerebral dysfunction in patients undergoing CABG.

**Methods:** Patients and methods. The study included 108 patients who received CABG for coronary heart disease in a planned manner. Group 1 included 28 patients operated on a beating heart. 80 patients were operated with CPB: 51 of them formed group 2, and 29 patients who also were given peptide methionyl-glutamyl-histidyl-phenylalanyl-prolyl-glycyl-proline for neuroprotection formed group 3. Neuropsychological testing and MRI of the brain in structural and functional techniques were carried out.

**Results:** Posthypoxic encephalopathy was diagnosed in 7% (group 1), 63% (group 2) and 27% (group 3) patients.

In group 1 functional MRI (fMRI) detected changing in functional connection of postcentral gyrus, right sensorimotor gyrus, amygdala and right intracalcarine cortex ( $p < 0,05$ ). In group 2 fMRI revealed changing in functional connection of the medial prefrontal cortex with the posterior cingulate gyrus, temporal gyrus, insula, cerebellum. In group 3 MRI noted changing in posterior cingulate gyrus, frontal orbital cortex, amygdala.

**Conclusion:** In patients operated with CPB, cerebral complications are diverse and highly frequent. Performing MRI scans allows to identify morpho-functional changes in the brain. methionyl-glutamyl-histidyl-phenylalanyl-prolyl-glycyl-proline can be used as effective pharmacological neuroprotection strategy.

**Disclosure:** Nothing to disclose

## EPO3027

**Short-Term Effects of Transcranial Direct-Current Stimulation on Naming in Subacute Stroke Patients with Aphasia**

D. Prtina

*Banja Luka, Bosnia and Herzegovina*

**Introduction:** Aphasia after stroke is a frustrating language disorder for which specialized speech and language therapy is the most efficient treatment. Various naming errors can be found in a stroke patient. We wanted to examine: Can tDCS improve effects of speech language therapy in a short post-stroke period.

**Methods:** 15 aphatic patients with subacute stroke, underwent anodal tDCS (A-tDCS, 15min, 1.5mA) over the left perilesional dorsolateral prefrontal cortex and standard speech and language therapy. Stimulation was done with the Soterix Medical 1 x 1 device, clinical standard in the field of non-invasive neuromodulation. 15 consecutive sessions (5 days per week for 3 weeks) were implemented. Logopedic evaluation was performed with Naming sub tests of Boston Diagnostic Aphasia Examination (BDAE) before and after application of tDCS.

**Results:** The mean age of patients was 62.20 ( $\pm 8.52$ ), 66.66% were male. Treatment began an average of 37.86 days after stroke. Ischemic stroke was present in 14 patients, hemorrhagic in 1 patient. 11 patients had sensorimotor aphasia (global), 4 patients had motor (Broca's) aphasia. The average success on Naming sub tests before and after tDCS was: Responsive 25.76-44.43%; Confrontation 30.6-43.73%; Body-part 27.25-28.17%; Animal 19.22-29.61%. The correlation between the initial and final estimates on Naming sub test is very high, the average for the measured parameters is  $r=0.897$

**Conclusion:** We found a significant beneficial effect of A-tDCS in all our aphatic patients, although with some inter-individual differences.

**Disclosure:** Nothing to disclose

## EPO3028

**Complications of mannitol therapy in patients with acute stroke - A prospective observational study**

P. Pulu, S. Rackimuthu

*Neurology, Father Muller Medical College, Mangalore, India*

**Background and aims:** Mannitol is one of the frequently used drug to treat cerebral edema resulting from ischemic and hemorrhagic strokes. Mannitol administration is associated with complications such as acute kidney injury and electrolyte imbalance.

**Methods:** We did a prospective longitudinal observational study of patients with acute stroke who received mannitol. Study was conducted in Father Muller Medical college from January 2019 till September 2019 after taking Institutional ethics committee clearance. After taking informed consent, nature of the stroke, presence of comorbidities and dosage of mannitol given was recorded. Serum electrolytes, Serum urea and creatinine were recorded at admission and in first week.

**Results:** Total of 72 patients were included in the study. Mean age was 57.7 $\pm$ 14.6 years and Male:female ratio was 2.3:1. Ischemic stroke was seen in 42% patients and hemorrhagic stroke was seen in 58% patients. Patients received mannitol at the dose of 1-1.5gm/kg/day. Cumulative dose of mannitol was 180g $\pm$ 177.3 grams. Serum sodium levels were significantly lower during 1st week compared to admission where as serum potassium and chloride levels were not significantly changed during therapy. There was statistically significant elevation in serum urea levels from admission to 1st week where as creatinine levels were not significantly altered. Total cumulative dose was compared to serum electrolyte levels and urea and creatinine at admission and first week and no significant changes were found

**Conclusion:** Low dose mannitol therapy doesnot produce significant electrolyte or renal function abnormality in patients with acute stroke.

**Disclosure:** Nothing to disclose

## EPO3029

### ACCURACY OF INTRACEREBRAL HEMORRHAGE VOLUME CALCULATION: COMPARISON BETWEEN A FULLY AUTOMATIC COMPUTERISED METHOD, ABC/2 and sABC/2

L. Purcaru<sup>1</sup>, R.A. Radu<sup>1</sup>, E. Terecoasa<sup>1</sup>, C. Tiu<sup>1</sup>, A.V. Marinescu<sup>2</sup>

<sup>1</sup>Bucharest, Romania, <sup>2</sup>Department of Radiology and Medical Imaging, University Emergency Hospital Bucharest, Bucharest, Romania

**Background and aims:** Rigorous estimation of the intracerebral blood volume in patients with intracerebral hemorrhage (ICH) is of major importance since it guides important treatment decisions. We aimed to determine the accuracy of the ABC/2 and sABC/2 methods relative to a fully automatic computerised method (FACM) for measuring ICH volumes.

**Methods:** Neuroimaging data were prospectively collected for 73 patients with ICH. Agreement between FACM, ABC/2 and sABC/2 methods was evaluated using the Bland-Altman plots. FACM was considered the reference method.

**Results:** Median ICH volumes and 25-75IQR assessed with the FACM, ABC/2 and sABC/2 were 8.6mL (3.1–24.5), 6.2mL (2.2–17.8) and respectively 9.5mL (3.5–30.1). ABC/2 method systematically underestimated FACM with a mean difference of – 14.9mL (95% CI -6.3-2.08). Conversely, sABC/2 systematically overestimated FACM with a mean difference of 8.4mL (95% CI 3.74-13.1). Since we observed an increase in variability of the ICH volume differences assessed with the 3 methods as the ICH volumes increased, we created second Bland – Altman plots using the geometric means which showed an ABC/2 to FACM ratio of 0.7 and a sABC/2 to MVS ratio of 1.19.

**Conclusion:** Absolute haematoma volumes might vary depending on the technique used. Further work is needed to identify the most suitable methods for ICH volume measurement and to estimate their clinical impact.

**Disclosure:** Nothing to disclose

## EPO3030

### Exploring the prognostic value of left atrial volume index in cardioembolic acute ischemic stroke

A. Rachão, E. Silva, M. Rodrigues, L. Pereira  
*Neurology, Hospital Garcia de Orta, Almada, Portugal*

**Background and aims:** Left atrial volume index (LAVI) has shown to have prognostic implications in multiple cardiologic pathologies and recent studies proposed LAVI to be related with increased mortality in acute ischemic stroke (AIS). Our aim was to retrospectively evaluate the relationship between LAVI and cardioembolic AIS clinical characteristics and prognostic outcomes.

**Methods:** Demographics, comorbidity profile and stroke clinical characteristics and prognostic outcomes of patients with cardioembolic stroke due to atrial fibrillation admitted to a stroke unit of a tertiary hospital were analysed with SPSS®.

**Results:** In 131 patients, with a median age of 80 years and a majority of female (61.1%), hypertensive (86.3%), neither diabetic (74.8%) nor obese (70.4%) individuals, the mean LAVI was 42.85mL/m<sup>2</sup> and 89.4% had abnormal LAVI values (>28mL/m<sup>2</sup>). Patients with higher C-reactive protein levels at admission ( $r=0.227$ ;  $p=0.018$ ) and total anterior circulation infarcts (TACI) (71.16 vs. 53.38mL/m<sup>2</sup>;  $p=0.009$ ) had increased LAVI. Significantly higher LAVI values were found in patients who died during hospital stay (90.27 vs. 63.78mL/m<sup>2</sup>;  $p=0.018$ ), even after adjustment for confounding variables, and the ones discharged with higher Rankin scores (67.69 [3-6] vs. 52.14 [0-2] mL/m<sup>2</sup>;  $p=0.014$ ;  $r=0.311$ ;  $p<0.001$ ), though this association was dependent on the presence of TACI. No significant relationship was found between LAVI and the remaining analysed parameters, namely long-term mortality and Rankin score at 6-month follow-up.

**Conclusion:** LAVI seems to have a possible in-hospital prognostic role, with an independent association with greater mortality. Bigger cohort and prospective studies should be pursued to clarify this association.

**Disclosure:** Nothing to disclose

## EPO3031

### The impact of thyroid function in the clinical features and prognostic outcome of acute ischemic stroke

A. Rachão, T. Geraldes, M.D. Grunho  
*Neurology, Hospital Garcia de Orta, Almada, Portugal*

**Background and aims:** There is a bidirectional association between thyroid metabolism and stroke. Thyroid dysregulation following acute ischemic stroke (AIS) has been associated with greater stroke severity, higher mortality rates and a poorer long-term functional outcome. Our aim was to retrospectively evaluate the relationship between changes in thyroid function and clinical and prognostic outcomes of AIS.

**Methods:** Out of 1172 AIS patients, 96 (8,2%) had acute thyroid changes (TC) after stroke and were paired by gender with patients without thyroid changes (WTC). A statistical analysis was carried out considering demographic data, comorbidity profile, and clinical and prognostic stroke outcomes.

**Results:** The TC group registered a higher frequency of use of reperfusion therapy (38.5 vs. 24%; OR=1.99; 95%IC: 1.067-3.712), even after adjustment for confounding variables, higher average NIHSS score at admission (7.5 vs. 5; p=0.042) and higher mortality rates (6.3 vs. 0%; p=0.029). Cardioembolic strokes (34.4 vs. 17.7%; OR=2.434; 95%IC: 1.243-4.768) and total anterior circulation infarcts (37.2 vs. 21.1%; OR=2.225; 95%IC: 1.165-4.247) were more prevalent in this group. In the WTC group, there was a higher prevalence of small vessel disease (25.0 vs. 12.5%; OR=0.429; 95%IC: 0.200-0.917). There were no significant differences in NIHSS and Rankin scores at the time of hospital discharge and at six months, duration of hospital stay, stroke recurrence, and TOAST and OCSF classification.

**Conclusion:** Though retrospective, this study showed a link between TC following AIS and stroke severity and mortality. Nevertheless, this connection is complex and multiple factors intervene. Studies with larger cohorts should aim to clarify it.

**Disclosure:** Nothing to disclose

## EPO3032

### Atrial Fibrillation and Ischemic Stroke, Predicting Outcome

D. Racic, V. Djajic, S. Miljkovic  
*Banja Luka, Bosnia and Herzegovina*

**Background and aims:** Patients with atrial fibrillation (AF) are at increased risk of stroke, usually associated with poorer outcomes.

**Methods:** We present a cohort of patients with acute ischemic stroke admitted to Stroke Center, Department of Neurology, University Clinical Center of Republic of Srpska in Banja Luka in 2018. year. The main outcomes considered were mortality, NIHSS and modified Rankin score at admission and at discharge.

**Results:** Among 305 patients with acute ischemic stroke, 106 (34.8%) had AF. Overall, AF patients had higher risk of death at 30 days (43.3% versus 17.6%), higher NIHSS at admission (13.8 versus 11.5) and at discharge (7.8 versus 4.9), higher modified Rankin score at admission (4.4 versus 3.8) and at discharge (4.3 versus 3.2), compared with non-AF patients.

**Conclusion:** AF is highly prevalent among stroke patients and is one of the top risk factors associated with poor functional outcome. Stroke patients with AF have higher mortality compared with non-AF patients.

**Disclosure:** Nothing to disclose

## EPO3033

**Strokes in the young: a rising concern**

S. Rafee<sup>1</sup>, A. Lockhart<sup>1</sup>, R. O'connor<sup>2</sup>, J. Kennedy<sup>1</sup>,  
C. McGuigan<sup>1</sup>

<sup>1</sup>Neurology, St Vincent's Hospital, Dublin, Ireland,

<sup>2</sup>Neurology, St Vincents University Hospital, Dublin, Ireland

**Background and aims:** Trends have emerged internationally showing incidence of "young strokes" (stroke affecting people under the age of 45 years) is escalating. They have mechanisms of stroke when compared to older patients. Despite improvement in stroke care, it remains a leading cause of mortality and morbidity.

We aimed to analyse all acute stroke presentations under the age of 45 years over 12 months and to identify the mechanism.

**Methods:** A retrospective chart review was undertaken on all patients under the age of 45 years presenting with ischaemic stroke from January 1st 2010 to September 30th 2019 in a tertiary referral centre. Details regarding presentation, vascular territory, management, and aetiology were analysed. TOAST criteria was used to assign stroke mechanism

**Results:** A total 3420 patients presented with acute strokes over the 10 year period. One hundred and seventeen patients were enrolled. 74% were ischaemic strokes. The majority were cryptogenic (26%). "Other determined aetiology" accounted for 21%, 11% were secondary to small vessel disease, cardioembolic (11%), and 4% were from large vessel atherosclerosis. 6 patients were thrombolysed, and 2 underwent thrombectomy. The "other determined aetiology" was made up of carotid and vertebral artery dissection, hypercoagulability, antiphospholipid syndrome, vasculitis, and substance abuse. No patients had iatrogenic causes for stroke.

**Conclusion:** The mechanism of stroke in the young differs significantly. This population requires more extensive testing, and a meticulous search for risk factors and underlying pathologies. Further investigations into cryptogenic strokes can improve the long term outcome and decrease the burden of strokes on the healthcare system.

**Disclosure:** Nothing to disclose

## EPO3034

**How Does Hyperlipidaemia Influence Functional Outcome in Patients with Ischemic Stroke, Treated with Intravenous Thrombolysis?**

S. Rajić<sup>1</sup>, Z. Zivanovic<sup>1</sup>, D. Vlahovic<sup>1</sup>, A. Lučić Prokin<sup>2</sup>,  
T. Vujančić Stankov<sup>2</sup>, M. Jovicevic<sup>1</sup>

<sup>1</sup>Novi Sad, Serbia, <sup>2</sup>Clinical Center of Vojvodina, Novi Sad, Serbia

**Background:** The relationship between hyperlipidaemia and ischemic stroke is complex. There are number of trials that found no link between dyslipidaemia and ischemic stroke. On the other hand, epidemiological studies find modest relationship between high low-density lipoprotein (LDL) cholesterol level and the risk of ischemic stroke, while low LDL-cholesterol levels increase the risk of intracranial haemorrhage.

**Aim:** We aimed to evaluate the influence of hyperlipidaemia on 3-month functional outcome after ischemic stroke, treated with intravenous thrombolysis.

**Methods:** This retrospective cohort study included patients treated with intravenous thrombolysis for acute ischemic stroke in 10-year period. Lipid disorders were classified according to the Fredrickson classification. Primary outcome was defined as functional independence (modified Rankin score 0-2).

**Results:** Laboratory data on dyslipidaemia were available in 360 patients that received intravenous thrombolysis. Functional independence was achieved in 54.9% of cases. All types of hyperlipidaemia were significantly positively associated to favourable outcome. Patients with hyperlipidaemia type IIa had favourable outcome in 66.7%, those with type IIb in 57.6%, while those with type IV had favourable outcome in 75.8%. Patients with normal lipid levels were less likely to achieve favourable functional outcome.

**Conclusion:** We observed a protective effect of elevated lipid levels in patients treated with alteplase, leading to better 3-month functional outcome. This fact can be attributed to antioxidative effect of cholesterol and its neuroprotective effect, but also the use of statins, which were given to all patients with dyslipidaemia as a part of secondary prevention.

**Disclosure:** Nothing to disclose

## EPO3035

### Establishment of an Organotypic Culture System of Cortico-striatal Brain Slices to Investigate Cerebral Hypoxia ex vivo

J. Remlinger<sup>1</sup>, K. Guse<sup>2</sup>, P. Meyer<sup>3</sup>, D. Grandgirard<sup>3</sup>, A. Salmen<sup>2</sup>, S.L. Leib<sup>3</sup>, H.R. Widmer<sup>4</sup>, A. Chan<sup>2</sup>

<sup>1</sup>University of Bern, Dept. of Neurology, Inselspital, Bern University Hospital and Dept. for BioMedical Research (DBMR) and Graduate School for Cellular and Biomedical Sciences, Berne, Switzerland, <sup>2</sup>University of Bern, Dept. of Neurology, Inselspital, Bern University Hospital and Dept. for BioMedical Research (DBMR), Berne, Switzerland,

<sup>3</sup>University of Bern, Neuroinfection Laboratory, Institute for Infectious Diseases, Berne, Switzerland, <sup>4</sup>University of Bern, Dept. of Neurosurgery, Neurocenter and Regenerative Neuroscience Cluster, Inselspital, Bern University Hospital, Berne, Switzerland

**Background and aims:** Unlike primary single cell cultures, organotypic brain slice cultures (OSC) conserve all major cell types in a three-dimensional tissue architecture allowing a profound study of morphological and (patho-) physiological changes. Importantly to note, only few OSC systems comprising the striatum as the primary affected structure in experimental ischemic stroke have been developed.

**Methods:** Cortico-striatal slices of neonatal mice were cultivated for 8 days in vitro (div). Cell viability was assessed by a lactate dehydrogenase (LDH) assay and by histological examination of cell morphology and tissue architecture. Furthermore, OSC were exposed to different concentrations of Triton X-100 and hypoxic-hypoglycemic conditions provoked by oxygen and glucose deprivation (OGD) on div 7.

**Results:** Histological fluorescence and Nissl staining revealed a better OSC viability when maintained in serum-free compared to serum-containing culture medium. Cell death peaked at div 1 and remained low thereafter until the end of cultivation period (<10%). A gradual increase of cell death in the OSC was induced by treatment with increasing concentrations of Triton (0.01%, 0.1%, 1%) for 24h or exposition to OGD for 25min, 90min and 5h with 24h reperfusion.

**Conclusion:** We provide an ex vivo OSC system of cortico-striatal structures that remains viable over 8 days in culture with inducible gradual cell death. Modulation of cell death by OGD in this OSC system represents a promising tool to study the effects of hypoxic-hypoglycemic conditions, complex interactions and novel treatment approaches.

**Disclosure:** Nothing to disclose

## EPO3036

### Effect of therapy on Stroke Mortality and Prognosis in a cohort of 121 patients with Atrial Fibrillation

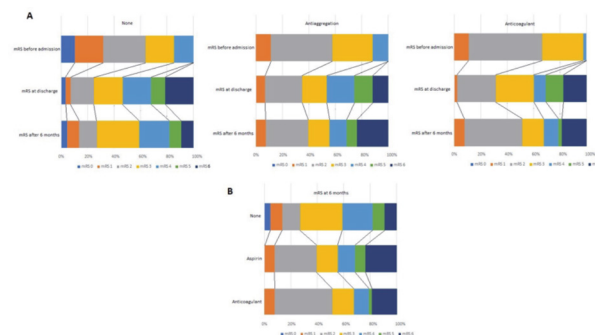
N. Rifino<sup>1</sup>, C. Scaccabarozzi<sup>2</sup>, V. Mantero<sup>2</sup>, A. Aliprandi<sup>2</sup>, D. Sangalli<sup>2</sup>, G. Costantino<sup>2</sup>, M.G. Filizzolo<sup>3</sup>, C. Ferrarese<sup>1</sup>, A. Salmaggi<sup>2</sup>

<sup>1</sup>Department of Neurology, University of Milano-Bicocca, Monza, Italy, <sup>2</sup>Department of Neurology, Lecco Hospital, Lecco, Italy, <sup>3</sup>Lecco Hospital, Lecco, Italy

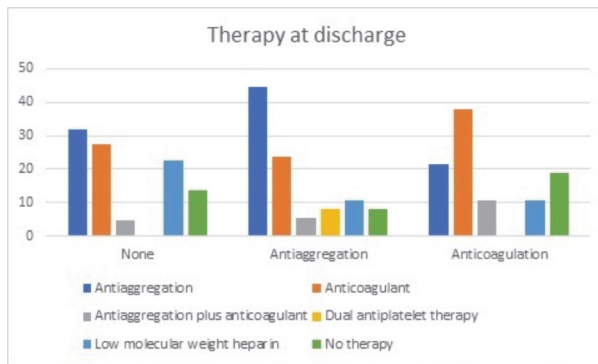
**Background and aims:** The incidence of stroke in patients with atrial fibrillation (AF) is greatly reduced by oral anticoagulation (OA). However, some patients are not treated with OA because of high bleeding risk. The effect of pre- and post-hospitalization treatment on the severity and prognosis of AF-related stroke is not clear.

**Methods:** Retrospective study including 121 patients with AF (known or unknown) admitted for ischaemic stroke between 2012 and 2013. We divided our population into 3 groups, depending on their treatment prior to admission (None-N; Antiaggregation-AGG; Anticoagulation-AC). We calculated their modified-Rankin scale (mRS) before admission and at discharge. Then, we considered subgroups distinguished by therapies at discharge and we calculated mRS at 6 months.

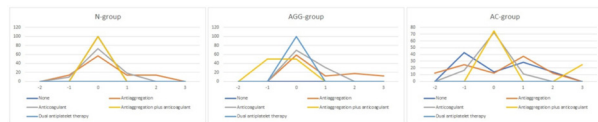
**Results:** Patients not treated or on anticoagulation prior to admission had a higher mortality-rate compared to those on antiplatelet therapy (N-21.4%; AGG-12%; AC-17.8%) (Fig.1a); however, patients in the N-group had a more severe stroke (mean-NIHSS: N-11.9; AGG-11.3; AC-9.7; median-NIHSS: N-12.5; AGG-9.5; AC-5). Mortality-rate at 6 months was greater in the AGG- and AC-groups (N-9%; AGG-23.7%; AC-18.9%) (fig.1b). Fig.2 shows the rate of patients according to their therapies at discharge for each group. The rate of patients with a worse mRS after 6 months was greater in the AGG- and AC-group compared to the N-group (N-19%; AGG-31%; AC-27%). No significant differences in mRS at 6 months were detected between patients according to their treatment at discharge(Fig.3).



A. Shift analysis of the mRS score before admission, at discharge and after 6 months for each group (Not treated, Antiaggregation and Anticoagulation). B. Shift analysis that compares the mRS score after 6 months for each group



Rates according to the therapies at discharge for each group



Difference between mRS at discharge and after 6 months for each group distinguishing patients according to their therapies at discharge

**Conclusion:** Our findings suggest that patients with AF receiving anticoagulant or antiplatelet therapy before stroke have a worse prognosis and a higher mortality during hospitalization and at 6 months compared with those not treated. Therapy at discharge did not affect functional status at 6 months.

**Disclosure:** Nothing to disclose

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## EPO3037

**Do patients over 80 years old benefit from reperfusion therapy in an acute stroke?**

J.C. Romero Fábrega, J.M. Barrios López, C. Muñoz Martínez, I. Rego Garcia, J.A. Medina Gamez, S. Blanco Madera, A. López Ferreiro, I. Pérez Ortega, M.D. Fernández Pérez  
*Neurología, Hospital Universitario Virgen de las Nieves, Granada, Spain*

**Background and aims:** Patients older than 80 have limited representation in the reported studies. This implies little evidence on the benefit of treatments in this age group. Our objective is to assess whether reperfusion treatments in stroke are safe and effective in this group of patients in our center.

**Methods:** In a retrospective series of 202 patients treated in an acute stroke, we carry out a comparative analysis between the groups over 80 years old and those under 80, mainly according with the functional outcome (modified Rankin scale after 3 months) and safety (symptomatic hemorrhages and mortality).

**Results:** 59 patients (29.2%) were over 80 years old. The previous Rankin and the NIHSS were significantly higher in the older patients; there were no significant differences in the previous ASPECTS or in the door-to-needle time in fibrinolysis between the groups. The percentage of Rankin less than or equal to 2 in the group <80 was 58.3% and 27.1% in the group >80; there were no significant differences in the number of symptomatic hemorrhages between both groups; mortality at 3 months was 35.6% in >80 and 10.1% in <80.

**Conclusion:** In our study, the efficacy and safety results are worse in the age group >80 compared to the younger group. The groups also differ in previous functional situation and in the severity of the stroke. We believe it is necessary to improve the treatment selection criteria in >80.

**Disclosure:** Nothing to disclose

## EPO3038

**SuPAR level's correlation with degree of disability, death and other inflammatory factors in patients with ischemic stroke.**

D. Różański<sup>1</sup>, K. Saramak<sup>2</sup>, S. Szlufik<sup>1</sup>, D. Koziorowski<sup>1</sup>, L. Milanowski<sup>1</sup>, R. Tomasiuk<sup>3</sup>, A. Friedman<sup>1</sup>  
<sup>1</sup>*Department of Neurology, Faculty of Health Science, Medical University of Warsaw, Warsaw, Poland,* <sup>2</sup>*Students Scientific Group by the Department of Neurology, Medical University of Warsaw, Warsaw, Poland,* <sup>3</sup>*Department of Laboratory Diagnostics, Mazovia Brodno Hospital, Warsaw, Poland*

**Background and aims:** Soluble urokinase plasminogen activator receptor (suPAR) seems to be inflammatory biomarker elevated in cardiovascular disease, including stroke. The aim of this 3-year follow up prospective study was to evaluate suPAR levels in patients with a 1st ischemic stroke in correlation with inflammatory markers (CRP, PCT, NT-proCNP), marker of endothelial damage (endothelin 1-21, NT-proCNP) and to investigate the impact of suPAR and other markers on prognosis and death.

**Methods:** Fifty patients (mean age 73.7±11.9 years, 26F and 24M) with a 1st ischemic stroke were included in this study. Blood samples were collected on the first (suPAR1), third (suPAR2) and seventh day after stroke onset (suPAR3). Blood samples were analysed for suPAR, CRP, PCT, endothelin and NT-proCNP serum levels using enzyme-linked immunoabsorbent assay ELISA. The phone interview was conducted to collect follow-up information after 24 and 36 months (Rankin and Barthel scales).

**Results:** The positive correlation between suPAR levels and other inflammatory biomarkers (except endothelin 3) was observed. The negative correlation between suPAR1 and Rankin scale at 36 month was observed ( $r=-0.406$ ,  $p=0.003$ ). Logistic regression model revealed no significant effect of suPAR on death occurrence in first 24 months (suPAR1 ( $p=0.203$ ), suPAR2 ( $p=0.0953$ ), suPAR3 ( $p=0.236$ )). Non-significant effect was observed for dynamic of suPAR on death difference between suPAR1 and suPAR2 ( $p=0.0865$ ) and between suPAR1 and suPAR3 ( $p=0.20$ ).

**Conclusion:** suPAR level can be new potential inflammatory marker in ischemic stroke. There is no major impact on death, however suPAR level may be associated with the degree of disability or dependence in daily activities after stroke.

**Disclosure:** Nothing to disclose



## EPO3039

**Predicting outcome in intracerebral hemorrhage by transcranial duplex sonography**

G. Ruiz-Ares, M. Ramírez-Torres, J. Rodríguez-Pardo, M. Alonso de Leciana, R. Gutiérrez-Zúñiga, B. Fuentes, E. Díez-Tejedor

*Neurology, Hospital Universitario La Paz, Madrid, Spain*

**Background and aims:** Intracerebral hemorrhage (ICH) volume on admission and severity measured by NIHSS are the main prognostic factors in ICH. Transcranial duplex sonography (TDS) showed good correlation with CT scan measuring bleeding extent in acute phase. Our aim was to evaluate TDS in monitoring ICH and its relation with prognosis.

**Methods:** Prospective study of patients with supratentorial ICH evaluated within 24 hours of onset. All patients underwent CT scan and TDS exam on admission, 48 hours and at 7 days. Hematoma volume was determined using the formula  $(\text{longitudinal} \times \text{sagittal} \times \text{coronal})/2$ , Midline shift (MLS) was calculated according to the formula:  $\text{MLS}=(A-B)$ , in both techniques. Association of ICH volume and MLS measured by TDS with outcome at 3 month by modified Rankin Scale was evaluated.

**Results:** 45 patients were included. ICH was not measured by TDS in 12 cases due to the lack of transtemporal window. Mean age was 66.3 year-old and 23 (51.1%) were male. A significant correlation with CT between determinations was found for mean ICH volume ( $r=0.791$ ,  $p<0.001$  on admission;  $r=0.708$ ,  $p<0.001$  at 48hs;  $r=0.672$ ,  $p<0.001$  at 7 days) and MLS ( $r=0.548$ ,  $p=0.003$  on admission;  $r=0.696$ ,  $p<0.001$  at 48hs;  $r=0.760$ ,  $p<0.001$  at 7 days) measured with TDS. ICH volume measured by TDS was related with dependency at 3 months ( $p=0.045$ ). MLS measured with TDS was associated with mortality at 3 months.

**Conclusion:** Hemorrhage volume and Midline shift measured by TDS are a useful tool for monitoring ICH at bedside and for predicting outcome.

**Disclosure:** Nothing to disclose

## EPO3040

**Idarucizumab for Dabigatran reversal in patients with acute ischemic stroke receiving intravenous thrombolysis: Our experience**

R. Sainz Amo, S. García Madrona, B. Baena Álvarez, A. Celdrán de Castro García, J. Gómez Corral, P. Pérez Torre, C. Matute Lozano, A. De Felipe Mimbrea, A. Cruz, R. Vera, J. Masjuan  
*Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain*

**Background and aims:** The use of direct oral anticoagulants 48 hours prior to acute ischemic stroke is a contraindication for intravenous thrombolysis (IVT) in the current guidelines. Idarucizumab is a humanized monoclonal antibody who can quickly reverse the anticoagulant effects of the thrombin inhibitor Dabigatran. Experience with Dabigatran reversal previous to IVT is limited. We present our clinical experience with three new cases of IVT after reversal Dabigatran effect with Idarucizumab.

**Methods:** We performed an observational, retrospective study of patients treated with IVT after Dabigatran reversal with Idarucizumab from January 2018 to December 2019 at our comprehensive stroke centre. Clinical, radiological and prognostic variables, including hemorrhagic complications, were collected.

**Results:** 2 women and 1 man of 78, 82 and 55 years with atrial fibrillation treated with Dabigatran 150mg (2 patients) and Dabigatran 110mg (1 patient) with an acute ischemic stroke (NIHSS 7, 16 and 8 respectively) were included. Activated partial thromboplastin time (aPTT) was abnormal in all cases. AngioCT revealed a distal occlusion not accessible by mechanical thrombectomy. IVT was initiated 10 minutes after the infusion of Idarucizumab 5mg, with a door-to-needle time of 95, 115 and 136 minutes. No thrombotic, systemic hemorrhage or symptomatic intracranial hemorrhage events were detected. At discharge, NIHSS were 0, 7 and 2. All patients were independent (Rankin modified score at 3 months was 0, 2 and 1).

**Conclusion:** In our experience, Dabigatran reversal with Idarucizumab is safe and may improve the prognosis of this patients. Specific protocols are needed to improve the door-to-needle time.

**Disclosure:** Nothing to disclose

## EPO3041

**Ramadan fasting and intracerebral hematoma: Incidence and outcomes**S. Salama<sup>1</sup>, K. Eltukhy<sup>2</sup>, H. Egila<sup>3</sup><sup>1</sup>Mansoura, Egypt, <sup>2</sup>Neurology, Mansoura University Hospital, Mansoura, Egypt, <sup>3</sup>Department of Neurology, Faculty of Medicine, Mansoura University, Egypt, Mansoura, Egypt

**Background and aims:** Fasting over a prescribed period of time is a common religious tradition practiced by several prominent faiths in the world. It is also currently regaining interest as a medical practice, both as preventive and as therapy and/or simple choice of lifestyle. For the 1st time, we evaluate the effect of Ramadan fasting on incidence of intracerebral hematoma and its outcomes.

**Methods:** 69 patients enrolled in this study, 18 patients were fasting in Ramadan, 14 patients were not fasting and 37 patients 1 month later which isn't a recommended fasting month among Muslims. The in-hospital clinical course and mortality rate of these patients were recorded. They were assessed using routine lab, CT brain, National Institutes of Health Stroke Scale (NIHSS) score and Modified Rankin Scale (mRS) score.

**Results:** About 22% of fasting patients (8 patients) with intracerebral hematoma died, 28.6% non-fasting patients died (8 patients) and 20.5% of patients died in the month after Ramadan (16 patients) with no significant difference between the 3 groups ( $p > 0.05$ ). Also as regard NIHSS, hematoma expansion and mRS, there were no significant difference between the 3 groups ( $p > 0.05$ ).

**Conclusion:** Ramadan fasting showed neither protective effect nor worsening as regard incidence or bad impact on patients with spontaneous intracerebral hemorrhage.

**Disclosure:** Nothing to disclose

## EPO3042

**Atrial Fibrillation and Stroke or Stroke and Atrial Fibrillation?**

M. Santana

Lisbon, Portugal

**Background and aims:** There is some controversy regarding if atrial fibrillation (AF) discovered after stroke was the cause of stroke and therefore preexisting (cardiogenic) or if it can be a stroke consequence (neurogenic). These 2 entities may differ in subsequent stroke risk. We aimed to study if patients diagnosed with AF after stroke had previous heart rhythm changes that could be associated to a higher risk of developing AF supporting the cardiogenic hypothesis.

**Methods:** We performed a case-control study and included patients admitted to a stroke unit from 2009 to 2019, with the diagnosis of ischemic stroke. In order to be included patients had to have a 24h ECG Holter monitoring performed before stroke occurrence. We excluded patients with previous diagnosis of AF. Our cases were patients that developed atrial fibrillation on the 1st 5 days after stroke. Controls were patients that maintained sinus rhythm. We collected data regarding sex, age, medication, personal history, stroke territory and time before stroke of the 24h ECG Holter recording. We compared the two groups regarding time (HR, PNN50, RMSSD, VarIndex, SDANN) and frequency (total power, VLF, LF, HF, LF/HF) domains of the ECG Holters.

**Results:** We included 9 cases and 11 controls. Cases were older than controls. There weren't other statistical differences between the 2 groups namely regarding time or frequency domains of the ECG Holters.

**Conclusion:** The absence of previous changes in the ECG Holters of patients that developed AF in the first days after the stroke supports the neurogenic hypothesis.

**Disclosure:** Education for Science by GAPIC

## EPO3043

**Diplopia – an atypical cause in an atypical location**

M. Sequeira<sup>1</sup>, M. Brum<sup>1</sup>, G. Gama Lobo<sup>2</sup>, R. Carranca<sup>2</sup>, C. Ribeiro<sup>2</sup>, M. Manita<sup>1</sup>, R. Relvas<sup>1</sup>

<sup>1</sup>Neurology, Centro Hospitalar Universitário de Lisboa Central, Lisbon, Portugal, <sup>2</sup>Neuroradiology, Centro Hospitalar Universitário de Lisboa Central, Lisbon, Portugal

**Background and aims:** Diplopia has an extensive differential diagnosis, however posterior reversible encephalopathy syndrome (PRES) doesn't come to mind in first place. PRES is a clinical and radiological diagnosis, usually presenting with headache, seizures, vision disturbances and encephalopathy. Brain magnetic resonance (MRI) shows vasogenic oedema predominantly involving the bilateral parieto-occipital regions. With this case, we aimed to describe an atypical variant of PRES.

**Methods:** Case report.

**Results:** A 58-year-old woman, with known hypertension, presented with a 3-day history of binocular horizontal diplopia. Her blood pressure was 184/100mmHg and a left abducens palsy was the only finding at examination. Brain computed tomography scan showed no abnormalities and microvascular ischemia was deemed as first diagnostic hypothesis. However, her MRI showed hyperintense areas in fluid-attenuated inversion recovery (FLAIR) involving bilaterally the posterior mesencephalon, sparing the red nuclei, with extent to the left paramedian pons. These areas showed no restricted diffusion. Her blood pressure was lowered to normal range values and the diplopia resolved five days after admission. Her blood work and cerebrospinal fluid showed no relevant abnormalities, including sodium values. 9 days later, a second MRI showed almost complete resolution, favouring PRES diagnosis and excluding other entities. She was discharged completely asymptomatic.

**Conclusion:** In our case, the clinical and radiological improvement with only blood pressure control favours this atypical diagnosis. Isolated brainstem involvement in PRES is rarely reported, but as the classical presentation, is usually reversible. We highlight the importance of MRI imaging in diagnosing those cases, otherwise this interesting variant could be missed.

**Disclosure:** Nothing to disclose

## EPO3044

**The role of individual sensitivity to sodium in development of cerebral small vessel disease**

K.V. Shamtieva<sup>1</sup>, A. Shabalina<sup>2</sup>, Z. Gadzhieva<sup>1</sup>, M. Zabitova<sup>1</sup>, L. Dobrynina<sup>1</sup>

<sup>1</sup>3rd Department, Research Center of Neurology, Moscow, Russian Federation, <sup>2</sup>Hemostasis and Hemorrhology, Research Center of Neurology, Moscow, Russian Federation

**Background and aims:** Cerebral small vessel disease (CSVD) is 1 of the main causes of cognitive impairment, ischemic and hemorrhagic strokes. Sodium consumption could be 1 of the risk factors of CSVD, what could be connected with individual sensitivity of patients to its overindulgence with salt.

The aim is assessment of the role of individual sensitivity to sodium in development of CSVD.

**Methods:** The study included 73 patients (mean age 60.1±6.5, 48 (65.8%) women) with CSVD according to STRIVE criteria (2013). The control group consisted of 19 volunteers (mean age 56.9±5.4 years, 14 (73.7%) women). Individual sensitivity to sodium were estimated by measurement the buffer capacity of erythrocyte glycocalyx toward sodium and erythrocyte resistance to lysis in hypotonic solutions with decreasing concentrations. The relation between individual sensitivity to sodium and CSVD was estimated using receiver operating characteristic analysis (ROC-analysis) and binary logistic regression.

**Results:** ROC-analysis revealed the possibility of prediction of CSVD with measurement the buffer capacity of erythrocyte glycocalyx (AUC:0.723, 95% CI:0.610–0.836) and erythrocyte resistance to lysis in hypotonic solutions (AUC:0.708, 95% CI:0.578–0.839) and determined threshold values of these indicators. Using of logit-model showed greater reliability of the prediction of CSVD with both laboratory tests (p<0.000001, AUC:0.824, 95% CI:0.724–0.923).

**Conclusion:** The results revealed the possibility of prediction of CSVD by using laboratory tests of assessment individual sensitivity to sodium, which should be considered as independent risk factor of CSVD, but reduction in salt intake should be applied only in patients with exceeding of threshold values of the proposed indicators.

**Disclosure:** Nothing to disclose

## EPO3045

**Perineural Administration of Autologous Mesenchymal Stem Cells of Adipose Tissue in Patients with Cerebral Infarction**

Y. Shanko<sup>1</sup>, V. Navitskaya<sup>1</sup>, S. Pashkevich<sup>2</sup>, S. Krivenko<sup>3</sup>, A. Zamaro<sup>2</sup>, L. Novikova<sup>1</sup>, V. Smeyanovich<sup>1</sup>, S. Marchenko<sup>4</sup>, S. Komlikov<sup>4</sup>, V. Goncharov<sup>4</sup>, Y. Takalchik<sup>2</sup>, M. Dosina<sup>2</sup>, A. Denisov<sup>2</sup>, V. Kulchitsky<sup>2</sup>  
<sup>1</sup>Republican Scientific and Practical Center of Neurology and Neurosurgery, Minsk, Belarus, <sup>2</sup>Institute of Physiology, National Academy of Sciences, Minsk, Belarus, <sup>3</sup>Minsk Scientific and Practical Center of Surgery, Transplantology and Hematology, Minsk, Belarus, <sup>4</sup>Emergency City Clinic Hospital, Minsk, Belarus

**Background and aims:** We developed a unique technique for natural perineural migration of autologous mesenchymal stem cells (MSC) of adipose tissue to the area of cerebral infarction.

**Methods:** The method was used in addition to standard therapy of acute cerebral infarction. 35 patients were examined (aged 47-73 years, 61.25 mean); control group patients (n=20) were treated by standard therapy. Patients were subjected to intranasal perineural administration of MSC. Approximately 50ml of adipose tissue took from umbilical area. Cells were cultivated and then endoscopic threefold intranasal implantation of autologous MSC for 5-12x10<sup>6</sup> cells was performed with the intervals of 5-9 days.

**Results:** All the patients showed only stable recovery of neurologic functions in 24 hours after each implantation of MSC.

Patients with cerebral infarctions showed statistically significant improvement of physiological functions control in 6 months after course therapy with MSC assessed by NIHSS. There were no repeated infarctions in the main group of patients for at least one and a half years. Administration of allogeneic SC to patients with cerebral infarctions (n=5) was ineffective.

**Conclusion:** Combination of standard therapy of cerebral infarctions with endoscopic perineural implantation of autologous MSC of adipose tissue is accompanied with activation of reparative processes leading to recovery of neurologic functions.

**Disclosure:** Nothing to disclose

## EPO3046

**MRI assessment of the relationship between small vessel disease and stroke outcome in patients on oral anticoagulants.**

S. Shokhimardonov<sup>1</sup>, S. Kuzieva<sup>1</sup>, S. Xudjanov<sup>2</sup>  
<sup>1</sup>Neurology, Tashkent Medical Academy, Tashkent, Uzbekistan, <sup>2</sup>Tashkent Medical Academy, Tashkent, Uzbekistan

**Background and aims:** Despite the fact that the disease of small vessels remains an important cause of both ischemic stroke and intracranial hemorrhage. Knowledge about the effect of small blood vessel diseases on the clinical course and outcomes in patients with stroke who received oral anticoagulation with atrial fibrillation is limited.

**Methods:** 240 patients aged 55-76 years was observed on the basis of the Uzbekistan stroke register, who received anticoagulation therapy after atrial fibrillation. The diagnosis of patients was substantiated by CT and NIHSS scale, as well as MRI (for assessing indicators of small blood vessel diseases) studies. Patients were evaluated both in the acute period and in the recovery period during the year. We evaluated the association of imaging modalities with clinical outcome, including repeated ischemic stroke, intracranial hemorrhage and death. Quality of life was assessed using a modified Rankin and Barthel scales.

**Results:** Small vessels disease was related to an increased risk of the composite endpoint (intracranial haemorrhage, ischaemic stroke, death: odds ratio (OR) 2.05, 95% p=0.005. In addition, confluent white matter hyperintensities were associated with increased disability OR 4.03; 95% CI 2.16–7.52; p<0.001) and mortality (HR 1.81, 95%CI 1.04–3.14, P 1/4 0.04).

**Conclusion:** In this study, we found that brain small vessels disease are associated with poor outcomes in patients with atrial fibrillation who received anticoagulant therapy after a stroke. cerebral microbleeds and white matter hyperintensities both were associated with an increased risk of a combined outcome during a follow-up period of one year.

**Disclosure:** Nothing to disclose

## EPO3047

**Abdominal Aorta occlusion as a cause of sudden paraplegia in the Emergency Department**

A. Silva<sup>1</sup>, R. Machado<sup>1</sup>, J. Silva<sup>2</sup>, F.V. Moreira<sup>1</sup>

<sup>1</sup>Neurology Department, Coimbra University and Hospital Center, Coimbra, Portugal, <sup>2</sup>Angiology and Vascular Surgery Department, Coimbra University and Hospital Center, Coimbra, Portugal

**Background and aims:** Abdominal aortic occlusion is a rare vascular emergency. It may occur due to embolization or thrombosis, in a concomitant vascular disease context. It typically presents with sudden-onset low back pain, whereas paresis or paresthesia are less frequent manifestations. The mortality rate is very high unless there is immediate treatment.

**Methods:** Non-applicable

**Results:** We present a case of a 72-year-old woman, with a history of ischemic stroke 2 weeks before, admitted to the emergency department with symmetrical and flaccid paraplegia, myotatic areflexia, pain and vibratory sensory deficit below the T10-12 level, flexor plantar reflex, livedo reticularis and bilaterally absent femoral pulses, confirmed by Doppler ultrasound. Abdominal and pelvic CT angiography revealed thrombosis of the abdominal aorta and both common iliac arteries. She was submitted to immediate thromboembolectomy, with successful revascularization and complete muscle strength recovery. Magnetic resonance imaging performed after 5 months ruled out any ischemic lesion of the spinal cord.

**Conclusion:** Acute paraplegia due to spinal cord ischemia is a rare condition and it is associated with a poor prognosis. Its mechanism is not yet fully understood, but is thought it is caused by an ischemic peripheral neuropathy, however more importantly would be a spinal cord ischemia, due to lower arterial blood flow through the intercostal, lumbar, sacral and pelvic radicular arteries. Abdominal aortic occlusion should always be considered in the differential diagnosis of acute paraplegia associated with limb ischemia signs, given its irreversibility without urgent surgical intervention.

**Disclosure:** Nothing to disclose

## EPO3048

**Does stroke location, assessed by a 24-hour CT scan, improve prediction of stroke outcome?**

R. Soares Dos Reis<sup>1</sup>, B. Malafaya<sup>2</sup>, A.L. Rocha<sup>1</sup>, G. Moreira<sup>3</sup>, L. Fonseca<sup>3</sup>, P. Castro<sup>1</sup>

<sup>1</sup>Neurology Department, Centro Hospitalar Universitário de São João, Porto, Portugal, <sup>2</sup>School of Medicine, Universidade do Minho, Braga, Portugal, <sup>3</sup>Stroke Unit, Centro Hospitalar Universitário de São João, Porto, Portugal

**Background and aims:** Stroke is a major source of disability worldwide and, thus, predicting individual disability outcomes is a hot topic in stroke research. We intend to establish a relationship between the infarcted brain regions, assessed using the widely available plain head computerized tomography (CT), and the clinical outcome.

**Methods:** 459 patients with anterior circulation ischemic stroke submitted to revascularization were retrospectively assessed with CT imaging at 24 hours. The Alberta Stroke Program Early CT Score (ASPECTS), with the addition of the corona radiata, and lesion volume using the ABC/2 formula were calculated. Baseline and 3-month modified Rankin Scale (mRS), admission and 24-hour National Institutes of Health Stroke Scale (NIHSS) and other patient characteristics were obtained. Multivariate logistic regression models were used to study the influence of infarct location after adjusting for baseline mRS, admission blood glucose, infarct volume, 24-hour NIHSS, age and sex on outcome.

**Results:** Median baseline NIHSS was 14 [Interquartile range(IQR): 7-18], median age was 76 (IQR: 65-83), median 24-hour NIHSS was 7 (IQR: 2-16) and infarct volume was 9.1cm<sup>3</sup> (IQR: 0.3-47.4). The insula was the most frequently infarcted region (53.8%). However, adjusted multivariate analysis revealed that the internal capsule and greater lesion volume (15cm<sup>3</sup> intervals) were associated with worse outcome [Odds Ratio for good outcome: 0.40 (95% CI: 0.23-0.71) p<0.01; 0.88 (95% CI: 0.80-0.97) p<0.01, respectively].

**Conclusion:** Our study supports that lesion location, assessed by CT scan at 24h after stroke onset, independently impacts functional outcome.

**Disclosure:** Nothing to disclose

## EPO3049

### COL4A2 gene mutations as cause of cerebral small vessel disease, hemorrhagic stroke and intracranial vessels dolichoectasia

C. Sousa Fernandes<sup>1</sup>, H. Gens<sup>1</sup>, R. Machado<sup>2</sup>, A.R. Silva<sup>2</sup>, I. Baldeiras<sup>3</sup>, M.R. Almeida<sup>4</sup>, G. Santo<sup>1</sup>

<sup>1</sup>Neurology, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal, <sup>2</sup>Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal, <sup>3</sup>Laboratório de Neuroquímica, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal, <sup>4</sup>Genetics, CNC, Coimbra, Portugal

**Background and aims:** COL4A1 and COL4A2 genes encode alpha subunits of type IV collagen, a vascular basement membrane component. Mutations in these genes have been recently identified as a cause of cerebral small vessel disease (cSVD), with an autosomal dominant transmission pattern. The disease can present with different phenotypes, including isolated cSVD, congenital porencephaly and multisystemic involvement – the HANAC Syndrome (Hereditary angiopathy with nephropathy, aneurysms and muscle cramps).

**Methods:** N/A

**Results:** A 54-year-old man from Guinea-Bissau presented in outpatient clinic with a 6-year-history of cognitive decline. He had a 12-year education and medical history of hypertension and hemorrhagic stroke at age 47 without relevant neurologic deficits. On examination he had decreased spontaneous behavior and speech, psychomotor slowing and scored 17/30 on Mini-Mental State Examination. Family history for stroke or dementia was unremarkable. Blood analysis showed only a slight and sustained elevation of the creatine-kinase and the patient confirmed that he felt muscle cramps frequently. Brain MRI showed confluent bilateral periventricular white matter hyperintensities, a left periventricular hemorrhagic sequel and diffuse cerebral atrophy. Angio-CT revealed diffuse tortuosity and dolichoectasia of the circle-of-Willis vessels, without aneurismal malformations. Genetic testing was performed through Next Generation Sequencing 7-gene panel for cSVD and it was identified the variant NM\_001846.3:c.3448C>A(p.Gln1150Lys) of the COL4A2 gene, previously described as pathogenic.

**Conclusion:** COL4A2-gene mutation is a rare and less known cause of hereditary cSVD. COL4A1/A2 gene mutations should be considered in adults with cSVD, history of hemorrhagic stroke, muscle cramps and dolichoectatic intracranial vessels, even in the absence of aneurismal malformations.

**Disclosure:** Nothing to disclose

## EPO3050

### Stent-graft – a good choice of therapeutic approach in a variety of clinical situations

D. Stefan, A.C. Ribigan, B. Dorobat, F. Antochi  
Bucharest, Romania

**Background and aims:** Initially designed for endovascular treatment of aortic and peripheral aneurysms and arteriovenous fistulas, stent-grafts are now increasingly used for intracerebral vessels. The aim of our presentation is to illustrate the utility of stent-grafts in different clinical situations.

**Methods:** We present a series of 5 patients: a 46-year-old female with a giant aneurysm in the intracavernous segment of the left internal carotid artery, a 37-year-old female with an aneurysmal dilation of 1.5cm at the origin of the left internal carotid artery, a 36-year-old male with a post-traumatic right internal carotid artery dissection with a pseudoaneurysm in the C1 segment, a 47-year-old female with post-traumatic right direct carotid-cavernous fistula and a 73-year-old female with an iatrogenic lesion of the left vertebral artery after surgery for cervical myelopathy due to a herniated disk.

**Results:** All patients underwent digital subtraction angiography of the cerebral vessels and endovascular treatment with stent-graft, with optimal results and no intrastent stenosis at their follow-up visits. The therapeutic decision was made based on anatomic particularities of each case.

**Conclusion:** Stent-grafts represent a safe, effective and minimally invasive therapeutic alternative in a variety of clinical situations, which could become first-line therapy as experience with this kind of devices is continuously improving.

**Disclosure:** Nothing to disclose

## EPO3051

### Case report of bilateral intracranial internal carotid artery dissection in a patient with female phenotype, 46XY karyotype and homozygous MTHFR C677T mutation

T.T. Takacs, G. Bozsik, N.C. Tegze, P. Balicza, D. Bereczki

*Department of Neurology, Semmelweis University, Budapest, Hungary*

**Background and aims:** Multiple intracranial internal carotid artery (ICA) dissections occur more frequently in younger women compared to a single spontaneous cerebral arterial dissection (CAD).

**Methods:** Case report. Computed Tomography Angiography (CTA), Magnetic Resonance Imaging (MRI), Magnetic Resonance Angiography (MRA) and MTHFR genetical testing were performed.

**Results:** A 33-year-old patient presented with left>right anisocoria and headache. About a month prior a minor head trauma occurred, at the time no examinations were performed. Upon presentation carotid-cerebral CTA and head MRI showed right intracranial ICA dissection. No intracranial brain tissue damage was described. They administered acenocumarol. A week later, the patient was admitted to our hospital because of reoccurring right sided headache and immeasurably high INR. Neurological examination was negative. Repeated head MRI/MRA showed new, spontaneous left sided ICA C1 dissection next to the known right sided ICA C1-C2 dissection. Detailed medical history revealed primary amenorrhea, 46 XY karyotype on FISH examination and primary gonadal dysgenesis. Laboratory results showed MTHFR C677T homozygous mutation. Since limited data is available about the use of direct oral anticoagulants (DOACs) in ICA dissection, we continued administration of acenocumarol.

**Conclusion:** We present a case of bilateral (potentially spontaneous) ICA dissection in a patient with 46XY karyotype and homozygous MTHFR C677T mutation. A few cases of Turner Syndrome associated with CAD are mentioned in literature, but none with Swyer-syndrome. The detected MTHFR mutation might be an additional genetic risk factor. Further research is needed to prove the association between sex chromosome alterations and vasculopathy. The use of DOACs in such cases should be evaluated.

**Disclosure:** Nothing to disclose

## EPO3052

### The value of neuron-specific enolase in determining brain damage in the acute period of ischemic stroke

M. Topuzova<sup>1</sup>, T. Alekseeva<sup>1</sup>, A. Chaykovskaya<sup>1</sup>, E. Panina<sup>1</sup>, T. Vavilova<sup>1</sup>, M. Pospelova<sup>1</sup>, P. Kovzelev<sup>1</sup>, K. Simakov<sup>1</sup>, E. Vasilieva<sup>1</sup>, T. Sergeeva<sup>2</sup>, M. Efimova<sup>1</sup>, I. Ternovykh<sup>1</sup>, A. Krasil'nikova<sup>1</sup>

<sup>1</sup>*Department of Neurology and Psychiatry, Federal State Budgetary Institution «Almazov National Medical Research Centre» of the Ministry of Health of the Russian Federation, Saint-Petersburg, Russian Federation,* <sup>2</sup>*City Hospital of the Holy Martyr Elizabeth, Saint-Petersburg, Russian Federation*

**Background and aims:** Neuron-specific enolase (NSE) is an isoenzyme localized in neurons and released into the bloodstream by brain damage. Serum NSE levels can be valuable in patients with acute ischemic stroke (IS).

**Methods:** 42 patients in acute IS (23 women, 19 men) were examined, median age 55 [46; 61]. Blood samples were collected: 1st 72 hours (point-1) and 10-14 day (point-2). An enzyme immunoassay (ELISA kit) was used, control values (CV) 16.3 ng/ml.

**Results:** The NSE level at point-1 significantly exceeded CV and decreased in dynamics (20.4 [14.9; 36.8]→15.7 [12.8; 20.8], p=0.02).

In patients with a favorable outcome (mRS 0-2) the NSE level was significantly lower (point-2) compared with patients with a poor outcome (mRS 3-6) (13.6 [11.8; 17.4] and 16.9 [14.1; 21.9], respectively, p=0.03).

The correlation was determined between the NSE level at point-1 and the index Barthel (IB) at point-2 (r=-0.4), NSE at point-2 and IS severity (NIHSS) at point-1 (r=0.5) and 2 (r=0.7), a short-term outcome at point-2 (mRS) (r=0.5), IB at point-1 (r=-0.5) and 2 (r=-0.5).

**Conclusion:** The higher NSE level in the first 72 hours of IS, the worse the restoration of neurological functions by 10-14 days. The severe IS in the first 72 hours, the higher the NSE level by 10-14 days, meaning a more prolonged and massive damage to neurons. NSE can be considered a diagnostic and prognostic biomarker of brain damage in the IS acute period.

**Disclosure:** Nothing to disclose

## EPO3053

### **Cognitive decline in patients in the preoperative period of cardiac surgery**

O. Trubnikova, I. Tarasova, O. Barbarash

*State Research Institute for Complex Issues of Cardiovascular Diseases, Kemerovo, Russian Federation*

**Background and aims:** The study aimed to investigate the neuropsychological parameters and the frequency of mild cognitive impairment (MCI) in patients with coronary artery disease (CAD) in the preoperative period of cardiac surgery.

**Methods:** The study included 114 consecutive CAD patients scheduled for cardiac surgery, the mean age was  $56.3 \pm 5.25$  years. The control group consisted of 40 healthy individuals, the average age of  $55.1 \pm 4.67$  years. The patients were examined preoperatively with the Mini-Mental State Examination. A diagnosis of MCI was established based upon the Petersen's criteria. In addition, the CAD patients and healthy controls were underwent the expanded neuropsychological testing with assessment of psychomotor and executive function, attention, and short-term memory using the psychophysiological complex software "Status PF". The statistical analysis was performed using the STATISTICA 10.0.

**Results:** MCI was diagnosed in 48% of the CAD patients. It was found that the patients with CAD had lower complex sensorimotor reaction times, more errors, worse directed attention, memorization of words and meaningless syllables in comparison with healthy individuals.

**Conclusion:** The CAD patients preoperatively had the cognitive decline with impaired executive function, attention and short-term memory in comparison to the healthy controls. The data obtained in our study can be useful in developing an individual approach to preventing the development and progression of cognitive impairment in patients with CAD who underwent cardiac surgery.

**Disclosure:** The reported study was funded by RFBR and Kemerovo region, project number 20-415-420005.



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## EPO3054

**Reversible cerebral vasoconstriction syndrome: a dramatic case report**

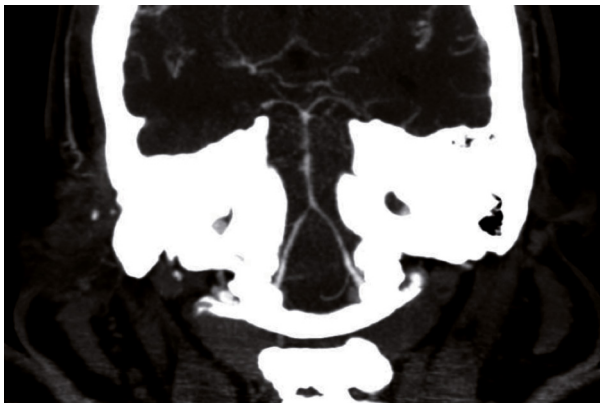
M. Mañez<sup>1</sup>, I. Del Pino de Laguno<sup>1</sup>, V. Delgado Gil<sup>1</sup>, O. Leon<sup>1</sup>, E. Garcia Carrasco<sup>2</sup>, G. Garcia Martin<sup>1</sup>

<sup>1</sup>Department of Neurology, Virgen de la Victoria Hospital, University of Málaga, Málaga, Spain, <sup>2</sup>Radiologia, Hospital Virgen de la Victoria, Malaga, Spain

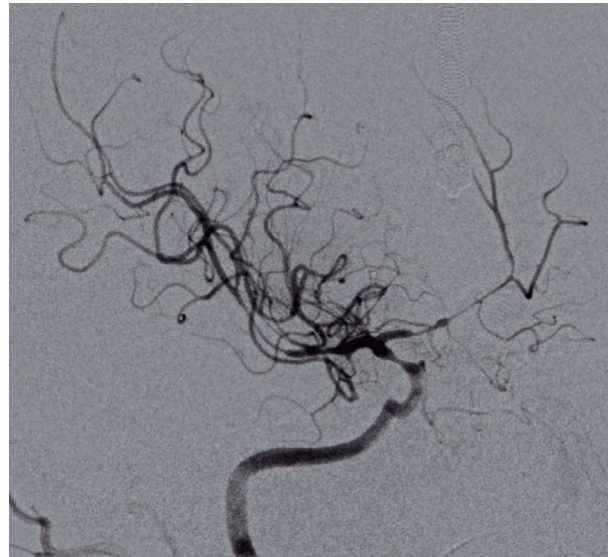
**Background and aims:** Reversible cerebral vasoconstriction syndrome (RCVS) is characterized by severe headaches, with or without other acute neurological symptoms, and diffuse segmental constriction of cerebral arteries that resolves spontaneously within 3 months. The clinical outcome is benign in 90-95% of patients.

**Methods:** We present a 42-year-old woman, with a story of Sertraline medication. She began with a thunderclap headache. 5 days after, she started with low level of awareness, incoherent speech and loss of ambulation. She had no fever or other associated symptoms.

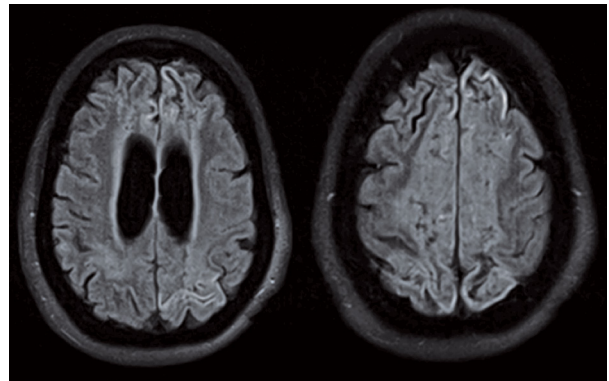
**Results:** The CT and MRI demonstrated multiple strokes located in arterial watershed and a cortical surface nonaneurysmal subarachnoid hemorrhage (NHSA). The cerebral Angiography showed multiple segments of narrowing in vessel caliber. 2 probable diagnoses performed: a vasculitis of the central nervous system and RCVS. The cerebrospinal fluid findings were normal. After 3 months, the follow up Angiography demonstrated a normal vessel caliber and diagnosis of RCVS was established. The clinical outcome was poor and patient follow-up showed a spastic tetraplegia and mutism. The follow up MRI showed a larger infarcts, especially in the territory of both anterior cerebral arteries. Our patient represents the 5% of cases of SVCR with poor prognosis.



CT- Angiography, multiple segments of narrowing in vessel caliber



Arteriography: cerebral vasoconstriction affecting basilar, vertebral and anterior cerebral arteries



Follow up MRI. Stroke in territory of both cerebral anterior arteries and arterial watershed regions

**Conclusion:** The RCVS represents an underdiagnosed entity to consider in middle-aged female patients with thunderclap headache and neurological deficit and combination of stroke and NHSA. There are some triggers described (like the serotonin reuptake inhibitors) but the etiology it's unknown yet.

**Disclosure:** Nothing to disclose

## EPO3055

**Posterior circulation ischaemic stroke: focal vasculitis 6 months after cervical Zoster**

B. Nunes Vicente<sup>1</sup>, I. Amorim<sup>1</sup>, L. Azevedo Kauppila<sup>1</sup>, F. Falcão<sup>1</sup>, L. Albuquerque<sup>2</sup>

<sup>1</sup>Neurology, Neurosciences and Mental Health Department, Hospital Santa Maria, Centro Hospitalar Universitário Lisboa Norte, Lisbon, Portugal, <sup>2</sup>Department of Neurology, Department of Neuroscience, Hospital de Santa Maria, Centro Hospitalar Lisboa Norte, Lisbon, Portugal, Lisbon, Portugal

**Background and aims:** Varicella Zoster Virus (VZV) vasculitis occurs by viral arterial transmural invasion after its reactivation in ganglion neurons. Diagnosis is confirmed by IgG VZV antibody in cerebrospinal fluid (CSF), with VZV PCR being positive in 30% of cases.

**Methods:** Case report of a woman with posterior circulation ischaemic stroke after cutaneous zoster infection.

**Results:** A 26-year-old woman, with a history of systemic lupus erythematosus (SLE) and chronic hepatitis B infection (inactive carrier), on prednisolone 15mg/day, mycophenolate 3000mg/day, and hydroxychloroquine 200mg/day. In January 2019, she was admitted for cutaneous cervical zoster (C2 territory) and right hemicranial headache, having completed 21 days of acyclovir (500mg IV q8h, 7 days followed by 14 days PO). 6 months later, she was for altered state of consciousness, dysarthria and left hemiparesis. Neurological examination disclosed gaze evoked nystagmus, left hemiparesis and left Babinsky sign. showed right pons and cerebellar hemispheres hyperintensities on DWI and T2/FLAIR. Blood tests showed controlled SLE activity markers CSF revealed pleocytosis (22 polymorphonuclear cells), hyperproteinorrachia (422mg/dL, traumatic puncture), glycorrachia 70mg/dL, negative CSF microbiological exams, and positive VZV PCR.

Brain MRI-angiography and transcranial Doppler ultrasound revealed stenosis of both vertebral arteries and distal occlusion of the basilar artery. She completed 21 days of IV acyclovir, with neurological improvement and maintained prophylactic acyclovir for 6 months and chronic antiaggregation.

**Conclusion:** VZV vasculopathy is a major cause of ischaemic stroke in immunocompromised patients and has a specific treatment. A high degree of clinical suspicion is required, as the disease might manifest quite sometime after the primary infection.

**Disclosure:** Nothing to disclose

## EPO3056

**Ruptured medullary bridging vein-draining dural arteriovenous fistula at the craniocervical region presenting with subarachnoid hemorrhage**

M. Rodrigues<sup>1</sup>, T. Waelchli<sup>2</sup>, P. Nicholson<sup>3</sup>, K. Bhatia<sup>3</sup>, V. Mendes Pereira<sup>4</sup>, I. Radovanovic<sup>2</sup>, F. Gentili<sup>2</sup>, T. Krings<sup>3</sup>

<sup>1</sup>Neuroradiology Department, Centro Hospitalar de Vila Nova de Gaia/Espinho, Vila Nova de Gaia, Portugal, <sup>2</sup>Division of Neurosurgery, Toronto Western Hospital, Toronto, Canada, <sup>3</sup>Neuroradiology Department, Toronto Western Hospital, Toronto, Canada, <sup>4</sup>Interventional Neuroradiology, University of Toronto University Health Network, Toronto, Canada

**Background and aims:** Background and Importance: Dural arteriovenous fistulas (DAVFs) at the craniocervical junction are rare vascular lesions with a potentially devastating natural history. Medullary bridging vein-draining DAVFs (MBV-DAVFs) at the craniocervical junction may present with both subarachnoid and intramedullary hemorrhage. Their complex angioarchitecture makes diagnosis challenging, with only a few published case reports so far.

**Methods:** Case Report

**Results:** Clinical Presentation: Here, we report a case of a MBV-DAVF presenting with acute subarachnoid hemorrhage. The fistula was supplied by a radiculomeningeal branch arising from the right vertebral artery at C1 level, while venous drainage occurred via an intradural perimedullary bridging vein that drained into the paravertebral venous plexus and the preponine venous system. There was an associated venous pouch, which presumably constituted the rupture point of the fistula. More distally there was also a stenosis of the outflow vein. Given the very small feeding branches and their very short security margin to the parent vertebral artery on the one hand and the venous outflow obstruction on the other, an endovascular approach was not deemed possible, and the patient was treated surgically with successful clipping of the bridging vein, with good clinical outcome and confirmed obliteration of the fistula on follow-up.

**Conclusion:** MBV-DAVF should be taken into consideration in the differential diagnosis of acute SAH. Their complex angioarchitecture makes diagnosis and treatment planning challenging. Currently, most of these patients are treated surgically since endovascular treatment is often too risky given the complex angioarchitecture of the lesions.

**Disclosure:** Nothing to disclose

## EPO3057

**The diagnostic yield of Holter ECG in a cohort of young ischaemic stroke patients**

G.V. Bonifácio, R.P.M.F. Guerreiro, R. Matos  
Setúbal, Portugal

**Background and aims:** Atrial fibrillation is a frequent cause of embolic strokes, but its prevalence is very low in young patients. The 24-hour Holter ECG monitoring takes more time to perform and read than most other exams done in this setting. We retrospectively looked at our young stroke patients to find the actual usefulness of this exam in our population.

**Methods:** We included all patients younger than 50-years-old admitted to the stroke unit of our centre since 2014 with the diagnosis of ischaemic stroke. We divided them in lacunar or non-lacunar strokes, and registered the results of the cardiologic exams performed.

**Results:** We found 100 patients (40% female) with a median age of 44-years-old (IQR: 40-48). 18% of the exams had relevant findings (64/346); Non-lacunar strokes had more positive exams (34/62 vs. 12/38,  $p=0.02$ ). Only 2.3% of the Holter ECG exams were positive, while 38% of the echocardiograms had relevant findings (transthoracic: 26%; transesophageal: 56%); No patient with a normal transthoracic echocardiogram had a positive Holter ECG (0/65 vs. 2/21,  $p=0.06$ ).

Table 1: Characteristics of the patients

Characteristics	All patients (n = 100)	Lacunar strokes (38)	Non-lacunar strokes (62)
Median age (IQR)	44 (40 - 48)	45 (40 - 48)	43 (40 - 47)
Female gender (%)	40	12 (32)	28 (45)
Hypertension (%)	36	16 (42)	20 (32)
Diabetes (%)*	12	9 (24)	3 (5)
Dyslipidemia (%)	29	14 (37)	15 (24)
Smoking (%)	38	17 (45)	21 (34)
Known heart disease (%)	11	3 (8)	8 (13)
Anticoagulant use (%)	4	1 (3)	3 (5)
Oral contraceptive use (%)	9	4 (11)	5 (8)
Previous stroke (%)	7	2 (5)	5 (8)

\*  $p < 0,05$  for lacunar vs. non-lacunar strokes

Table 1: Characteristics of the patients

Table 2: Summary of findings on cardiologic exams

Exam (positive/total)	All patients	Lacunar strokes	Non-lacunar strokes
ECG on admission‡	2/99	1/37	1/62
24-hour Holter ECG	2/88	1/33	1/55
TT echocardiogram*	25/96	4/37	21/59
TE echocardiogram	35/63	9/20	26/43
(Of which PFO)	26/63	7/20	19/43

TT: Transthoracic; TE: Transesophageal; PFO: Patent foramen ovale

\*  $p < 0,05$  for lacunar vs. non-lacunar strokes

‡ All but one patient – who had stopped anticoagulation despite a known permanent atrial fibrillation – performed ECG on admission. Retrospectively, both patients with atrial fibrillation on Holter ECG had an arrhythmia on ECG.

Table 2: Summary of findings on cardiologic exams

**Conclusion:** Our cohort showed a very low yield of 24-hour Holter ECG recordings, as was suggested by previous studies. We found that a normal transthoracic echocardiogram may be a predictor of a negative Holter ECG in this population. Based on these results, we suggest that the exclusion of atrial fibrillation should not lengthen admissions in young patients. In the case of embolic strokes of unknown source, monitoring heart rhythm during admission and using an event recorder after discharge is likely more effective.

**Disclosure:** Nothing to disclose

## EPO3058

**Gaseus-contrast transcranial doppler ultrasound for right-to-left shunt confirmation.**

A. Velayos Galán, P. Del Saz Saucedo, R. García Ruiz  
Alcazar de San Juan, Spain

**Background and aims:** Right-to-left shunt (RLSh) because of foramen ovale is an accepted risk factor for cryptogenic stroke. Gaseus-contrast transcranial doppler (cTCD) is a useful method for determination RLS. The aim of this study is to describe utility of cTCD before and during efficacy Valsalva maneuver in the diagnosis of RLS in young patients with cryptogenic stroke.

**Methods:** We conducted an observational, prospective cTCD examination of consecutive young adults with cryptogenic stroke. We used the database register of the neurology ultrasonology laboratory. There were 485 RLS studies of 13589 database registers between April 2009 and December 2018.

**Results:** During normal breathing, massive RLS was detected in 37 (7.6%), nonmassive RLS in 121 (25%) and absence of RLS in 327 (67.4%). During the efficacy standardized Valsalva maneuver, which could not be performed by 15 patients, massive RLS was detected in 97 (20.7%), nonmassive RLS in 111 (23.6%) and absence of RLS in 262 (55.7%). Efficacy Valsalva maneuver increased the detection rate of RLS by 11.7%.

**Conclusion:** Our results show utility of cTCD for determination RLS. With an efficacy Valsalva maneuver during the examination, there is a significant increment of RLS detection rate. Evaluation of cryptogenic stroke in young adults should include a cTCD for RLS detection.

**Disclosure:** Nothing to disclose

## EPO3059

**Rare ischemic stroke mechanisms in 4,154 consecutive patients: causes, predictors, treatment and outcome**

A. Vicino<sup>1</sup>, G. Sirimarco<sup>1</sup>, A. Eskandari<sup>1</sup>, D. Lambrou<sup>1</sup>, P. Maeder<sup>2</sup>, V. Dunet<sup>2</sup>, P. Michel<sup>1</sup>

<sup>1</sup>Neurology, Lausanne University Hospital and University of Lausanne, Lausanne, Switzerland, <sup>2</sup>Radiology, Lausanne University Hospital, Lausanne, Switzerland

**Background and aims:** There are few systematic analyses of rare mechanisms of stroke (RMS) in acute ischemic stroke (AIS). Our aim was to define the frequency, etiologies, predictors and outcome of RMS in a large consecutive single center series of AIS.

**Methods:** Data from consecutive patients arriving within 24 hours from 2003-2016 were extracted from the Acute STroke Registry and Analysis of Lausanne. Frequency of subcategories of RMS were calculated. Multiple variables of RMS were compared with strokes of all other mechanisms. Long-term outcome was assessed with 3-months-Rankin-shift and 12-months-mortality/recurrence rates.

**Results:** 222 of 4154 AIS (5.3%) were found to have a RMS (42.3% female, median age 66 years). The most frequent RMS etiologies were related to medical interventions (26%), active cancer (22%) and vasculitis (12%). In multivariate analysis, RMS patients were younger, had more preceding and bilateral strokes, and higher admission temperature.

They were associated with less traditional risk factors and more systemic disease (such as AIDS, coagulopathy, and cancer). RMS had more early changes on plain CT, less revascularization treatments but more symptomatic hemorrhagic transformations.

RMS had significantly higher 3-months disability (Rankin-shift-OR adj 1.74), 12-months recurrence rate (OR adj 1.99) and 12-months mortality rate (OR adj 2.41).

**Conclusion:** RMS occurred in 5.3% of a large consecutive AIS population and are most frequently related to medical interventions, cancer and vasculitis. Such patients have less traditional risk factors but more systemic comorbidities, hemorrhagic transformations, recurrences, and a worse long-term outcome. Identification of RMS has direct implications on early treatment and long-term outcome.

**Disclosure:** Nothing to disclose

## EPO3060

**Cerebral Autosomal Dominant Arteriopathy with Subcortical Infarcts and Leukoencephalopathy (CADASIL): “Retrospective study in the National Health Service of Ciudad Real (Spain)”**

F.J. Villanueva Ruiz<sup>1</sup>, A. Hernandez<sup>2</sup>, A. Franco Salinas<sup>3</sup>, L. Ruiz-Escribano Menchén<sup>3</sup>, L. Quirós Illán<sup>2</sup>, M.A. Del Real Francia<sup>3</sup>, J.J. Muñoz-Torrero<sup>2</sup>

<sup>1</sup>Neurology, Ciudad Real Hospital, Ciudad Real, Spain,

<sup>2</sup>Neurology, University General Hospital of Ciudad Real, Ciudad Real, Spain, <sup>3</sup>Ciudad Real, Spain

**Background and aims:** CADASIL is an autosomal dominantly inherited angiopathy caused by mutations in the NOTCH3 gene. The estimated prevalence is 0.8 to 5 per 100.000 individuals. Clinical features comprise migraine, ischemic stroke and transient ischemic attacks (TIA's), cognitive deficits and neuropsychiatric symptoms. Recent studies concluded that substantial proportion of CADASIL adults experience clinical deterioration over a period of three years (incident stroke, dementia, progressive disability or death).

**Methods:** All clinical records of patients with genetically confirmed CADASIL diagnosis at the population area of reference (250.000 individuals) were retrospectively reviewed. Signalment, signs and symptoms were tabulated for analysis.

**Results:** 9 patients were diagnosed in the past 12 years, resulting in a prevalence of 3.6 patients /100.000 individuals. The age of diagnosis ranged between 40 and 72 years (average: 56 years old). The average follow-up time was 5.4 years (1-12 years). The initial clinical symptoms/signs of ischemic stroke or TIA's were present in 8 of the patients. 4 of the patients suffered migraine at diagnosis. 5 of the patients showed clinical symptoms of mild cognitive deterioration, although only 2 of them developed dementia. White matter hyperintensities on MRI were seen in all, and three cases had cerebral microbleeds.

**Conclusion:** We would like to comment the low incidence of progression to dementia from the initial diagnosis. The other signs and symptoms, and prevalence did fit with previously published data. We just want to highlight the case of a 54 years-old patient with neuro-psychiatric clinical symptoms at onset, which showed an unusual fast progression over a two-year period.

**Disclosure:** Nothing to disclose

## EPO3061

**Blood pressure variability during mechanical thrombectomy and outcomes, is there a connection?**

D. Vlahovic<sup>1</sup>, Z. Zivanovic<sup>2</sup>, A. Ilić<sup>2</sup>, G. Knezović<sup>2</sup>, A. Vukosavljević<sup>3</sup>, S. Vujin<sup>3</sup>, S. Rajić<sup>4</sup>, T. Vujanić Stankov<sup>4</sup>, B. Radovanović<sup>1</sup>, A. Lučić<sup>2</sup>, S. Ruzicka Kalocić<sup>2</sup>, M. Zarkov<sup>2</sup>

<sup>1</sup>Neurointensive Care, Neurology Clinic, Clinical Center of Vojvodina, Novi Sad, Serbia, <sup>2</sup>Cerebrovascular Diseases, Neurology Clinic, Clinical Center of Vojvodina, Novi Sad, Serbia, <sup>3</sup>Faculty of Medicine, University of Novi Sad, Novi Sad, Serbia, <sup>4</sup>Neurology Clinic, Clinical Center of Vojvodina, Novi Sad, Serbia

**Background and aims:** Optimal values of blood pressure during mechanical thrombectomy (MT) are not well known. Blood pressure (BP) variability during MT is a direct response of autonomic nervous function, and its dysregulation can affect cerebral autoregulation. BP and BP variability can have an effect on outcome after MT. The aim of this study was to assess the association of BP variability during MT with different outcomes in patients with acute ischemic stroke (AIS).

**Methods:** Patients with AIS and confirmed occlusion of middle cerebral artery or basilar artery were included. Mean arterial pressure (MAP) was recorded during MT. BP variability was expressed through few variables: generalized ARV, mean MAP, MAP SD, CV MAP and  $\Delta$ MAP. Outcomes were defined as: mTICI score 2b/3, no early dramatic response (NEDR), as well as unfavorable neurological outcome (UNO, mRS after 90 days >3).

**Results:** Anterior circulation occlusion had 80% of patients. NEDR had 73%, while 56% had UNO. Patients with NEDR had higher MAP SD (mean $\pm$ SD) 7.3 $\pm$ 3.3 (vs. 5.3 $\pm$ 1.4),  $p < 0.05$ . Mean MAP during thrombectomy was higher 100.4  $\pm$  14.3 (vs. 90.6 $\pm$ 11.9), while  $\Delta$ MAP was lower 7.9 $\pm$ 20.5 (vs. 19.9 $\pm$ 18.1) in group of patients with UNO, which was significant ( $p < 0.05$ ). Other BP variability variables were not significantly different between outcome groups.

**Conclusion:** BP variability during mechanical thrombectomy is associated with unfavorable outcomes. Mean arterial pressure and its variability during thrombectomy can affect outcomes.

**Disclosure:** Nothing to disclose

## EPO3062

**Biomarkers of inflammation, hypoxia and dyslipidemia in the acute period of cerebral stroke**

I. Voznjouk<sup>1</sup>, L. Pivovarova<sup>1</sup>, I. Osipova<sup>1</sup>, K. Gogoleva<sup>2</sup>, O. Ariskina<sup>3</sup>, H. Morozova<sup>2</sup>, I. Chernyavsky<sup>2</sup>, L. Kolichenko<sup>3</sup>, T. Kopylova<sup>3</sup>

<sup>1</sup>Department of Neurology, Sain-Petersburg I.I. Dzhanlidze Research Institute of Emergency Medicine, St. Petersburg, Russia, <sup>2</sup>Neurological department for patients with acute cerebrovascular accident, Sain-Petersburg I.I. Dzhanlidze Research Institute of Emergency Medicine, St. Petersburg, Russia, <sup>3</sup>Laboratory diagnostics department, Sain-Petersburg I.I. Dzhanlidze Research Institute of Emergency Medicine, St. Petersburg, Russia

**Background and aims:** Inflammation, impaired systemic oxygenation, dyslipidemia are some of the key points in the development of acute cerebrovascular pathology.

To determine the relationship of inflammation, lipid metabolism disorders, tissue oxygenation with the clinical manifestations of acute stroke (AS).

**Methods:** 36 people with AS were examined at the age of 68.5 (68; 75.7) years; comparison group – 18 volunteers aged 65.0 (62.0; 66.8) years. Patients were assessed using the NIHSS, Rivermead Mobility Index (RMI), the modified Rankin scale (mRS) and the presence of comorbidity. On the 1st day after AS, blood cholesterol, low density lipoproteins (LDL), apolipoprotein A-I (ApoA1), C-reactive protein (CRP) levels, pCO<sub>2</sub>, pO<sub>2</sub>, pH and serum IL-6 (ELISA) were determined.

**Results:** Neurological status of patients: NIHSS 7.5 (5.3; 12.5), mRS 4 (3.0; 4.0), RMI 3 (1.0; 5); heart failure was observed in 44% of patients. A decrease blood pO<sub>2</sub> to 56.8 (50.6; 71.23) mmHg was revealed and correlated with the presence of heart failure and the serum IL-6. A decrease blood LDL (3.1 (2.5; 3.8) mmol/l) and ApoA1 (1.59 (0.8; 1.4) g/l) was revealed. The correlation of LDL and ApoA1 with serum IL-6 was found ( $r = -0.380$ ,  $p < 0.05$  and  $r = -0.433$ ,  $p < 0.01$ , respectively).

**Conclusion:** A violation of tissue oxygenation, the development of systemic inflammation and a decrease of transport atherogenic and antiatherogenic lipoproteins in patients with the acute phase of cerebral stroke was observed.

**Disclosure:** Nothing to disclose

## EPO3063

**Neurosonological findings in female patients with hypertension**

R. Vukasović, M. Barbir, I. Kobasic, A. Dimitrović, M. Roje-Bedekovic, A. Lovrencic-Huzjan  
*Neurology, UHC Sisters of mercy, Zagreb, Croatia*

**Background and aims:** There are no clearly defined neurosonological criteria for the diagnosis of fibromuscular dysplasia. Due to subtle changes of blood vessel most patients remain unrecognized.

The aim of the study was to determine neurosonological findings in carotid and vertebral arteries in younger hypertensive women.

**Methods:** The study included 50 female patients, BMI<25 with hypertension and no obvious vascular risk factors, referred to ultrasound laboratory. Neurosonological findings were divided into 6 categories. 1. Carotid markers (diffuse or localized increase IMT>0,70mm); 2. Focal or multifocal, obvious or subtle, stenosis of carotid or vertebral arteries with appearance of string of breads; 3. Tortuosity (S shape, kinking, coiling); 4. Intracranial aneurysm; 5. Fibrous septum; 6. Carotid web.

**Results:** Among 50 female patient (mean age 47±2), thirteen (26%) had thyroid gland abnormalities. Most patients, 45 (90%), had neurosonological changes. 6 patients (8%) had only initial changes, carotid markers, and IMT increase was found in 33 (66%) patients. Strings of breads were found in 5 (10%) patients. Tortuosity were most common changes, in 19 patientes (26%). Most common combination was tortuosity of carotid arteries with carotid markers in 15 patients (39%). Carotid web was found in 5 (10 %) patients.

**Conclusion:** Most female patients with hypertension and no other vascular risk factors had at least one pathological finding on either the carotid or vertebral artery.

**Disclosure:** Nothing to disclose

## EPO3064

**High on- treatment platelet reactivity predicts recurrent vascular events- 3 years follow-up study.**

A. Wiśniewski<sup>1</sup>, K. Filipiska<sup>2</sup>

<sup>1</sup>Department of Neurology, Department of Neurology, Collegium Medicum in Bydgoszcz, Nicolaus Copernicus University in Toruń, Bydgoszcz, Poland, <sup>2</sup>Department of Neurological and Neurosurgical Nursing, Collegium Medicum in Bydgoszcz, The Nicolaus Copernicus University in Toruń, Bydgoszcz, Poland

**Background and aims:** The aim of this prospective, 3 years follow-up study, was to establish the role of high on-treatment platelet reactivity (HTPR) in predicting both early and late recurrence of vascular events in patients after cerebral ischemia.

**Methods:** The study included 101 subjects with non-embolic cerebral ischemia - 69 patients who met the AHA/ASA criteria for the diagnosis of ischemic stroke and 32 patients with transient ischemic attack treated with 150mg of acetylsalicylic acid a day. Platelet reactivity was performed in the 1st 24 hours after cerebral ischemia onset by impedance aggregometry (ASPI-test). Recurrent vascular events, including recurrent ischemic stroke, transient ischemic attack, myocardial infarction, systemic embolism or sudden death of vascular reason, were assessed 36 months after cerebral ischemia onset.

**Results:** Recurrent vascular events occurred in 8.5% of all subjects, in HTPR subgroup in 17.9%, in non-HPRT subgroup in 4.6%. Aspirin resistant subjects have significant higher risk of recurrent vascular events than aspirin sensitive (OR=4.57, 95% CI 1.00-20.64; p= 0.0486) (Fig.1). Cox proportional hazards models showed that large vessels disease (HR 12.04, 95% CI 2.43-59.72; p= 0.0023) and high on-treatment platelet reactivity (HR 4.28, 95% CI 1.02-17.93; p=0.0465) are independent predictors of recurrent vascular events.

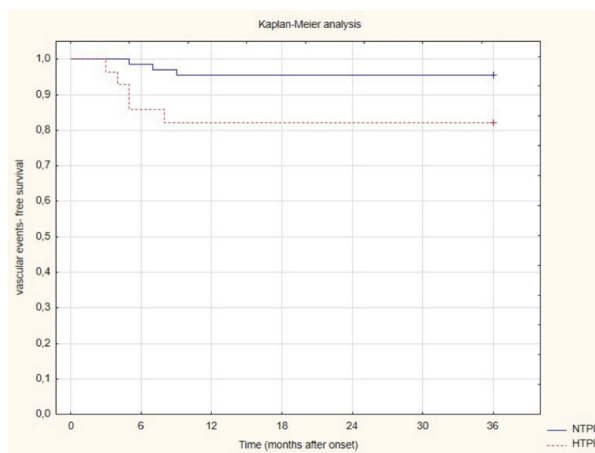


Fig.1

**Conclusion:** High on-treatment platelet reactivity in acute phase of cerebral ischemia and large vessels etiology of cerebro-vascular incidents are associated with higher risk of recurrent vascular events, both early and late.

**Disclosure:** Nothing to disclose

## EPO3065

### Aspirin resistance is associated with worse clinical condition in stroke due large vessel disease.

A. Wiśniewski<sup>1</sup>, K. Filipka<sup>2</sup>

<sup>1</sup>Department of Neurology, Collegium Medicum in Bydgoszcz, The Nicolaus Copernicus University in Toruń, Bydgoszcz, Poland, <sup>2</sup>Department of Neurological and Neurosurgical Nursing, Collegium Medicum in Bydgoszcz, The Nicolaus Copernicus University in Toruń, Bydgoszcz, Poland

**Background and aims:** The aim of the study was to assess the relationship between platelet reactivity and clinical and functional condition in patients with ischemic stroke, with particular emphasis on the role of stroke etiopathogenesis.

**Methods:** The study involved 69 patients with ischemic stroke, including 20 subjects with large vessel disease. The assessment of platelet reactivity was made using 2 aggregometric methods: impedance and optical, while the clinical condition was assessed using the NIHSS scale and the functional state using the mRS scale on the 1st and 8th day (early prognosis) and the 90th day of stroke.

**Results:** The initial platelet reactivity was found to be higher in patients with severe neurological deficit on the 90th day after stroke, than in the group with mild or moderate neurological deficit ( $p=0.033$ ). In the subgroup of patients with large vessels disease a significant correlation between the platelet reactivity and the functional condition on the 1st day of stroke was found ( $r=0.4526$ ;  $p=0.0451$ ), platelet reactivity was higher in the subgroup of patients with severe than mild neurological deficit on the 1st day of the disease ( $p=0.0372$ ), and patients resistant to aspirin have significantly greater possibility of a severe neurological deficit on the 1st day of stroke compared to those sensitive to aspirin (OR=14.00, 95% CI 1.25-156.12,  $p=0.0322$ ).

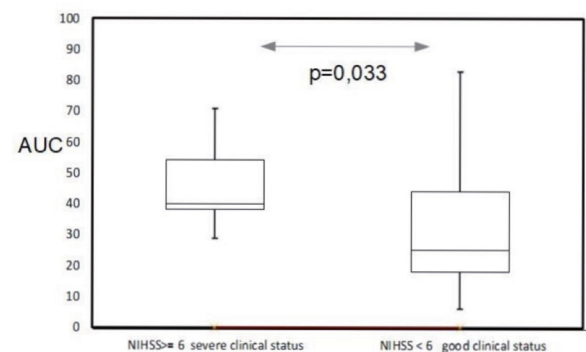


Figure 1. Comparison of platelet reactivity with the Multiplate method in subgroups of patients with mild and moderate/severe neurological deficit on the 90th day.

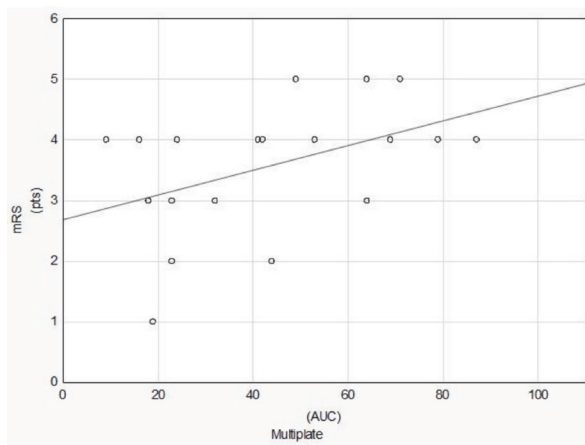


Figure 2. Dependence of platelet reactivity assessed by the Multiplate method and functional status (mRS score on the 1st day of stroke) in the subgroup of patients with the pathology of large vessels.

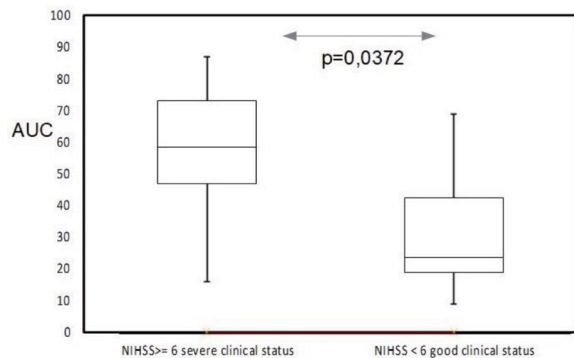


Figure 3. Comparison of platelet reactivity with the Multiplate method in subgroups of patients with the pathology of large vessels with mild and moderate/severe neurological deficit on the 1st day of stroke.

**Conclusion:** Aspirin resistance is associated with worse late prognosis overall and in the subgroup with large vessels disease with worse early prognosis and clinical condition.

**Disclosure:** Nothing to disclose

## EPO3066

### Recurrence Ischemic Stroke and Bleeding Complications Among Thai Octogenarians with Nonvalvular Atrial fibrillation Using Warfarin and Novel Oral Anticoagulants, A Retrospective Comparative study

K. Woranisaraku<sup>1</sup>, Y. Nilanont<sup>2</sup>, T. Suansanae<sup>3</sup>

<sup>1</sup>Mahidol University, Siriraj Hospital, Bangkok, Thailand,

<sup>2</sup>Siriraj Stroke Center, Siriraj Hospital, Bangkok, Thailand,

<sup>3</sup>Faculty of Pharmacy, Mahidol University, Bangkok, Thailand

**Background and aims:** Stroke prevention with oral anticoagulants (OACs) is gold standard for management of nonvalvular atrial fibrillation (NVAF). Data using non-vitamin K antagonists (NOACs) among patients aged over 80 are limited. This study investigated efficacy and safety of NOACs compare with warfarin in extreme aged population.

**Methods:** A retrospective comparative study in octogenarians with NVAF initiating OACs was conducted in tertiary care hospital in Thailand. Patients who received apixaban, dabigatran, rivaroxaban or warfarin for stroke prevention from 2013 to 2018 were recruited. Primary outcome was recurrence of ischemic stroke in 90 days. Recurrence of ischemic stroke, major bleeding and non-major bleeding in 180 days were evaluated as secondary outcomes.

**Results:** A total of 205 patients were enrolled, 135 patients (65.9%) were OACs-naïve. 39 patients received NOACs which most of them were apixaban. Mean age was 84.5 years old. Median CHA<sub>2</sub>DS<sub>2</sub>VASc scores and HAS-BLED scores were 6 and 4. Patients in warfarin group had higher CHA<sub>2</sub>DS<sub>2</sub>VASc and HAS-BLED scores. 24 patients (62%) were prescribed dose of NOACs appropriately based on their renal function. During 90 days, rate of ischemic stroke in NOACs group were lower than warfarin (1.6% vs. 4.3%, p=0.52). Rate of ischemic stroke and non-major bleeding in 180 days were similar in both group. However, rate of major bleeding in 180 days was significantly higher in NOACs group (1.8% vs. 0.6%, p=0.007).

**Conclusion:** NOACs and warfarin demonstrated similar rate of recurrence ischemic stroke in 90 and 180 days among octogenarians with NVAF. However, major bleeding occurred higher in NOACs group despite receiving appropriate dosing.

**Disclosure:** Nothing to disclose



## EPO3067

### The reasons for not providing thrombolytic therapy to acute ischemic stroke patients: A stroke centre experience in Turkey

Ü. Yalaz Tekan, D. Selçuk Demirelli, G. Genç, N. Kuloğlu Pazarıcı, Ş. Işık, M.E. Guven Azap, S. Bulut  
*Neurology, Şişli Hamidiye Etfal Training and Research Hospital, İstanbul, Turkey*

**Background and aims:** Intravenous thrombolysis with recombinant tissue plasminogen activator (tPA) remains the only effective and approved treatment for acute ischemic stroke (AIS). Despite scientific evidence, its use has not become widespread as desired. We aimed to investigate the reasons for not providing tPA to AIS patients in our center. **Methods:** The study was conducted between January 1, 2019 and December 31, 2019 at a Training and Research Hospital which is a comprehensive stroke center in İstanbul. AIS patients who did not receive thrombolytic therapy although they were admitted to the emergency department within 4.5 hours of symptom onset, were included in the study. Patients' demographic characteristics, comorbidities, onset-to-door time, NIH stroke scale (NIHSS) scores at admission and brain imaging findings were recorded. The reasons for not providing tPA to AIS patients were determined.

**Results:** Of 294 patients with AIS, 103 (35%) did not receive tPA. The most common reason that associated with treatment failure was mild stroke (NIHSS<5) without large vessel occlusion (25%). 22 patients (21%) were using oral anticoagulant agents. History of intracranial hemorrhage, recent major surgery, presence of cerebral aneurysm or brain metastases, failure to obtain informed consent, resistant high blood pressure at admission, low ASPECT score and intrahospital delays were some of the other reasons. Some of other controversial factors including age, severe stroke, dementia, prior ischemic stroke and cerebral microbleeds did not affect our decision.

**Conclusion:** The reasons for the low utilization are multifactorial. Further investigations and educational programs are needed to clarify the clinician's uncertainty in the treatment of AIS.

**Disclosure:** Nothing to disclose

## EPO3068

### Tissue-type plasminogen activator-associated macro- and microstructural changes in patients with cerebral small vessel disease

M. Zabitova, A. Shabalina, E. Kremneva, K.V. Shamtieva, B. Akhmetzyanov, M. Krotenkova, L. Dobrynina

*Research center of Neurology, Moscow, Russian Federation*

**Background and aims:** White matter hyperintensity (WMH) is the main neuroimaging marker of cerebral small vessel disease (cSVD), leading to cognitive impairments, increased risk of stroke and disability. Tissue-type plasminogen activator (tPA) is secreted by endothelial cells and involved in key mechanisms of cSVD: inflammation, blood-brain barrier (BBB) disruption, endothelial dysfunction.

**Aim:** To estimate association between t-PA and macro- and microstructural changes in patients with cSVD

**Methods:** 71 patients with cSVD (48 f., 60.5±6.8) according to STRIVE and 21 age- and sex-matched healthy controls (15 f., 57.3±5.2) were included in study. Patients and control group underwent conventional and DTI MRI (3T) and laboratory testing for t-PA level. Macrostructural changes were assessed by the Fazekas (F) scale. As a marker of microstructural changes were used fractional anisotropy (FA) and mean diffusivity (MD) in WMH and normal-appearing white matter (NAWM) in different white matter regions. ANOVA ( $p < 0.05$ ) and Pearson correlation analyses were used

**Results:** WMH was corresponded to F1 stage in 17, F2–24, F3–30 patients. Significantly higher level of t-PA was determined between patients with F3 compare to control ( $p = 0.000$ ) and F1, F2 groups ( $p = 0.003$ ,  $p = 0.002$ ). Significant negative correlation was revealed between decrease in FA in WMH of anterior frontal lobe with t-PA increasing ( $r = -0.310$ ). Significant positive relationship was determined between increase in MD in NAWM of frontal lobes ( $r = 0.388$ ), temporo-parietal lobes ( $r = 0.428$ ) and increase in t-PA

**Conclusion:** We demonstrated an important role of t-PA in pathogenesis of white matter lesions and microstructural integrity changes in cSVD. Correlation with MD may suggest involvement of t-PA in BBB dysfunction.

**Disclosure:** Nothing to disclose

## EPO3069

**Proteomic changes in ischemic stroke**

R. Zhetishev<sup>1</sup>, P. Kamchatnov<sup>1</sup>, M. Melnikov<sup>1</sup>,  
L. Kovalev<sup>2</sup>, M. Kovaleva<sup>2</sup>

<sup>1</sup>Neurology, Neurosurgery and Medical Genetics, Pirogov Russian National Research Medical University, Moscow, Russian Federation, <sup>2</sup>A.N Bach Institute of Biochemistry Federal Research Center «Fundamentals Of Biotechnology», Moscow, Russian Federation

**Background and aims:** The search for biomarkers of cardiovascular diseases is a promising scientific field in medicine, which is important in the screening, diagnosis, prognosis and monitoring of the effectiveness of the therapy. Among all possible technologies for the search for new disease biomarkers, proteomic ones are the most promising. Of particular interest is the study of the protein composition of human brain tissue in cerebral infarction

**Methods:** Autopsy brain samples were obtained within 6 hours after the death of patients with ischemic stroke (n=4): the cortex and white subcortical substance in the infarction zone with the corresponding sites of the opposite brain hemisphere. 2-dimensional O'Farrell electrophoresis was used for fractionation. Peptide sets were studied by MALDI-TOF MS and MS/MS mass spectrometry. The quantitative content of proteins was calculated using the ImageMaster 2D Platinum version 7 software package.

**Results:** In the infarction zone a fraction of the isoform of 18.5kDa of the myelin basic protein (MBP) was found. A significant amount of MBP is preserved in the form of discrete, diminished forms only by amino acid residues of arginine, which turned it into citrulline. As a result, the preserved part of MBP shifted to the acid side of the pH gradient, and began to be detected with the equilibrium 2DE variant at the level of hemoglobin fractions.

**Conclusion:** Determination of arginine-deiminated forms of the MBP is a promising method for the diagnosis of the acute stage of cerebral stroke.

**Disclosure:** Nothing to disclose

## EPO3070

**Seizures in cerebral venous thrombosis: is it a predictor of poor prognosis?**

R. Zouari, M. Messelmani, M. Mansour, R. Mrissa,  
J. Zaouali

Neurology department, Military Hospital of Tunis, Tunis, Tunisia

**Background and aims:** Cerebral venous thrombosis (CVT) is a rare disease with potentially serious consequences, usually affecting young to middle-aged patients. Headaches, although frequently neglected, are the most common presentation of CVT. Therefore, seizures are often an alarming sign that urges the consultation.

We aimed to assess the predictors of CVT associated seizures and compare these patients with seizure-free patients (SFP).

**Methods:** A retrospective study was conducted over 10 years [2009-2019] including patients who attended our department of Neurology and were diagnosed with CVT. All patients had a neurological examination and were explored with a CT-scan and venous MRI(MRV).

**Results:** A total of 56 patients were enrolled with a sex-ratio M/F=19/37 and a mean age of 41,55 years (range:10-77). Among them, 17 patients (30%) had seizures as a revealing symptom and most of them were generalized (64%). Half of the patients with seizures (SP) had also focal motor deficits and altered consciousness. MRV showed an extensive CVT affecting multiple sinuses (58%) and venous infarction (64%) mostly frontoparietal. The majority of patients were seizure-free as soon as the anticoagulation and an antiepileptic monotherapy were initiated. Only one patient had recurrent seizures after CVT recovery leading to long-term antiepileptic therapy.

Compared to SFP, symptoms were remarkably more severe in SP (motor or sensitive deficit, altered consciousness) (58% vs. 20% and 47% vs. 12% respectively) and cerebral infarcts were more frequent in SP (82% vs. 29%). However, the outcome is nearly the same after treatment.

**Conclusion:** We concluded that the occurrence of seizure is predicting severe CVT cases but had no impact on long-term prognosis.

**Disclosure:** Nothing to disclose

## Cognitive neurology/neuropsychology 2

## EPO3071

**Could Telemedicine improve detection and diagnosis of Neurocognitive disorders in Nursing homes?**

A. Leperre Desplanques<sup>1</sup>, A. Maillet<sup>1</sup>, I. Hauger<sup>2</sup>, S. Mehrabian<sup>3</sup>, A. Politis<sup>4</sup>, S. Gaulier<sup>1</sup>, L. Cartz Piver<sup>5</sup>, B. Fougere<sup>6</sup>, P. Krolak Salmon<sup>1</sup>

<sup>1</sup>Clinical and Research Memory Centre, Lyon Institute for Elderly, Lyon University Hospital, Lyons, France, <sup>2</sup>Résidence Talanssa, Résidence Talanssa, Talence, France, <sup>3</sup>Department of Neurology, Medical University, Sofia, UH "Alexandrovska", Sofia, Bulgaria, <sup>4</sup>National and Kapodistrian University of Athens, Athens, Greece, <sup>5</sup>Limoges, France, <sup>6</sup>Division of Geriatric Medicine, Tours University Hospital, Tours, France

**Background and aims:** There is a lack of detection of neurocognitive disorders (NCD) in nursing homes (NH) in Europe. Obstacles include general practitioner's (GP) limited time, unawareness of diagnosis guidelines and tools, and difficulties to refer disabled patients to NCD specialist doctors. Telemedicine (TLM) could improve this situation.

**Methods:** During the "Act On Dementia" European Joint Action, 3 countries (Bulgaria, France, and Greece) tested TLM for NCD detection/diagnosis in 6 NH (1 in Bulgaria; 3 in Greece; 2 in France) from April to June 2018.

NCD detection tools were shared as well as satisfaction and dementia attitude questionnaires for NH staffs.

**Results:** The 6 NH were faced with various legal, ethical and practical requirements before TLM could be implemented. In Greece, NH staff followed a 30 hour teleeducational training about NCD. In France, there was current TLM for behavioral disorders, yet few requests for diagnosis, due to unawareness of diagnosis benefits for NH residents. In Bulgaria, NH staff training and 17 teleconsultations for NCD diagnosis took place.

All the NH teams were satisfied of TLM. The dementia attitude questionnaire results were similar between different NH, between countries, and between health professionals and other NH professionals.

**Conclusion:** This pilot helped identify facilitators to improve NCD diagnosis in NH, e.g. training about benefits of NCD etiological diagnosis for NH staff and GPs.

The main request for TLM for NCD in NH was for BPSD; NCD detection and diagnosis in NH could be improved by TLM when combined with BPSD evaluation.

**Disclosure:** Nothing to disclose

## EPO3072

**Management of an unusual presentation of spontaneous intracranial hypotension (SIH)**

A. Mahmood<sup>1</sup>, M. Bengner<sup>1</sup>, S. Mohideen<sup>1</sup>, L. Mantoan<sup>2</sup>, B. Stanton<sup>1</sup>

<sup>1</sup>Neurology/stroke, King's College Hospital, London, United Kingdom, <sup>2</sup>London, UK,

**Background and aims:** A 49-year-old woman presented with a 9 month history of progressive cognitive decline, predominantly affecting memory and language, and worsening somnolence. In the few weeks prior to presentation her family reported occasional intermittent generalised headaches (although this was a minor feature), worsening postural instability, intermittent right hand tremors and urinary incontinence, with symptomatic improvement after lying flat.

Positive examination findings included: apathetic affect, vertical gaze restriction, persistent right-sided pill-rolling tremor, rigidity and bradykinesia, globally brisk reflexes and a markedly unsteady gait. Her ACE was 50/100.

Brain MRI showed features consistent with intracranial hypotension with suggestion of possible dural leak at C7. Initial Digital Subtraction Myelogram (DSM) was non-diagnostic, but repeat DSM identified a leak at C6-7 with a large irregular diverticulum.

**Methods:** Not applicable

**Results:** A blind blood patch at mid-thoracic level showed a temporary improvement in symptoms (ACE transiently increased to 75). An L-dopa challenge worsened her somnolence. Subsequently, a CT-guided fibrin patch was injected at C6/7 which again only yielded a transient improvement. Finally, definitive surgical repair of the diverticulum effected a dramatic and permanent improvement in both her cognitive and motor symptoms (ACE 85 on discharge).

**Conclusion:** SIH presenting with cognitive decline and parkinsonism is a challenge to diagnose and manage. DSM – which may require multiple attempts – is an ideal aid in diagnosing CSF leaks. Cognitive presentations can be challenging to manage with percutaneous procedures, and definitive management often requires open surgery.

**Disclosure:** Nothing to disclose

## EPO3073

**Profile of behavioural and psychological symptoms in vascular parkinsonism with dementia**

R. Manso Calderon, M.D. Sevillano-García  
*Neurology Department, Complejo Asistencial de Salamanca (CAUSA), Salamanca, Spain*

**Background and aims:** The clinical profile in vascular parkinsonism with dementia (VPD) is not well described in the literature, especially with regard to behavioural and psychological symptoms (BPS). Our goal is to evaluate the frequency of BPS in VPD.

**Methods:** This is an observational descriptive study that prospectively recorded data of 48 consecutive patients, who met vascular parkinsonism criteria proposed by Zijlmans plus dementia, in 2 outpatient neurological consultations in Salamanca, Spain. Mean age at onset was 74.3±7.9 years, mean duration of dementia 4.3±2.8 years, 45.8% were women, MMSE score 15.9±6.3. 85.4% exhibit hypertension, 41.7% diabetes, 66.7% dyslipemia, 41.7% cigarettes and 25% alcohol consumption. 17.1% reported previous transient ischemic attack, 75% ischemic stroke, 4.2% hemorrhagic stroke and 55.1% recurrent cerebrovascular events. The Neuropsychiatric Inventory (NPI) was used to assess BPS.

**Results:** At least one BPS occurred in 97.9% of VPD participants; the median NPI score was 46 (range:0-132), with a median number of 5 symptoms per patient. The most frequent symptoms were depression (70.8%) apathy (70.8%), sleep disturbances (64.6%) and irritability (64.6%), followed by agitation (54.2%), anxiety (54.2%), delusions (52.1%), hallucinations (41.7%), appetite/eating abnormalities (33.3%), disinhibition (27.1%), aberrant motor behaviour (18.8%) and euphoria (8.3%). 52.1% received antidepressants, 43.8% antipsychotics, 35.4% anxiolytics and 25% hypnotics. It is remarkable that 8 of 16 patients with appetite/eating abnormalities showed hyperphagia.

**Conclusion:** BPS are frequent in VPD. New investigations are required to better evaluate the relationship between neuroimaging evidence of cerebrovascular disease in VPD and different BPS profiles.

**Disclosure:** Nothing to disclose

## EPO3074

**Cognitive Impairment in early stages of White Matter diseases**

F. Masuzzo<sup>1</sup>, Y. Camassa<sup>1</sup>, P. Cavalla<sup>2</sup>, P. Perozzo<sup>1</sup>, G.C. Geminiani<sup>1</sup>, L. Lopiano<sup>2</sup>, G. Vaula<sup>1</sup>

<sup>1</sup>Neuroscience, Molinette Hospital, Turin, Italy, <sup>2</sup>Turin, Italy

**Background and aims:** We tried to clarify the differences in White Matter diseases analyzing 2 leucoencephalopathies: Multiple Sclerosis (MS) and CADASIL (Cerebral Autosomal Dominant Arteriopathy with Subcortical Infarcts and Leucoencephalopathy).

**Methods:** We enrolled 15 patients with MS and 14 ones with CADASIL. All participants were right-handed and showed no sign of cognitive impairment or campimetric deficit. They assessed the Poffemberger test, that inspects reaction times analyzing 4 different conditions (LVF-LH left visual field-left hand, LVF-RH left visual field-right hand, RVF-LH right visual field-left hand, RVF-RH right visual field-right hand) and the BRB-NT (Brief Repeatable Battery Neuropsychological test or RAO battery).

**Results:** Considering the Poffemberger test, we found a statistical difference between the groups in LVF-LH  $p=0.05$  and CUD (Crossed Uncrossed Difference)  $p=0.026$ , with negative marks in the 2nd group. The comparison of the mean values of BRB reached a significative difference in WLG (Word List Generation) test ( $p=0.03$ ), with lower scores in CADASIL patients. A comparison of proportion in single domain showed lower scores in PASAT (Paced Auditory Serial Addition task) in MS patients ( $p=0.01$ ). We completed the analysis with a Spearmann Rank Correlation, that pointed out no correlation within reaction times, age and education.

**Conclusion:** Our results could be interpreted as a major lobar lesion load in vascular leucoencephalopathy. Moreover since the early stages of the diagnosis, verbal fluence (tested by WLG) has been compromised in patients with CADASIL. Finally, we might say that executive functions represent the weakest domain in MS, and they get worse over the years.

**Disclosure:** Nothing to disclose

## EPO3075

**Therapy of post-stroke dementia on the example of memantine**

N. Maxamatjanova, Z. Ibodullayev  
Tashkent, Uzbekistan

**Background and aims:** According to various studies, post-stroke cognitive impairment of varying severity is detected in 40-70% of stroke patients, on average, in about half of patients.

To study the effectiveness of memantine in the treatment of post-stroke dementia.

**Methods:** The study was conducted on 30 patients with ischemic stroke hemispheric localization in retro ventricular projection. The age of patients 60 to 75 years. Patients were divided into groups: 1st-main (15 people) receiving basic therapy and memantine); 2nd - control (15 people) who received only basic therapy, without memantine. Assessment of cognitive function was performed on the MMSE scale.

**Results:** Cognitive impairment was studied in 30 patients on the MMSE scale on the 1st day of hospitalization in the clinic, among them 17 patients (56.7%) showed a mild degree of disorders - 21-27 (average 24) points, in 8 patients (26, 7%) the average degree is 11-18 (14.5) points; in 5 patients (16.6%), the severe degree is 3-10 (6.5) points.

A 2nd study was conducted after 1 month on an outpatient basis. In group 1, in 6 patients, cognitive disorders were not detected (40%); 5 patients (33.3%) have a mild degree of disorders; 4 patients (26.7%) had an average degree of disorders. In the 2nd group: in 7 patients (51.7%) a mild degree of cognitive impairment was revealed; 5 patients (33.3%) - moderate; 3 patients (15%) have a severe degree of disorders.

**Conclusion:** This study showed that memantine effectively affects behavioral disorders, patient aggressiveness, thought processes, and the memory of patients with post-stroke dementia.

**Disclosure:** Nothing to disclose

## EPO3076

**Withdrawn**

## EPO3077

**Recovery of cognitive and neurological functions in patients with ischemic stroke.**

R. Sharafutdinova<sup>1</sup>, I. Bakhtogirimov<sup>2</sup>  
<sup>1</sup>Ulyanovsk, Russian Federation, <sup>2</sup>Ulyanovsk State University, Medical Institute, Ulyanovsk, Russian Federation

**Background and aims:** To study the degree and dynamics of restoration of cognitive and neurological functions in patients with acute ischemic stroke (AIS) in vertebral basilar basin (VBB) and in right middle cerebral artery basin (RMCAB).

**Methods:** The research was conducted at Central Clinical Health Department. 182 patients (95 women & 87 men) between 39-82 years were studied in acute(1 & 10 days) period with AIS in VBB and RMCAB. In addition to studies of neurological status and routine research methods, we used MMSE and MOCA-test.

**Results:** The average age of patients with AIS in VBB was 60.79±11.14 (women 64.11±10.13, men 57.80±11.40), patients with AIS in RMCAB was 65.46±12.28 years old (women 65±10.11, men 64.40±16.47). In course of the data analysis, reliable results (p<0.05) were obtained that in the most acute(1 day) period of AIS patients with localization in RMCAB had more pronounced cognitive disturbances in comparison with patients with AIS in VBB, and more pronounced dynamics of recovery in acute period (10 days). Also statistically significant (p<0.05) were results of evaluation of neurological deficit and dynamics of its recovery in 2 groups of patients. Patients with AIS in RMCAB had more pronounced neurological deficit compared to patients with AIS in VBB, both in 1 and 10 days.

**Conclusion:** Patients who had AIS in RMCAB had more pronounced cognitive impairment and lower recovery rates than patients with AIS in VBB. Patients with AIS in RMCAB had more neurological deficits than patients with AIS in VBB. Also, the dynamics of neurological function recovery in AIS patients in RMCAB is less pronounced than in AIS patients in VBB.

**Disclosure:** Nothing to disclose

## EPO3078

**Associations of separate working memory parameters with COMT genotypes in Western Siberia**

A. Sukhanov, S. Semaev, V. Maksimov

*Laboratory of molecular genetic research of therapeutic diseases, "Research Institute of Internal and Preventive Medicine" -Branch of the Federal State Budget Scientific Institution "The Federal Research Center Institute of Cytology and Genetics of Siberian Branch of the Russian Academy of Sciences", Novosibirsk, Russian Federation*

**Background and aims:** To evaluate the associations between working memory parameters and Val158Met (rs4680) polymorphism of the COMT gene in young adults.

**Methods:** 371 young adults of both sexes 25-44 years old were recruited from population sample of Novosibirsk. The study included 199 (53,6%) men (average age was 36,54±5,67 years) and 172 (46,4%) women (average age was 36,84±5,75 years). Cognitive function were determined by standardized screening methods. Luria's 10-words test, letter cancellation test (modified Bourdon's test), and test of excluded of incorrect words (verbal version of the test) with fixing the time for its implementation, as well as animal naming test were used. Genomic DNA was isolated from venous blood by the phenol-chloroform extraction. Genotyping of the Val158Met polymorphism (rs4680) of the COMT gene was performed using PCR with RFLP.

**Results:** Statistically significant associations ( $p < 0.05$ ) between quantity of the animals who are correctly called in 1 minute, with time which was spent for exclusion of incorrect words, as well as with the 1st reproduction of the words memorized immediately in Luria test and Val158Met (rs4680) polymorphism of the COMT gene in young adults were revealed. Moreover the quantity of the complaints about the forgetfulness of used phone numbers had significantly higher in the presence of 1 or 2 A alleles of the Val158Met polymorphism of the COMT gene.

**Conclusion:** The allele A of the Val158Met (rs4680) polymorphism of the COMT gene, especially in the homozygous state, has a significant association with the working memory parameters of Novosibirsk residents.

**Disclosure:** Nothing to disclose

## EPO3079

**Associations of separate working memory parameters with apolipoprotein E gene polymorphism at the Siberian adolescents: the population-based study**

A. Sukhanov<sup>1</sup>, S. Semaev<sup>1</sup>, D. Denisova<sup>2</sup>, V. Maksimov<sup>1</sup>

<sup>1</sup>*Laboratory of molecular genetic research of therapeutic diseases, "Research Institut of Internal and Preventive Medicine" -Branch of the Federal State Budget Scientific Institution "The Federal Research Center Institute of Cytology and Genetics of Siberian Branch of the Russian Academy of Sciences", Novosibirsk, Russian Federation,*

<sup>2</sup>*Laboratory of clinical, population-based and preventive researches of therapeutic and endocrine diseases, "Research Institute of Internal and Preventive Medicine" -Branch of the Federal State Budget Scientific Institution "The Federal Research Center Institute of Cytology and Genetics of Siberian Branch of the Russian Academy of Sciences", Novosibirsk, Russian Federation*

**Background and aims:** To investigate the associations between apolipoprotein E (APOE) gene polymorphism and its influence on a verbal memory in adolescence population of Novosibirsk city (the largest scientific and industrial centre of West Siberia).

**Methods:** Cross-sectional population-based survey of randomly representative sample of school students aged 14-17 of both sexes in Novosibirsk was implemented (totally enrolled 549 persons). Cognitive domains were determined by standardized screening methods. Letter cancellation test (modified Bourdon's test), Luria's 10-words test and test of excluded of incorrect words were used. Genomic DNA was isolated from venous blood by the phenol-chloroform extraction. General linear models (GLM) were used to test the association between variation in the APOE polymorphism (e4 presence vs. absence) and memory measures.

**Results:** APOE gene polymorphism was tested at 290 persons (117 male, 173 female). The main effect of e4 allele presence in GLM on the mean quantity of errors at reproduction of the words memorized immediately in Luria's test is significant,  $F(1,285)=4.49$ ,  $p < 0.05$ . From the estimated marginal means, it can be seen that the subjects made significantly more errors with e4 allele presence ( $M=2.21$ ), than without e4 allele ( $M=1.85$ ). The main effects of age and sex are not significant ( $F(1,285)=1.15$ ,  $p > 0.05$ , and  $F(1,285)=2.27$ ,  $p > 0.05$ , respectively). The age\*sex interaction is not significant,  $F(1,285)=1.57$ ,  $p > 0.05$ .

**Conclusion:** The allele e4 of the apolipoprotein E gene has a significant association with the working memory parameters in adolescence population of Novosibirsk city.

**Disclosure:** Nothing to disclose

## EPO3080

**Excessive daytime sleepiness prevalence and associated psychosocial problems in Siberian urban adolescents: the school-based study**

S. Tereshchenko, M. Shubina

*Department of child's physical and mental health, Scientific Research Institute of Medical Problems of the North, Krasnoyarsk, Russian Federation*

**Background and aims:** Excessive daytime sleepiness (EDS) is 1 of the most common sleep disorders in adolescents associated with social behaviors patterns and school performance. The Strengths and Difficulties Questionnaire (SDQ) was developed by R. Goodman [1] as a brief psychopathological screening tool that has been recommended for the detection and classification of psychosocial problems in adolescents. Data regarding the SDQ assessment in adolescent with sleep disturbances are limited.

**Methods:** 3022 urban Siberian (Krasnoyarsk) school-based adolescents (aged 12-18; boys/girl ratio 1393/1629) were tested with self-report version of SDQ questionnaire and Pediatric Daytime Sleepiness Scale (PDSS [2]); cutoff for EDS was 15 points, as was proposed [2]. Chi-square test was used.

**Results:** The prevalence EDS was 28.0%. The prevalence of EDS was significantly higher among girls (35.1%) compared to boys (20.4%,  $p < 0.001$ ) and among older (aged 15-18, 24.0%) compared to younger (aged 12-14, 32.7%,  $p < 0.001$ ) adolescents. Significant positive associations were detected between SDQ and PDSS scores and (Kruskal-Wallis test  $< 0.001$ ; Fig. 1).

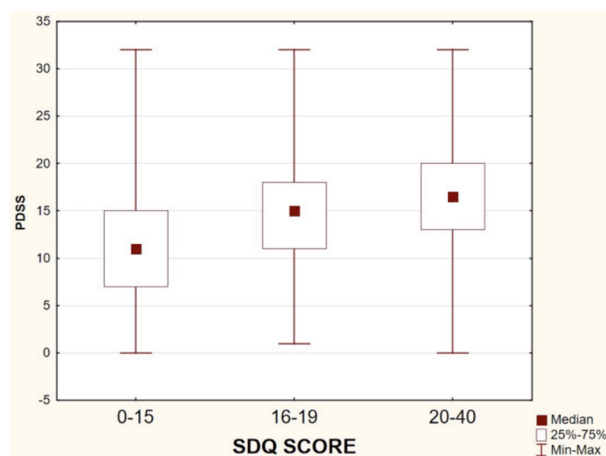


Figure 1. PDSS scores in adolescents with different SDQ scores.

**Conclusion:** The prevalence of EDS with PDSS cutoff 15 points in Central Siberia urban adolescents is very high (35.1%). EDS is closely associated with adolescence psychosocial problems.

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*Adolesc Psychiatry* 2001; 40(11): 1337-45. Drake C. The pediatric daytime sleepiness scale (PDSS): sleep habits and school outcomes in middle school children. *SLEEP* 2003; 26(4):455-458. Meyer C. Proposal of cutoff points for pediatric daytime sleepiness scale to identify excessive daytime sleepiness. *Chronobiology International* 2018; 35(3): 303-11.

**Disclosure:** Nothing to disclose

## EPO3081

**A Rare Case of Transient Global Amnesia Caused by A Brain Tumor**B.G. Turk<sup>1</sup>, A.F. Özdemir<sup>2</sup>, C. Işler<sup>2</sup><sup>1</sup>Istanbul, Turkey, <sup>2</sup>Department of Neurosurgery, Istanbul University-Cerrahpasa, Cerrahpasa Faculty of Medicine, Istanbul, Turkey

**Background and aims:** Transient global amnesia (TGA) is defined as a period of an anterograde and retrograde amnesia that lasts up to 24 hours. The exact etiological mechanism has not been known yet. Among the other reasons; the co-occurrence of brain tumor and TGA is extremely rare, happening to have approximately 20 cases reported in the literature. Here we present a case with TGA whom to have a brain tumor.

**Methods:** 55-year-old right-handed woman was referred to the neurology outpatient clinic. She had a complaint of memory loss for 3 hours. During this period she was able to recognize who she is, where she is. Only she kept asking repetitive questions about what happening within just. After 3 hours; spontaneously her symptoms recovered completely. Magnetic resonance (MR) brain imaging showed a lesion at the right frontal lobe (Figure-1). The imaging findings were thought most likely to indicate low-grade neoplasia. Surgical resection of the lesion was offered to her, but she preferred not to. She is under clinical and radiological follow up for last 3 months.

**Results:** There are cases of TGA associated with brain tumors in the various locations. In our case the tumor was locating at the non-dominant frontal lobe and it's known that frontal lobe has a role in the temporal processing of the memory.

**Conclusion:** The evidence suggests that the concurrence of brain tumor and TGA is extremely rare. However; on the basis of the location of the tumor we interpreted that TGA is relevant with the tumor itself.

**Disclosure:** Nothing to disclose

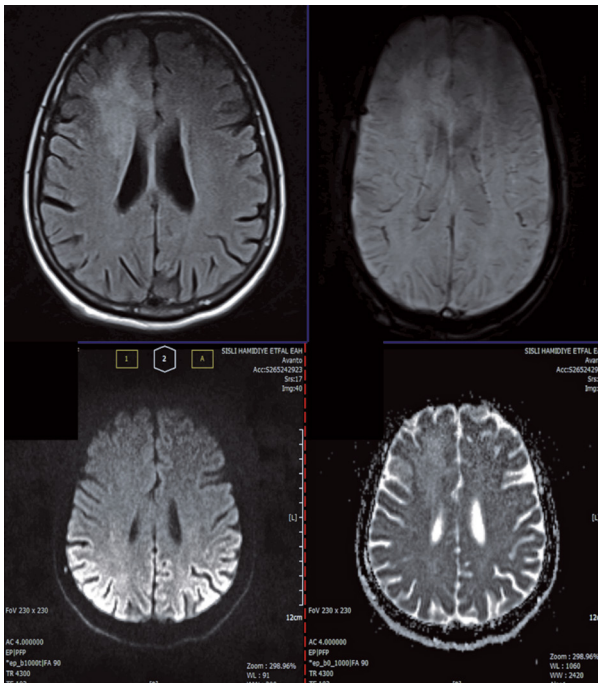


Figure-1: Cranial MRI of the patient



### EPO3082

#### The Average Reaction Time and the Speed of the Fine Motor Skills in the Patients with Arterial Hypertension and Vascular Mild Cognitive Impairment

S. Likhachev, E. Sidorovich, T. Paulouskaya, A.V. Astapenko, V. Vashchylin  
 Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus

**Background and aims:** The assessment of the average reaction time (ART) and the fine motor skills performance in the patients with arterial hypertension (AH) and vascular mild cognitive impairment (VaMCI).

**Methods:** The study subjects were 150 patients with VaMCI (n=65) and those without VaMCI (n=85) in AH (Table 1). Cognitive performance tests included MoCA scale and Shulte's tables. Fine motor skills were assessed by the Nine Hole Peg Test (NHPT), by the 10 sequential finger tapping (FT) and by the computerized testing (while patients were to hit the center of the repeatedly appearing target square with the cursor and to tap mouse button). ART (from the moment of appearing square to the moment of moving the mouse) and average time before clicking (ATC-from the moment of appearing square to the mouse clicking the square) were automatically calculated.

Table 1 – Characteristics of the patients included

patients with AH (not achieving target blood pressure)	150
grade I hypertension n (%)	72 (48%)
grade II hypertension n (%)	78 (52%)
male/female (n)	67/83
age (mean±SD)	55,4±9,1

Table 1 – Characteristics of the patients included

**Results:** It was found that the ART (427.0±61.1 vs 385.6±65.4ms, p<0.001) and ATC (2349.3±359.2 vs 1944.0±313.4ms, p<0.001) as well as the NHPT time (23.5±2.9 vs 21.7±2.6sec, p<0.001) and FT time (20.5±4.9 vs 15.3±2.3sec, p<0.001) were significantly higher in VaMCI patients compared to the patients without VaMCI. MoCA total score and Shulte's tables time significantly correlated with ART (R=-0.37, p<0.001 and R=0.42, p<0.001), ATC (R=-0.52, p<0.001 and R=0.48, p<0.001), NHPT time (R=-0.48, p<0.001 and R=0.35, p<0.001), FT time (R=-0.54, p<0.001 and R=0.48, p<0.001).

**Conclusion:** The increase of the ART, ATC as well as NHPT time and FT time may be suggested as early markers of psychomotor slowing and may be valuable in earlier diagnosing VaMCI in the patients with AH.

**Disclosure:** Nothing to disclose

### EPO3083

#### The Subclinical Statokinetic Instability in the Patients with Arterial Hypertension and Vascular Mild Cognitive Impairment

E. Sidorovich<sup>1</sup>, T. Paulouskaya<sup>1</sup>, A.V. Astapenko<sup>1</sup>, V. Vashchylin<sup>1</sup>, T. Borisova<sup>2</sup>  
<sup>1</sup>Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus, <sup>2</sup>Minsk Clinical Consulting and Diagnostic Centre, Minsk, Belarus

**Background and aims:** The aim of the study was detecting early diagnostic markers of statokinetic instability (SI) by static stabilography data in the patients with arterial hypertension (AH) and vascular mild cognitive impairment (VaMCI).

**Methods:** The study subjects were 150 patients with grades I and II of AH (male/female - 67/83, age 55.4±9.1) not achieving target blood pressure and 30 healthy controls. Patients with other risk factors for cerebrovascular disease (excepting AH) were excluded. Cognitive performance examination used Montreal Cognitive Assessment (MoCA). Patients with AH were categorised as having VaMCI and without VaMCI according to Petersen's criteria. Postural function was assessed by the computerized static stabiloplatfrom ("Stabilan 01" Russia) using the parameters: the ellipse area (EA), the quality of balance function (QBF), the average speed of pressure center movement (ASPCM).

**Results:** It was found that more pronounced SI in the patients with VaMCI in AH was evidenced by larger EA and ASPCM as well as the decrease of QBF compared to the subjects without VaMCI in AH and healthy controls. There was no significant difference in postural stability in the patients without VaMCI in AH and the healthy controls (Table 1). The significant negative correlation between MoCA total score and EA (R=-0.30; p<0.001) and ASPCM (R=-0.31; p<0.001) as well as positive correlation with QBF (R=0.33; p<0.001) were found.

Parameters	Patients with AH and VaMCI n=65 median [IQR]	Patients with AH without VaMCI n=85 median [IQR]	Healthy controls n=30 median [IQR]	Kruskal-Wallis H-test
	1	2	3	
EA (mm <sup>2</sup> )	163,1 [104,8; 278,0]  Z <sub>1,3</sub> =3,79; p <sub>1,3</sub> <0,001 Z <sub>1,2</sub> =2,49; p <sub>1,2</sub> =0,041	121,3 [79,8; 235,7]  Z <sub>2,3</sub> =2,09; p <sub>2,3</sub> =0,108	103,0 [77,4; 139,8]	H=15,1 p<0,001
QBF (%)	71,6 [59,9; 80,6]  Z <sub>1,3</sub> =4,48; p <sub>1,3</sub> <0,001 Z <sub>1,2</sub> =3,02; p <sub>1,2</sub> =0,008	79,7 [69,8; 86,7]  Z <sub>2,3</sub> =2,21; p <sub>2,3</sub> =0,083	84,8 [80,2; 88,1]	H=21,7 p<0,001
ASPCM (mm/s)	12,1 [9,7; 15,9]  Z <sub>1,3</sub> =4,46; p <sub>1,3</sub> <0,001 Z <sub>1,2</sub> =3,04; p <sub>1,2</sub> =0,007	10,1 [7,7; 12,4]  Z <sub>2,3</sub> =2,18; p <sub>2,3</sub> =0,088	8,6 [7,5; 9,8]	H=21,6 p<0,001

Table 1. - Parameters of static stabilography in the patients with AH and VaMCI, the patients with AH without VaMCI and the healthy control subjects

**Conclusion:** VaMCI in the patients with AH was associated with the subclinical SI detected by static stabiloplatform. Assessment of stabilography parameters (EA, QBF, ASPCM) may be suggested as an early markers of SI in the patients with VaMCI in AH.

**Disclosure:** Nothing to disclose

## EPO3084

### Psychoemotional distress in parents of patients with Autism Spectrum Disorders: a cohort study

T. Voloshyn<sup>1</sup>, V. Kozyavkin<sup>1</sup>, O. Kozyavkina<sup>2</sup>, N. Kozyavkina<sup>3</sup>

<sup>1</sup>TRUSKAVETS, Ukraine, <sup>2</sup>Elita Rehab Center, Lviv, Ukraine,

<sup>3</sup>International Clinic of Medical Rehabilitation, Larnaca, Cyprus

**Background and aims:** Treatment of children with ASD should not be singly related to patients themselves. The prolonged emotional stress experienced by the parents of a child with autism forms certain features of their personality, such as increased sensitivity and anxiety, insecurity, internal contradictions. Such an emotional state, coupled with anxiety, uncertainty in itself, in turn, adversely affects the emotional and personal development of the child.

The social demand of parents of ASD children for a qualitative and timely examination, diagnosis, systematic medical and psychological and pedagogical assistance does not always correspond to the realities of life. Faced with a disease, the family can be isolated because of misunderstanding or rejection by society.

**Methods:** After baseline examination, 358 parents of patients with ASD (F84.0) (mean age 32.2y., range 21-46y.) were examined using Autism Spectrum Questionnaire (ASQ), Family Quality of Life Survey (FQoLS-2006), Analysis of Family Relations- Eidemiller version (AFR), Internet Addiction Test (IAT), General Health Questionnaire (GHQ-28).

**Results:** Parents of ASD children have increased levels of anxiety, social dysfunction, psychological instability that is primary (commonly occurring problems in the perinatal period, parents of mostly older age) and the secondary (constant psycho-emotional stress associated with the increased care and supervision after ASD child). They have more autistic traits than average, moderate-level of Internet addiction.

**Conclusion:** The system of interaction with the child isn't formed enough and most often manifests itself in the form of disharmonious education strategies. Interaction is mandatory between parents of ASD children and neurologists, psychologists, speech therapists involved in family-based rehabilitation.

**Disclosure:** Nothing to disclose

## EPO3085

**A clinical case report of a probable Heidenhain Variant of Creutzfeldt-Jakob Disease**B. Vuchkova<sup>1</sup>, J. Samuel<sup>2</sup>, M. Dimitrova<sup>3</sup><sup>1</sup>*N.I. Pirogov, Sofia, Bulgaria*, <sup>2</sup>*Sofia, Bulgaria*, <sup>3</sup>*Neurology, UMHATEM "N.I.Pirogov", Sofia, Bulgaria*

**Background and aims:** Creutzfeldt-Jakob Disease (CJD) is a rapidly progressive, rare, transmissible, fatal, neurodegenerative condition caused by defects in prion proteins. It has been classified into sporadic, hereditary, acquired and variant types, and clinically presents with rapidly progressing dementia, ataxia, myoclonus and psychiatric symptoms. The Heidenhain variant is characterized by isolated visual disturbances at disease onset

**Methods:** A 65-year-old man presented with complaints of progressive loss of vision, visual field restriction, disturbed color perception, behavioral and personality changes along with difficulty recognizing relatives that evolved over a period of 2 months. The patient underwent physical and neurological examinations (NE), Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) of the Brain, Electroencephalography (EEG), ophthalmological tests, screening for autoimmune encephalitis, Cerebrospinal Fluid (CSF) and serological tests for infections.

**Results:** NE on admission revealed bilateral amaurosis, optical apraxia, psychomotor slowing, executive function impairment and extrapyramidal symptoms of bradykinesia and rigidity. EEG recordings showed periodic sharp-wave complexes, paroxysmal discharges, and diffuse non-specific slowing. Brain MRI with contrast showed no significant pathological changes. Screening for autoimmune encephalitis, serological and CSF tests for viral, bacterial, as well as toxic-metabolic etiologies were negative. Genetic tests for mutations in the PRNP gene were negative. The CSF biomarker analysis of protein 14-3-3 was positive. Within a couple of weeks, the patient's condition worsened into severe dementia with loss of speech and mobility.

**Conclusion:** The patient had a fatal outcome within four months of disease onset. We present a clinical case of a probable Heidenhain variant of CJD with an extremely rapid disease progression.

**Disclosure:** Nothing to disclose

## EPO3086

**Saliva THz Analysis in Alzheimer's Disease, Relatives and Caregivers**I. Zhukova<sup>1</sup>, E. Kolupaeva<sup>1</sup>, N. Zhukova<sup>1</sup>, O. Izhboldina<sup>1</sup>, D. Vrazhnov<sup>2</sup>, M. Popova<sup>3</sup><sup>1</sup>*Department of Neurology and Neurosurgery, Siberian State Medical University, Tomsk, Russian Federation*, <sup>2</sup>*Tomsk, Russian Federation*, <sup>3</sup>*Laboratory of Biophotonics, Tomsk State University, Tomsk, Russian Federation*

**Background and aims:** The current diagnostic methods of the Alzheimer's disease (AD) are inefficient, expensive, and unsuccessful at making diagnoses during the earliest stages of the disease progression. Patients with AD usually need a high level of care in all types of everyday life, most of which are provided by family members, friends, or caregivers. Caregivers must cope with both age-related conditions and dementia-related factors. The burden of care could be a reason of cognitive impairment and negative outcomes on a quality of life in family members and informal care. Recent works show promising approach by saliva analysis via Raman Hyperspectroscopy. Several works demonstrate ability to diagnose AD by terahertz spectroscopy (THz) of the brain tissue by the low level of tryptophan and beta-amyloid plaque buildup within grey matter.

The aim of study is search of the potential markers of neurodegenerative process in saliva in patients with AD, relatives and caregivers.

**Methods:** In our work the THz time-domain spectroscopy (THz-TDS) was used to compare defrosted and dried saliva samples from AD patients, relatives and caregivers. Further analysis was made by machine learning methods. Principal component analysis and unsupervised learning methods were used to visualize and study latent relations in the initial data.

**Results:** The aforementioned methods was applied to 3 subject groups: 12 adults with the AD, their 8 healthy relatives, and 9 healthy caregivers. The obtained results show difference between groups by THz-TDS.

**Conclusion:** THz-TDS is a promising technique for early diagnosis of neurodegenerative process.

**Disclosure:** Nothing to disclose

## Epilepsy 4

## EPO3087

**Paediatric epilepsy monitoring unit: 8 years experience**

M. Seabra<sup>1</sup>, J. Mendes-Ribeiro<sup>2</sup>

<sup>1</sup>Porto, Portugal, <sup>2</sup>Neurophysiology, Centro Hospitalar e Universitário de São João, Porto, Portugal

**Background and aims:** Adult epilepsy monitoring units (EMU) are primarily dedicated to surgical evaluation of known epilepsies. When evaluating children, the study of paroxysmal events is the most important indication. Our aim was to characterize the population of children admitted to the paediatric EMU.

**Methods:** Observational, retrospective study to characterize clinical, imaging and neurophysiologic features of patients admitted to the paediatric EMU between January 2010 and November 2018.

**Results:** We analysed 329 Video-EEG exams. 56% were males, with a mean age of 6 years. Differential diagnosis was the most common (46%) indication for the exam. 196 children (59%) did not have an epilepsy diagnosis. 109 (33%) had a normal MRI, 56 (17%) had a single lesion and 69 (21%) multiple lesions. Patients were monitored for a mean of 30 hours. 66 (20%) had at least one seizure, 153 (46,5%) had interictal EEG activity and in 124 (38%) interictal dysfunction was detected in the EEG. 43 (13%) had a diagnosis of an epileptic encephalopathy and in 30 a genetic mutation/Cromossomopathy was detected.

**Conclusion:** This series shows our centre's 8 years experience with paediatric EMU. This is a vital exam for its value in diagnosing and managing epileptic and non epileptic cases. We also highlight the short duration of the Video-EEG needed to capture the abnormal events, making it an efficient tool in this population.

**Disclosure:** Nothing to disclose

## EPO3088

**Women's issues in epilepsy: a cross-sectional survey of community pharmacists' knowledge in the West Bank of the occupied Palestinian territories**

R. Shawahna

Pharmacology, An-Najah National University, Nablus, PALESTINIA

**Background and aims:** Community pharmacists are key providers of healthcare services for patients with chronic diseases including women with epilepsy. This study was conducted to assess pharmacist's knowledge of women's issues in epilepsy in the West Bank of the occupied Palestinian territories.

**Methods:** This study was conducted using a cross-sectional observational design. The study participants were community pharmacists of both genders. A total of 500 community pharmacists were approached in person in their places of work and invited to take part in the study. After collecting their sociodemographic and practice details, the participants responded to a validated and reliable 12-item KOWIE-II knowledge questionnaire of women's issues in epilepsy.

**Results:** The questionnaire was completed by 408 pharmacists, giving a response rate of 81.6%. On the 12-item questionnaire, the median correct score was only 53.8% with an IQR of 30.8. Pharmacists who interacted with  $\geq 10$  patients with epilepsy per month were 1.61 (95% CI of 1.04-2.49) more likely to score  $\geq 60\%$  in the test than those who interacted with  $< 10$  patients with epilepsy per month. Nearly 91% of the pharmacists answered correctly the question on the role of folic acid in reducing teratogenesis and only 46% answered correctly the question on exposure to valproic acid and the risk of giving birth to a child with autism.

**Conclusion:** Although pharmacists could be knowledgeable and in key position to provide essential information to patients with chronic diseases, in this study pharmacists were fairly knowledgeable of issues pertaining to women's general health issues.

**Disclosure:** Nothing to disclose

## EPO3089

**A Multicenter Retrospective Study evaluating Brivaracetam in the treatment of epilepsies in clinical practice.**

M. Stefanatou<sup>1</sup>, E. Kapetanou Vasileiadou<sup>2</sup>, V. Kimiskidis<sup>3</sup>, V. Papaliagkas<sup>3</sup>, P. Polychronopoulos<sup>4</sup>, S. Markoula<sup>5</sup>, K. Charisiou<sup>5</sup>, D. Kazis<sup>6</sup>, A. Verentzioti<sup>7</sup>, P. Patrikelis<sup>7</sup>, A. Alexoudi<sup>7</sup>, S. Gatzonis<sup>7</sup>

<sup>1</sup>*1st Department of Neurology, National and Kapodistrian University of Athens, Athens, Greece,* <sup>2</sup>*Department of Applied Statistics, University of Piraeus, Piraeus, Greece,* <sup>3</sup>*Laboratory of Neurophysiology, Aristotle University of Thessaloniki, Thessaloniki, Greece,* <sup>4</sup>*Department of Neurology, University of Patras, Rio/Patra, Greece,* <sup>5</sup>*Department of Neurology, University of Ioannina, Ioannina, Greece,* <sup>6</sup>*Department of Neurology, Aristotle University of Thessaloniki, Thessaloniki, Greece,* <sup>7</sup>*A Dept of Neurosurgery, National and Kapodistrian University of Athens, Evangelismos Hospital, Athens, Greece*

**Background and aims:** Introduction: Brivaracetam (BRV) is the latest approved antiepileptic drug and acts as a synaptic vesicle protein 2A ligand. The aim of the present study was to evaluate the efficacy and tolerability of BRV in every day clinical practice.

**Methods:** In this retrospective, observational, multicentre study, data from epilepsy patients receiving BRV anytime from January 2018 to July 2019 were collected. Patients with age  $\geq 16$  who had at least one follow up were included.

**Results:** 156 consecutive patients were included in the study (82 males, 74 females). The mean age was 40 (16-84 yrs), the mean duration of epilepsy was 21 yrs and 39% of them suffered from drug resistant epilepsy. Of the 156 patients, 81% were diagnosed with focal onset epilepsy, 16% with generalized seizures while 3% suffered from unclassified seizures. The mean cosponsored drugs with the BRV treatment were 2.28 at baseline. 9 patients received BRV as monotherapy. After BRV treatment, the rate of  $\geq 50\%$  responder was 36%. Seizure freedom was achieved in 56 (39%) patients, while 15% remained unchanged. 6 patients (4%) were recorded with increased seizure frequency, while the remaining 9% had a responder less than 50%.

26 patients (17%) showed clinically significant adverse events. 16 patients discontinued BRV after the 1st follow up. The reasons for discontinuation were lack of efficacy (2 patients) and adverse events (10 patients) or both (4 patients).

**Conclusion:** Brivaracetam seems to be an effective, easy to use and safe antiepileptic drug in clinical setting

**Disclosure:** This research was funded by UCB

## EPO3090

**The peculiarities of epileptic process in MS patients**

N. Tolstykh, N. Koroleva, I. Stoliarov  
*Neurology, IHB RAS, Saint-Petersburg, Russian Federation*

**Background and aims:** Seizures are a rare manifestation of MS, however, a number of studies have shown that the risk of seizures and epilepsy in MS patients is 3-6 times higher than in the general population. The aim of this work was to clarify the links in the pathogenesis of MS, which lead to the development of symptomatic epilepsy, and the features of its course.

**Methods:** Material and methods. The study examined 22 MS patients, burdened with epileptic seizures.

We used clinical-anamnestic method, MRI, PET with 18Fdeoxyglucose, video-EEG monitoring (VEM).

**Results:** The structure of seizures is dominated by secondary generalized tonic-clonic seizures (57.14%), a high percentage (38.1%) of vegetative seizures. 33.33% of patients had a series of seizures, 3 patients (14.29%) had epileptic status. On MRI, cortical-juxtacortical lesions were observed in 45.45% of patients. Epileptiform patterns were mainly localized in temporal and frontal leads on VEM. According to the results of the PET study, data were obtained that confirm the data of VEM on the localization of epileptic foci, however, the area of epileptic lesions is more extensive.

**Conclusion:** Clinical and radiological manifestations of the inflammatory process (white and gray matter) in MS patients can lead to the activation of the latent focus of epileptic activity due to concomitant chronic inflammatory metabolic disorders and changes in the cerebral micro-environment. We have shown that the clinical manifestations of epilepsy in MS patients are determined not by the number, but by the activity of foci of the inflammatory process, with predominant localization in the fronto-temporal regions.

**Disclosure:** Nothing to disclose

## EPO3091

**Invasive EEG monitoring for presurgical evaluation in patients with drug resistant form of epilepsy**

I. Trifonov<sup>1</sup>, V. Krylov<sup>1</sup>, A. Guekht<sup>2</sup>, A. Lebedeva<sup>3</sup>, M. Sinkin<sup>1</sup>, I. Kaïmovskii<sup>4</sup>, E. Grigorieva<sup>5</sup>

<sup>1</sup>Neurosurgical, Moscow State University of Medicine and Dentistry, Moscow, Russian Federation, <sup>2</sup>Neurosurgical, Moscow Research and Clinical Center for Neuropsychiatry, Moscow, Russian Federation, <sup>3</sup>Neurology, Pirogov Russian National Research Medical University, Moscow, Russian Federation, <sup>4</sup>Neurological, Buyanov City Clinical Hospital, Moscow, Russian Federation, <sup>5</sup>Moscow State University of Medicine and Dentistry, Moscow, Russian Federation

**Background and aims:** Resective epilepsy surgery based on an invasive EEG (iEEG), performed with subdural grids or depth electrodes is considered to be the best option towards achieving seizure-free state in drug-resistant epilepsy.

**Methods:** prospective analysis of 79 patients with drug-resistant epilepsy who underwent iEEG monitoring for the presurgical evaluation before resective surgery.

**Results:** 31 patients (39%) - MRI negative, 48 (61%) - MRI positive. During sEEG in 55 patients (69%) seizure onset zone (SOZ) was bilateral. In 24 (31%) patients results of MRI and sEEG were not concordance. In patients with bilateral SOZ by sEEG, on iEEG we found: 6 (13%) patients had bilateral SOZ and in 49 (87%) seizure began in one side. In patients, with non-concordance MRI/scalp EEG: 3 patients (9%) didn't have epileptiform activity on sEEG, but had it on iEEG; in 3 patients (9%) - sEEG was not concordance with iEEG and in 18 patients SOZ were detected only by iEEG. For all patients were made resective surgery. Outcomes after 12 months after surgery in 60 patients (76%): 32 patients (53%) became seizure free: 26 patients (43%) - Engel Ia, 2 - Engel Ic, 4 - Engel Id. Eleven (18%) - Engel II: 1 - Engel IIa, 7 - Engel IIb, 1 - Engel IIc, 2 - Engel IId. The unsatisfactory result of treatment were noted at 13 patient (21%): 3 - Engel IIIa, one - Engel Iva, 9 - Engel IVb. There was no mortality in our group. The complications developed in 7 (11%) patients: 2 - intracerebral hematoma in the area of electrode placement (without indications for surgery), 4 - status epilepticus and 1 - wound liquorrhea.

**Conclusion:** Our results confirmed efficiency and safety of iEEG as presurgical procedure in patients with drug resistant form of epilepsy. 53% patients become «seizure free» 12 months after surgery.

**Disclosure:** Nothing to disclose

## EPO3092

**VNS – second chance after failed resective epilepsy surgery**

I. Trifonov<sup>1</sup>, V. Krylov<sup>1</sup>, A. Guekht<sup>2</sup>, I. Kaïmovskii<sup>3</sup>, M. Sinkin<sup>1</sup>, A. Lebedeva<sup>2</sup>, E. Grigorieva<sup>4</sup>

<sup>1</sup>Neurosurgical, Moscow State University of Medicine and Dentistry, Moscow, Russian Federation, <sup>2</sup>Neurology, Pirogov Russian National Research Medical University, Moscow, Russian Federation, <sup>3</sup>Neurological, Buyanov City Clinical Hospital, Moscow, Russian Federation, <sup>4</sup>Moscow State University of Medicine and Dentistry, Moscow, Russian Federation

**Background and aims:** To evaluate the effectiveness of vagus nerve stimulator (VNS) after failed resective epilepsy surgery.

**Methods:** All the patients who had persistent seizures after resective surgery who subsequently VNS placement at our institution from 2016 to 2019 were included in the study. 21 consecutive patient (14 women) were enrolled and followed for the outcome. Seizure outcomes were based on modified Engel classification (I: seizure-free/rare simple partial seizures; II: >90% seizure reduction (SR), III: 50-90% SR, IV: <50% SR; classes I to III (>50% SR) = favorable outcome).

**Results:** the average age was - 31.15 (±2.3) y, the mean duration of the epilepsy was 17.6 years. Temporal lobe epilepsy was diagnosed in 5 patients, temporal plus (temporal+frontal) - 8 patients, 6 patients had bilateral lesions and 2 multifocal. All patients in this group previously had resective surgery: 20 patients - anterior medial temporal lobectomy (AMTLE) and 1 patient - AMTLE plus extTLE. Ten patients (47%) were evaluated 12 months after surgery: 2 (20%) had a modified Engel class I outcome, 4 (40%) had class II, 4 (40%) had class III. The pathohystology was: FCD Ia-2, FCD Ic-4, FCD IIa - 1, FCD IIIa-10, FCD IIIId-4. There was no surgical mortality. Side effects of VNS were: hoarseness-10 (47%) patients, cough during stimulation-3 (14%)

**Conclusion:** In our series, patients who failed surgical therapies, VNS improved seizure control in all 100% patients. We confirmed its efficacy and safety: 20 % patients become “seizure free”, 40% - had >90% seizure reduction and 40% - 50-90% SR 12 months after surgical treatment.

**Disclosure:** Nothing to disclose

## EPO3093

**Types of epileptogenic lesions in patients with drug-resistant forms of epilepsy.**

I. Trifonov<sup>1</sup>, V. Krylov<sup>1</sup>, A. Guekht<sup>2</sup>, A. Lebedeva<sup>2</sup>, I. Kaïmovskii<sup>3</sup>, M. Sinkin<sup>1</sup>, E. Grigorieva<sup>4</sup>

<sup>1</sup>Neurosurgical, Moscow State University of Medicine and Dentistry, Moscow, Russian Federation, <sup>2</sup>Neurology, Pirogov Russian National Research Medical University, Moscow, Russian Federation, <sup>3</sup>Neurological, Buyanov City Clinical Hospital, Moscow, Russian Federation, <sup>4</sup>Moscow State University of Medicine and Dentistry, Moscow, Russian Federation

**Background and aims:** To evaluate pathomorphological types of epileptogenic lesions in patients with drug-resistant epilepsy.

**Methods:** Prospective analysis of 270 patients with drug-resistant epilepsy, who had undergone resective surgery in University Clinic of Moscow State University of Medicine and Dentistry between 01.01.2014 and 12.12.2019.

**Results:** According to MRI data 49 (18%) patients were MRI negative and 221 patients (82%) – MRI positive. Data of the pathohistological results were: FCD Ia – 14 patients, FCD Ic – 37, FCD IIa – 34, FCD IIb – 3, FCD IIIa – 117, FCD IIIb – 11, FCD IIIc – 5, FCD IIId – 28, LGG – 10, HS – 3, AVM – 4, HH – 3, LGG+HS – 1. Based on the histology data, the main type of pathology was FCD IIIa – 117 patients (43%). In group of patients with FCD IIIa, the accompanying pathology with HS was: FCD Ia – in 12 patients, FCD Ib – 2, FCD Ic – 32, FCD IIa – 52, FCD IIb – 19. In analysis patients with MRI positive and negative forms the following results were obtained: in MRI positive forms the main type of epileptogenic lesion was FCD IIIa – 50%, in MRI negative – FCD Ic – 32% and FCD IIId – 26%. No statistically important relationship between outcomes of surgical treatment and pathomorphology was found in our study.

**Conclusion:** The results obtained in our series revealed that the main type of epileptogenic lesions were FCD – 43% and in MRI positive forms - FCD IIIa – 50%, in MRI negative – FCD Ic – 32% and FCD IIId – 26%.

**Disclosure:** Nothing to disclose

## EPO3094

**Quality of life in patients with epilepsy – experience from a tertiary epilepsy centre in Croatia**

Z. Petelin Gadze<sup>1</sup>, A. Bujan Kovac<sup>1</sup>, K.I. Tudor<sup>1</sup>, S. Nankovic<sup>1</sup>, V. Sulentic<sup>1</sup>, Z. Poljaković<sup>1</sup>, G. Mrak<sup>2</sup>, M. Mudrovčić<sup>3</sup>, I. Brezak<sup>4</sup>, D. Mijatović<sup>5</sup>, F. Derke<sup>6</sup>, A. Desnica<sup>2</sup>, J. Nemir<sup>2</sup>, I. Cajic<sup>7</sup>, P. Nimac Kozina<sup>1</sup>, B. Dapic Ivancic<sup>1</sup>, B. Radić<sup>1</sup>, S. Hajnsek<sup>1</sup>

<sup>1</sup>Department of Neurology, Referral Centre of the Ministry of Health of the Republic of Croatia for Epilepsy, University Hospital Centre Zagreb, School of Medicine, University of Zagreb, Zagreb, Croatia, <sup>2</sup>Department of Neurosurgery, University Hospital Centre Zagreb, School of Medicine, University of Zagreb, Zagreb, Croatia, <sup>3</sup>University Hospital for Infectious Diseases “Dr Fran Mihaljevic”, Zagreb, Croatia, <sup>4</sup>Croatian Association for Behavioral-Cognitive Therapies, Zagreb, Croatia, <sup>5</sup>Umag Section, Istrian Health Center, Umag, Croatia, Umag, Croatia, <sup>6</sup>Zagreb, Croatia, <sup>7</sup>Psychiatric hospital “Sveti Ivan”, Zagreb, Croatia

**Background and aims:** Many factors influence quality of life (QoL) of patients with epilepsy. The aim of this study was to evaluate the relationship between epilepsy, anti-epileptic drugs (AEDs) and QoL.

**Methods:** Quality of life in epilepsy-31 (QOLIE-31) was used for evaluation of QoL, Arizona Sexual Experiences Scale (ASEX) for SD and Hamilton Rating Scale for depression (HAM-D17).

**Results:** 108 patients with epilepsy were enrolled (68 (63%) women, 40 (37%) men; mean age 39.54±15.91; 16 (14.8%) focal, 38 (35.2%) generalized and 44 (40.7%) combined type of epilepsy). Mean result on QOLIE-31 was 62.88±17.21 (women 63.31±16.51, men 62.18±18.51). No significant differences were found regarding gender, type of epilepsy and age, except in regard to the domain ‘Overall QoL’, where the age group 35-55 years was found to have statistically significantly lower QoL in comparison to those younger than 35 years. Patients taking both types of AEDs were found to have significantly lower QoL compared to those on newer AEDs. Lower QoL was found to be associated with more pronounced symptoms of SD ( $r=-0.34$ ,  $p=0.001$ ) and depression ( $r=-0.71$ ,  $p=0.000$ ). Out of 44 patients with drug-resistant epilepsy, 27 were treated with vagus nerve stimulation (VNS), with statistically significant differences found between the 2 groups ( $p=0.041$ ).

**Conclusion:** Patients with epilepsy taking both types of AEDs were found to have lower QoL in comparison to those on newer AEDs. Furthermore, QoL and mood were found to improve following VNS implantation in patients with drug-resistant epilepsy.

**Disclosure:** Nothing to disclose

## EPO3095

**EEG seizure onset patterns in status epilepticus**

G. Turchi<sup>1</sup>, G. Giovannini<sup>1</sup>, G. Melegari<sup>2</sup>, N. Orlandi<sup>3</sup>, M.C. Cioclu<sup>1</sup>, J. Rossi<sup>1</sup>, S. Meletti<sup>4</sup>

<sup>1</sup>Neurology Unit, OCB Hospital, Azienda Ospedaliera-Universitaria di Modena, Modena, Italy, <sup>2</sup>Azienda Ospedaliera universitaria di Modena, Modena, Italy, <sup>3</sup>Castelvetro di Modena, Italy, <sup>4</sup>Department of Biomedical, Metabolic and Neural Sciences, University of Modena, Modena, Italy

**Introduction:** Seizure-onset (SON) patterns have been studied especially in isolated seizures in epilepsy surgery candidates. EEG studies characterizing the SON patterns in status epilepticus (SE) are lacking.

**Methods:** Consecutive EEG recorded from adult patients admitted for focal SE, from January 2015 to August 2019 were reviewed. 5 SON patterns were identified (Tanaka et al. 2018): (1) paroxysmal rhythmic slow activity at <13Hz; (2) paroxysmal rhythmic fast activity at ≥13Hz; (3) repetitive epileptiform discharge; (4) suppression of background activity to ≤10μV; and (5) artifacts. For each patient 1 to 5 seizures were analyzed, and each seizure's duration was registered.

**Results:** 307 seizures were analyzed in 100 consecutive patients (mean age 70 yrs); the most frequent SON pattern was pattern 3 (39 patients) followed by pattern 1 (34 patients) and pattern 2 (14 patients); pattern 4 and 5 were observed 1 and 3 patients respectively. 9 patients presented with multiple SON. Seizures with SON pattern 3 showed longest duration ( $p < 0.05$ ). No statistical difference in demographics, SE etiology, semeiology and treatment response was observed among the different SON, while a higher 28-day mortality was observed in SON pattern 3 ( $p = 0.02$ ; HR 3.00; 95% CI 1.13-7.97).

**Conclusion:** In SE the pattern characterized by repetitive epileptiform discharges (# 3, spike and waves) was the most frequent, with the longest mean seizures duration, and associated to highest short-term mortality. Analysis of SON patterns could improve our understanding on SE mechanism and could become a useful EEG biomarker.

**Disclosure:** Nothing to disclose

## EPO3096

**Periodic Leg Movements in Sleep May Influence Severity of Epilepsy**

L. Vardani Vardanyan<sup>1</sup>, H. Amirjanyan<sup>2</sup>, S. Khachatryan<sup>3</sup>  
<sup>1</sup>Yerevan, Armenia, <sup>2</sup>Sleep and Movement Disorders Center, Somnus Neurology Clinic, Yerevan, Armenia, <sup>3</sup>Neurology and Neurosurgery, National Institute of Health, Yerevan, Armenia

**Background and aims:** Sleep disorders are important risk factors for patients with epilepsy (PWE). Abnormal sleep-interrupting phenomena could influence the course of epilepsy. Periodic leg movements (PLM) in sleep (PLMS) are a hidden but frequent encounter in general population which could also play a role in PWE being associated with arousals. Our aim was to evaluate relationship between abnormal EEG discharges and PLMS among PWE.

**Methods:** 85 PWE had polysomnography (PSG) plus EEG studies. PSG was performed and scored according to accepted standards. PLMS index (PLMI) ≥ 10/h was considered abnormal. 12 PSG-EEG recordings from 10 PWE (F-50%, mean age-39.6) with high PLMI and abnormal EEG were selected. EEG was inspected visually and epileptiform discharges were marked manually. Special EEG-LM/PLM association events were attributed and counted. Yearly seizure frequency (YSF) was obtained.

**Results:** On average we registered 145 (29-614) EEG events per recording and mean EEG event index in sleep was 24.75h. Leg movement (LM) data: LM index (LMI)-31.8h, PLMI-22.6h. REM-PLMI-4.7h was lower than NREM-PLMI-29h, similarly REM-EEG event index-12.4h was lower than NREM-EEG event index-28.1h. We found no correlation of EEG events with LMI and PLMI. There was a strong positive correlation between LM-linked EEG events and YSF ( $r = 0.9$   $p < 0.001$ ). Independent EEG events did not show this association ( $r = 0.45$   $p = 0.3$ ). PLM sequence-associated ( $r = 0.5$   $p = 0.1$ ) and independent EEG events ( $r = 0.17$   $p = 0.6$ ) did not correlate with YSF.

**Conclusion:** Although, we found no relationship between EEG abnormalities and LMI/PLMI, the LM-linked EEG epileptiform discharges were in strong correlation with YSF. This is the first report of such association.

**Disclosure:** Nothing to disclose



## EPO3097

### The role of assessment of cognitive dysfunction in the differential diagnosis of pharmacoresistant epileptic and psychogenic non-epileptic seizures.

E. Veevnik<sup>1</sup>, S. Likhachev<sup>2</sup>, M. Dymkovskaya<sup>3</sup>, N. Naumovskaya<sup>3</sup>

<sup>1</sup>Minsk, Belarus, <sup>2</sup>Department of Neurology, Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus, <sup>3</sup>Consultative outpatient department, Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus

**Background and aims:** Epileptic seizures and psychogenic non-epileptic seizures (PNES) often should be differentiated. The main diagnostic method is video-EEG. It is not always available and allows to assess only clinical event during the study. The most difficult situation is a combination of epileptic seizures and PNES in one patient.

**Methods:** 116 patients: 32 men and 84 women, mean age 31.5±11.3 years. 1 group (n=60) – pharmacoresistant epilepsy (PRE), 2 (n=23) – combination of epileptic seizures and PNES, 3 (n=28) – PNES. Cognitive status, emotional-volitional sphere, personality profile were analysed. Cognitive status was assessed using the diagnostic tool developed by us, which contains 34 items, adequate for the study of aphasia, gnosis, praxis and other higher mental functions. Emotional-volitional sphere – using STAI, BDI, MFI-20, personality profile – MMPI.

**Results:** The most characteristic and significant differences between groups:

1 group – asthenic syndrome, decrease of cognitive functions, decrease of all subtests of modal-specific memory impairments;

2 group – asthenic syndrome, normal cognitive status, mono-impairment: regulatory apraxia, tactile inattention;

3 group – high rates of anxiety and depression, conversion/somatiform personality profile, normal cognitive status, mono-impairment: tactile alexia, auditory agnosia, auditory and motor inattention.

**Conclusion:** Conversion features of the personality profile were characteristic only in the 3rd group. Group 1 and 2 differed mainly in terms of cognitive status. The presence of the abovementioned mono-impairments in groups 2 and 3 can be caused by functional reactions, characteristic for dissociative disorders. The results demonstrate the role of assessment of cognitive status in the diagnosis of PRE and PNES.

**Disclosure:** Nothing to disclose

## EPO3098

### A retrospective, multicentre study of perampanel efficacy and tolerability in pharmacoresistant focal epilepsy.

P. Vlasov<sup>1</sup>, V. Karlov<sup>1</sup>, I. Zhidkova<sup>1</sup>, D. Dmitrenko<sup>2</sup>, I. Rudakova<sup>3</sup>, T. Danilova<sup>4</sup>, V. Kalinin<sup>5</sup>, I. Ponomareva<sup>6</sup>, N. Sobianina<sup>7</sup>, O. Grebenyuk<sup>8</sup>, U. Salomatin<sup>9</sup>

<sup>1</sup>Department of Neurology of General Medical Faculty, Moscow State University of Dentistry named after A.I. Evdokimov, Moscow, Russian Federation, <sup>2</sup>Department of Neurology, Krasnoyarsk State Medical University named after Prof. V. F. Voyno-Yasenetsky, Krasnoyarsk, Russian Federation, <sup>3</sup>Department of Neurology, M.F. Vladimirskiy Moscow Regional Clinical Research Institute, Moscow, Russian Federation, <sup>4</sup>Department of Neurology, Kazan State Medical University, Kazan, Russian Federation, <sup>5</sup>Department of Neurology and Neurosurgery, Samara State Medical University, Samara, Russian Federation, <sup>6</sup>Department of Neurology, Chelyabinsk State Medical University, Chelyabinsk, Russian Federation, <sup>7</sup>Department of Neurology, Perm State Medical University, Perm, Russian Federation, <sup>8</sup>, Department of neurology and neurosurgery, <sup>9</sup>Siberian State Medical University, Tomsk, Russian Federation, <sup>9</sup>Department of Neurology, Moscow State University of Medicine Named after N.I. Pirogov, Moscow, Russian Federation

**Background and aims:** To study the efficacy and tolerability of Perampanel (PER) as an additional antiepileptic drug (AED) in patients with pharmacoresistant focal epilepsy. The study design: multicenter retrospective.

**Methods:** The study included 164 patients over 12 years old. The average age 37.7±15.2 years, men – 49.4%, disease duration over 10 years - 68.7%, structural temporal lobe epilepsy - 53.4%, structural frontal - 39.1%. For the majority of patients, PER was prescribed in addition to 2 AEDs 50.9% and after 3 previous lines of therapy 26.6%. The maximum duration of the study was 12 months.

**Results:** The average dose of PER was 8mg. The retention rate on therapy for 12 months was 80.7% (95% CI: 72.3%-89.1%). The absence of all types of seizures was achieved in 22.7%, responders (>50%) in 52.8%. The absence of focal to bilateral tonic-clonic seizures (FBTCS) was achieved in 60.8%, FBTCS responders accounted for 27.8%. Adverse events (AEs) were observed in 31.3% of patients: drowsiness - 10.4%, aggression - 9.8%, irritability - 6.7%, gait shakiness - 6.1%, other AEs were observed extremely rarely (<3% each).

**Conclusion:** PER has shown high efficacy mainly in FBTCS seizures and a predicted safety profile in a group of patients with focal pharmacoresistant epilepsy. The average dose of PER was 8mg. PER dosage above 4 mg to prevent AE should be increased more slowly and AE should be monitored.

**Disclosure:** Nothing to disclose

## EPO3099

**Anti-epileptic drugs consumption in the primary health care in Albania, 2004-2018**L. Kakariqi<sup>1</sup>, G. Vyshka<sup>1</sup>, J. Kruja<sup>2</sup><sup>1</sup>*University of Medicine in Tirana, Biomedical and Experimental Department, Faculty of Medicine, Tirana, Albania,* <sup>2</sup>*University Hospital Center "Mother Theresa" and Faculty of Medicine, University of Medicine in Tirana, Service of Neurology, Tirana, Albania*

**Background and aims:** Authors discuss the use of anti-epileptic drugs (AEDs) in Albania, with focus on the consumption of AEDs at the primary health care level; and differences of prescription patterns over a period of 15 years. The relation between the consumption data of AEDs and the level of epilepsy morbidity is also considered for the period 2004-2018.

**Methods:** The data were assembled from Health Insurance Institute in Tirana, Albania and analysed for the period 2004-2018. The consumption of drugs was expressed as a number of Defined Daily Dose (DDD)/1000 inhabitants/day. We also analysed the data of imported and domestically produced drugs, which represent the total consumption of AEDs in the country.

**Results:** The consumption of AEDs was 1.82-2.30 DDD/1000 inhabitants/day; as for the minimum and maximal figures registered during 2004-2018. The most prescribed AEDs are the classic or the old-generation drugs with values of 1.77-1.69 DDD/1000 inhabitants/day. New-generation AEDs included in the reimbursement scheme are lamotrigine, gabapentin, levetiracetam and topiramate, with values of consumption resulting 0.06-0.61 DDD/1000 inhabitants/day.

**Conclusion:** The consumption values of anti-epileptic drugs in Albania is comparatively low. We noted an annual decrease in the time-trend consumption of classic antiepileptic drugs, compensated with higher consumption of new-generation drugs. An important part of the anti-epileptic drugs flows out from the reimbursement scheme. Epilepsy morbidity data indicated an existing significant correlation between the disease and the trend of consumption of AEDs. A comparative analysis in the consumption of AEDs between Albania and other countries suggested also important differences in the overall consumption figures.

**Disclosure:** Nothing to disclose

## EPO3100

**Effects of deep brain stimulation on PTZ-induced seizure and sleep disruption**Y.L. Yang<sup>1</sup>, P.-L. Yi<sup>2</sup>, F.-C. Chang<sup>1</sup><sup>1</sup>*National Taiwan University, Taipei, Taiwan, Chinese Taipei,* <sup>2</sup>*Department of Sport Management, Aletheia University, Taipei, Taiwan, Chinese Taipei*

**Background and aims:** Deep brain stimulation (DBS) can effectively suppress epilepsy. However, the mechanism of DBS is still unclear. One of hypothesis of DBS mechanism is to affect epileptogenesis, which is an important process in epilepsy development.

**Methods:** A low-dose pentylenetetrazole (PTZ) was Intraperitoneal (IP) injected every 2 days, for a total of 6 injections, to achieve the effect of kindling, and the DBS was stimulated 10 minutes before the PTZ injection and lasted 20 minutes after the injection. We recorded the entire process using an electroencephalogram (EEG) to analyze frequency of seizures and sleep changes.

**Results:** The seizure duration after the 6th injection of PTZ was 68.49% lower in the DBS treatment group comparing with the PTZ group ( $P < 0.05$ ). After the 1st injection of PTZ, duration of NREM in the DBS-treated group higher than that in the PTZ group ( $P < 0.05$ ). After the 6th injection of PTZ, it was found that sleep duration of NREM sleep was decreased, but the DBS blocked the PTZ-induced NREM sleep decreases ( $P < 0.01$ ). In the interictal section, the DBS treatment lower the epileptic spikes.

**Conclusion:** DBS does improve PTZ-induced seizures and has an effect on the epileptogenesis and sleep duration.

**Disclosure:** Nothing to disclose

## EPO3101

**Deep brain stimulation (DBS) increases epilepsy threshold by altering REM sleep and delta powers during NREM sleep**P.-L. Yi<sup>1</sup>, H.-T. Tseng<sup>2</sup>, F.-C. Chang<sup>2</sup><sup>1</sup>*Department of Sport Management, Aletheia University, Taipei, Taiwan, Chinese Taipei,* <sup>2</sup>*National Taiwan University, Taipei, Taiwan, Chinese Taipei*

**Background and aims:** Epilepsy and sleep reciprocally influence each other. Our previous result elucidates that unilateral deep brain stimulation (DBS) of anterior nucleus of thalamus (ANT) suppresses epilepsy recurrence. In present study, we tried to further determine whether DBS changes sleep and delta powers during non-rapid eye movement (NREM) sleep to suppress spontaneous recurrence of epilepsy.

**Methods:** We intraperitoneally injected pentylentetrazol (PTZ) for consecutive 14 days to induce spontaneous epilepsy in rats, and a 30-minute or a 3-hour DBS of unilateral ANT was applied to suppress epilepsy. The frequency of DBS stimulation was 200Hz and the electrical currents consisted of biphasic square pulses with an intensity of 50 $\mu$ A, an 100  $\mu$ s pulse width and a 4.1ms stimulation interval. Sleep and epileptiform electroencephalograms (EEGs) were recorded for 24 hours.

**Results:** Unilateral ANT DBS prolonged the onset latency of the ictal epilepsy, decreased the spontaneous seizure duration, and increased the survival rate. Unilateral ANT DBS increased the amounts of REM sleep. Our result also indicated that power intensities of all frequencies were enhanced during the PTZ-induced ictal period and subsequent spontaneous epilepsy. 39 of ANT DBS suppressed the augmentation of low-frequency (<10Hz) intensities during spontaneous epilepsy. Consecutive injections of PTZ progressively increased the enhancement of the delta powers during NREM sleep, whereas ANT DBS inhibited this progressive enhancement.

**Conclusion:** These results elucidated that unilateral ANT DNS enhanced the seizure threshold by increasing REM sleep and decreasing the progressive enhancement of delta power during NREM sleep to suppress spontaneous seizure recurrences.

**Disclosure:** Nothing to disclose

## EPO3102

**Symptomatic epilepsy in stroke**

B. Zivadinovic

*Nice, Serbia*

**Background and aims:** Stroke is one of the leading causes of disease and death in older population. The risk of developing epilepsy after stroke is seven times higher compared to normal population. The development of PSE is caused by stroke at a younger age, the size of stroke, cortical presentation, early seizures, cerebral hemorrhage.

**Methods:** This prospective study analyzed patients with the first stroke with ischemic and hemorrhagic genesis. The research was conducted at the Clinic of Neurology Nis and it lasted for a year. The same group of patients was monitored for the following 2 years, focusing on the development of symptomatic epilepsy.

**Results:** The control group was composed of 246 patients without symptomatic epilepsy after 1st stroke and the other group of 21 patients, with epileptic seizures after 1st stroke. The lesions were classified into deep lesions and those with cortical localization. The depth of the lesions had a statistically significant influence on the development of seizures. The lesions are classified into big and small. The small lesions included changes that were  $\leq 3$ cm whereas big lesions included changes  $> 3$ cm. A statistical significance between the size of the lesion and seizures was not determined although twice as more patients with a big lesion were observed in PSE group.

**Conclusion:** The frequency of PSE in the examined group was 7.86%. Big lesions were more commonly found in the PSE group. The PSE group more often had stroke in the MCA territory. The number of patients with cortical and subcortical lesion was significantly higher.

**Disclosure:** Nothing to disclose

## Headache and pain 3

## EPO3103

**Effect of cervical proprioception disorders on balance function in patients with chronic migraine**

M. Mozheiko, I. Maryenko, S. Likhachev, I. Goursky  
*Department of Neurology, Republican Research and Clinical Center of Neurology and Neurosurgery, Minsk, Belarus*

**Background and aims:** One of the causes of imbalance may be comorbidity of migraine with vestibular dysfunction (VD) and proprioception disorder of the cervical spine muscles (CSM).

**Aim:** to evaluate statokinetic stability (SS) in patients with migraine in a period between headache attacks.

**Methods:** 32 patients (females) were examined, mean age  $38 \pm 9.4$ , diagnosis of migraine according to ICD-3 beta. SS was evaluated by stabilometry ("Stabilan-01-2") using Romberg test with open eyes, closed eyes, and with head turns. Ellipse area (EA,  $m^2$ ), balance function quality (QBF, %), movement speed of the pressure center (MSPC, mm/s) were evaluated. Trigger points (TP) in CSM were determined by manual testing.

**Results:** While comparing the results with closed eyes to the results with open eyes, a significant decrease in QBF was revealed from  $87.5[84.2;94.2]\%$  to  $81.4[75.7;88.8]\%$ ; an increase in EA from  $78[34.0;111.9]mm^2$  to  $108.4[44.5;279.6]mm^2$ ; an increase in MSPC from  $6.1[5.3;9.03]mm/s$  to  $8.1[7.1;12.4]mm/s$ , (Wilcoxon,  $p < 0.05$ ). While "Head turn" test MSPC increased significantly to  $6.4[5.0;9.7]mm/s$  while right turn, and to  $7.0[5.45;9.5]mm/s$  while left turn. TP were detected in the trapezoid muscles in 32 patients, and in the splenius cervicis muscles in 8.

**Conclusion:** Stabilography allowed to quantify VD in patients with migraine. Statistically significant deterioration of SS while visual deprivation and head rotations indicates contribution of altered afferentation from trigger points in CSM on the condition of balance in patients with migraine.

**Disclosure:** Nothing to disclose

## EPO3104

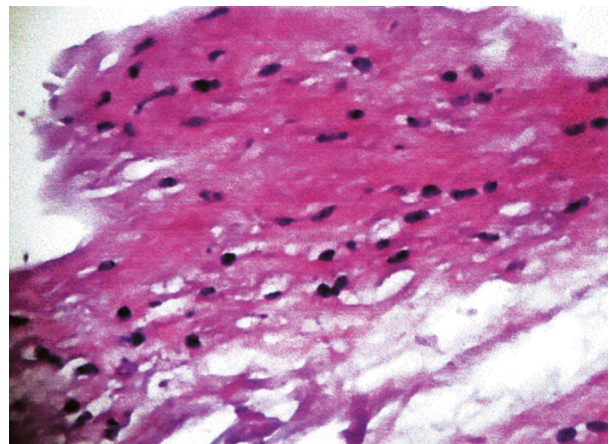
**Prevalence of Aracnoiditis in patients with Paroxistic Trigeminal Neuralgia with Continuous Persistent Pain**

A. Maldonado<sup>1</sup>, O. Carranza<sup>2</sup>, A. Munguia<sup>3</sup>, M. Segura<sup>1</sup>  
<sup>1</sup>Hospital Angeles Morelia, Morelia, Mexico, <sup>2</sup>Morelia, Mexico, <sup>3</sup>Hospital Angeles, Morelia, Mexico

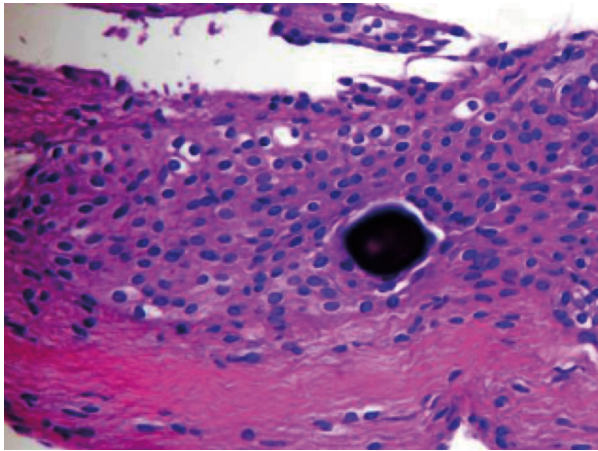
**Background and aims:** Trigeminal Neuralgia (TN) can be classified based on its clinical presentation in paroxistic or paroxistic with continuous persistent pain, previously known as atypical trigeminal neuralgia. There is no explanation as to why some patients develop this clinical presentation. The objective of this study was to describe the presence of inflammatory findings on biopsies of arachnoid in patients with atypical TN.

**Methods:** 43 patients with atypical TN seen at our center between January 2014 and December 2018 selected for Microvascular Decompression (MVD) were included for our study. Biopsies of arachnoid were obtained in every case and analyzed with a hematoxylin-eosin stain. Follow-up was at three- and twelve-months post-surgery.

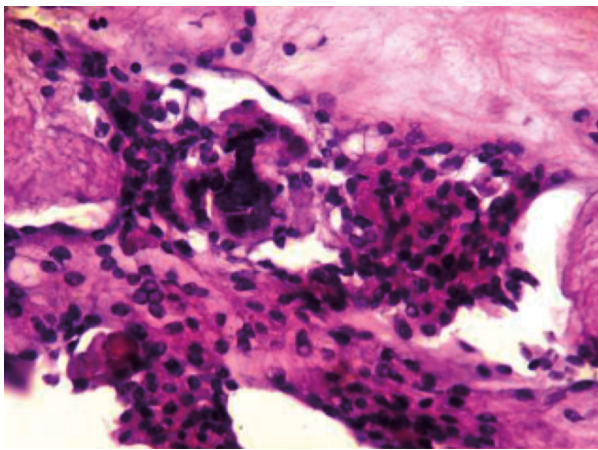
**Results:** Analysis of the biopsies revealed components of chronic aracnoiditis: mild fibrosis (n=17), moderate fibrosis (n=6) and severe fibrosis (n=3), dystrophic microcalcifications (n=9) and hyperplasia of neuroepithelial cells (n=6). Average time of disease evolution was 7.75 years. 7 patients developed a contralateral neuralgia after being operated of MVD. The surgery had a success rate of 67.44% (n=29). 23.26% (n=10) of patients had persistence of pain after surgery and 9.30% (n=4) patients had recurrence of pain between 12-60 months.



Fibrosis and Microcalcifications



Microcalcification in the Arachnoid



Hyperplasia of neuroepithelial cells

**Conclusion:** The pathology results suggest that there is a chronic inflammatory process accompanying the TN with paroxysmic and continuous persistent pain. These inflammatory changes probably occur after a prolonged neurovascular contact. This hypothesis may offer an explanation to the atypical clinical presentation of TN and new ideas regarding the treatment and management of this disease.

**Disclosure:** Nothing to disclose

## EPO3105

### Pooled Analysis of Cardiovascular Safety of Fremanezumab in Patients $\geq 60$ Years of Age With Migraine: Pooled Results of 3 Randomised, Double-blind, Placebo-controlled Phase 3 Studies

S. Naegel<sup>1</sup>, J.M. Cohen<sup>2</sup>, Y. Kessler<sup>2</sup>, X. Ning<sup>2</sup>, R. Yang<sup>2</sup>, D. Kudrow<sup>3</sup>

<sup>1</sup>Department of Neurology, Martin Luther University Halle, University Hospital Halle (Saale), Halle, Germany, <sup>2</sup>Teva Branded Pharmaceutical Products R&D, Inc., West Chester, PA, USA, <sup>3</sup>California Medical Clinic for Headache, Santa Monica, CA, USA

**Background and aims:** Although migraine prevalence declines with age, treatment may be challenging in older patients as some preventive medications may cause cognitive and cardiac side effects in this population. Fremanezumab, a fully-humanised monoclonal antibody (IgG2 $\Delta$ a) that selectively targets calcitonin gene-related peptide (CGRP), has proven efficacy for the preventive treatment of migraine in adults. Overall adverse events (AEs) and cardiovascular (CV) AEs with fremanezumab were evaluated in a subgroup of patients  $\geq 60$  years of age in this pooled analysis.

**Methods:** This analysis in patients  $\geq 60$  years of age with episodic migraine (EM) or chronic migraine (CM) included data from three phase 3 trials (HALO EM, HALO CM, and FOCUS), in which patients were randomised 1:1:1 to receive subcutaneous quarterly or monthly fremanezumab or matched monthly placebo over 12 weeks. Overall AEs and CV AEs were summarised for these patients.

**Results:** Overall, 246 patients  $\geq 60$  years of age were included in these pooled analyses. A total of 73 (30%) patients had CV medical history. AEs were reported for similar proportions of patients across treatment groups; the most common AEs were injection-site induration, pain, and erythema (Table 1). In patients with CV medical history, 4 individual CV AEs were reported across treatment groups. In patients without CV medical history, 2 individual CV AEs were reported (Table 2).

Table 1. Overall AEs Occurring in  $\geq 1$  Patient  $\geq 60$  Years of Age in Any Treatment Group

AEs, n (%)	Placebo (n=80)	Quarterly fremanezumab		Monthly fremanezumab	
		675mg/placebo/placebo (n=74)	675/225/225mg (n=46)	225/225/225mg (n=46)	
Patients with $\geq 1$ AE	44 (55)	48 (65)	29 (63)	24 (52)	
Injection-site induration	14 (18)	11 (15)	10 (22)	13 (28)	
Injection-site pain	10 (13)	13 (18)	9 (20)	10 (22)	
Injection-site erythema	13 (16)	8 (11)	7 (15)	3 (7)	

AE, adverse event; SAE, serious adverse event.

Table 2. CV AEs in Patients  $\geq 60$  Years of Age With and Without CV Medical History

CV AEs, n (%)	Placebo (n=23)	Quarterly fremanezumab		Monthly fremanezumab	
		675mg/placebo/placebo (n=6)	675/225/225mg (n=14)	225/225/225mg (n=30)	
Patients with CV medical history					
Patients with $\geq 1$ CV AE	1 (4)	1 (3)	2 (14)	0	
Palpitations	1 (4)	0	1 (7)	0	
Supraventricular tachycardia	0	1 (3)	0	0	
Hypertensive crisis	0	0	1 (7)	0	
Patients without CV medical history					
Patients with $\geq 1$ CV AE	0	0	2 (6)	0	
Hot flush	0	0	1 (3)	0	
Hypertension	0	0	1 (3)	0	

CV, cardiovascular; AE, adverse event.

**Conclusion:** This pooled analysis demonstrates that fremanezumab treatment over 12 weeks was well tolerated in patients  $\geq 60$  years of age, with CV AEs occurring in similar proportions of patients with or without a CV medical history.

**Disclosure:** This study was funded by Teva Pharmaceuticals.

## EPO3106

### Dialysis headache: 4 cases of a tertiary headache centre

L. Azevedo Kauppila<sup>1</sup>, B. Nunes Vicente<sup>1</sup>,  
I. Pavão Martins<sup>2</sup>

<sup>1</sup>Neurology, Neurosciences and Mental Health Department, Hospital Santa Maria, Centro Hospitalar Universitário Lisboa Norte, Lisbon, Portugal, <sup>2</sup>Language Research Laboratory, Lisbon Faculty of Medicine, Lisbon, Portugal

**Background and aims:** Dialysis headache (DH) is a secondary headache, occurs during hemodialysis (HD) and resolves up to 72h after HD ends. Its pathophysiology is not established, and it is a rare headache in the outpatient clinic. We aimed to characterize DH in a patient sample consulted in the headache outpatient clinic.

**Methods:** A retrospective analysis of headache outpatient registries fulfilling DH criteria. Variables collected: demographic and clinical data (time-to-onset (TTO) since HD and TTO during HD, localization and type of headache, headache duration, accompanying symptoms, pharmacotherapy, response to therapeutics, previous headache diagnosis).

**Results:** 4 patients (3 men), 51-72 years-old, were identified, with headache starting 0-4 years since commencing HD. Localization was variable, but bilateral in all patients. Pain was described as dull (n=2), pulsatile (1) or both, and lasted up to 48h, starting 2-3h after HD. 3 patients presented associated symptoms: nausea, vomiting, phonophobia, photophobia, and kinesiophobia. 3 patients took symptomatic treatment, with partial relief in 2 (paracetamol, metamizole, zolmitriptan), and total resolution in 1 (eletriptan). 2 patients had a previous migraine diagnosis, 1 of them with an associated medication-overuse headache.

**Conclusion:** There is not a specific pattern for DH, besides its temporal profile and its relation to HD. Response to triptans in one suggests a migraine-type pathophysiology.

**Disclosure:** Nothing to disclose

## EPO3107

**Pharmacological treatment of trigeminal neuralgia in a secondary hospital.**

G. Ogando<sup>1</sup>, S. Gómez Enjuto<sup>1</sup>, J. Lapeña Motilva<sup>1</sup>,  
C.A. Cemillán Fernández<sup>1</sup>, J. Díaz-Díaz<sup>2</sup>

<sup>1</sup>Neurology, Hospital Universitario Severo Ochoa (Leganés, Madrid), Madrid, Spain, <sup>2</sup>Neurology, Hospital Clínico San Carlos, Madrid, Spain

**Background and aims:** Trigeminal neuralgia is a relatively common cause of headache. Usually there is a good response to pharmacological treatment, but according to some series, up to 25% of the patients are refractory, having tried at least one drug at maximal dosage. In these cases, other therapies should be tested in order to try to avoid side effects of polytherapy.

**Methods:** We analysed all patients diagnosed with trigeminal neuralgia during 2018 in our centre, focusing on magnetic resonance imaging and pharmacological treatment.

**Results:** We diagnosed a total of 60 patients, with a mean age of 67 years. 80% women and a medium disease duration of 8 years. Nearly 75% of patients had no abnormalities in brain MRI (1.5T), being diagnosed with idiopathic trigeminal neuralgia. Only 12,5% showed neurovascular compression.

Regarding treatment, 40% of the patients were controlled with a single drug; 50% have tried at least 2 different drugs; and 18% had tried 3 or more. Pregabalin, gabapentin and amitriptyline were the more frequent add-on (table 1).

In our series, the most common side effects were drowsiness, nausea, dizziness, hypertransaminasemia and hyponatremia, presenting in 20% of patients treated in monotherapy, increasing up to 50% in polytherapy. Only 8,4% of patients were evaluated by a neurosurgeon, all of them with abnormal MRI

	CBZ	OXC	ESL	GBP	PGB	AMI	LAC
Carbamazepine (CBZ)	11			1	6	3	
Oxcarbazepine (OXC)		1		1			
Eslicarbazepine (ESL)			8	1	2	1	
Gabapentin (GBP)				4		2	
Pregabalin (PGB)					4	2	
Amitriptyline (AMI)				1	1	1	
Lacosamide (LAC)						1	2

Drugs used more frequently.

**Conclusion:** Although an extensive variety of drugs to treat trigeminal neuralgia exist, we found that up to 50% of patients can be considered refractory to medical treatment. Refractory patients should be referred promptly for neurosurgical evaluation to avoid polytherapy and unbearable side effects.

**Disclosure:** Nothing to disclose

## EPO3108

**Video Head impulse test in inter-ictal Vestibular Migraine**

P. Özçelik<sup>1</sup>, K. Koçoğlu<sup>2</sup>, R.T. Ala<sup>3</sup>, G. Akdal<sup>3</sup>

<sup>1</sup>Neurosciences, Dokuz Eylül University Institute of Health Sciences, Izmir, Turkey, <sup>2</sup>Institute of Health Sciences, Dokuz Eylül University, Izmir, Turkey, <sup>3</sup>Neurology, Dokuz Eylül University Medical School, Izmir, Turkey

**Background and aims:** To evaluate the vestibulo-ocular reflex (VOR) with the video head impulse test (vHIT) in patients with vestibular migraine (VM).

**Methods:** We studied 62 VM patients, 55 females, 7 males aged 18-63 years (mean 43) diagnosed according to the ICHD-3 beta diagnostic criteria and 35 healthy controls aged 18-86 years (mean 41). The vHIT was evaluated in 3 semicircular (SCC) planes: right lateral-left lateral, right anterior-left posterior and left posterior- left anterior using GN Otometrics apparatus.

**Results:** While mean VOR gains from each SCC were within normal limits, VOR gain was below normal from: one anterior SCC in 29 patients; one posterior SCC in 26 patients; one lateral SCC of 35 patients; both posterior SCCs in 19 patients, both anterior SCCs in 8 patients and both lateral SCCs in 11 patients. Even with normal VOR gain overt catch-up saccades (CUS) were present from both lateral SCCs in 14 patients and from both posterior SCCs in one patient and overt CUS were present from one lateral SCC in 1 patient and from one posterior SCC in 3 patients. 2 patients with covert CUS in posterior SCC also had low VOR gain.

**Conclusion:** VM patients had normal mean VOR gain, but half the patients had low gain from one or more individual semicircular SCCs. Our study confirms that VOR impairment – either with low VOR gain or with catch-up saccades, or with both seems to be a regular feature of interictal VM.

**Disclosure:** Nothing to disclose

# EPO3109

## Generalisability of the CONQUER trial results to routine clinical practice: galcanezumab versus placebo in patients with inadequately controlled migraine

M.-A. Paget<sup>1</sup>, A. Tockhorn-Heidenreich<sup>1</sup>, M. Belger<sup>1</sup>, F. Chartier<sup>1</sup>, M. Lanteri-Minet<sup>2</sup>

<sup>1</sup>Eli Lilly and Company, Indianapolis, IN, USA, <sup>2</sup>CHU Nice and FHU InovPain Université Côte Azur, Nice, France

**Background and aims:** Healthcare decision makers are often concerned about the external validity of randomised controlled trials (RCTs) (i.e., results may not apply to all patients who are intended to receive treatment in the ‘real-world’ [RW]). CONQUER is a RCT of galcanezumab in patients who experienced  $\geq 4$  migraine headache days/month and for whom 2–4 prior preventive treatment categories had failed. This analysis aimed to generalise results from CONQUER to the RW French migraine population.

**Methods:** The InovPain migraine database is a RW cohort of all French patients with migraine followed in a large tertiary headache centre (Pain Department, CHU Nice). This analysis was conducted in steps:

Step 1: Individual patient-level data from CONQUER were weighted to match aggregated InovPain data regarding the subgroup of French patients with migraine and  $\geq 2$  preventive treatment failures using the Signorovitch method (2010). Matched patient characteristics were gender, age, migraine type and duration, number of migraine headache days and number of headache days at baseline.

Step 2: The primary endpoint of CONQUER was reanalysed using the weighted CONQUER patient data using a priori defined methodology.

**Results:** Table 1 shows patient characteristics before and after weighting. Results of the weighted analysis were similar to those of the primary CONQUER analysis, with a statistically significant greater mean reduction in the number of monthly migraine headache days for galcanezumab versus placebo (Table 2).

Table 1. Baseline patient characteristics before and after weighting

	InovPain (N=130)	CONQUER (N=462)	Weighted CONQUER IPD with InovPain characteristics (ESS=320)
Age, years	45.8 ± 12.3	45.8 ± 11.8	<b>45.8 ± 11.9</b>
Females	109 (83.8)	397 (85.9)	<b>(83.8)</b>
Years since migraine diagnosis	25.3 ± 13.9	23.2 ± 13.5	<b>25.3 ± 14.2</b>
Number of monthly MHDs	14.6 ± 7.0	13.2 ± 5.9	<b>14.6 ± 6.3</b>
Number of monthly headache days	17.7 ± 8.8	15.0 ± 6.2	<b>17.7 ± 6.9</b>
Episodic migraine	65 (50.0)	269 (58.2)	<b>(50.0)</b>
HFEM	53 (40.8)	198 (42.9)	<b>(40.8)</b>
LFEM	12 (9.2)	71 (15.4)	<b>(9.2)</b>
Chronic Migraine <sup>a</sup>	65 (50.0)	193 (41.8)	<b>(50.0)</b>
Acute medication overuse <sup>b</sup>	73 (56.2)	207 (44.8)	(53.6)
Failure of 2 previous preventive treatments <sup>c</sup>	64 (49.2)	159 (34.4) <sup>d</sup>	(33.2)
Failure of 3 previous preventive treatments <sup>c</sup>	43 (33.1)	127 (27.5) <sup>d</sup>	(27.7)
Failure of 4 previous preventive treatments <sup>c</sup>	14 (10.8)	82 (17.8) <sup>d</sup>	(17.2)
Failure of >4 previous preventive treatments <sup>c</sup>	9 (6.9)	93 (20.1) <sup>d</sup>	(21.7)

Data shown are mean ± standard deviation or n (%) of patients. Data were matched using the corresponding variables of the values shown in bold in the last column.  
<sup>a</sup>Capped at about 40% of the study population in CONQUER.  
<sup>b</sup>Data collection may have differed between the two sources.  
<sup>c</sup>In InovPain, all beta-blockers were considered as a single treatment.  
<sup>d</sup>Failure during lifetime.  
 ESS, effective sample size =  $\frac{\sum_{i=1}^n weight_i^2}{\sum_{i=1}^n weight_i}$ ; HADS, Hospital Anxiety and Depression Scale; HFEM, high frequency episodic migraine (8 to 14 MHD/month); IPD, individual patient data; LFEM, low frequency episodic migraine (<8 MHD/month); MHD, migraine headache days.

Table 1. Baseline patient characteristics before and after weighting

Table 2. Results of the primary CONQUER and weighted analyses: overall mean change from baseline in the number of monthly migraine headache days during the 3-month double-blind treatment phase for the total population with episodic or chronic migraine

	Placebo LSM (SE)	Galcanezumab LSM (SE)	Difference LSM (95% CI)	p-value
Primary CONQUER analysis	N=228	N=230	-3.12	<.0001
	-1.02 ± 0.32	-4.14 ± 0.32	(-3.92, -2.32)	
Weighted CONQUER IPD with InovPain characteristics	ESS=173	ESS=151	-3.13	<.0001
	-1.04 ± 0.36	-4.17 ± 0.36	(-4.02, -2.24)	

CI, confidence interval; ESS, effective sample size =  $\frac{\sum_{i=1}^n weight_i^2}{\sum_{i=1}^n weight_i}$ ; IPD, individual patient data; LSM, least squares mean; SE, standard error.  
 LSM and SE were obtained with a mixed model for repeated measures (MMRM) model including the following variables: treatment, pooled country, month, treatment\*month, baseline, and baseline\*month, and used an unstructured covariance structure.

Table 2. Results of the primary CONQUER and weighted analyses: overall mean change from baseline in the number of monthly migraine headache days during the 3-month double-blind treatment phase for the total population with episodic or chronic migraine

**Conclusion:** There is no evidence to suggest that the treatment effects observed in CONQUER would be different if the RCT population had been similar to the RW French InovPain cohort.

**Disclosure:** This study was sponsored by Eli Lilly and Company. M-AP, AT-H, MB and FC are employees and minor shareholders of Eli Lilly and Company; ML-M has received honoraria for advisory boards, speaker panels or investigation studies from Amgen, Astellas, ATI, Boston Scientific, Grunenthal, Lilly, Medtronic, Menarini, Novartis, Pfizer, ReckittBenckiser, Saint-Jude, Sanofi-Aventis, Teva, and Zambon in the past 5 years.



## EPO3110

### Could Medical Cannabis be an Effective Treatment for Migraine? A Literature Review

H. Pai

*Medicine, Kings College London, London, United Kingdom*

**Background and aims:** Cannabis has been prescribed for headache alleviation by physicians since the time of the ancient Persians. The main chemical components of cannabis are: Cannabidiol (CBD) and Tetrahydrocannabinol (THC). Recently, studies have begun to show that these compounds can increase the bodies endogenous endocannabinoid systems levels. The endocannabinoid system is involved in the mediation of pain. The purpose of this review is to evaluate whether medical cannabis could be an effective treatment for the headache disorder migraine.

**Methods:** This review was carried out using papers across two web databases; PubMed and Web of Science.

**Results:** The papers reviewed highlight the fact that endocannabinoid system dysfunction is likely to contribute to chronic migraine. This is thought to be from reduced levels of endocannabinoids which result in increased CGRP and Nitric Oxide production leading to migraine. This is backed up by the reduced levels of certain endocannabinoids in the CSF of people with chronic migraine compared to controls. People with chronic migraine have also been shown to have increased CGRP and NO production. Human based studies primarily have been case-reports, but these also given intriguing results. Not only has cannabis been reported to be effective in the abortion of migraine attacks but there is some evidence that it reduces the frequency of migraine attacks as well.

**Conclusion:** Medical Cannabis appears to be a promising treatment for migraine, especially with its potential ability to reduce migraine frequency. More research is required into which forms of medical cannabis are the most efficient in combating migraine.

**Disclosure:** Nothing to disclose

## EPO3111

### Post-operative pain following lumbar spine surgery: risk factors of chronic pain and quality of life outcomes

S. Rachin, S. Zevachin, E. Barantsevich, V. Andreev  
*Department of Neurology and Manual Medicine, Pavlov First Saint Petersburg State Medical University, Saint Petersburg, Russian Federation*

**Background and aims:** Chronic pain (CP) after lumbar spine surgery (LSS) is distinguished by high prevalence and socio-economic burden. Study aimed to investigate risk factors of CP after LSS and impact of CP on quality of life.

**Methods:** Prospective cohort observational study recruited adults after L4-L5 or L5-S1 microdiscectomy. Patients were divided into 3 groups - with CP, episodic pain (EP) and without pain (control group). All patients were tested prospectively and retrospectively with Numeric and Verbal rating scales, DN4 questionnaire, prospectively with Oswestry Disability Index, Holmes-Rahe Life Stress, Beck's Depression, Spielberger State-Trait Anxiety Inventories.

**Results:** Altogether 29 patients (15/29 females, median age 48 years old (IQR 45-51), median time after surgery 7.5 months (IQR 6-10)) were enrolled; 8/29 patients had CP, 7/29 - EP, 14/29 - no pain. There was no difference in characteristics of pain before surgery. Patients with CP had more points in DN4 as compared to EP (Figure 1). Before surgery patients with pain had higher body mass index (BMI), length of conservative therapy was longer among individuals with CP (Figure 2). Group with CP had higher functional disability, depression and anxiety after surgery, EP resulted to higher functional disability and anxiety as compared to control group, both CP and EP patients were characterized by higher stress in previous 12 months (Figure 3).

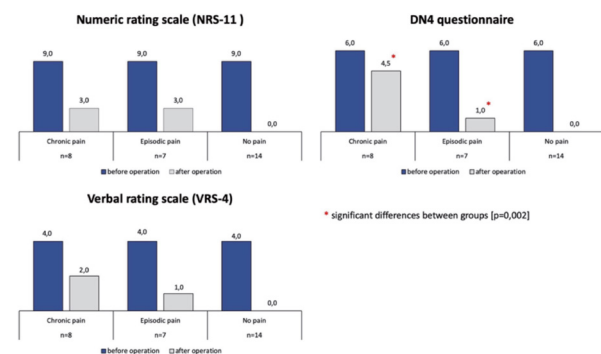


Figure 1. Dynamics of pain after the operation.

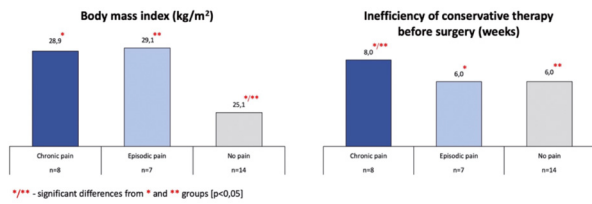


Figure 2. Body mass index, inefficiency of conservative therapy before the operation.

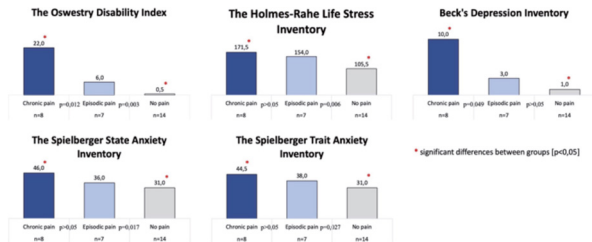


Figure 3. Comparison of indicators of anxiety, depression, disability, stress after the operation.

**Conclusion:** High BMI, stress and prolonged conservative therapy before LSS can be predictors of CP emergence. Post-operative CP is often neuropathic and can result to high functional disability, depression and anxiety.

**Disclosure:** Nothing to disclose

## EPO3112

### MRI and evoked potentials in postoperative estimation of trigeminal neuralgia

E. Rozhnova<sup>1</sup>, M. Sinkin<sup>2</sup>, V. Dashyan<sup>2</sup>, A. Tokarev<sup>3</sup>, V. Stepanov<sup>3</sup>, I. Tikhomirov<sup>2</sup>

<sup>1</sup>Moscow, Russian Federation, <sup>2</sup>Emergency Neurosurgery, The N.V. Sklifosovsky Research Institute of Emergency Medicine, Moscow, Russian Federation, <sup>3</sup>Radisurgery Center, The N.V. Sklifosovsky Research Institute of Emergency Medicine, Moscow, Russian Federation

**Background and aims:** It is accepted, constant artery pulsation leads to damage of nerve sheath and formation of demyelination area. The estimation of trigeminal nerve (TN) somatosensory evoked potentials (tnSEP) is 1 of functional methods for diagnosis of TN root demyelination. We can estimate the anatomical damage of TN using diffuse-tensor MRI, comparing the difference between fractional anisotropy (FA) parameters on damaged and contralateral sides.

We estimated the sensibility of tnSEP and FA in the setting of clinical improvement during 7-10 days after microvascular decompression (MVD) of TN root.

**Methods:** MVD of TN root was performed for 10 patients (7 male and 3 female, age from 47 till 76) suffered from with classical trigeminal drug-resistant neuralgia. Pain intensity at VAS was not less than 6. Preoperatively diffuse-tensor MRI of TN tracts with the estimation of FA parameters was performed for all patients. Estimation of tnSEP was performed at 6 patients resulting from pain syndrome provocation during electrodes placement on face skin. These diagnostic studies were repeated at in 7-10 days after operation.

**Results:** Clinical improvement was achieved in 100% postoperatively. No significant changes of FA parameters pre-and postoperatively. Initially we registered decreased speed transmission on symptomatic TN root at 2 patients while estimating tnSEP preoperatively. In 7 days after operation we observed symmetric signals from both TN at one of patients.

**Conclusion:** Such methods as tnSEP and diffuse-tensor MRI with FA parameters estimation not reflect preoperative and early postoperative changes of afferent conduction via TN branches and microstructural nerve changes even in case of clinical improvement.

**Disclosure:** Nothing to disclose

## EPO3113

**Posterior Reversible Encephalopathy Syndrome of unknown precipitating factor: A case report**

M. Rubinic Majdak<sup>1</sup>, V. Vojnovic<sup>1</sup>, M. Stojic<sup>2</sup>, J. Badzak<sup>1</sup>, A. Vrca<sup>2</sup>, I. Lazibat<sup>2</sup>

<sup>1</sup>Zagreb, Croatia, <sup>2</sup>University Hospital Dubrava, Zagreb, Croatia

**Background and aims:** Posterior Reversible Encephalopathy Syndrome (PRES) is a complex condition caused from a loss of autoregulation and results in reversible subcortical vasogenic brain oedema. The most common precipitating factor is hypertension and other causes are renal failure, sepsis, autoimmune disorders, and use of immunosuppressive or cytotoxic drugs.

**Methods:** A 55-year-old female, with past medical history of osteosclerotic changes in Th11 and Th12, was admitted to our hospital due to persistent, throbbing headache with nausea and vomiting lasting for one week. No history of hypertension, previous immunosuppressive or cytotoxic drugs was found. Her family history was positive for seizures, arthritis and psoriasis.

**Results:** Examination revealed normal blood pressure and mild liver lesion. Urinalysis was unremarkable. Neurologic examination and fundoscopic examination were within normal limits. The visual field was normal. Immunological laboratory tests were negative except for antimitochondrial antibody (AMA). The MRI scans demonstrated abnormal signal intensity involving bilateral occipital regions with cortical subarachnoid haemorrhage in the left frontal region consistent with the diagnosis of PRES. A brain MRI one month later demonstrated complete resolution of the initial cerebral lesions. Her headache resolves completely. After extensive work up, an internal medicine diseases was excluded as a cause of PRES.

**Conclusion:** PRES is reversible neurological disorder of unclear pathophysiological mechanism. Effective therapy includes treatment of underlying cause. Extensive workup did not reveal any precipitating factor of PRES. Even after months of monitoring, our patient did not fulfilled criteria for any disorder known as the cause of PRES which is a challenge in a treatment algorithm.

**Disclosure:** Nothing to disclose

## EPO3114

**Coping strategies for chronic low back pain in patients with anxiety and depressive symptoms – is behavior a decisive factor?**

M. Sangheli<sup>1</sup>, S. Plesca<sup>2</sup>, A. Melnic<sup>2</sup>, D. Istratii<sup>1</sup>, V. Simon<sup>1</sup>

<sup>1</sup>Department of Neurology No.1, State University of Medicine and Pharmacy “Nicolae Testemitanu”, Chisinau, Moldova,

<sup>2</sup>Department of Medical Rehabilitation, Physical Medicine and Manual Therapy, State University of Medicine and Pharmacy “Nicolae Testemitanu”, Chisinau, Moldova

**Background and aims:** Depression and anxiety in patients with chronic low back pain have an impact on coping strategies used by the sufferers. Passive coping strategies lead to the persistence of pain, increased level of disability and decreased social participation, while active positive behaviour would represent a core support in controlling pain.

**Aim:** To observe the coping strategies employed by patients suffering from chronic low back pain.

**Methods:** 31 (11 male/21 female) patients with chronic low back pain associated with anxiety and depression were included in the study. The Chronic Pain Coping Inventory-42, The Spielberger trait anxiety inventory measures, PHQ-9 Patient Health Questionnaire and visual analogic scale were used.

**Results:** Most of patients assumed passive methods of coping such as: guarding/avoiding physical activity (male -  $3.58 \pm 2.14$  / female -  $4.24 \pm 1.21$ ,  $p=0.36$ ); relaxation – avoidance of physical involvement (men -  $2.96 \pm 1.64$  / women -  $4.09 \pm 2.23$ ,  $p=0.15$ ); exercise (men -  $3.04 \pm 1.77$  / women -  $1.97 \pm 1.29$ ,  $p=0.06$ ). The least used strategy in both groups is persistence of task (male -  $4.97 \pm 2.00$ , female -  $1.82 \pm 1.59$ ,  $p<0.0001$ ). No statistically significant results were revealed comparing the types of coping strategies and pain intensity.

**Conclusion:** Determined trend of using passive coping strategies by patients with chronic low back pain and marked anxiety and depression confirm the need of active coping strategies implementation along education, that will bring a substantial benefit for management of persistent low back pain.

**Disclosure:** Nothing to disclose

## EPO3115

**Does fibromyalgia predict a poor response to Onabotulinumtoxin A in patients with chronic migraine?**

M. Sastre, M. Lara Lara, J. Díaz de Terán  
*Neurology, Hospital Universitario La Paz, Madrid, Spain*

**Background and aims:** Patients with fibromyalgia were excluded from PREEMPT trials. Our aim was to evaluate the effectiveness of Onabotulinumtoxin A in a group of patients with chronic migraine (CM) and fibromyalgia.

**Methods:** This is an observational retrospective study that includes patients who suffered CM and had a previous diagnosis of fibromyalgia. The response to OnabotulinumtoxinA during follow-up visits was assessed.

**Results:** Data from 25 patients with CM and fibromyalgia were collected (100% females). 21 patients received Onabotulinumtoxin A at any point of follow-up. Mean age at first procedure was  $50.38 \pm 11.25$  years (range 37–75 years). Depression (71.40%), other central sensitization syndromes (38.09%) and medication overuse headache (90.47%) were frequent comorbidities. 46,6% had failed  $\geq 3$  preventives previously. They received an average of  $6.42 \pm 4.11$  injections cycles.

Response rate (at least 50% of reduction from baseline in headache days per month) was 52.94% at cycle 2, 50% at cycle 3 and 62.50% at cycle 4.

16 patients completed 1 year of treatment, with  $12.28 \pm 10.88$  mean change from baseline in frequency of headache days and 43.75% patients reducing  $\geq 70\%$  their headache frequency.

In 2 cases (9.52%) Onabotulinumtoxin A therapy was interrupted due to a lack of response. No adverse effects were recorded.

**Conclusion:** Response rate was 62.50% after 1 year of treatment. These results suggest that fibromyalgia does not predict a poor response to Onabotulinumtoxin A in CM.

**Disclosure:** Nothing to disclose

## EPO3116

**Onabotulinumtoxin A in high frequency episodic migraine: experience in a University Hospital.**

M. Sastre, M. Lara Lara, J. Díaz de Terán  
*Neurology, Hospital Universitario La Paz, Madrid, Spain*

**Background and aims:** High frequency episodic migraine (HFEM) shares clinical features with chronic migraine (CM) regarding headache-related disability and impact on daily life. Our aim was to evaluate response to OnabotulinumtoxinA in HFEM.

**Methods:** An observational study was performed. We included patients diagnosed with HFEM attended in a headache unit. We analyzed data from medical records and evaluate treatment effectiveness.

**Results:** 24 patients were included. 96% were female, mean age was  $44 \pm 7$  years (mean  $\pm$  SD). 17 patients received OnabotulinumtoxinA and 11 patients received oral medications (4 patients received both).

Patients receiving Onabotulinumtoxin A had failed a mean of 3.5 oral preventatives. 5 patients (27%) discontinued treatment due to a lack of response. 15 patients received  $\geq 2$  cycles of treatment, 13 patients  $\geq 2$  cycles and 8 patients  $\geq 2$  cycles. 81% and 73% reported subjective overall response (clinically significant reduction in frequency or intensity of attacks or response to acute treatment) after 1st and 3rd cycle, respectively. Mean reduction of monthly headache days was 3.4 after first cycle, 4.3 after second cycle and 4.4 after third cycle. 44% of patients experimented a reduction of  $\geq 50\%$  in headache frequency.

Patients treated with oral medications had failed to a mean of 3 previous preventatives (35% had not received any preventive treatment). 54% of them had  $\geq 50\%$  reduction in headache frequency after 6 months of treatment. Mean reduction on monthly headache frequency was 6 days.

**Conclusion:** Our results suggest that Onabotulinumtoxin A can be a therapeutic option in patients with HFEM who did not respond or tolerate oral treatments.

**Disclosure:** Nothing to disclose

## Headache and pain 4

## EPO3117

**Visual Snow Syndrome: Quantification of symptoms over time**

M. Graber<sup>1</sup>, A. Scutelnic<sup>1</sup>, P. Goadsby<sup>2</sup>, C. Schankin<sup>1</sup>  
<sup>1</sup>Department of Neurology, Inselspital, Bern University Hospital, University of Bern, Berne, Switzerland, <sup>2</sup>Headache Group, Department of Basic and Clinical Neuroscience, Institute of Psychiatry, Psychology & Neuroscience, King's College London, United Kingdom, London, United Kingdom

**Background and aims:** Patients with 'visual snow syndrome' (VSS) describe a continuous disturbance of TV snow-like flickering dots in the entire visual field (visual snow, VS) with additional visual symptoms. This study aims at quantifying the severity of VS over time.

**Methods:** In 2019, we re-contacted 78 patients with definite VSS who had taken part in a previous interview in 2011. In addition to the distraction by VS, we assessed VS density, velocity, noticeability, and other characteristics. Parameters were measured using ordinal scales.

**Results:** We were able to interview 40 of 78 (51%) patients with a mean follow up time of 83.6±4.5 months. The distraction VS creates ameliorated in 10/40 (25%), whereas 6/40 (15%) reported worsening. Density of VS increased in 7/40 (17.5%) and decreased in 5/40 (12.5%), whereas movement of VS dots became more rapid in 10% (4/40) and slowed down in 10% (4/40). VS dots could be perceived on more surfaces in 4/40 (10%) and on less surfaces in 2/40 (5%). Morphologic characteristics (color and size of VS dots), duration of symptoms during the day and influence of different lightning conditions on VS were mainly unchanged. Fluorescent lightning was generally associated with a worsening of symptoms.

**Conclusion:** In VSS, visual snow itself remained stable in the majority patients. Distraction created by VS improved in one fourth.

**Disclosure:** The study was supported by the Baasch Medicus Foundation.

## EPO3118

**Synergic effect of anesthetic block and botulinum toxin in migraine in clinical practice.**

S. Secades, A. Plaza Herráiz, R.J. Martínez Marín, J.A. Membrilla López, M. Sastre Real, M. Lara Lara, J. Díaz de Terán  
 Neurology, La Paz University Hospital, Madrid, Spain

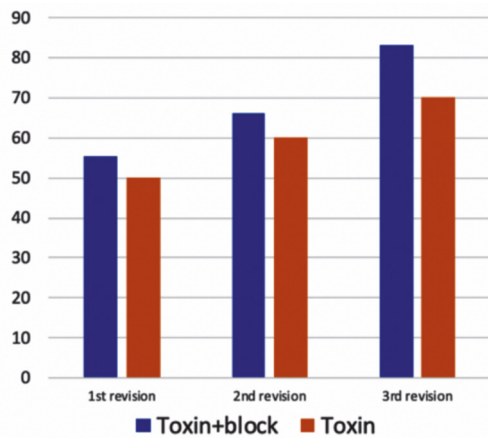
**Background and aims:** Onabotulinumtoxin A (OnabotA) is a therapy indicated in the treatment of chronic migraine. The anesthetic block (AB) with lidocaine or mepivacaine, appears as a second-line treatment in acute migraine attacks. Our goal is to evaluate the actual use of these techniques in a Headache Unit (HU), the frequency with which they are used and analyze the impact on the frequency of pain.

**Methods:** Retrospective analysis of patients treated for the first time in a HU between 2017-2018 who met migraine criteria according to those established in IHC-3 and on which techniques had been used (OnabotA, AB of both major occipital nerves (GON)). Pain frequency were analyzed after the use of these techniques. Response rate (frequency reduction of pain episodes ≥50%) was analyzed over 3 successive visits.

**Results:** 56 patients with migraine (79% chronic migraine) were included in which OnabotA was used. 78% of women. AB was additionally used in 12 of these patients. After 3 visits, a response rate of 70% was observed in patients in whom OnabotA was used exclusively and 83,3% in which additionally AB was performed in both GON

<b>Age</b>	<b>41</b>
<b>Gender</b>	<b>78,6% women</b>
<b>Chronic migraine</b>	<b>78,6%</b>
<b>Aura</b>	<b>17,9%</b>
<b>Medication Overuse Headache</b>	<b>42,9%</b>

Figure 1. Patients characteristics



**Figure 2: Percentage of response in patients infiltrated with toxin vs patients infiltrated with toxin + AB.**

**Conclusion:** While the effectiveness of OnabotA as a preventive therapy in chronic migraine is known, the additional use of AB in consultation could have a synergistic effect on this preventive therapy.

**Disclosure:** Nothing to disclose

## EPO3119

### Effectiveness of Ayurveda for chronic migraine: a pragmatic, randomised, clinical trial.

N. Sharma<sup>1</sup>, J. Joshi<sup>1</sup>, S. Sharma<sup>2</sup>

<sup>1</sup>Aarogyam, Leicester, United Kingdom, <sup>2</sup>NMP Medical Research Institute, Jaipur, India

**Background and aims:** Ayurveda is the oldest holistic medical system and commonly practiced in India. To evaluate the effectiveness of Ayurveda in participants with chronic migraine, present study was undertaken.

**Methods:** Study was conducted as multicentre, pragmatic, randomised, clinical trial, 72 participants with chronic migraine were randomly assigned to Ayurveda or to usual care. Primary outcome measures were frequency of headache. Secondary outcome measures were severity of headache, disability and use of medication.

**Results:** After 16 weeks, a significantly larger reduction of headache frequency was found for the ayurveda group ( $p < 0.01$ ). Disability and medication use showed significant differences in favour of the ayurveda group compared to usual care.

**Conclusion:** Ayurveda therapy could be more effective than usual care in the short-term in reducing symptoms of chronic migraines. Long term follow up is required.

**Disclosure:** Nothing to disclose

## EPO3120

**Effect of Vitamin D supplementation on symptoms in patients with migraine**

C. Shin

*Gwangju, Korea, Republic of*

**Background and aims:** Migraine is the most common headache around the world including Korea. This study investigated whether vitamin D supplementation would be beneficial for patients with migraine

**Methods:** A randomized, double-blinded, placebo-controlled parallel trial was conducted in migraine patients (40 women and 20 men, 20-65 years of age). A 4-week baseline period was conducted before randomization to 48 weeks of treatment. The patients were divided into 2 groups: Group 1, which had low vitamin D levels and received vitamin D therapy (n=30, 22 women and 8 men, 300,000 IU cholecalciferol intramuscular injection per 6 months), Group 2, which had low vitamin D levels and did not receive vitamin D therapy (n=30, 18 women and 12 men). The response rate (i.e. experiencing a 50% or greater reduction in migraine frequency from baseline to week 48), change in migraine severity, duration and number of migraine days were recorded.

**Results:** The group 1 demonstrated a significant decrease ( $p<0.001$ ) in migraine frequency from baseline to week 48 compared with the group 2. The number of headache days changed from  $13.14\pm 3.60$  in the group 1 and  $12.8\pm 5.52$  in the group 2 at baseline to  $6.58\pm 3.24$  and  $11.7\pm 4.24$  by the end of the trial, respectively. The incidence of aura, phonophobia/photophobia, allodynia, and resistance to medications were significantly decreased ( $p<0.005$ ) in the group 1 than those with the group 2.

**Conclusion:** Vitamin D supplementation was significantly beneficial in decreasing duration, frequency, and severity of headache attacks.

**Disclosure:** Nothing to disclose

## EPO3121

**The opportunity of using tolperisone for treatment of tension-type headache**V. Shirokov<sup>1</sup>, V. Gusev<sup>2</sup>, O. Lvova<sup>2</sup>, I. Evdokimova<sup>3</sup>

<sup>1</sup>*Yekaterinburg Medical Research Center for Prophylaxis and Health Protection in Industrial Workers, Yekaterinburg, Russian Federation,* <sup>2</sup>*Laboratory of Neurotechnology, Ural Federal University, Yekaterinburg, Russian Federation,* <sup>3</sup>*Neurology Unit, City Clinical Hospital 23, Yekaterinburg, Russian Federation*

**Background and aims:** Tension-type headache (TTH) is common and has a high socio-economic impact. The lack of effectiveness of existing therapeutic methods requires the study of alternative treatments for these patients.

**Methods:** We enrolled 48 patients met the diagnostic criteria for Chronic TTH (The International Classification of Headache Disorders, 3rd edition). Mean age 39 years; 31 women; signed informed form. Patients had one injection of 100mg tolperisone in different muscles of the head and neck according to "follow the pain" method (Blumenfeld AM, 2003). The number of points and muscles for injection was determined by the condition, the physique, the muscle size and the severity of pain in a particular area (m. masseter, m. temporalis, m. frontalis, m. pterygoideus lateralis, m. trapezius, m. sternocleidomastoideus). All patients were evaluated before, one day and one month after treatment using a visual analog scale (VAS), Verbal Rating Scale (VRS).

**Results:** VAS score significantly diminished from baseline to one day ( $5.12\pm 0.18$  vs  $2.55\pm 0.17$   $p<0.05$ ) and one month after treatment ( $5.12\pm 0.18$  vs  $2.17\pm 0.18$ ,  $p<0.05$ ). VRS score from baseline to one month after treatment decreased as well ( $1.88\pm 0.12$  vs  $1.07\pm 0.09$ ,  $p<0.05$ ).

**Conclusion:** The data obtained may allow to use tolperisone injections as affordable alternative medicine to BTA in TTH patients due to its efficacy as well as possibility of more frequent injections.

**Disclosure:** Nothing to disclose

## EPO3123

### Is tolerability to onabotulinumtoxin A injection correlated with adverse events or clinical response? A prospective cohort study.

A. Sierra Mencia<sup>1</sup>, D. Gil Contreras<sup>2</sup>, D. García Azorín<sup>3</sup>  
<sup>1</sup>Valladolid, Castilla y Leon, Spain, <sup>2</sup>Neurology, Hospital clinico de valladolid, Valladolid, Spain, <sup>3</sup>Valladolid, Spain

**Background and aims:** Onabotulinumtoxin A (OnabotA) is an effective treatment for Chronic Migraine (CM), with a distinct Adverse Event (AE) profile. The procedure sometimes overwhelms patients. We aim to analyze if tolerability is associated with AE occurrence and clinical response.

**Methods:** Prospective cohort study including all consecutive patients with CM treated with OnabotA from January 2017 to December 2019 in a headache unit. All patients were asked to rate tolerability to onabotA injections in a 0-10 scale. We phoned patients 2 weeks afterwards and systematically asked about AE. We analyzed if 50% response was correlated with tolerability, headache intensity at the moment of injection or AE occurrence. We hereby present data obtained after first procedure.

**Results:** We included 97 patients, aged 43.7 (Sx=±10.9), with 44.4 (Sx=±58.4) months of CM. Headache at the moment of injection was referred in 72.1% of them, with a mean intensity of 3.58 (Sx=±2.9). Patients described tolerability to the injections as 7.6/10 (Sx=±1.8). 52.6% patients had a 50% response, with a mean reduction of 10.2 headache days compared with baseline. AEs was described in 70.1% of patients. Frequency of AE did not differ in the responder group compared with non-responders (67 vs 75%; p=0.34). We did not found association between tolerability and response

**Conclusion:** OnabotA tolerability was good in our series and it did not correlate with presence of adverse events or response.

## EPO3124

### Interferon-β produces analgesic effect through activating μ-opioid receptor

P.-H. Tan<sup>1</sup>, J.-Y. Chen<sup>1</sup>, C.C. Liu<sup>2</sup>

<sup>1</sup>Anesthesiology, Chi-Mei Medical Center, Tainan, Tainan, Taiwan, Chinese Taipei, <sup>2</sup>Anesthesiology, E-Da Hospital/I-Shou University, Kaohsiung, Taiwan, Chinese Taipei

**Background and aims:** Interferons (IFNs), such as type-I IFN (IFN-α) and type-II IFN (IFN-γ) are produced by immune cells to elicit antiviral effects. IFNs are also produced by glial cells in the CNS to regulate brain functions. As a proinflammatory cytokine, IFN-γ drives neuropathic pain by inducing microglial activation in the spinal cord. However, little is known about the role of IFN-β in regulating pain sensitivity in spinal cord. Thus, we will study the role of IFN-β in regulating pain sensitivity and mechanism of antinociception in this study.

**Methods:** To produce persistent inflammatory pain, complete Freund's adjuvant was injected into a hindpaw. Intrathecal IFN-β injection (10000u) was also made to provide antinociceptive effect for acute inflammatory pain. After behavior test, the spinal cords were dissected for immunohistochemistry staining and western blot.

**Results:** Spinal (intrathecal) administration of IFN-β increased pain threshold in naïve rats and reduced complete Freund's adjuvant (CFA)-induced inflammatory pain, whereas removal of endogenous IFN-β by a neutralizing antibody induced hyperalgesia in naïve rats. Intrathecal injection of naloxone reversed the antinociceptive effect of IFN-β on CFA-induced mechanical allodynia. IFN-α/β receptor (type-I IFN receptor) was expressed in the superficial dorsal horn and co-expressed with the μ-opioid receptor. Intrathecal injection of IFN-β induced phosphorylation of μ-opioid receptor evidenced by the increased expression of phospho-μ-opioid receptor after injection of IFN-β.

**Conclusion:** IFN-β binds to IFN-α/β receptor expressed in superficial dorsal horn of spinal cord and partially activates μ-opioid receptor to induce antinociceptive effect. Methods of boosting IFN-β release may open a new avenue for pain management.

**Disclosure:** Nothing to disclose



## EPO3125

### Patient attitudes and valuation of preventive migraine treatments: A focus group study

A. Tockhorn-Heidenreich<sup>1</sup>, J. Seo<sup>2</sup>, C. Thomas<sup>3</sup>, J.H. Ford<sup>1</sup>, V.L. Stauffer<sup>1</sup>, R.A. Nicholson<sup>1</sup>, K.H. Duffy<sup>1</sup>, T. Tervonen<sup>3</sup>

<sup>1</sup>Eli Lilly and Company, Indianapolis, IN, USA, <sup>2</sup>Evidera, Bethesda, MD, USA, <sup>3</sup>Evidera, London, United Kingdom

**Background and aims:** This study aimed to understand patients' attitudes towards and valuation of injectable preventive migraine treatments, including preferred characteristics of administration devices.

**Methods:** 9 face-to-face focus groups were conducted among participants (n=47) with episodic (n=28) or chronic (n=19) migraine in the United States, the United Kingdom and Germany. The semi-structured focus groups consisted of open discussions about symptoms, impacts on quality of life, treatment expectations, hands-on testing of 5 administration devices (i.e. 2 prefilled syringes and 3 auto-injectors) and an interactive ranking of treatment aspects. Transcripts were analysed using content analysis and online questionnaires were analysed using descriptive statistics.

**Results:** Participants were on average 46.8 (SD: 13.0) years, mostly female (85.1%) and naïve to self-injectable treatments (74.5%). While most participants (85.1%) had experience with beta-blockers, antidepressants or anticonvulsants, participants emphasized a need for efficacious and safe/tolerable migraine prevention treatments due to dissatisfaction with current treatments. The ranking exercise indicated that patients' valuation of such treatments is largely driven by decreasing migraine frequency, reduction in migraine severity and concerns about thinking/memory problems. Patients' treatment valuation was also driven by frequency of administration and administration device characteristics, including device type (prefilled syringe and auto-injector), ease of use (needle auto-retraction, injection angle and shape), sense of control, dose confirmation (visual and audio) and injection time.

**Conclusion:** Patients reported a need for efficacious and safe/tolerable treatments for migraine prevention. While their valuation of injectable preventive treatments mostly depend on the overall benefit-risk profile, patients' treatment valuation was affected by attributes of the administration device.

**Disclosure:** The study was funded by Eli Lilly and Company.

## EPO3126

### Epidemiology of pain: a long way to effective pain management

N. Vashchenko<sup>1</sup>, L. Medvedeva<sup>2</sup>, M. Churyukanov<sup>1</sup>, O. Zagorulko<sup>2</sup>

<sup>1</sup>Department of Nervous Diseases and Neurosurgery, I. M. Sechenov First Moscow State Medical University, Moscow, Russian Federation, <sup>2</sup>Petrovsky Russian Research Center of Surgery, Moscow, Russian Federation

**Background and aims:** Despite the ubiquity and burden of pain, whether acute, chronic or intermittent, patients still have to go a long way to get the right diagnosis and treatment, frequently getting unnecessary medications and procedures.

The aim was to evaluate the prevalence of different pain syndromes in patients of the pain department and their journey to effective treatment.

**Methods:** The cross-sectional study included 2521 patients who came to the appointment in a pain department and had completed a questionnaire. The questionnaire was designed to assess the intensity and quality of pain and previous patient's experience. It included demographic data, questions about preceding doctor's visits and former treatment and Visual Analogue Scale (VAS).

**Results:** Back pain (46.5%), headaches (22.6%) and joint pain (21.4%) were the most widely represented. Before the appointment in the pain department, almost 50% of patients had been consulted by more than 3 specialists, 38.9% - by 4-10 doctors, 10.2% - more than 10. Patients mostly went to neurologists (36.8%), general physicians (25.2%) and surgeons (16.7%). Due to intensive pain, 1 in 5 patients (19.1%) had called an ambulance at least once during the last year. The most common treatments prescribed to patients were medications, massage, manual therapy and physical exercise and were mostly not followed. Previous medications included nonsteroidal anti-inflammatory pills (41.2%), non-specific vascular-metabolic drugs (25.6%) and muscle relaxants (20.4%).

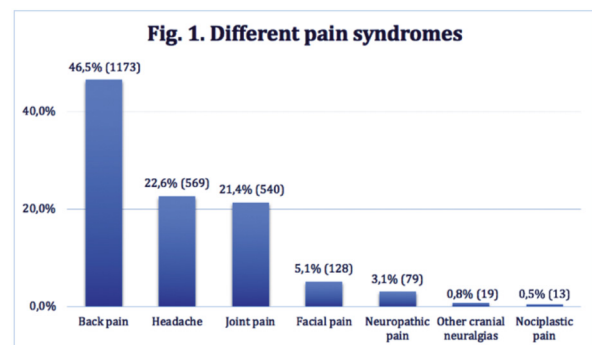


Fig. 1

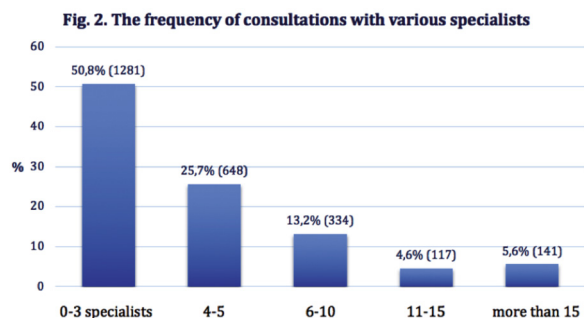


Fig. 2

**Conclusion:** Consultations by various specialists and non-adherence to therapy lead to ineffective pain management and more years with chronic pain.

**Disclosure:** Nothing to disclose

## EPO3127

### Epidemiology of pain: the intensity of everyday pain.

N. Vashchenko<sup>1</sup>, L. Medvedeva<sup>2</sup>, M. Churyukanov<sup>1</sup>, O. Zagorulko<sup>2</sup>

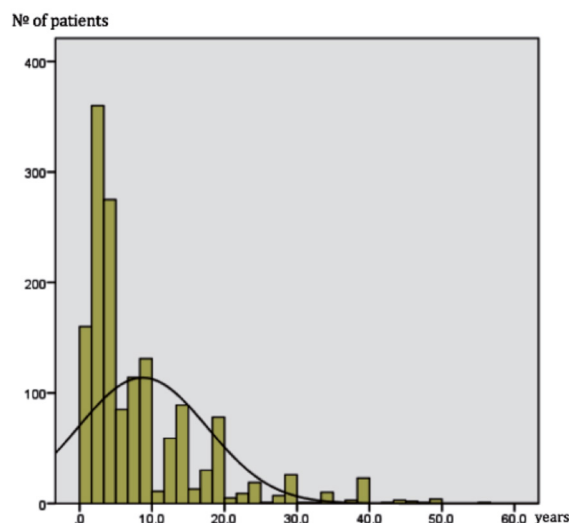
<sup>1</sup>Department of Nervous Diseases and Neurosurgery, I. M. Sechenov First Moscow State Medical University, Moscow, Russian Federation, <sup>2</sup>Petrovsky Russian Research Center of Surgery, Moscow, Russian Federation

**Background and aims:** Dealing with chronic diseases, patients often have to struggle with everyday pain, which can affect their working ability and social life.

The aim was to evaluate the duration and intensity of pain in out-patients of pain department and factors that may be associated with it.

**Methods:** The cross-sectional study included 2521 out-patients who had completed a questionnaire. The questionnaire was designed to assess the duration, intensity and quality of pain during the disease, the whole life-time and every-day pain with Visual Analogue Scale (VAS).

**Results:** There were more male (60.4%), working-age (76.4%) and highly educated (60.9%) patients. 88,1% of patients had chronic pain (>3 months). 76% indicated the most severe pain during the present disease as 5 or higher on VAS and 40.2% - as 8 or higher. More than 95% reported everyday pain, the intensity of which was  $\geq 5$  on VAS in 59.5% of cases. The average intensity of everyday pain depended on the duration of the illness: the longer the patient is in pain, the higher the intensity descriptors of his daily pain; e.g. the intensity of daily pain was 0.8 points higher in patients with a disease duration >3 months and 1 point higher if the disease lasts more than a year. Unemployed and widowed patients had more intense pain ( $p < 0.05$ ).



**Fig.1. Pain duration in years**

Fig.1. The duration of pain in years

**Conclusion:** Marital status, employment and duration of pain can affect the intensity of everyday pain in patients with chronic pain. There was no correlation of intensity with gender and education level.

**Disclosure:** Nothing to disclose

## EPO3128

**Epidemiology of pain and social consequences**

N. Vashchenko<sup>1</sup>, M. Churyukanov<sup>1</sup>, L. Medvedeva<sup>2</sup>, O. Zagorulko<sup>2</sup>

<sup>1</sup>Department of Nervous Diseases and Neurosurgery, I. M. Sechenov First Moscow State Medical University, Moscow, Russian Federation, <sup>2</sup>Petrovsky Russian Research Center of Surgery, Moscow, Russian Federation

**Background and aims:** Pain seriously affects the patient's quality of life, since pain disorders are one of the main reasons for absence at work and increased number of years lived with disability.

The study aimed to evaluate the duration and intensity of pain, comorbidity as well as its repercussions in the workplace, and on the family and social environment.

**Methods:** The study enrolled patients who 1st came to the pain department and had completed a questionnaire. The questionnaire was designed to assess the intensity and quality of pain, comorbid diseases and the social impact of pain on the patient's life. It included Visual Analogue Scale (VAS) and DN4 questionnaire for neuropathic pain as well.

**Results:** There were 90 patients, 41.6% of which suffer from pain  $\geq 5$  years. 88.8% described their worst pain during the current disease as 6 or higher on VAS. One third (34.9%) of patients had neuropathic pain, mainly the patients who had pain for more than 3 years. Sleep disturbance and essential arterial hypertension were the most often comorbid diseases (Fig. 1). 92.3% of patients reported that pain limits their social activity. 76.9% and 75.6% also reported the limitation in working ability and family life, respectively.

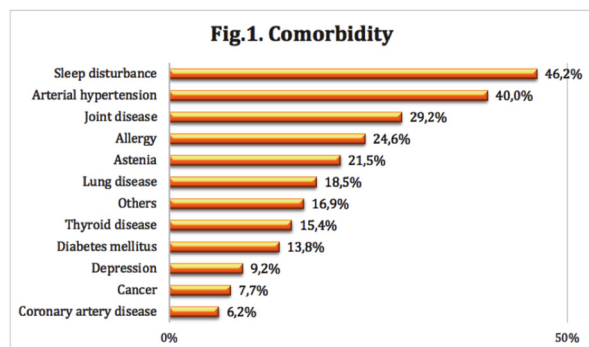


Fig. 1. Comorbidity

**Conclusion:** Comorbid sleeping disorders in almost half of the cases with high pain intensity during the disease limit the social and family-life activity of patients. Thus, we want to emphasize on the need to implement a multidisciplinary approach to treatment to achieve more comprehensive improvements for patients in familial and social contexts.

**Disclosure:** Nothing to disclose

## EPO3129

**Treating chronic SUNCT with a nerve blockade in an anticoagulated patient**

M.D. Villar Martínez<sup>1</sup>, D. Moreno Ajona<sup>1</sup>, J.R. Hoffmann<sup>2</sup>, P.J. Goadsby<sup>3</sup>

<sup>1</sup>Headache Group, King's College Hospital, London, United Kingdom, <sup>2</sup>London, United Kingdom, <sup>3</sup>Headache Group, Department of Basic and Clinical Neuroscience, Institute of Psychiatry, Psychology & Neuroscience, King's College London, United Kingdom, London, United Kingdom

**Background and aims:** In chronic short-lasting unilateral neuralgiform headache attacks with conjunctival injection and tearing (SUNCT), attacks occur for more than 1 year without remission, or remission last less than 3 months. A migrainous biology has been associated with the pain between attacks and peripheral nerve blockades are efficacious.

**Methods:** Case report.

**Results:** This was a 73-year-old male with vascular risk factors, atrial fibrillation on rivaroxaban and recurrent cervical abscesses.

In 2010, he developed episodes of left facial sharp pain, occurring fortnightly and rated 8/10 in the pain Visual Analogue Scale (pVAS). Attacks appeared 50-100times/day, lasted for 30 seconds and extended from V2 to the fronto-temporal area. Triggers included touching, chewing or talking and were associated with bilateral photosensitivity, phonophobia, cranial allodynia, conjunctival injection, lacrimation, rhinorrhoea and facial flushing, without refractory period. Lamotrigine, carbamazepine, indomethacin, amitriptyline and melatonin were not effective. In 2015, after commencing gabapentin, the frequency diminished to 10attacks/day, although he developed a constant, bruising sensation (pVAS=5/10), that in 2019 became a multi-stabbing sensation (pVAS=7/10) and a daily, severe lancinating pain (pVAS=10/10) that lasted for 1 hour.

A supraorbital nerve (SON) blockade (methylprednisolone 30mg and 2% lidocaine 0.75mL) was performed. A 30G needle was used and pressure applied for 15 minutes, without adverse events. 2 weeks after the injection the background pain and the severe stabbings disappeared.

**Conclusion:** SON blockade may be an effective treatment for SUNCT and may even be considered in anticoagulated patients. The presence of migrainous features may predict a better outcome of peripheral blockades for SUNCT.

**Disclosure:** Nothing to disclose

## EPO3130

**Lasmiditan in Patients with Common Migraine Comorbidities: A Post hoc, Safety, and Efficacy Analysis of Two Phase 3 Randomized Clinical Trials**

D.B. Clemow<sup>1</sup>, S.K. Baygani<sup>1</sup>, P.M. Hauck<sup>1</sup>,  
C.B. Hultman<sup>1</sup>, S. Wilhelm<sup>2</sup>

<sup>1</sup>Eli Lilly and Company, Indianapolis, USA, <sup>2</sup>Lilly  
Deutschland GmbH, Bad Homburg, Germany

**Background and aims:** Determine whether common comorbidities affect safety and efficacy of lasmiditan, a 5-HT<sub>1F</sub> receptor agonist approved in the US, as an acute treatment for migraine. SAMURAI and SPARTAN were Phase 3 clinical trials of migraine patients, randomized to oral lasmiditan 50 (SPARTAN only), 100, 200mg, or placebo. Lasmiditan increased the proportion of pain-free and most bothersome symptom (MBS)-free patients at 2 hours after dose versus placebo. Common treatment-emergent adverse events (TEAEs) were dizziness, paresthesia, somnolence, fatigue, nausea, muscular weakness, and hypoesthesia.

**Methods:** Based upon literature review of common migraine comorbidities, anxiety, allergy, bronchial, cardiac, depression, fatigue, gastrointestinal, hormonal, musculoskeletal and pain, neurological, obesity, sleep, and vascular groups were created. Using pooled data, 2-hr pain freedom, 2-hr MBS freedom, and TEAEs were compared in patients with or without migraine comorbidity. P-values were calculated for treatment-by-subgroup interaction, based on logistic regression with treatment-by-Comorbidity Condition Status (Yes/No) as the interaction term; study, treatment group, and Comorbidity Condition Status (Yes/No) were covariates. Differential treatment effect was examined.

**Results:** No consistent statistical differences were observed between subgroups for 2-hr pain or MBS freedom. Similarly, no significant differential treatment by subgroup effects were identified with regards to TEAEs.

**Conclusion:** No consistent significant differences in efficacy were observed between patients with and without common comorbidities. Comorbidity status had no significant differential treatment by subgroup effects on the incidence of individual TEAEs. Therefore, the safety and efficacy of lasmiditan for treating single migraine attacks appears independent of comorbid conditions.

**Disclosure:** All the authors are employees and stockholders of Eli Lilly and Company.

## Movement disorders 7

### EPO3131

#### Which factors predict the success of Opicapone? Defining the optimal patient profile

T. Muñoz Ruiz<sup>1</sup>, G. Pons Pons<sup>1</sup>, L. Garcia Trujillo<sup>1</sup>, C. Martínez Tomás<sup>1</sup>, P. Serrano Castro<sup>2</sup>

<sup>1</sup>Neurology, Hospital Regional Universitario de Málaga, Málaga, Spain, <sup>2</sup>Neurology Department, Hospital Regional Universitario de Málaga, Málaga, Spain

**Background and aims:** Opicapone (OPC) is a catechol O-methyltransferase inhibitor indicated as an adjunct treatment to levodopa in Parkinson's disease (PD).

Our objective is to evaluate the prognostic factors of OPC as an add-on therapy in PD fluctuator patients.

**Methods:** Descriptive retrospective study of PD patients treated with OPC in our hospital from 2018-2019. The primary efficacy variable was the difference in absolute OFF-time (OT) based on diaries, and secondary variables were the subjective reduction of fluctuations and the appearance of adverse effects (AE). Early fluctuators (EF) and switchers from Entacapone were evaluated by an independent subgroup analysis.

**Results:** 126 PD patients were enrolled (57.8% male, 42.2% female, 55.8 years old, s11.6).

We found an absolute OT reduction of 1,4h/day, and a decrease of fluctuations in 67% patients.

Age of disease onset ( $p<0.005$ ), Hoehn and Yahr (HyY) ( $p<0.001$ ), and Schwab and England (SE) ( $p<0.0001$ ) were significantly related with OT reduction and fluctuation decrease. A shorter course of PD was related with a higher reduction of fluctuations.

38% of patient withdraw OPC; dyskinesia or hallucinations were the main reasons. HyY, SE, having hallucination previously or cognitive impairment were significantly related with withdrawal.

Only 18 patient were EF, efficacy differences could not be demonstrated, however they developed less hallucinations and dyskinesia.

In switchers from Entacapone subgroup analysis, the only differences found were equivalent dose of Levodopa pre- (1055mg vs 872,  $p<0.008$ ) and post- OPC (997mg vs 827mg,  $p=0.01$ ).

**Conclusion:** Early stages of the disease with less time of evolution, low score on HyY and high on SE seem to be related with more efficacy of OPC and less AE.

**Disclosure:** Nothing to disclose

### EPO3132

#### Can clinical features help to differentiate Holmes tremor from post-thalamic stroke tremor?: a review of 13 cases.

N. Nsengiyumva<sup>1</sup>, A. Macerollo<sup>2</sup>, A. Barakat<sup>2</sup>, M. Bonello<sup>2</sup>, R. Ellis<sup>2</sup>, R. Pullicino<sup>2</sup>, S. Alusi<sup>2</sup>

<sup>1</sup>Department of Neurology, RUDN University, Moscow, Russian Federation, <sup>2</sup>The Walton Centre NHS Foundation Trust, Liverpool, United Kingdom

**Background and aims:** Holmes Tremor (HT), previously called Rubral tremor, is a debilitating movement disorder with unique characteristics and involves the midbrain and its connections, but has a poorly understood pathophysiology. Some of its clinical features can resemble post-thalamic stroke tremor and differentiation requires careful clinical examination. We report a case-series of 13 patients highlighting their clinical and radiological findings with a focus on distinguishing HT from the post-thalamic stroke tremor clinically.

**Methods:** A retrospective review of 13 patients with a HT type presentation was conducted. The tremor characteristics, as well as associated clinical and radiological findings were analysed.

**Results:** 9 of the patients had a myorhythmic tremor at rest which increased in amplitude on posture and further on goal directed movement, without any additional features beyond mild dystonic posturing distally. These were classified as HT. 4 patients had complex involuntary movement of the limbs, with a slow, large amplitude tremor proximally with choreathetoid movements distally and associated proprioceptive sensory loss, representing the entity of post-thalamic stroke tremor. Haemorrhagic lesions (cavernoma, arteriovenous malformations, and traumatic brain injury) were the predominant causes of HT whereas ischaemia was more commonly associated with post-thalamic stroke tremor.

**Conclusion:** When examining patients with Holmes tremor, careful attention to the presence of other movement disorders and other neurological features such as sensory deficits can help the clinician in the accurate localisation of the causative lesion which can have significant implications on the clinical management.

**Disclosure:** Nothing to disclose

## EPO3133

**Non-motor burden grading may serve as a predictor of cognitive decline in Parkinson's disease**

P. Oikonomou<sup>1</sup>, D.J. Van Wamelen<sup>2</sup>, V. Leta<sup>2</sup>, A.M. Podlewska<sup>2</sup>, K. Rukavina<sup>2</sup>, M. Parry<sup>2</sup>, A. Rizos<sup>2</sup>, C. Sportelli<sup>2</sup>, C. Borley<sup>2</sup>, D. Trivedi<sup>2</sup>, K.R. Chaudhuri<sup>2</sup>  
<sup>1</sup>Department of Neurology and Neurophysiology, Medical Center-University of Freiburg, Freiburg, Germany, <sup>2</sup>department of basic and clinical neurosciences, Institute of Psychiatry, Psychology, Psychiatry, Psychology & Neuroscience, King's College London, London, United Kingdom

**Background and aims:** The identification of risk factors, which may predict cognitive decline (CD), 1 of the most important non-motor (NM) features in Parkinson's disease (PD), is highly relevant for the improvement of clinical management. Subtyping PD, considering also NM symptoms, may be a useful strategy of understanding the PD's heterogeneity. The NM symptom scale (NMSS) has been validated and standardized in the evaluation of PD patients and could contribute to PD subtyping.

**Methods:** To investigate if specific differences in PD NM profiles predispose to the development of CD, we performed a longitudinal study on 541 non-demented PD patients taking part in the NM International Longitudinal Study, assessed among others with Mini Mental State Examination (MMSE), NMSS and scales for outcomes in PD -motor, -daily living (SCOPA-A, B) at baseline and last follow-up (median 3- year follow-up).

**Results:** We found that PD patients, who developed CD defined by MMSE  $\leq 25$  at last follow-up (N=107), had significantly more frequent and severe hallucinations/perceptual problems and deterioration of the attention/memory NMSS domain at baseline. These findings were independent of dopaminergic medication, presence of depression/anxiety, sleep disorders and disease duration, but we did notice that PD patients with CD were older, had more advanced H/Y stages and performed worse in SCOPA-A, -B and MMSE scores at baseline.

**Conclusion:** Our results complement previous findings but demonstrate, for the 1st time, that baseline NM profiles assessed through the NMSS could aid in predicting the development of CD in PD. These clinical features might comprise the phenotype of the cognitive subtype of PD.

**Disclosure:** Dr. P. Oikonomou does not report any conflicts of interest. The European Academy of Neurology Clinical Fellowship Programme 2019 supported Dr. P. Oikonomou.

## EPO3134

**Sudden-onset hemichorea-hemiballism as first manifestation of brain metastasis in a patient with colon cancer**

R. Oliveira<sup>1</sup>, J. Madureira<sup>2</sup>, L. Guedes<sup>3</sup>  
<sup>1</sup>Lisbon, Portugal, <sup>2</sup>Neuroradiology, Hospital de Santa Maria, Lisbon, Portugal, <sup>3</sup>Neurology Service, Department Of Neurosciences, Hospital Santa Maria, Lisbon, Portugal

**Background and aims:** Hemichorea-hemiballism (HC-HB) has a strong association with lesions of the subthalamic nucleus (STN). Vascular lesions are the most frequent cause of HC-HB, but the differential diagnosis include granulomatous, neurodegenerative and demyelinating disorders, as well as some metabolic and infectious diseases. Acute onset HC-HB secondary to STN involvement by metastasis is rarely reported in the literature.

**Methods:** We report a case of a 71-year-old man with sudden-onset of difficulty controlling his left upper limb due to abrupt involuntary movements.

**Results:** Medical history included hypertension and ischemic cardiopathy, medicated with dual antiplatelet therapy, which he stopped 2 weeks prior due to gastrointestinal bleeding, and recent palliative immunotherapy with pembrolizumab due to stage IV colon adenocarcinoma. Examination revealed spontaneous, non-rhythmic, choreiform, involuntary movements of the left arm and hand associated with oromandibular dyskinesias (video). Vascular stroke of the basal ganglia was initially suspected. Non-contrast brain-CT showed 3 mildly hyperdense lesions in left thalamus, right corona radiata, and right subthalamic region. Additionally, brain-MRI showed perilesional oedema extending to the posterior limb of the internal capsule and cerebral peduncle on the right side, peripheral contrast enhancement and small foci of intralesional hemorrhage.

**Conclusion:** Sudden-onset focal neurological signs, including lateralized involuntary movements, are highly characteristic of an acute vascular lesion. Other causes of acute HC-HB can be found in the literature, the most frequent being nonketotic hyperglycemia. In our case, brain metastasis was the cause of the sudden-onset of HC-HB. Our case illustrates that sudden-onset involuntary movements can be the first and only manifestation of strategic brain metastasis.

**Disclosure:** Nothing to disclose

## EPO3135

**Frailty as clinical modulator of brain damage and progression in Parkinson's disease**

A. Pilotto<sup>1</sup>, A. Lupini<sup>2</sup>, F. Savoldi<sup>3</sup>, F. Conforti<sup>2</sup>, G. Gianni<sup>2</sup>, A. Imarisio<sup>2</sup>, S. Gipponi<sup>2</sup>, E. Cottini<sup>2</sup>, A. Scalvini<sup>4</sup>, S. Masciocchi<sup>2</sup>, S. Nocivelli<sup>2</sup>, R. Grasso<sup>2</sup>, R. Turrone<sup>5</sup>, C. Rizzetti<sup>6</sup>, A. Padovani<sup>2</sup>

<sup>1</sup>Brescia, Italy, <sup>2</sup>Department of Clinical and Experimental Sciences, University of Brescia, Brescia, Italy, <sup>3</sup>Department of Clinical and Experimental Sciences, University of Brescia, Milan, Italy, <sup>4</sup>Neuroscience Section, Department Clinical and Experimental Sciences, Neuroscience Section, Department Clinical and Experimental Sciences– University of Brescia, Italy, Brescia, Italy, <sup>5</sup>Neurology Unit, Department of Clinical and Experimental Sciences, University of Brescia, Brescia, Italy, <sup>6</sup>S. Isidoro Hospital, FERB ONLUS, Trescore Balneario, Italy

**Background and aims:** Frailty is a complex syndrome characterized by increased risk of disability in the elderly. No studies assessed frailty in patients with Parkinson's disease. Objective of the study was to evaluate the prevalence of frailty and correlation with motor and cognitive features symptoms in Parkinson's disease.

**Methods:** 162 consecutive outpatients with PD diagnosis (mean age 68.8 y, mean disease duration 8.3 years) entered the study. Each subject underwent a comprehensive motor and nonmotor evaluation and geriatric assessment using multidimensional prognostic index (MPI) and 104 patients underwent clinical follow-up at 2 years.

**Results:** Pre-Frailty assessed by MPI was presented by 38.5% of patients and correlated with age and disease duration and its prevalence increased along with Hoehn and Yahr staging. When stratified for H/Y staging, PD patients with frailty presented similar motor impairment but worse non-motor symptoms and cognitive performances. At 2-years follow-up, frailty predict worse cognitive and motor progression when adjusted for disease burden.

**Conclusion:** Frailty is a possible important modulator of pathology and brain vulnerability in Parkinson's disease and could explain different severity in motor and non-motor symptoms. Longitudinal larger studies are warranted to evaluate the impact of frailty in disease progression.

**Disclosure:** Nothing to disclose

## EPO3136

**Exploring the Use of Wearable Sensors in Parkinson's disease and the Detection of Early Morning Periods**

H. Pai

London, United Kingdom

**Background and aims:** Early Morning Off (EMO) is a common feature found in Parkinson's disease (PD). It can be difficult to detect and often presents with a combination of motor and non-motor symptoms. Whilst EMO can be detected by patient interview, this method is unreliable. Wearable sensors offer an alternative method of identifying EMO. The Parkinson's Kinetigraph (PKG) is a wristwatch device which uses accelerometry to provide, objective ambulatory monitoring of PD throughout the day This is the 1st study to evaluate the use of wearable-sensors in EMO detection. The primary objective of this study was to examine if PKG recordings were relevant to the clinical description of EMO in a treated PD population. Secondary objectives were to find potential predictors for EMO.

**Methods:** Using data from the Non-motor Longitudinal International Study we performed a retrospective, cross-sectional study on 104 participants at King's College Hospital, London. To identify patients whose PD symptoms were morning worse (and thus likely suffering from EMO) a ratio was created using Bradykinesia data from the PKG (see attached figure).

**Results:** Our cohort's EMO prevalence was 38%. EMO patients had much higher levels of motor dysfunction. This was reflected by significantly higher SCOPA Motor dysfunction scores and more advanced HY scores. From our correlation, only higher SCOPA C scores were seen to be predictive of EMO presence.

**Conclusion:** Our results showed a strong correlation between higher levels of motor dysfunction and EMO presence. As prior clinical EMO descriptions mention a correlation between more advanced PD and EMO this result is not unexpected.

**Disclosure:** Nothing to disclose

# EPO3137

## The Upper Limb Cardiopulmonary Exercise Test in Friedreich Ataxia Patients

C. Pane<sup>1</sup>, A. Salzano<sup>2</sup>, R. Vastarella<sup>2</sup>, C. Del Prete<sup>1</sup>, A. Trinchillo<sup>1</sup>, A. Cittadini<sup>2</sup>, F. Giallauria<sup>2</sup>, A. Filla<sup>1</sup>, G. De Michele<sup>1</sup>, F. Sacca<sup>1</sup>

<sup>1</sup>Department of Neuroscience, Reproductive Science and Dentistry University "Federico II", Naples, Italy;

<sup>2</sup>Department of Translational Medical Sciences, University Federico II, Naples, Italy, Naples, Italy

**Background and aims:** In Friedreich Ataxia (FRDA) primary endpoints for phase IIb trials, or secondary functional endpoints are currently missing. Aim of our study was to explore the feasibility of upper limbs cardiopulmonary exercise testing (CPET) in FRDA patients and to compare the results with a cohort of matched Healthy Controls (HC).

**Methods:** CPET was performed using an upper limbs cycle ergometer. Patients followed a ramp protocol of 5W/min, HC of 10 W/min. We recorded: peak oxygen consumption (peak-V<sub>2</sub>), anaerobic threshold (AT), ventilation per minute vs CO<sub>2</sub> production (VE/VCO<sub>2</sub>). Variables were compared using an unpaired t test, or a  $\chi^2$  test when appropriate. Correlation was performed using the Parson's correlation coefficient.

**Results:** We studied 55 FRDA and 54 HC. Age (35.3±13.8 vs 32.1±10.5; p=0.186), gender (p=0.851), and BMI (23.1±4.6 vs 23.5±3.5; p=0.557) did not differ between groups. In FRDA, peak-VO<sub>2</sub> showed a 31% reduction (15.2±5.7 vs 22.0±6.1 mL/Kg/min; p<0.001), and AT-VO<sub>2</sub> a 36% reduction (p<0.001) (Figure 1). In FRDA, peak-VO<sub>2</sub> correlated with clinical measures (Table 1). AT occurred at 33% of peak workload in FRDA and at 86% in HC (p<0.001) (Figure 2). In HC, time at AT correlated with workload (R=0.610; p<0.001) and O<sub>2</sub> consumption (R=0.586; p<0.001), but did not in FRDA. VE/VCO<sub>2</sub> slope was higher in FRDA (33.0±5.4 vs 27.1±4.9; p<0.001).

Variable	R	P value
BMI	-.333	0.014
Interventricular septum thickness	-.281	0.039
SARA	-.434	0.001
Disease duration	-.397	0.003
9HPT	-.437	0.001
ADL	.536	<0.001
IADL	.385	0.004

Correlations with peak VO<sub>2</sub> and clinical measures in FRDA

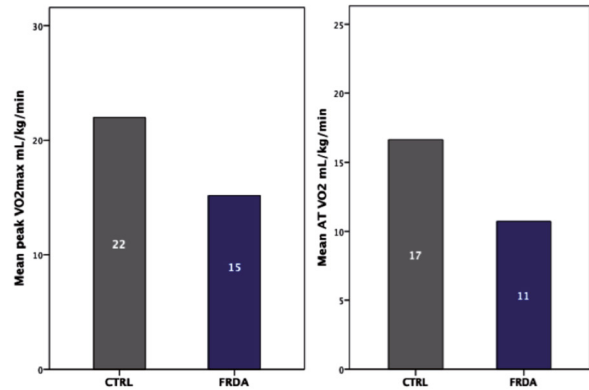


Figure 1. O<sub>2</sub> consumption at peak and at AT

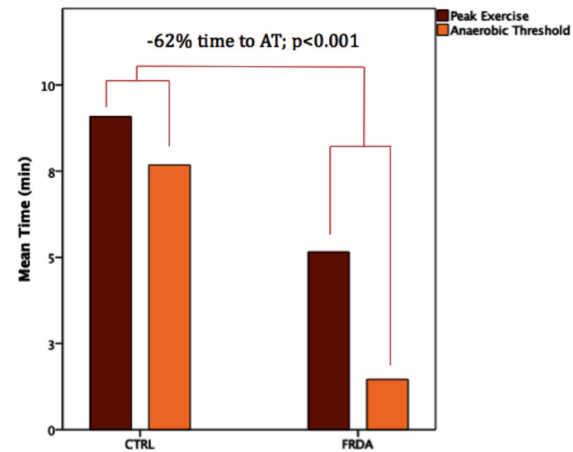


Figure 2. Time at peak and at AT: FRDA patients take in percentage 53% less time to reach peak workload and 63% less time to the AT relative to peak workload, as compared to HC (p<0.001).

**Conclusion:** FRDA patients showed reduced peak-VO<sub>2</sub> at the CPET compared to HC. Patients reached the AT very early during workload, indicating a dysfunctional mitochondrial energy production with a rapid shift to anaerobic metabolism. CPET could be successfully used as a primary endpoint in phase IIb studies.

**Disclosure:** Nothing to disclose



## EPO3138

## Is there evidence of bradykinesia in essential tremor?

G. Paparella<sup>1</sup>, M. Bologna<sup>2</sup>, D. Colella<sup>2</sup>,  
A. Cannavacciuolo<sup>2</sup>, L. Angelini<sup>2</sup>, D. Alunni-Fegatelli<sup>3</sup>,  
A. Guerra<sup>1</sup>, A. Berardelli<sup>2</sup>

<sup>1</sup>IRCCS Neuromed, Pozzilli (IS), Italy, <sup>2</sup>Human  
Neurosciences, Sapienza, University of Rome, Rome, Italy,  
<sup>3</sup>Department of Public Health and Infectious Disease,  
Sapienza, University of Rome, Rome, Italy

**Background and aims:** Essential tremor (ET) is a movement disorder primarily characterized by postural tremor of the upper limb. Although still under-investigated, bradykinesia may be part of the phenotypic spectrum of ET. We aimed to evaluate the bradykinesia features in ET by clinical examination and kinematic analysis of repetitive finger movements. We compared data collected in ET patients with those recorded in Parkinson's disease patients and healthy controls.

**Methods:** Overall, 258 subjects participated in the study (90 ET patients, 84 Parkinson's disease patients, and 84 healthy controls). Repetitive finger tapping was kinematically recorded using an optoelectronic motion analysis system. Movement velocity and amplitude, as well as decrement (sequence effect), were measured. We first compared the 3 groups by 1-way analysis of variance. We also performed a cluster analysis to better address the data variability observed in ET patients. Possible relationships between kinematic and clinical data were assessed in ET.

**Results:** ET patients were slower than healthy controls. Movement slowness in ET did not correlate with tremor severity. We also found that movement slowness in ET was not associated with sequence effect, which instead is a common feature in Parkinson's disease. Cluster analysis showed that a proportion of ET patients may have movement abnormalities as those showed in Parkinson's disease.

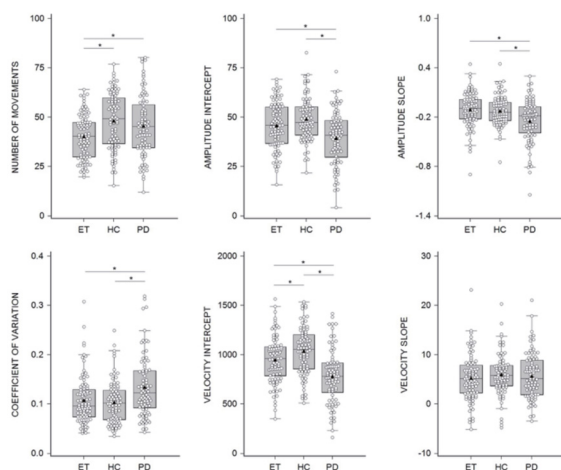


Figure 1: Kinematic variables of repetitive finger movements in ET, Parkinson's disease (PD) patients and healthy controls (HC). Triangles: mean values. Boxes:  $\pm 1$  standard error of the mean. Whiskers:  $\pm 1$  standard deviation of the mean. Circles indicate each individual value. Asterisks:  $P < 0.05$  in the post hoc comparisons.

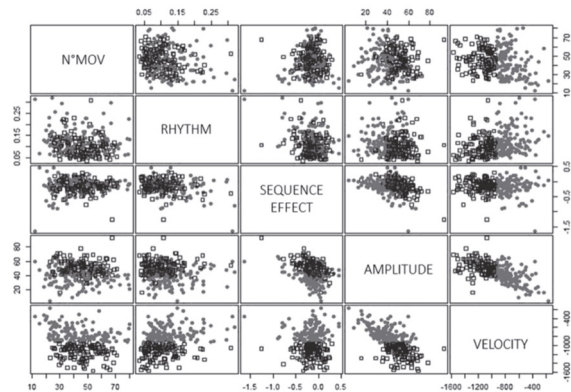


Figure 2: Cluster analysis. Kinematic variables of repetitive finger movements in subjects in cluster 1 (white squares) and cluster 2 (grey circles). Rhythm refers to the coefficient of variation (CV) of the inter-tap intervals. Sequence effect refers to amplitude slope.

**Conclusion:** Movement slowness without sequence effect is a common feature in ET patients that is likely mediated by prominent involvement of the cerebellum. The present findings are relevant when interpreted in the context of the new tremor classification system.

**Disclosure:** Nothing to disclose

## EPO3139

**The sooner, the better: early diagnosis and treatment in functional neurological disorders**

P. Parra Díaz, J.L. Chico García, E. Natera Villalba, V. Nedkova Hristova, F. Rodríguez Jorge, Á. Beltrán Corbellini, J.C. Martínez Castrillo, J. Masjuan, A. Alonso Cánovas, I. Parées Moreno  
*Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain*

**Background and aims:** Functional neurological disorders (FND) are common and may present acutely. They are potentially disabling, but early diagnosis and treatment may improve outcome.

**Methods:** Retrospective analysis of patients with FND admitted in the emergency department of our tertiary hospital, with the intervention of a neurologist in the acute phase. A positive diagnosis of the FND was effectively communicated to the patient following current recommendations. Online material was also provided ([www.neurosymptoms.org](http://www.neurosymptoms.org)) for further information about diagnosis, and an early ambulatory appointment with the same specialist was programmed.

**Results:** 10 cases were included in the analysis (8 female, mean age 33,8 years; 21-58), from October 2018 to December 2019. Symptoms were functionally relevant for daily activities in all cases. A positive diagnosis was made on clinical grounds, although complementary tests were also performed, with normal results in all cases (head CT scan and blood tests in all cases; CT angiography, cranial MRI in 3). The mean time from onset to 1st consultation in the hospital was 2.56 weeks (0-10). All patients were reassessed ambulatory 1-4 weeks after the 1st hospital visit, and followed for a mean time of 13.1 weeks (2-54). Neurological symptoms disappeared in 90% of cases during the follow-up.

**Conclusion:** In our experience, the early diagnosis and intervention in FND with acute presentation was effective, with an early and sustained improvement of potentially disabling symptoms. Continuity of care with the same specialist and expertise in FND are likely to play a role in the positive outcomes.

**Disclosure:** Nothing to disclose

## EPO3140

**Trimetazidine Treatment in Parkinson's Disease: Is It a Real Problem or Just a Falme?**

D. Pintér, A. Juhasz, M. Harmat, J.V. Janszky, N. Kovacs  
*Department of Neurology, University of Pécs, Pécs, Hungary*

**Background and aims:** Trimetazidine, a widely used second-line antianginal drug, is contraindicated in movement disorders, however, some recent data suggest that a considerable part of trimetazidine users is still patients with Parkinson's disease (PD). In the present study, we aimed to objectively determine the impact of trimetazidine on the severity of symptoms and the health-related quality of life of patients with PD by measuring changes after its withdrawal.

**Methods:** A consecutive series of 42 patients with PD using trimetazidine underwent detailed neurological and neuropsychological assessments at baseline and three months after the discontinuation of the drug.

**Results:** Clinically relevant improvements were achieved with discontinuation of trimetazidine according to changes in scores of each part of the Movement Disorder Society-sponsored Unified Parkinson's Disease Rating Scale (Part I: -25.7%,  $p < 0.001$ ; Part II: -23.8%,  $p < 0.001$ ; Part III: -28.5%,  $p < 0.001$ ; Part IV: -30.1%,  $p = 0.004$ ) and total scores of the Non-Motor Symptoms Scale (-25.6%,  $p = 0.004$ ) and the Montgomery-Asberg-Depression Rating Scale (-20.1%,  $p = 0.001$ ). A remarkable improvement of axial symptoms, such as postural instability and gait disturbances, were detected. Benefits resulting from the withdrawal of the drug also manifested in the improvement of the health-related quality of life based on changes in the summary index of the 39-item Parkinson's Disease Questionnaire (-18.2%,  $p = 0.031$ ). Discontinuation of trimetazidine did not lead to any cardiovascular events (e.g., acute ischaemic coronary syndrome and refractory angina pectoris) in the included patients during a 12-month follow-up.

**Table 1.** Changes in scores of the applied scales due to discontinuation of trimetazidine

	Baseline [mean±SD or n (%)]	Follow-up <sup>a</sup> [mean±SD or n (%)]	Change		p-value
			Absolute (mean±SD)	Relative change (%) <sup>b</sup> (mean)	
MDS-UPDRS Part I	15.0±7.1	10.9±6.6	-4.0±4.4	-25.7	<0.001
MDS-UPDRS Part II	13.1±8.4	9.6±6.9	-3.5±4.7	-23.8	<0.001
MDS-UPDRS Part III	38.2±14.4	27.8±13.5	-10.4±6.7	-28.5	<0.001
MDS-UPDRS Part IV	3.4±3.2	2.2±2.4	-1.2±2.6	-30.1	0.004 <sup>c</sup>
PIGD score	10.6±6.2	7.5±5.2	-3.1±3.2	-27.9	<0.001
0	0 (0.0)	2 (4.8)			
1	1 (2.4)	3 (7.1)			
2	24 (57.1)	28 (66.7)			
3	9 (21.4)	4 (9.5)			
4	7 (16.7)	5 (11.9)			
5	1 (2.4)	0 (0.0)			
Change in HYS after TMZ discontinuation					0.008 <sup>d</sup>
Improvement		16 (38.1)			
No change		23 (54.8)			
Worsening		3 (7.1)			
NMSS					
Cardiovascular problems	3.5±3.7	2.4±3.2	-1.1±3.7	-28.6	0.053 <sup>e</sup>
Sleep problems	14.3±8.9	10.1±7.3	-4.1±7.3	-24.7	0.001
Mood problems	14.7±17.0	11.4±13.4	-3.3±13.5	-19.7	0.119
Hallucinations	1.7±3.9	1.8±5.3	0.1±5.3	5.1	0.931
Memory problems	6.7±7.7	4.8±5.9	-1.9±6.9	-23.6	0.085
Gastrointestinal problems	5.5±8.0	3.1±5.2	-2.4±6.7	-39.1	0.024
Urinary problems	12.2±10.0	9.6±8.7	-2.5±8.5	-20.5	0.060
Sexual problems	0.9±3.9	0.2±0.5	-0.7±3.9	-76.0	0.261 <sup>f</sup>
Miscellaneous	3.4±5.0	3.3±4.6	-0.2±4.0	-5.8	0.790 <sup>g</sup>
Total	62.8±49.9	46.6±35.3	-16.2±34.6	-25.6	0.004
MADRS	14.3±8.8	11.4±6.4	-3.0±5.4	-20.1	0.001
PDSS-2	17.5±10.9	15.1±11.4	-2.4±8.3	-13.8	0.068
ESS	6.4±4.7	5.5±4.7	-0.9±5.0	-9.3	0.246
MoCA	22.2±4.0	22.9±4.0	0.5±2.8	1.7	0.374
PDQ-39					
Mobility	30.2±29.5	24.3±23.6	-6.2±18.9	-20.7	0.043
Activities of daily living	20.7±23.7	15.2±16.4	-5.7±19.3	-27.2	0.067
Stigma	18.3±27.3	13.1±24.0	-5.6±16.5	-26.2	0.034
Emotional well-being	25.5±18.5	25.3±18.0	-0.2±13.0	-0.4	0.920
Social support	11.1±14.0	6.9±10.0	-4.5±13.9	-37.2	0.046
Cognition	19.6±16.3	19.1±13.4	-0.8±12.1	-3.7	0.692
Communication	14.7±22.5	12.6±21.3	-2.4±17.9	-15.1	0.388
Bodily discomfort	36.3±24.1	31.1±23.0	-5.3±22.1	-11.1	0.134
Summary index	21.9±16.5	18.3±13.9	-3.8±10.8	-18.2	0.031

<sup>a</sup>Follow-up examinations were performed 95±25 days after the baseline visit.  
<sup>b</sup>To calculate relative change the following formula was used: (Score<sub>Baseline</sub>-Score<sub>Follow-up</sub>)/Score<sub>Baseline</sub>\*100  
<sup>c</sup>The Wilcoxon signed rank test was used for the analysis of changes in these scores.  
<sup>d</sup>The Chi-square test was utilized for the calculation of this value.  
**Abbreviations:** ESS = Epworth Sleepiness Scale; EQ = EuroQoL instrument; HYS = Hoehn-Yahr Scale; MADRS = Montgomery-Asberg Depression Rating Scale; MDS-UPDRS = Movement Disorder Society-sponsored Unified Parkinson's Disease Rating Scale; MoCA = Montreal Cognitive Assessment; NMSS = Non-Motor Symptoms Scale; PDSS-2 = Parkinson's Disease Sleep Scale 2<sup>nd</sup> version; PDQ-39 = 39-Item Parkinson's Disease Questionnaire; PIGD = postural instability and gait difficulty; TMZ = trimetazidine; VAS = visual analogue scale

**Conclusion:** Our results provide clinical rationale for strictly avoiding the use of trimetazidine in PD.

**Disclosure:** The examination discussed here is the own work of the authors with the help of government-based funds. This study was supported by the Hungarian Brain Research Program (2017-1.2.1-NKP-2017-00002), NKFIH EFOP-3.6.2-16-2017-00008, and NKFIH SNN125143 government-based funds. Our research was partly financed by the Higher Education Institutional Excellence Program of the Ministry of Human Capacities in Hungary, within the framework of the 5th thematic program of the University of Pécs, Hungary (20765/3/2018/FEKUSTRAT). Regarding this study, the authors did not receive any corporate funding.

## EPO3141

### Change in OFF-/ON-Time After Switching from Double-Blind Entacapone or Placebo to Open-Label Opicapone in Patients who Ended the 1-Year BIPARK-I Extension Study on Opicapone 50mg

W. Poewe<sup>1</sup>, J.J. Ferreira<sup>2</sup>, A. Lees<sup>3</sup>, O. Rascol<sup>4</sup>, F. Ikedo<sup>5</sup>, D. Magalhães<sup>6</sup>, J.-F. Rocha<sup>6</sup>, P. Soares-Da-Silva<sup>5</sup>

<sup>1</sup>Department of Neurology, Medical University of Innsbruck, Innsbruck, Austria, <sup>2</sup>Laboratory of Clinical Pharmacology and Therapeutics, Faculty of Medicine, University of Lisbon, Lisbon, Portugal, <sup>3</sup>Department of Clinical and Movement Neurosciences, National Hospital for Neurology and Neurosurgery, London, United Kingdom, <sup>4</sup>Department of Neurosciences and Clinical Pharmacology, University of Toulouse, Toulouse, France, <sup>5</sup>Research and Development Department, BIAL - Portela & Ca S.A., Coronado, Portugal, <sup>6</sup>Global Parkinson's Disease Department, BIAL - Portela & Ca S.A., Coronado, Portugal

**Background and aims:** Opicapone (OPC), a once-daily catechol-O-methyltransferase inhibitor, proved effective in treating end-of-dose motor fluctuations in Parkinson's disease (PD) patients in two large multinational trials (BIPARK-I and II) [1,2].

**Methods:** Following completion of the double-blind phase of BIPARK-I, placebo (PLC)- and entacapone (ENT)-treated patients switched to OPC in a 1-year open-label extension (OLE) study. This exploratory post-hoc analysis evaluated the efficacy (change in absolute OFF-/ON-time) of OPC in levodopa-treated PD patients who switched from PLC or ENT to OPC and ended the 1-year OLE on OPC 50mg. Results were evaluated using analysis of covariance (ANCOVA).

**Results:** In the OLE study, 199 patients switched from PLC (n=99) or ENT (n=100) to OPC (Table 1). Overall, 44/98 (44.9%), 40/100 (40.0%) and 38/98 (38.8%) patients treated with PLC, ENT and OPC 50mg in the double-blind trial who entered the OLE study ended it on OPC 50mg, respectively (Full Analysis Set). For PLC or ENT switchers who ended the OLE study taking OPC 50mg, switching to OPC resulted in significant improvements in OFF-/ON-time (Table 2). Efficacy was maintained in patients originally allocated to OPC 50mg in the double-blind phase.

**Table 1.** Baseline characteristics (Safety Set)

Characteristic	DB PLC/OL OPC N=99	DB ENT/OL OPC N=100	DB OPC 50-mg/OL OPC N=98
<b>At double-blind baseline</b>			
Male gender, n (%)	61 (61.6)	64 (64.0)	61 (62.2)
Age, mean years	64.4	63.2	63.3
Disease duration, mean years	8.3	7.6	7.4
Daily OFF-time, mean hours	6.2	6.4	6.2
<b>At OLE baseline</b>			
Daily OFF-time, mean hours	5.1	4.9	4.3
Hoehn & Yahr stage (ON), mean	2.4	2.2	2.3
Presence of dyskinesia <sup>a</sup> – yes, n (%)	39 (39.4)	43 (43.0)	41 (41.8)
Daily levodopa dose, mean mg	661.2	606.0	675.2

<sup>a</sup>From Unified Parkinson's Disease Rating Scale IV item 32  
 DB, double-blind; ENT, entacapone; OL, open-label, OLE, open-label extension; OPC, opicapone; PLC, placebo

Table 1

**Table 2.** Change from OLE baseline to OLE endpoint in absolute OFF-/ON-time in patients who ended the OLE on OPC 50-mg (ANCOVA analysis; Full Analysis Set)

Characteristic	DB PLC/OL OPC N=44	DB ENT/OL OPC N=40	DB OPC 50-mg/OL OPC N=38
<b>Absolute OFF-time, min</b>			
LS mean change from baseline	-54.9	-68.2	-8.6
SEM	20.6	22.4	22.1
95% CI	-95.5, -14.4	-112.1, -24.2	-52.0, 34.8
p-value	0.0081	0.0025	0.6968
<b>Absolute ON-time, min</b>			
LS mean change from baseline	71.7	53.3	-4.5
SEM	21.0	22.7	22.4
95% CI	30.5, 112.9	8.6, 98.0	-48.6, 39.6
p-value	0.0007	0.0195	0.8412

ANCOVA, analysis of covariance; CI, confidence interval; DB, double-blind; ENT, entacapone; LS, least squares; OL, open-label, OLE, open-label extension; OPC, opicapone; PLC, placebo; SEM, standard error of the mean

Table 2

**Conclusion:** Significant improvements in OFF- and ON-time were achieved in patients switching from PLC or ENT to OPC and ending the BIPARK-I OLE study on OPC 50mg.

1. Ferreira et al., *Lancet Neurol.* 2016;15(2):154-165.

2. Lees et al., *JAMA Neurol.* 2017;74(2):197-206.

**Disclosure:** Study supported by Bial - Portela & C<sup>a</sup>, S.A.

## EPO3142

### Is CD56+ a possible laboratory biomarker of depressive symptoms at Parkinson Disorder (PD)?

A. Boika<sup>1</sup>, V. Ponomarev<sup>2</sup>, N. Aleinikava<sup>1</sup>, H. Ivanchik<sup>3</sup>

<sup>1</sup>Minsk, Belarus, <sup>2</sup>MEDICAL ACADEMY OF POST

GRADUATION, Minsk, Belarus, <sup>3</sup>Immunology group,

BelMAPO, Minsk, Belarus

**Background and aims:** Patients with PD have signs of peripheral and central inflammation, including elevated levels of serum cytokines [1] and cerebrospinal fluid (CSF) [2], as well as activated microglia [3]. Analysis of peripheral blood lymphocyte subsets characterizes the lymphocytic immunity unit. To detect a possible correlations of peripheral blood lymphocyte subsets with the severity of depressive symptoms at PD patients was the aim of the study.

**Methods:** The study group consisted of 23 patients (m: f - 13: 10) with a diagnosis of PD according to the criteria of the Bank of the Brain of the Parkinson's Disease Society of the United Kingdom. The average age of the patients was 52.0 (43.5÷60.75) years, the duration of the disease was 6.5 (4.5÷7.5) years, the severity of the disease according to the Hen and Yar scale was 2.0 (2.0÷3.0) points. Hamilton Rating Scale for Depression was used for detection of the level of depressive symptoms. We used CD45-FITC/CD4-RD1/CD8-ECD/CD3-PC5 and CD45-FITC/CD56-RD1/CD19-ECD/CD3-PC5 ("BeckmanCoulter", USA) monoclonal antibodies panels for assessment of peripheral blood lymphocyte subsets. Statistical analysis based on counting Spearman's rank correlation coefficient.

**Results:** In patients with PD, there is a statistically significant correlation between the severity of depressive symptoms and levels of following peripheral blood lymphocyte subsets (CD56 +,% and CD, 56+ abs. Sc, \* 10<sup>^6</sup>) (p<0.05).

**Conclusion:** Our results indicate a relationship between the severity of depressive symptoms and the level of CD56 + (absolute and relative values) at blood of PD patients.

**Disclosure:** Nothing to disclose

## EPO3143

**Apomorphine in Multiple System Atrophy: a therapeutic tool?**

G. Pons Pons, T. Muñoz Ruiz, L. Garcia Trujillo, N.L. Ciano Petersen, P. Serrano Castro  
*Neurology Department, Hospital Regional Universitario de Málaga, Málaga, Spain*

**Background and aims:** Multiple system atrophy (MSA) is a sporadic neurodegenerative disorder characterized by parkinsonism and/or cerebellar signs and autonomic failure. A poor levodopa response is one of the diagnostic criteria of MSA that helps differentiate it from Parkinson's disease (PD). Nevertheless, a transient response to levodopa may be observed in approximately 40% of patients during early disease stages.

**Methods:** We present 3 cases of MSA-P (MSA-parkinsonism) treated with apomorphine.

**Results:** The 1st patient is a 48-year-old male who presented with asymmetric parkinsonism, gait disturbance, dysarthria and orthostatic hypotension, diagnosed as MSA-p. He had clinical stability for 2 years after levodopa treatment. Treatment with continuous subcutaneous infusion was started, being responsive for 2 years.

The 2nd patient is a 68-year-old woman who presented with oromandibular dystonia, dysarthria, dysphagia, orthostatic hypotension and gait instability diagnosed as MSA-p. Treatment with levodopa improved partially her symptoms. Infusion of apomorphine was initiated to treat dystonia and non-motor symptoms, with improvement.

The 3rd patient is a 52-year-old male initially diagnosed as PD. He was treated with dopamine agonists with transitory improvement. He came up with urinary incontinence and erectile dysfunction after 2 years. Treatment with continuous subcutaneous infusion improved motor symptoms for 3 years.

**Conclusion:** We used apomorphine as a therapeutic trial in three patients diagnosed as MSA-p with good transitory response. No major side effects have been experienced (worsening of orthostatic hypotension). Subcutaneous administration may be an effective route of administration in patients who have gastroparesis as in MSA.

**Disclosure:** Nothing to disclose

## EPO3144

**Effects of sleep disorder on activities of daily living in patients with Parkinson's disease**

Z. Popovic<sup>1</sup>, S. Matoša<sup>2</sup>, M. Drlje<sup>2</sup>, T. Gilman Kuric<sup>1</sup>, T. Mirosevic Zubonja<sup>1</sup>, S. Tomic<sup>1</sup>

<sup>1</sup>Department of Neurology, University Hospital Center Osijek, Osijek, Croatia, <sup>2</sup>School of Medicine J.J. Strossmayer University in Osijek, Osijek, Croatia

**Background and aims:** The paper aimed to examine the effects of excessive daytime sleepiness (EDS) and nocturnal sleep quality on activities of daily living (ADLs) as well as the effect of nocturnal sleep quality on EDS in Parkinson's disease (PD).

**Methods:** Study was cross-sectional and carried out at the Movement Disorder Outpatient Clinic. We examined a sample of 30 patients (12 female and 18 male) diagnosed with idiopathic PD. Demographic data were collected via a questionnaire. Nocturnal sleep disturbances were assessed using the Parkinson Disease Sleep Scale (PDSS). EDS was assessed using the Epworth Sleepiness Scale (ESS). ADLs were assessed using the Unified Parkinson Disease Rating Scale – Part II (UPDRS II).

**Results:** Average age, disease duration and test scores are shown in Table 1. No statistically significant differences were observed in UPDRS II scores of patient groups divided according to their ESS scores. Correlation of age, disease duration, ESS and PDSS scores with UPDRS II is shown in Table 2.: a statistically significant negative correlation was observed between PDSS and UPDRS II, while there was no correlation between other observed parameters and UPDRS II.

	Mean value	IQR/SD <sup>§</sup>
Age	72	63-77.25
Disease duration	5	2-6
ESS*	9.7	5.95 <sup>§</sup>
UPDRS II <sup>#</sup>	14.50	11.75 – 18.75
PDSS <sup>¶</sup>	81.93	26.83 <sup>§</sup>

\* Epworth Sleepiness Scale, <sup>#</sup>UPDRS – Unified Parkinson Disease Rating Scale part II, <sup>¶</sup>PDSS – Parkinson Disease Sleep Scale

Table 1. Mean age, disease duration and test scores

	Spearman correlation coefficient Rho	P value
Age	- 0,048	0,80
Disease duration	0,360	0,05
ESS*	0,222	0,24
PDSS <sup>¶</sup>	- 0,593	<b>0,001</b>

\*ESS – Epworth Sleepiness Scale; <sup>¶</sup>PDSS – Parkinson Disease Sleep Scale

Table 2. Correlation of age, disease duration, ESS and PDSS scores with level of impairment in activities of daily living (UPDRS II)

**Conclusion:** The paper observed no effect of EDS on ADLs nor the effect of nocturnal sleep quality on EDS in patients with PD. Nocturnal sleep quality was found to have an effect on ADLs. Specifically, patients with comparatively pronounced disturbances exhibited greater difficulty in cutting food and handling utensils, dressing themselves, more frequent freezing of gait, gait disturbances and comparatively pronounced tremors.

**Disclosure:** Nothing to disclose

## EPO3145

### Beyond the 'eye-of-tiger': qualitative assessment of radiologic signs associated with preoperative motor clinical score and Deep Brain Stimulation outcome in PKAN patients

P. Prin<sup>1</sup>, V. Gonzalez<sup>1</sup>, L. Cif<sup>1</sup>, F. Cyprien<sup>1</sup>, E. Sanrey<sup>1</sup>, E. Chan Seng<sup>1</sup>, G. Poulen<sup>1</sup>, E. Le Bars<sup>2</sup>, A. Coget<sup>2</sup>, N. Leboucq<sup>2</sup>, N. Menjot de Champfleury<sup>2</sup>, P. Coubes<sup>1</sup>  
<sup>1</sup>Neurosurgery, University Hospital of Montpellier, Montpellier, France, <sup>2</sup>Department of Neuroradiology, Gui de Chauliac Hospital, Montpellier, France

**Background and aims:** PANK2 gene-associated-Neurodegeneration (PKAN) is the most common cause of Neurodegeneration with brain iron accumulation. The 'eye-of-the-tiger' is the classical MRI sign. To date, several small series have been published describing the outcome of Deep brain stimulation (DBS) in PKAN disease. The aim of this study was to identify potential MRI features guiding DBS surgery indication.

**Methods:** We conducted a retrospective review of all PKAN patients treated by pallidal DBS in our department, whose cerebral MRI was available for analysis. Qualitative assessment of pallidal, cerebellar and cortical atrophy, following a homemade scale, was analyzed by 2 independent clinicians. BFMDRS was used for motor clinical assessment.

**Results:** Among the 19 patients who underwent pallidal DBS surgery, MRI was available for 16. Median age at surgery was respectively 30 and 11 years for adults (n=6) and children (n=10). Median follow-up was 7 years (1-18). 7 patients died in the follow-up. Median BFMDRS motor was higher among patients with severe pallidal atrophy (72 (severe) versus 44 (mild/absent)). All patients but 1 showed an 'eye-of-the-tiger' sign. Later age of onset (>8 years) was associated with better clinical DBS outcome. Severe pallidal atrophy was found in 10 patients and diffuse cortical and cerebellar atrophy in respectively 7 and 7. All deceased patients had atrophy in at least 2 of these regions.

**Conclusion:** Pallidal, cerebellar and cortical atrophy were associated with higher motor scores and might be useful to predict the clinical outcome following DBS. Further studies are needed to confirm these results.

**Disclosure:** Nothing to disclose

## EPO3146

### How accurate is death certification in Parkinsonism? A Systematic Review and Meta-Analysis

N. Ramsay, H. Shi, A. Macleod, C. Counsell  
 Institute of Applied Health Sciences, University of Aberdeen, Aberdeen, United Kingdom

**Background and aims:** Death certification is often used in research studies to identify cases of, and deaths in parkinsonism. We systemically reviewed the literature on the accuracy of death certification in identifying different parkinsonian disorders.

**Methods:** Comprehensive searches were performed to identify studies that assessed the accuracy of death certification in parkinsonism. We extracted data on the proportion of patients with (i) any parkinsonian disorder mentioned on their death certificate and ii) the correct parkinsonian disorder on the death certificate. We included unpublished data from the Parkinsonism In the North East [PINE] incidence cohort in Aberdeen and performed random-effects meta-analysis. Two authors independently checked the data.

**Results:** 13 studies were included (9 Parkinson's disease [PD], 3 progressive supranuclear palsy [PSP], 2 multiple systems atrophy [MSA], 4125 patients). In PD patients, meta-analysis showed sensitivity of 57% (95%CI 33-80%) for any parkinsonian condition mentioned on the death certificate and 60% (95%CI 52-67%) for PD being specifically named. In PSP the sensitivity was 69% (95%CI 61-77%) for any parkinsonian condition and 45% (95%CI 26-64%) for PSP. In MSA the sensitivity was 77% (95%CI 66-87%) for any parkinsonian condition and 31% (95%CI 0-67%) for MSA. There was substantial heterogeneity in each meta-analysis, in PSP and MSA this was in part attributable to one study. Regression analysis showed no evidence of improvement over time for PD.

**Conclusion:** Death certificates have low sensitivities for identification of parkinsonian syndromes. MSA and PSP were often incorrectly coded. Studies which use death certificates to identify cases will have substantial ascertainment bias.

**Disclosure:** Nothing to disclose

### EPO3147

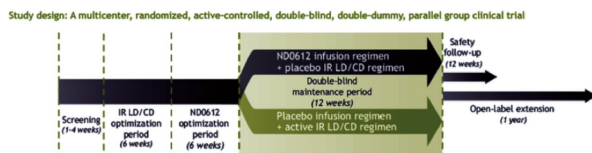
#### BouNDless: An active-controlled, randomised, double-blind, double-dummy trial of continuous subcutaneous infusion of levodopa/carbidopa with ND0612 in patients with Parkinson's disease experiencing motor complications

O. Rascol<sup>1</sup>, W. Poewe<sup>2</sup>, F. Stocchi<sup>3</sup>, T. Yardeni<sup>4</sup>, L. Adar<sup>4</sup>, O. Rosenfeld<sup>4</sup>, C. Olanow<sup>5</sup>

<sup>1</sup>University of Toulouse <sup>2</sup>CHU of Toulouse and INSERM, Toulouse, France, <sup>3</sup>Innsbruck, Austria, <sup>4</sup>Rome, Italy, <sup>5</sup>NeuroDerm, Rehovot, Israel, <sup>6</sup>New York, USA

**Background and aims:** The aim of this phase 3 study (NCT04006210) is to confirm the efficacy, safety, and tolerability of continuous levodopa infusion with ND0612 in comparison to oral immediate-release levodopa/carbidopa in patients with Parkinson's disease (PD) experiencing motor complications. ND0612 is a proprietary drug-device combination delivering liquid levodopa/carbidopa (60/7.5mg/mL) via a subcutaneous (SC) infusion pump.

**Methods:** This is a randomised, active-controlled, parallel-group clinical trial including two 6-week open-label optimisation periods followed by a 12-week, double-blind, double-dummy maintenance period [Figure]. A total of 288 PD patients in Europe and the US will be enrolled (Hoehn and Yahr I-III) to reach 202 randomised patients on  $\geq 4$  doses/day of levodopa/carbidopa oral therapy ( $\geq 400$ mg levodopa), experiencing  $\geq 2.5$  hours of daily OFF time.



**Results:** The primary endpoint is the change in mean ON time without troublesome dyskinesia from Baseline to end of maintenance period (Week 12), based on patient-reported diary assessments. Secondary outcome measures include changes in: OFF time (key secondary), UPDRS (Parts II and III), Patient's and Clinician's Global Impressions of Change, ON time without dyskinesia, PDQ-39 and Parkinson's Disease Sleep Scale scores. Clinical assessments will be conducted by a blinded rater. Safety and tolerability will be assessed via adverse event reporting, including local skin safety assessment, rates of premature discontinuation, and treatment compliance.

**Conclusion:** BouNDless will be the 1st phase 3 randomized, active-controlled trial to evaluate the efficacy and safety of continuous subcutaneous levodopa/carbidopa delivery with ND0612 compared to oral immediate-release levodopa/carbidopa in patients with PD experiencing motor fluctuations.

**Disclosure:** Funded by NeuroDerm

### EPO3148

#### Efficacy of Opicapone in Patients with Parkinson's Disease with Levodopa Dose Reduction: a Pooled Post-Hoc Analysis of BIPARK-I and II

O. Rascol<sup>1</sup>, W. Poewe<sup>2</sup>, J.J. Ferreira<sup>3</sup>, A. Lees<sup>4</sup>, A.-T. Santos<sup>5</sup>, D. Magalhães<sup>6</sup>, J.-F. Rocha<sup>6</sup>, P. Soares-Da-Silva<sup>5</sup>

<sup>1</sup>Department of Neurosciences and Clinical Pharmacology, University of Toulouse, Toulouse, France, <sup>2</sup>Department of Neurology, Medical University of Innsbruck, Innsbruck, Austria, <sup>3</sup>Laboratory of Clinical Pharmacology and Therapeutics, Faculty of Medicine, University of Lisbon, Lisbon, Portugal, <sup>4</sup>Department of Clinical and Movement Neurosciences, National Hospital for Neurology and Neurosurgery, London, United Kingdom, <sup>5</sup>Research and Development Department, BIAL – Portela & Ca S.A., Coronado, Portugal, <sup>6</sup>Global Parkinson's Disease Department, BIAL - Portela & Ca S.A., Coronado, Portugal

**Background and aims:** Opicapone (OPC), a once-daily catechol-O-methyltransferase inhibitor, proved effective in treating end-of-dose motor fluctuations in Parkinson's Disease (PD) patients in 2 large multinational trials (BIPARK-I and II) [1,2]. This exploratory post-hoc analysis evaluated OPC 50mg as a potential levodopa-sparing agent by assessing its efficacy in levodopa-treated PD patients whose levodopa dose was reduced during the double-blind adjustment periods of BIPARK-I and II.

**Methods:** Data from matching treatment arms in BIPARK-I and II were combined in placebo (PLC) and OPC 50mg groups. Studies had similar designs and eligibility criteria [1,2]. Motor response (change in absolute OFF- and ON-time; Unified Parkinson's Disease Rating Scale parts II and III [UPDRS II and III]) and quality of life (Parkinson's Disease Questionnaire-39 [PDQ-39]) were assessed in patients who had levodopa dose reduction.

**Results:** Overall 41 patients dose treated with OPC 50mg had levodopa dose reduction, either due to dopaminergic adverse events (n=30) or proactively (n=11). These patients had longer disease duration and higher baseline levodopa dosing than the overall OPC 50mg population (Table 1). Although mean daily levodopa dose decreased by an average of 23.4%, these patients still experienced improvements from baseline in absolute OFF- and ON-time, UPDRS II and III scores, and PDQ-39 score (Table 2).

Table 1. Baseline characteristics (Safety Set)

Characteristic	OPC 50 mg N=265	OPC 50 mg with levodopa dose reduction N=41
Male gender, n (%)	160 (60.4)	24 (58.5)
Age, mean (SD) years	64.5 (8.8)	62.4 (9.4)
Disease duration, mean (SD) years	7.7 (4.3)	10.1 (4.6)
Daily OFF-time, mean (SD) hours	6.2 (2.0)	6.5 (1.8)
Levodopa dose, mean (SD) mg/day	698 (322)	842 (344)
Concurrent PD medications, n (%)		
Levodopa/carbidopa	155 (58.5)	28 (68.3)
Levodopa/benserazide	124 (46.8)	17 (41.5)
Pramipexole	96 (36.2)	19 (46.3)
Ropinirole	69 (26.0)	8 (19.5)
Amantadine	55 (20.8)	9 (22.0)
Rasagiline	39 (14.7)	5 (12.2)

OPC, opicapone; PD, Parkinson's disease; SD, standard deviation

Table 1

**Table 2.** Mean (SD) changes from baseline in motor response and quality of life in patients treated with OPC 50 mg who had levodopa dose reduction (Full Analysis Set)

Scale	OPC 50 mg with levodopa dose reduction N=41
Absolute OFF-time, min	-131.2 (171.8)
Absolute ON-time, min	125.4 (184.0)
UPDRS II score	-3.3 (4.6)
UPDRS III score	-1.7 (8.1)
PDQ-39 score	-2.8 (9.8)

OPC, opicapone; PDQ-39; Parkinson's Disease Rating Scale-39; SD, standard deviation; UPDRS, Unified Parkinson's Disease Rating Scale

Table 2

**Conclusion:** These findings suggest that OPC could act as a levodopa-sparing agent while improving both the motor response and quality of life of levodopa-treated PD patients.

1. Ferreira JJ, et al., *Lancet Neurol.* 2016;15(2):154–165.

2. Lees AJ, et al., *JAMA Neurol.* 2017;74(2):197–206.

**Disclosure:** Study supported by Bial - Portela & C<sup>a</sup>, S.A.

## EPO3149

### Rationale and design of SUCCESS study (an observational, prospective, multinational StUdy comparing the effeCtiveness of safinamide, rasagiline and “standard of care” as add-on to levodopa)

O. Rascol<sup>1</sup>, A. Antonini<sup>2</sup>, W. Jost<sup>3</sup>, J. Kulisevsky<sup>4</sup>, R. Torricone<sup>5</sup>, A. P. Maggioni<sup>6</sup>

<sup>1</sup>Toulouse University, Toulouse, France, <sup>2</sup>Padua, Italy,

<sup>3</sup>Parkinson-Klinik Ortenau, University of Freiburg, Wolfach, Germany,

<sup>4</sup>Neurology - Movement Disorders Unit, Sant Pau Hospital, Barcelona, Spain, <sup>5</sup>Bocconi University, Milan, Italy,

<sup>6</sup>ANMCO Research Center, Florence, Italy

**Background and aims:** Parkinson's disease (PD) is characterized by a wide range of symptoms with a significant impact on patients' quality of life (QoL). Whilst the range of problems has been documented, little effort has been made to assess such impacts directly from the individual's perspective.

**Methods:** The SUCCESS trial is a European, multicenter, real-world study directly comparing for the 1st time the effectiveness of safinamide vs. rasagiline and other standard of care (SoC) drugs in terms of QoL as measured by the PDQ-39. A total of 1235 patients already on treatment for no more than 2 months will be enrolled in 135 centers across Belgium, Germany, Italy, Spain and United Kingdom and will be followed for 1 year. Follow-up visits will be scheduled per standard routine practice, ideally after 6 and 12 months. The decision of starting treatment with safinamide, rasagiline or other SoC drugs must have been taken considering patients' medical need and routine clinical practice.

Secondary objectives are to evaluate how treatment affects motor symptoms, pain, use of concomitant analgesics and anti-PD drugs, healthcare resource consumption and number of lost working days.

Motor symptoms will be evaluated by the Investigators. Other information will be reported by the patients in a home-diary to be completed in the last five days of each month.

**Results:** The study is ongoing and results are expected by 2021.

**Conclusion:** Levodopa is the “gold standard” for the therapy however, additional treatments are needed to control the emergence of disabling complications and deterioration of QoL.

**Disclosure:** The study is sponsored by Zambon Pharma Group



## Movement disorders 8

### EPO3150

#### Outcome of Deep Brain Stimulation in Chorea-acanthocytosis

L. Rebordão<sup>1</sup>, A. Gironell<sup>2</sup>, J. Kulisevsky<sup>2</sup>,  
B. Pascual-Sedano<sup>2</sup>

<sup>1</sup>Lisbon, Portugal, <sup>2</sup>Neurology - Movement Disorders Unit, Sant Pau Hospital, Barcelona, Spain

**Background and aims:** Chorea-acanthocytosis is an autosomal recessive very disabling disease characterized by multiorgan involvement, including central and peripheral nervous system.

**Methods:** The available treatment is symptomatic.

**Results:** A 30-year-old man with familiar history of bipolar disease and consanguinity, presented with seizures at 25 years old. One year after orofacial movements and vocalizations appeared and Tourette's syndrome was considered. Later he started with lingual mutilation, weight loss and behaviour problems. Neurologic examination showed inattention, impulsivity, frequent vocalizations, dysarthria, sialorrhea, feeding dystonia, generalized choreic movements, bilateral bradykinesia and instable freezing gait. UHDRS-MS (motor score) 51/124, UHDRS-FCS (functional capacity score) 8/33 and UHDRS-IS (independence score) 50%. Blood analysis showed increased creatine kinase and acanthocytes. Brain and medullar MRI were unremarkable so as EMG. Genetic test revealed homozygosity to pathogenic change c.2-47>T (p-Gin783) in the VPS13A gene, confirming the diagnosis of chorea-acanthocytosis. The patient was partially dependent, with severe sleeping and eating impairment and poorly medicated with aripiprazol 10mg/d, naltrexone 50mg/d, lorazepam, eslicarbazepine 800mg/d, botulinum toxin and liquid diet. Pallidal deep brain stimulation was performed (left GPi (0-, Case+) 2.6V, 130Hz, 60mcs and right GPi (8-, Case+) 2.6V, 130Hz, 60mcs). 3 months after the surgery he had a marked improvement of the attention, gait, swallowing, weight and chorea, becoming almost independent, despite worsening of dysarthria. Evaluation scores were: UHDRS-MS 14/124, UHDRS-FCS 20/33 and UHDRS-IS 70%.

**Conclusion:** Functional surgery can be useful to improve motor symptoms in patients with chorea-acanthocytosis, however, the eligibility should be individualized considering the benefit-risk profile

**Disclosure:** Nothing to disclose

### EPO3151

#### Gloves: the trick in guitarist dystonia

L. Rebordão<sup>1</sup>, A. Rêgo<sup>1</sup>, S. Machado<sup>2</sup>

<sup>1</sup>Lisbon, Portugal, <sup>2</sup>Almada, Portugal

**Background and aims:** Musicians' hand dystonia has been reported with several instruments, including the guitar.

**Methods:** Sensory tricks may reduce the dystonic symptoms of focal task-specific dystonias (FTSD).

**Results:** A 30-year-old man, guitarist, presented, at the age of 28, with discoordination while playing the guitar, at 1st more evident in the 3rd finger of the right hand, and, some months later, also noted in the 4th finger of the left hand, with abnormal postures in flexion, causing impairment and playing errors. No other tasks or body segments were involved nor other features as tremor, Parkinsonism or myoclonus. Blood analysis with copper and ceruloplasmin were negative. Brain and cervical MRI were unremarkable. Genetic test to Dyt1 and Dyt6 were negative. Once this was very disabling Artane, tritrate to 6mg, was initiated with poor response and no tolerance due to secondary effects. At this stage the use of gloves as a sensitive trick was suggested. At first he noticed lack of precision but, after cutting the fingers of the gloves, he noticed a marked improvement which allow him to maintain his professional activity.

**Conclusion:** FTSD are characterized by aberrant motor overactivation during the performance of a specific, often over-practised activity. The triggering activity can be associated with 1's occupation, and it can impact 1's livelihood. The aim of this report is to emphasize the gloves as a symptomatic relief option in guitarists and maybe other focal hand dystonia. Cutting the gloves fingers tip may be a piece of good advice when more precision is needed.

**Disclosure:** Nothing to disclose

## EPO3152

**Swimming disability as first symptom of motor impairment in Parkinson's disease**M. Relja<sup>1</sup>, V. Miletic<sup>2</sup><sup>1</sup>Department Neurology, Medical School Zagreb University, Zagreb, Croatia, <sup>2</sup>Neurology, University Hospital Centre Zagreb, Zagreb, Croatia

**Background and aims:** Parkinson's disease (PD) is generally thought of as movement abnormalities with motor symptoms such as tremor, rigidity and bradykinesia. But non-mot affects one side of or symptoms (NMS) are common and some of them like depression, sleep problems and loss of smell could develop years before patients get a PD. Consequently, contrary to motor symptoms, NMS are considered as pre-symptomatic signs of PD. But PD often affects 1 side of body more than another and it may become more difficult to use extremities to perform some motor task even in the early stage of disease. Experimental research showed that swim test is a direct correlation with striatal dopamine content in MPTP animal model of PD.

To investigate the presence of swimming disability as 1 of the 1st motor symptom in the early stage of PD.

**Methods:** Development of swimming disability was investigated in 230 Parkinson patients retrospectively using structured interview and NMS questionnaire (NMSQ, self-completed screening tool designed to draw attention to the presence on NMS).

**Results Discussion:** Structured interview and NMSQ were performed in 230 Parkinson patients (age 65.7±7.3 years, mean±SD) with disease duration range 1/13 years. 46 (20%) patients experienced depression as 1st symptom that brought them to physician (before any motor task abnormalities). However, more than 50% of patients (130) reported swimming difficulties as 1st symptom they experienced in physical activity that was the reason for seeking medical examination.

**Conclusion:** Parkinson patients easier recognize motor symptoms and question of swimming disabilities should be included in 1st neurological examination.

**Disclosure:** Nothing to disclose

## EPO3153

**Utility of skin biopsy to detect phosphorylated  $\alpha$ -synuclein deposits in the diagnosis of progressive supranuclear palsy and corticobasal syndrome**

G. Rizzo, V. Donadio, A. Incensi, R. Infante, P. Avoni, R. Liguori

UOC Clinica Neurologica, IRCCS Istituto Scienze Neurologiche Bologna, Bologna, Italy

**Background and aims:** Previous studies reported skin  $\alpha$ -syn deposits in Parkinson's disease (PD) patients but not in patients with parkinsonism due to tauopathies, although data on the latter are few.

Aim of this study is to perform skin biopsy in patients with clinical diagnosis of tauopathy, i.e progressive supranuclear palsy (PSP) and corticobasal syndrome (CBS).

**Methods:** We consecutively recruited 26 patients, 18 PSP and eight CBS, 26 patients with PD and 26 healthy controls. All subjects underwent skin biopsy to search for deposits of p-syn by immunofluorescence. 2 experts in immunofluorescent analysis blinded to the clinical classification analyzed the biopsies.

**Results:** All PSP/CBS patients except 2 had not skin  $\alpha$ -syn deposits, as well as all the controls. Conversely, all PD patients showed p-syn deposition.

The 2  $\alpha$ -syn positive patients in the group of tauopathies were 1 diagnosed with PSP and 1 with CBS. Although clinical and MRI findings in support of these diagnoses, both patients had some atypical features for PSP/CBS and more typical of synucleinopathy. The PSP patient developed visual hallucinations and orthostatic hypotension with low doses of levodopa. The CBS patient had a slow parkinsonism progression, moderate levodopa response, and cardiac denervation at 123I-meta-iodobenzylguanidine scintigraphy.

**Conclusion:** The detection of skin  $\alpha$ -syn deposits may help in the differential diagnosis of parkinsonism. Indeed, all PD patients and only 2 out of 26 with clinical diagnosis of PSP/CBS had skin  $\alpha$ -syn deposits. Furthermore, these 2 patients showed clinical features that can suggest an atypical presentation of a synucleinopathy rather than false positive results.

**Disclosure:** Nothing to disclose

## EPO3154

**Long-term mortality of patients with Parkinson's Disease treated with Deep Brain Stimulation**

A.L. Rocha<sup>1</sup>, A. Oliveira<sup>1</sup>, P. Monteiro<sup>2</sup>, C. Reis<sup>3</sup>, C. Sousa<sup>1</sup>, R. Vaz<sup>2</sup>, M.J. Rosas<sup>1</sup>

<sup>1</sup>Neurology Department, São João Hospital Center, Porto, Portugal, <sup>2</sup>Neurosurgery Department, São João Hospital Center, Porto, Portugal, <sup>3</sup>Neuroradiology Department, São João Hospital Center, Porto, Portugal

**Background and aims:** Parkinson's disease (PD) is a common neurodegenerative disorder, with a higher risk of death than general population. Deep Brain Stimulation (DBS) has been used to treat PD for more than 2 decades, but few studies exist concerning mortality in this subset of patients. Our goal is to analyse mortality in PD patients treated with DBS in our center.

**Methods:** Retrospective evaluation of clinical files of patients with PD who underwent DBS surgery consecutively between October 2002 and May 2019.

**Results:** We included 346 patients in the analysis, 60% male, with a mean age at disease onset of 48±8 years-old (18-64), mean age at surgery of 60.7 years-old (33-75), and mean disease until surgery of 14.6 years (3-52). Mean follow-up after surgery was 7.4 years (range 1-17). Overall mortality rate was 17.9% and mean age at time of death was 71.6 years-old. The main causes of death were pneumonia, dementia and acute myocardial infarction. In our series, male gender and disease duration until surgery were the only predictors of mortality in multivariate analysis.

**Conclusion:** Our study showed a long term survival higher than previously described, and suggest that the treatment of patients with shorter disease evolution might have a survival benefit. Death in PD patients treated with DBS seem to be unrelated to surgical treatment, as the main causes of death are comparable to non-DBS patients.

**Disclosure:** Nothing to disclose

## EPO3155

**Frontotemporal Lobar Degeneration: broadening the clinical spectrum.**

F. Rodríguez Jorge<sup>1</sup>, P. Pérez Torre<sup>1</sup>, Á. Beltrán Corbellini<sup>1</sup>, J.L. Chico García<sup>1</sup>, P. Parra Díaz<sup>1</sup>, B. Baena Álvarez<sup>1</sup>, J. Gómez Corral<sup>1</sup>, E. Natera Villalba<sup>1</sup>, A. Alonso Canovas<sup>1</sup>, J.C. Martínez Castrillo<sup>1</sup>, J.L. Lopez Sendon<sup>1</sup>, G. Garcia Ribas<sup>1</sup>, A. Rabano<sup>2</sup>, J. Masjuan Vallejo<sup>1</sup>

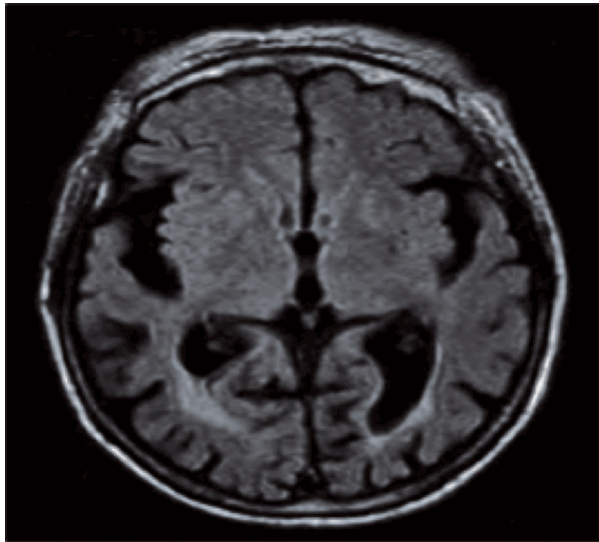
<sup>1</sup>Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain, <sup>2</sup>Neuropathology Department., Fundacion CIEN, Instituto de Salud Carlos III., Madrid, Spain

**Background and aims:** Frontotemporal dementia (FTD) encompasses a group of clinically, genetically and neuropathologically heterogeneous neurodegenerative disorders. Clinical features include changes in social behaviour and personality, language impairment and, in some patients, additional motor symptoms, with variable survival.

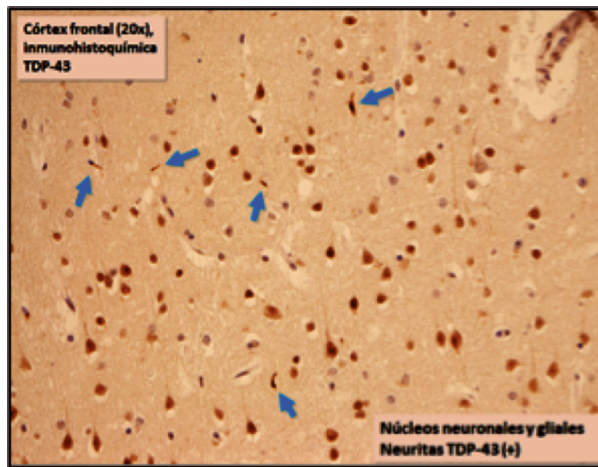
**Methods:** Case report.

**Results:** A 53-year-old previously healthy woman with no relevant family history, presented with a subacute gait disorder and repetitive falls.

The neurological examination revealed hypomimia, generalized bradykinesia with greater involvement of left limbs, hyperreflexia and bilateral Babinski. She progressively developed language impairment that finally led to anarthria, left-sided and oromandibular dystonia, supranuclear gaze palsy and gestural dyspraxia, without cognitive impairment. Brain MRI showed bilateral right-sided predominant cortical and subcortical atrophy. Electromyography, blood test, transcranial ultrasonography and cervical-MRI were normal. There was no response to dopaminergic therapies. She died 29 years after symptoms onset. Neuropathology showed frontal brain atrophy with cortical vacuolization, gliosis and TDP-43 positive pathology. Immunostaining was negative for TAU, Beta A4, and alpha-synuclein. Hippocampus was intact. The absence of p62 + inclusions in cerebellum would exclude the presence of C9ORF72 mutation and supports a sporadic TDP 43 frontotemporal lobar degeneration diagnosis.



Brain MRI: bilateral right-sided predominant cortical and subcortical atrophy.



Neuropathology: gliosis and TDP-43 positive pathology

**Conclusion:** We present an FTD TDP-43 positive case with a focal cortical frontal involvement and an atypical phenotype, with predominant motor symptoms in the corticobasal syndrome spectrum (TAU negative), no behavioural disturbances and long survival. It shows the complexity regarding the correlation between clinical phenotypes, genetics and neuropathology in neurodegenerative disorders, as well as pathology remains essential to accomplish a definite diagnosis.

**Disclosure:** Nothing to disclose

## EPO3156

### 2 clinical cases of secondary parkinsonism due to cerebral glioblastoma

L. Ruiz-Escribano Menchén, J.M. Flores Barragán, A. Franco Salinas, F.J. Villanueva Ruiz, L. Quirós Illán, J. Vaamonde Gamo  
*Neurology, General University Hospital of Ciudad Real, Ciudad Real, Spain*

**Background and aims:** Idiopathic Parkinson's disease (IPD) is the most common cause of parkinsonism. Other causes are: atypical Parkinsonisms and Secondary Parkinsonism (SP), due to structural, toxic-metabolic, infectious, or cerebrovascular disorders. We report 2 clinical cases of SP due to cerebral glioblastoma.

**Methods:** Case 1, 63-year-old woman with micrographia from 4 months and right hand rigidity and bradykinesia in examination. Case 2, 72-year-old man with left hand rest tremor, left knee pain and postural instability from 2 months, plus left bradykinesia in examination. Both started pharmacological treatment without clinical improvement and neuroimaging was performed.

**Results:** Case 1, MRI: tumoration at left basal ganglia extending to external capsula, insula and temporal lobe, with aedema and mass effect. Extension study was negative and brain biopsy showed high grade glioma. She was treated with temozolamide and radiotherapy, dying 2 years after diagnosis. Case 2, MRI: right frontal expansive process with vasogenic aedema, mass effect and peripheral ring enhancement, compatible with glioblastoma. He underwent total surgical resection and posterior temozolamide plus radiotherapy, with persistence of parkinsonism.

**Conclusion:** Intracranial tumours (specially those in basal ganglia) are a rare cause of SP. Glioblastomas are exceptionally reported being meningiomas the most frequent. IPD mustn't be excluded unless parkinsonism disappears after total resection, however, it's important to know that supratentorial tumours sparing extrapyramidal system also can produce parkinsonism due to damage of these structures secondary to mass effect, neural pathways disruption or blood flow impairment. We enhance the importance of neuroimaging for diagnosis of parkinsonism, specially in patients without pharmacological response.

**Disclosure:** Nothing to disclose

# EPO3157

## Prevalence of polyneuropathy in patients with Parkinson’s disease in Germany

V. Sajin, R.-M. Kolbe, U. Jahnke  
 Neurology and Neurophysiology, Schön Klinik Neustadt, Lübeck, Germany

**Background and aims:** The prevalence of the peripheral neuropathy (PN) is of 4.2-8% in those over 65yo [2-6]. In patients with the Parkinson’s disease (PD) a much higher PN-prevalence of 34.2-55% was reported [8-10]. Low vitamin B12-blood level was reported in 13% of PD patients [12]. There is a higher prevalence of PN in levodopa-treated patients (36.1%) than in naive (12.1%) and in healthy controls (8.1%). The present study examines the prevalence of PN in patients with PD in Germany.

**Methods:** We examined 601 patients with PD. Of them, 407 patients underwent electrophysiological examination.

**Results:** 444 (73.9%) had clinically PN (Fig. 1). Of 407 patients who underwent electrophysiological investigations, in 361 (88.7%) PN was confirmed. The most common was axonal (304 patients; 84.2%), sensory (282; 78.1%) and slight (78; 21.6%) or moderate (164; 45.4%) PN (Tab. 1). Of 471 patients receiving levodopa, 369 (78.34%) had clinical PN, compared to 75 (56.8%) of 132 levodopa-naive patients (p<0.01).

At the T1-time-point of first-diagnosis of polyneuropathy, 179 patients (40.3%) of 444 with PN had a vitamin B12-deficiency. In 585 of patients, 38 (33.3%) of 114 levodopa-naive PD patients had vitamin B12-deficiency at the T1, compared to 129 (27.1%) of 471 levodopa-treated PD patients (p=0.2).

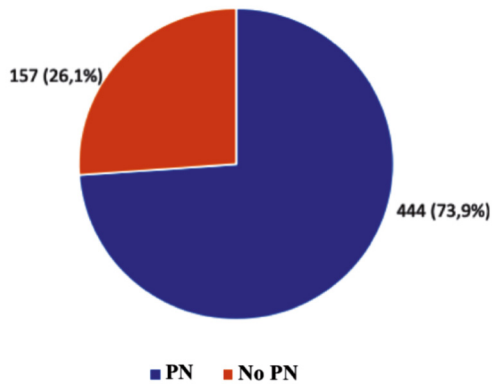


Fig. 1. Clinical polyneuropathy’s prevalence in PD. PN – peripheral polyneuropathy

Total electrophysiology	PP confirmed	Type PNP				Intensity PP			PP		
		axonal	demyelinating	mixed	slight	moderate	heavy	Sensory	Motor	Sensomotor	
407 (100%)	361 (88,7%)	304 (84,2%)	37 (10,2%)	20 (5,6%)	78 (21,6%)	164 (45,4%)	119 (33%)	282 (78,1%)	3 (0,8%)	76 (21,1%)	

Tab. 1. Characteristics of polyneuropathy detected in PD patients.

**Conclusion:** In our group of PD patients the prevalence of a clinical polyneuropathic syndrome was very high and in almost 90% of cases it was confirmed electrophysiologically. 40% of patients with PN had a vitamin B12-deficiency. Levodopa-treatment was more common in PD patients with PN than in those without PN.

**Disclosure:** Nothing to disclose

## EPO3158

**Real life experience with Opicapone**

J.M. Salom Juan<sup>1</sup>, A.P. Salvador Aliaga<sup>1</sup>,  
D. Garcia Lopez<sup>2</sup>, P. Magro Pose<sup>2</sup>, E. Martinez Monte<sup>2</sup>,  
R. Silla<sup>2</sup>, M. Láinez<sup>1</sup>

<sup>1</sup>Neurology department, University Clinical Hospital of Valencia, Valencia, Spain, <sup>2</sup>Neurology, HCU Valencia, Valencia, Spain

**Background and aims:** There's a clear scientific evidence of opicapone indication, clinical efficacy and advantages. However, no much literature regarding its use in the real life management is published.

We present our experience with this drug in the daily clinical practice.

**Methods:** This is a descriptive prospective, real-life study in which data are collected from 30 patients with idiopathic Parkinson's disease (IPD) in moderate stage, H&Y II-III, <400mg daily dose of Ldopa, after the addition of opicapone.

Clinical evaluation by obtaining quality of life and fluctuation scales (PDQ39, Quick19, Global Clinical Impression) at baseline, and after 3 and 6 months, is accomplished.

**Results:** 3 of the 30 patients had to be discontinued due to side effects.

The overall clinical impression was much improved or improved in 23 patients.

Previous fluctuations were observed in 19 patients. 14 cases were reported as improved, there were no substantial changes in 3 cases, and only 3 patients worsened.

In the PDQ39 analysis, we see an improvement in function and motor capabilities in 17 of the 30 patients. Some previous emotional problems improved in 12 patients. Communication difficulties, and sensitive symptoms improved in 50% of the patients, and there were no changes in sleep disorders and memory complaints

Results were consistent at 3 and 6 month evaluation, so the improvement was maintained.

**Conclusion:** Opicapone is a well tolerated drug, and we observe a maintained satisfactory response in different items in our patients.

Our experience supports previous studies, from a real-life clinical point of view.

**Disclosure:** Nothing to disclose

## EPO3159

**Clinical and fMRI effects of Action Observation and Motor Imagery Training on dual-task performances in Parkinson's disease patients with postural instability and gait disorders**

E. Sarasso<sup>1</sup>, F. Agosta<sup>2</sup>, N. Piramide<sup>3</sup>, E. Canu<sup>3</sup>,  
A. Gardoni<sup>3</sup>, S. Galantucci<sup>4</sup>, A. Tettamanti<sup>5</sup>,  
M.A. Volonté<sup>4</sup>, M. Filippi<sup>1</sup>

<sup>1</sup>Neuroimaging Research Unit, Institute of Experimental Neurology, Division of Neuroscience; and Laboratory of Movement Analysis, IRCCS San Raffaele Scientific Institute, Milan, Italy, <sup>2</sup>Neuroimaging Research Unit, Institute of Experimental Neurology, Division of Neuroscience, IRCCS San Raffaele Scientific Institute and Vita-Salute San Raffaele University, Milan, Italy, <sup>3</sup>Neuroimaging Research Unit, Institute of Experimental Neurology, Division of Neuroscience, IRCCS San Raffaele Scientific Institute, Milan, Italy, <sup>4</sup>Neurology Unit, IRCCS San Raffaele Scientific Institute, Milan, Italy, <sup>5</sup>Laboratory of Movement Analysis, IRCCS San Raffaele Scientific Institute, Milan, Italy

**Background and aims:** Dual-task is challenging for Parkinson's disease patients with postural instability and gait disorders (PD-PIGD) and impacts on postural stability and gait safety. This study aimed at assessing brain functional reorganization and gait changes performing dual-task after 6 weeks of action observation training (AOT) and motor imagery (MI) associated with gait/balance exercises in PD-PIGD patients.

**Methods:** 25 PD-PIGD patients were randomized into 2 groups: the DUAL-TASK+AOT-MI-group performed a 6-week (W6) gait/balance training consisting of AOT-MI combined with practicing the observed-imagined exercises; DUAL-TASK-group performed the same exercises combined with watching landscape videos. Exercises were increasingly difficult up to include dual-task. At baseline and W6, patients underwent: i) functional MRI (fMRI) including a foot-movement task and a dual-task (foot anti-phase movements counting backwards) and ii) gait/balance evaluations with and without dual-task.

**Results:** At W6 compared to baseline, both groups showed an improvement in gait, whereas only the DUAL-TASK+AOT-MI-group improved gait and balance in dual-task conditions, particularly during the turning phase of gait relative to the DUAL-TASK-group. At W6 the DUAL-TASK+AOT-MI-group compared to the DUAL-TASK-group showed an increased recruitment of motor areas during the foot-movement task and a reduced recruitment of frontal, occipital and temporal areas during both the fMRI foot-movement task and the dual-task.

**Conclusion:** Our results suggest that increasingly difficult gait/balance exercises improve gait speed in PD-PIGD patients; however, only when exercises were preceded by a motor-learning facilitation strategy (AOT-MI), patients showed gait/balance improvements and increased brain efficiency during dual-task circumstances, which are among the most challenging for PD-PIGD patients.

**Disclosure:** Nothing to disclose

## EPO3160

**Brain functional plasticity of the limbic circuit in Parkinson's disease patients with freezing of gait**

E. Sarasso<sup>1</sup>, F. Agosta<sup>2</sup>, N. Piramide<sup>3</sup>, E. Canu<sup>3</sup>, M.A. Volonté<sup>4</sup>, M. Filippi<sup>1</sup>

<sup>1</sup>Neuroimaging Research Unit, Institute of Experimental Neurology, Division of Neuroscience; and Laboratory of Movement Analysis, IRCCS San Raffaele Scientific Institute, Milan, Italy, <sup>2</sup>Neuroimaging Research Unit, Institute of Experimental Neurology, Division of Neuroscience, IRCCS San Raffaele Scientific Institute and Vita-Salute San Raffaele University, Milan, Italy, <sup>3</sup>Neuroimaging Research Unit, Institute of Experimental Neurology, Division of Neuroscience, IRCCS San Raffaele Scientific Institute, Milan, Italy, <sup>4</sup>Neurology Unit, IRCCS San Raffaele Scientific Institute, Milan, Italy

**Background and aims:** To assess brain functional MRI (fMRI) activity during an “empathy” task in Parkinson's disease patients with Freezing of Gait (PD-FoG) relative to healthy controls (HC).

**Methods:** 24 PD-FoG patients were recruited and performed clinical and neuropsychological evaluations and fMRI. 18 age- and sex-matched HC were also included to perform neuropsychological and fMRI evaluations. PD-FoG patients and HC performed two fMRI tasks: i) the “empathy task” consisted of watching a patient who experienced FoG during a walking task usually evoking FoG; ii) the “control task” consisted of watching a healthy subject performing similar walking tasks without experiencing FoG. HC were emotively educated to the FoG phenomenon before undergoing the fMRI scan.

**Results:** PD-FoG patients had cognitive deficits relative to HC particularly in attention/working memory and executive functions. During the empathy task, PD-FoG patients showed reduced activity of the sensorimotor part of the mirror neuron system (MNS) relative to HC. During the empathy task relative to the control task, PD-FoG revealed increased recruitment of the right anterior prefrontal cortex and decreased activity of the left inferior parietal cortex. HC showed increased recruitment of bilateral superior/middle frontal gyri during the empathy task and of the MNS performing the “control task”.

**Conclusion:** Our results suggested that when PD-FoG patients observe a subject experiencing FoG, there is increased brain activity in the limbic part of the MNS. This finding might suggest an involvement of the limbic circuit and, thus, of the emotional processes in the mechanisms underlying FoG in PD.

**Disclosure:** Nothing to disclose

## EPO3161

**Activities of daily living impairment before surgery predicts STN-DBS outcome in Parkinson's disease**

M. Sarchioto<sup>1</sup>, M. Zibetti<sup>2</sup>, L. Ricciardi<sup>1</sup>, E. Montanaro<sup>2</sup>, M. Edwards<sup>1</sup>, L. Lopiano<sup>2</sup>, F. Morgante<sup>1</sup>

<sup>1</sup>Institute of Medical & Biomedical Education, St. George's University of London, London, Italy, <sup>2</sup>Department of Neurological Science, University of Turin, Turin, Italy

**Background and aims:** Despite Subthalamic Nucleus (STN) Deep Brain Stimulation (DBS) proven safety and efficacy in Parkinson's Disease (PD), postoperative impact on patients' activities of daily living (ADL) is difficult to predict. Aim of this study was to investigate predictors of poor response after STN-DBS in PD at 1-year follow-up.

**Methods:** We retrospectively analyzed data acquired during pre-DBS assessment (T0) and 1-year follow-up (T1) at Turin University DBS center. To provide an ADL measure, unsatisfactory outcome was defined as less than 20% improvement at UPDRS-II OFFMED/ONSTIM at follow-up. Based on this cut-off, 2 resulting patients' groups, “poor” and “good” responders, were compared for demographical, clinical and cognitive variables.

**Results:** The cohort was constituted by 203 consecutive patients. Among them, we identified 35 “poor” and 91 “good-DBS-responders” similar for age at disease onset and surgical procedure, and disease duration. The 2 groups had comparable improvement of motor symptoms after DBS (as per UPDRSIII OFF-MED/ON-STIM) and reduction of dopaminergic drugs at T1. Remarkably, Poor-DBS responders had significantly less severe UPDRSII OFF-MED at T0 when compared with Good-DBS responders. Poor-DBS responders also had a not significant improvement of UPDRS-Axial and Motor Fluctuations scores at 12 months.

**Conclusion:** Our study demonstrates that PD Poor-DBS responders at 1-year follow-up have significantly less impaired ADL at the time of DBS selection. This is in line with recent evidence showing that better quality of life before DBS predicts less improvement after surgery. Post-operatively, not significant improvement of axial symptoms and of time spent in OFF condition are major determinants of unsatisfactory DBS outcome.

**Disclosure:** Nothing to disclose

## EPO3162

**Intrinsic functional connectivity correlates of RBD in cognitively unimpaired drug-naïve Parkinson's disease patients**

S. Satolli<sup>1</sup>, R. De Micco<sup>1</sup>, M. Siciliano<sup>1</sup>, F. Di Nardo<sup>1</sup>, F.P. Bonifacio<sup>1</sup>, P.G. Caiazzo<sup>1</sup>, F. Esposito<sup>2</sup>, G. Tedeschi<sup>1</sup>, M.P.A. Tessitore<sup>1</sup>

<sup>1</sup>Medical, Surgical, Neurologic, Metabolic and Aging Sciences, Second University of Naples, Naples, Italy,

<sup>2</sup>Department of Medicine, Surgery and Dentistry, Scuola Medica Salernitana, University of Salerno, Baronissi (SA), Italy

**Background and aims:** REM Behavioural Disorder (RBD) is characterized by lack of skeletal muscle atonia during REM sleep and it develops in around 50% of Parkinson's disease (PD) patients. PD patients with RBD present an increased risk of worse motor progression and dementia over the disease course. Using resting-state functional MRI, we investigated intrinsic connectivity correlates of RBD in a cohort of cognitively unimpaired drug-naïve PD patients and correlated neuroimaging findings to clinical and cognitive measures.

**Methods:** 3T MRI images of 56 drug-naïve PD patients (25 PD-RBD and 31 PD-no-RBD) were acquired. RBD presence and severity was assessed by means of a clinical interview and the RBD Screening questionnaire. Single-subject and group-level independent component analysis was used to investigate intra and inter-network functional connectivity differences within the major neurocognitive resting state networks between patients sub-groups. Finally, linear regression analysis was used to investigate correlations between imaging and clinical data.

**Results:** Compared to PD-no-RBD patients, PD-RBD showed an increased connectivity within the Salience Network and the Executive Control Network as well as a decreased connectivity within the Fronto-Parietal Network. Within the Default-Mode Network, PD-RBD exhibit both an increased and a decreased connectivity compared to PD-no-RBD. This imaging pattern was found to be correlated with both RBD severity and cognitive outcomes in PD patients.

**Conclusion:** Our findings demonstrated that an abnormal intrinsic brain connectivity may represent a potential neural correlates of RBD symptoms and severity in PD patients. This aberrant connectivity may potentially be proposed to develop an early biomarker of dementia in PD.

**Disclosure:** Nothing to disclose

## EPO3163

**Study design and rationale for an international study of DBS for movement disorders**

A. Schnitzler<sup>1</sup>, S. Groppa<sup>2</sup>, A. Fasano<sup>3</sup>, J. Ostrem<sup>4</sup>, J. Piliitsis<sup>5</sup>, F. Phibbs<sup>6</sup>, K. Lyons<sup>7</sup>, J. Jimenez-Shahed<sup>8</sup>, N. Pouratian<sup>9</sup>, J. Neimat<sup>10</sup>, F. Defresne<sup>11</sup>, E. Karst<sup>11</sup>, B. Cheeran<sup>11</sup>, R. Pahwa<sup>12</sup>

<sup>1</sup>Düsseldorf, Germany, <sup>2</sup>Department of Neurology, Neuroimaging and Neurostimulation, University Medical Center of the Johannes Gutenberg University Mainz, Mainz, Germany, <sup>3</sup>Morton and Gloria Shulman Movement Disorders Clinic and the Edmond J. Safra Program in Parkinson's Disease, Toronto Western Hospital and Division of Neurology, UHN, Division of Neurology, University of Toronto, Toronto, Canada, <sup>4</sup>UCSF, San Francisco, USA, <sup>5</sup>Albany Medical College, New York, USA, <sup>6</sup>Vanderbilt University Medical Center, Nashville, USA, <sup>7</sup>University of Kansas Medical Center, Kansas, USA, <sup>8</sup>Mount Sinai Hospital, New York, USA, <sup>9</sup>UCLA Medical Center, Los Angeles, USA, <sup>10</sup>University of Louisville, Louisville, USA, <sup>11</sup>Abbott, Plano, USA, <sup>12</sup>Kansas City, USA

**Background and aims:** DBS improves motor outcomes and quality of life in patients with movement disorders, including Parkinson's disease, disabling tremor, and dystonia. Several factors may affect DBS outcomes within and across geographies, including the surgical procedure, novel features, and patient management practices. There is increasing interest in tracking long-term outcomes to provide ongoing market surveillance, to establish best practices, and to identify opportunities for therapy unmet needs.

**Methods:** ADROIT (NCT04071847) is an international, prospective, multicenter, post-market, observational study of patients implanted with Abbott DBS systems designed to investigate real-world long-term outcomes over 5 years after device activation. Up to 1,000 subjects will be enrolled at up to 50 sites worldwide. The primary safety endpoint is the incidence of device- or procedure-related serious adverse events. The primary effectiveness endpoint is the change in disease-specific motor score (MDS-UPDRS Part III for Parkinson's disease, FTM-TRS for disabling tremor, BFMDRS for dystonia, TWSTRS for cervical dystonia). Additional endpoints will quantify medication usage, quality of life, global impression, mood, cognition, caregiver burden, MRI usage, and healthcare utilization. Surgical and programming data will also be collected.

**Results:** The 1st study site was activated in October 2019, and enrollment began in December 2019. Data on the 1st cohort of enrolled subjects will be presented.

**Conclusion:** ADROIT will quantify safety and effectiveness of DBS using systematic collection of clinician, patient, and caregiver reported outcomes. This study also provides a data collection platform to perform subgroup analyses, exploratory hypothesis testing, and substudy development.

**Disclosure:** The study is funded by Abbott



## EPO3164

**Cortical infarction and Abnormal involuntary movement**

J.Y. Seo, Y. Kim, H.K. Song, J.-H. Lee, J.S. Bae

*Department of Neurology, Kangdong Sacred Heart Hospital, Seoul, Korea, Republic of*

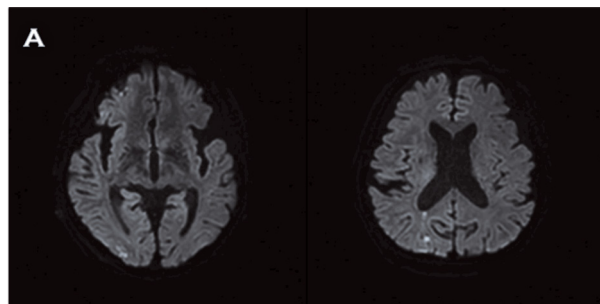
**Background and aims:** Hemichorea refers to chorea on one side of the body, that is rarely associated with cortical lesions. There are only a few cases of hemichorea associated with cortical infarction, except for the basal ganglia, thalamus and subthalamic nucleus (STN).

**Methods:** We describe a case of hemichorea which is suspected to be related to frontal-parietal-occipital lobe infarction.

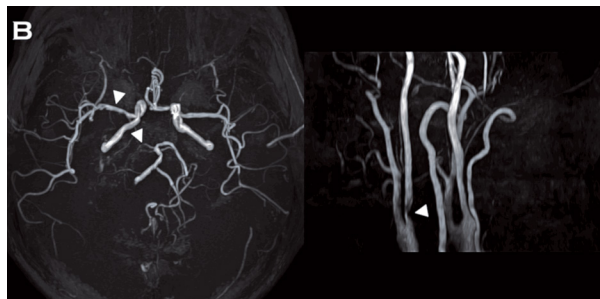
**Results:** A 79-year-old man was admitted with chorea on the left side, involving upper and lower extremities. There were no other symptoms such as motor weakness or sensory change.

Brain magnetic resonance imaging (MRI) showed multiple small recent infarctions on right frontal-parietal-occipital lobe. Brain magnetic resonance (MR) angiography showed total occlusion in the right posterior cerebral artery (PCA), multiple stenoses in right middle cerebral artery (MCA) and severe focal stenosis in right proximal internal carotid artery (ICA). In addition, perfusion MR revealed hypoperfusion of right MCA and PCA territories.

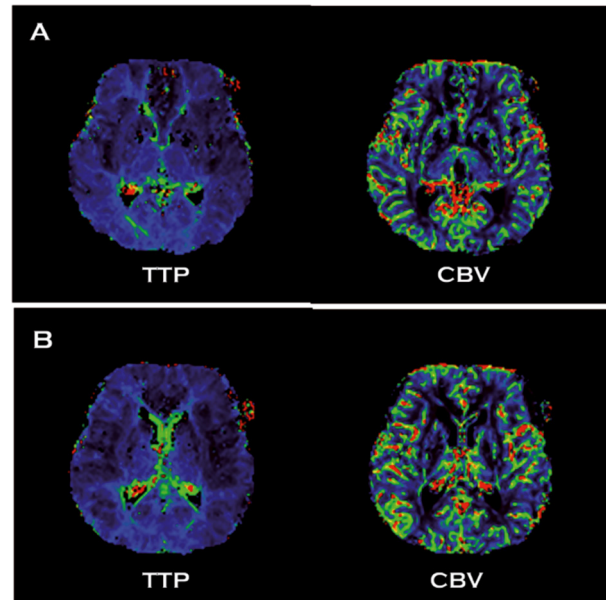
He started risperidone 1mg per day and antiplatelet agents for hemichorea and cerebral infarction, respectively. The movements relieved from the day after he started taking the medicine. From 2 weeks after discharge, risperidone was stopped and no chorea remained.



Brain MRI



MR angiography



Brain perfusion MR

**Conclusion:** The mechanism of hemichorea in the cortical infarction is unclear. However, in this case, the hypoperfusion of the territory including the basal ganglia, thalamus and STN identified by perfusion MRI, may have affected the symptoms.

Although treatment guideline of the hemichorea related to cerebral infarction are not established, antidopaminergic or neuroleptic drugs are mainly used. We applied risperidone which is an atypical neuroleptic, and it works well.

**Disclosure:** Nothing to disclose

## EPO3165

### Low emotional arousal in patients with functional movement disorders: a pupillometry study

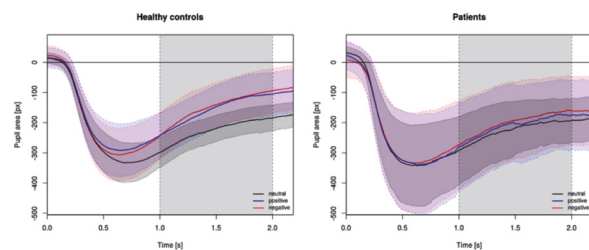
M. Slovák<sup>1</sup>, J. Anýž<sup>2</sup>, J. Erlebach<sup>3</sup>, Z. Forejtová<sup>1</sup>, V. Fabián<sup>4</sup>, T. Sieger<sup>1</sup>, E. Růžička<sup>1</sup>, M. Edwards<sup>5</sup>, T. Serranová<sup>1</sup>

<sup>1</sup>Department of Neurology and Center of Clinical Neuroscience, First Faculty of Medicine, Charles University and General University Hospital in Prague, Prague, Czech Republic, <sup>2</sup>Department of Cybernetics, Faculty of Electrical Engineering, Czech Technical University in Prague, Prague, Czech Republic, <sup>3</sup>Department of Economics, Management and Humanities, Faculty of Electrical Engineering, Czech Technical University in Prague, Prague, Czech Republic, <sup>4</sup>Department of Physics, Faculty of Electrical Engineering, Czech Technical University in Prague, Prague, Czech Republic, <sup>5</sup>Neuroscience Research Centre, Institute of Molecular and Clinical Sciences, St George's University of London, London, United Kingdom

**Background and aims:** It has been suggested that emotional hyperarousal is involved in the pathophysiology of functional movement disorders (FMD). However, direct evidence for this phenomenon is lacking. Pupillometry is a validated method for evaluation of emotional arousal by detecting changes in pupil dilation in response to emotionally charged stimuli.

**Methods:** We assessed emotional arousal in 17 female FMD patients (mean age 43.2 [SD 14.2] years) and 19 matched healthy controls using pupillometry. An infrared eye-tracking camera was used to record changes in pupil dilation during viewing series of positive, negative and neutral pictures from the International Affective Picture System. The time window for analysis was 1-2s after picture onset. Subjective ratings of emotional valence and arousal from all pictures were recorded.

**Results:** Pupil dilation to positive and negative pictures was significantly larger compared to neutral pictures in controls ( $p < 0.001$ ), but not in FMD patients ( $p = 0.262$ ), who showed significantly lower pupil dilation in response to positive and negative pictures compared to controls ( $p < 0.01$ ). No difference was found in pupil response to neutral pictures ( $p = 0.997$ ). No between-group difference in affective ratings was found.



**Conclusion:** FMD patients presented with a blunted autonomic reactivity to emotional stimuli and lower emotional arousal than controls. These changes were not

reflected in subjective evaluation of emotional arousal. This finding questions the role of emotional hyperarousal in the pathophysiology of FMD, while it could be interpreted within predictive coding accounts of FMD involving abnormal attention allocation and interoceptive processing.

**Disclosure:** This study was supported by grant AZV ČR 16-29651.

## EPO3166

**Cerebrospinal fluid levels of Interleukins 8 and 10 are not increased in functional movement disorders**

T. Serranová<sup>1</sup>, M. Slovák<sup>1</sup>, Z. Forejtová<sup>1</sup>, T. Sieger<sup>1</sup>,  
P. Dušek<sup>1</sup>, B. Srpová<sup>1</sup>, M. Hindoš<sup>2</sup>, P. Nytrová<sup>1</sup>

<sup>1</sup>Department of Neurology and Center of Clinical Neuroscience, First Faculty of Medicine, Charles University and General University Hospital in Prague, Prague, Czech Republic, <sup>2</sup>Institute of Medical Biochemistry and Laboratory Diagnostics, First Faculty of Medicine, Charles University and General University Hospital in Prague, Prague, Czech Republic

**Background and aims:** Patients with functional movement disorder (FMD) typically present with significant pain and fatigue. Abnormal cerebrospinal fluid (CSF) and/or serum concentrations of cytokines interleukin 8 (IL-8) and 10 (IL-10) have been consistently reported in fibromyalgia, and chronic fatigue syndrome. This pilot study aimed to compare the interleukin-8 (IL-8) and interleukin-10 (IL-10) CSF levels in FMD patients to non-inflammatory neurological and non-neurological disease patients and to assess their relationship to self-reported pain and fatigue in FMD.

**Methods:** Using ELISA, we measured the IL-8 and IL-10 levels in CSF from 20 patients with clinically established FMD (13 females, mean age 40 [SD 12] years), and 20 controls (13 females, mean age 43 [SD 16] years). The control group included 15 patients with non-inflammatory neurological symptoms and 5 patients with urinary tract disorder undergoing spinal anaesthesia. FMD patients completed standardized questionnaires for self-rated pain (PainDetect) and fatigue (Fatigue severity scale) measures.

**Results:** No differences in the CSF levels of IL-8 and IL-10 were found between FMD patients and control subjects ( $p=0.53$  and  $p=0.60$ , respectively). The levels of IL-8 were positively correlated with self-rated fatigue in FMD patients (Spearman's  $\rho=0.52$ ,  $p=0.027$ ).

**Conclusion:** We did not find evidence for glia activation resulting in intrathecal elevation of cytokines in FMD compared to heterogeneous non-inflammatory disorders. However, the relationship between IL-8 levels and self-reported fatigue suggests possible role of this cytokine in the pathophysiology of fatigue in FMD and should be addressed by future studies.

**Disclosure:** This study was supported by grant AZV ČR 16-29651.

## EPO3167

**Evaluation of duloxetine effectiveness in pain relief for Parkinson's disease patients**

S. Shokhimardonov, S. Xudjanov

Tashkent Medical Academy, Tashkent, Uzbekistan

**Background and aims:** The issue of creating accurate guidelines for treatment of pain in Parkinson's disease is extremely relevant. And the main problem is differing results of studies when using dopamine replacement therapy in combination with traditional analgesics. The aim of research is to determine effectiveness of duloxetine in relief in PD.

**Methods:** A double-blind, placebo-controlled study was conducted for 2 months. Patients with Parkinson's disease were selected according to the following criteria: with chronic pain in stage I-III of Hoehn & Yahr scale. From this group of samples in a random order, patients were divided into placebo groups and duloxetine groups. In the second group, patients received 30mg of duloxetine once a day. Results were evaluated using of 11-point Visual Analogue Scale and Short-Form McGill Pain Questionnaire, as well as a miniature pain stimulus were used to determine the subjective threshold of pain sensitivity. Threshold of pain sensitivity for each of the subjects was established after the application of the "multiple random stairs" method.

**Results:** At the beginning of study, there was no statistically significant difference in demographic and clinical data between duloxetine group and placebo group. Quantitative improvements were observed in evaluations of the scales in favor of duloxetine group ( $p=0.04$ ). In the induced pain stimulus was noticeable increase in pain thresholds in the duloxetine group compared with the placebo group ( $p=0.05$ ).

**Conclusion:** The efficacy of duloxetine in pain relief was determined in PD, further studies are needed to understand the effectiveness of duloxetine with prolonged use.

**Disclosure:** Nothing to disclose

## Movement disorders 9

## EPO3168

**The challenges of managing two neurological diseases at a time**

A. Rachão<sup>1</sup>, J. Coimbra<sup>1</sup>, M. Coelho<sup>2</sup>, R. Taipa<sup>3</sup>, T. Geraldes<sup>1</sup>

<sup>1</sup>Neurology department, Hospital Garcia de Orta, Almada, Portugal, <sup>2</sup>Internal Medicine Department, Hospital Garcia de Orta, Almada, Portugal, <sup>3</sup>Neuropathology Unit, Centro Hospitalar do Porto, Porto, Portugal

**Background and aims:** McArdle's disease is an autosomal recessive muscle disorder involving myophosphorylase gene mutations while Parkinson's disease is a movement disorder associated with bradykinesia, resting tremor and rigidity. They are clinically distinct and require different management approaches.

**Results:** We present the case of a 47-year-old male, with a medical history of presumed viral rhabdomyolysis in 2002, developed progressive and worsening asthenia, with scapular, and later pelvic, weakness, along with muscle pain, leading to significant functional impairment. Blood workup showed persistent CK elevations. He was hospitalized in 2013 and presented with right winged scapula, right proximal upper limb wasting and tetraparesis, with greater upper limb involvement. Additionally, he displayed left upper limb akinesia, rigidity and resting tremor. Muscle biopsy and genetic workup were consistent with McArdle disease. A DaTScan<sup>®</sup> was suggestive of parkinsonism. He started antiparkinson therapy, with transient clinical improvement, and was followed-up in both Neurology and Internal Medicine appointments. Genetic causes of parkinsonism were excluded. Due to complaints from both pathologies and a poor therapeutic compliance, he registered progressive functional impairment. Multiple therapeutic changes were attempted unsuccessfully.

**Conclusion:** This case illustrates the difficulties that arise from the coexistence of 2 neurologic diseases and the exponential worsening in functional impairment resulting from this interaction. This unusual clinical association leads to a challenging management approach. It must involve a multidisciplinary team, aiming to find the best therapeutic plan, with consideration for both pathologies, reducing thereby the resulting functional impairment.

**Disclosure:** Nothing to disclose

## EPO3169

**Patients with Multiple System Atrophy show higher variability of gait compared to Parkinson patients: impact of walking velocity**

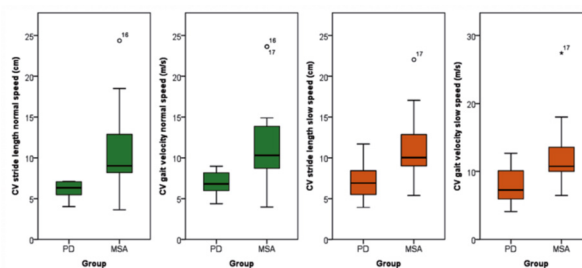
V. Sidoroff<sup>1</sup>, C. Raccagni<sup>1</sup>, J. Klucken<sup>2</sup>, K. Seppi<sup>1</sup>, G.K. Wenning<sup>3</sup>, H. Gassner<sup>2</sup>

<sup>1</sup>Neurology, Medical University of Innsbruck, Innsbruck, Austria, <sup>2</sup>Friedrich-Alexander University, Erlangen, Germany, <sup>3</sup>Department of clinical Neurobiology, Medical University Innsbruck, Innsbruck, Austria

**Background and aims:** Gait impairment is a common symptom in movement disorders like Parkinson's disease (PD) and Multiple system atrophy (MSA) leading to an increased risk of falling. Previous studies suggest that gait variability increases with motor impairment in advanced PD, but these aspects have never been analyzed in MSA patients. We aimed to investigate the variability of gait in PD compared to MSA patients with respect to different walking velocities.

**Methods:** Spatiotemporal gait parameters were recorded in 12 PD and 12 MSA patients using sensor-based gait analysis. Variability (Coefficient of Variance) of stride, swing and stance time, stride length and gait velocity were compared between PD and MSA patients and between self-selected comfortable, fast and slow walking velocity.

**Results:** Demographic data did not differ between groups except of age and disease duration ( $p < 0.05$ ). UPDRS III for MSA and PD did not show significant difference ( $p = 0.071$ ). MSA patients revealed a higher variability of stride length and gait velocity for comfortable ( $p < 0.001$ ,  $p = 0.002$ ) and slow walking velocity ( $p = 0.005$ ,  $p = 0.008$ ). Swing and stance time variability significantly differed in slow walking velocity ( $p = 0.007$ ,  $p = 0.002$ ). No significant differences were observed in fast walking condition.



Comparison of PD and MSA patients according to variation of stride length and gait velocity in normal (green) and slow speed (orange).

	MSA (n = 12)	PD (n = 12)	p-value
Gender (m:f)	6:6	6:6	n.s
Age, mean (SD)	57.0 ( $\pm$ 5.1)	71.3 ( $\pm$ 7.1)	< 0.05
Disease duration, mean (SD)	4.3 ( $\pm$ 2.1)	10.1 ( $\pm$ 8.0)	< 0.05
UPDRS I, median (IQR)	13.0 (9.5; 17)	8.0 (4.3; 12.5)	n.s
UPDRS II, median (IQR)	19 (14; 28.5)	5.5 (2.3; 9.8)	< 0.05
UPDRS III, median (IQR)	34.5 (20; 49.3)	23.5 (16.3; 28)	n.s
UPDRS IV, median (IQR)	0	0	n.s
UPDRS I-IV, median (IQR)	67.00 (52; 81.5)	36.5 (20.5; 54.8)	< 0.05

Patient characteristics.

**Conclusion:** Our observations revealed higher gait variability in MSA patients for comfortable and slow walking. Increased gait variability particularly reflects severe impairment of gait and postural stability presented by MSA patients, in contrast to PD patients.

**Disclosure:** Nothing to disclose

## EPO3170

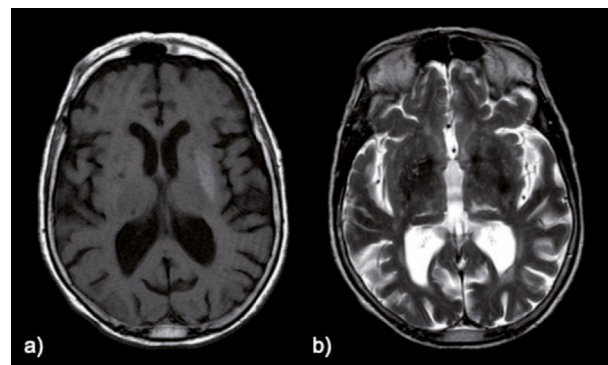
### Acute hyperkinetic movement disorders requiring inpatient approach – a 10-year review of a tertiary care hospital

R. Silva<sup>1</sup>, R. Rodrigues<sup>2</sup>, M. Branco<sup>2</sup>, M. Magalhães<sup>3</sup>  
<sup>1</sup>S. Maria da Feira, Portugal, <sup>2</sup>Santa Maria da Feira, Portugal, <sup>3</sup>Neurology, Hospital Santo António, Centro Hospitalar do Porto, Porto, Portugal

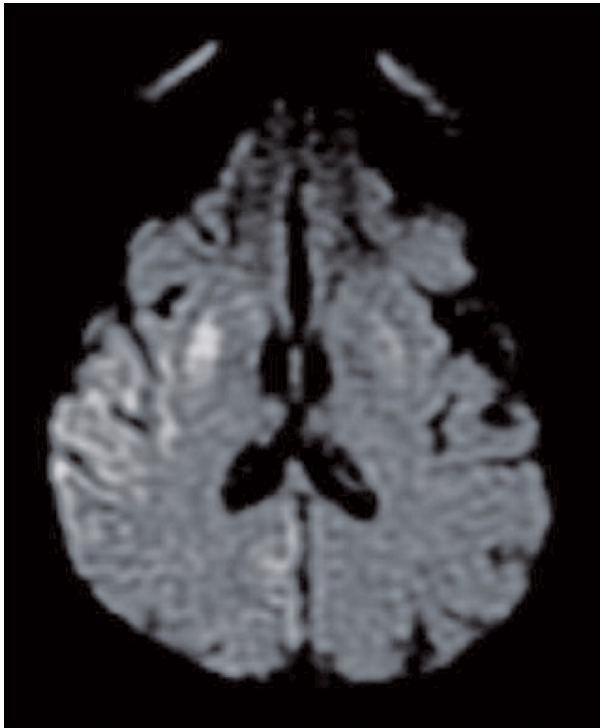
**Background and aims:** Although the majority of movement disorders are outpatient clinic diseases, an acute presentation or a complication of a chronic disorder may require an inpatient approach. Acute hyperkinetic movement disorders (HMD) are rare but may cause significant functional disability and distress.

**Methods:** We performed a retrospective analysis of patients with acute or subacute HMD admitted to a Neurology department of a Portuguese tertiary care hospital over 10 years (January 2008 to December 2018).

**Results:** 14 out of 5238 patients admitted were included. The mean age was 62.6 $\pm$ 20.5 years (30-87). The most common type of HMD was chorea (n=10), followed by myoclonus (n=3). Concerning to etiology, drug-induced HMD (n=4), Parkinson's disease (PD) related dyskinesia (n=4) and Huntington's disease (HD) (n=3) were the most frequent causes. Other etiologies included Creutzfeldt-Jakob disease (CJD) (n=1), nonketotic hyperglycemia (NKH) (n=1) and antiphospholipid syndrome (n=1). 5 patients had an underlying movement disorder (PD or HD). Brain MRI was performed in 7 patients and revealed characteristic findings in 2 cases: T1 hyperintensity and T2 hypointensity in the putamen (NKH), and hyperintensity in diffusion-weighted imaging and T2-FLAIR in the putamen, caudate nucleus and cortex (CJD). All patients, with exception of the CJD patient, improved during hospitalization. The average length of hospital stay was 12.8 $\pm$ 11.4 days (2-44).



Brain Magnetic Resonance Imaging of the nonketotic hyperglycemia case: (a) Axial T1-weighted image hyperintensity and (b) Axial T2-weighted image hypointensity in the putamen on the left.



Brain Magnetic Resonance Imaging of the Creutzfeldt-Jakob disease case: Axial diffusion-weighted imaging hyperintensity in the putamen and caudate nucleus bilaterally, mainly on the right, and on the right temporo-parietal and medial occipital cortex.

**Conclusion:** We found that HMD is a rare cause of hospitalization. Drug-induced HMD and PD related dyskinesia were the most frequently encountered HMD. Considering the disability associated with this disorders, inpatient treatment can be necessary for therapeutic optimization and functional recovery.

**Disclosure:** Nothing to disclose

## EPO3171

### REM Sleep Behavior Disorder and other sleep abnormalities in p. A53T SNCA mutation carriers using PSG

A.M. Simitsi<sup>1</sup>, C. Koros<sup>1</sup>, M. Stamelou<sup>1</sup>, D. Papadimitriou<sup>2</sup>, A. Bougea<sup>1</sup>, I. Pachi<sup>1</sup>, N. Papagiannakis<sup>1</sup>, R. Antonelou<sup>3</sup>, E. Angelopoulou<sup>1</sup>, L. Stefanis<sup>1</sup>, A. Bonakis<sup>3</sup>

<sup>1</sup>1st Neurology Clinic, Eginition Hospital, Athens University Medical School, Athens, Greece, <sup>2</sup>Neurology Clinic, Henry Dunant Hospital Center, Athens, Greece, <sup>3</sup>Second Department of Neurology, Medical School, National and Kapodistrian University of Athens, Attikon University General Hospital, Athens, Greece

**Background and aims:** Available data regarding sleep disturbances, and in particular RBD, in p.A53T carriers are scarce and are based on subjective measures such as questionnaires but not on Polysomnography (PSG). Our aim is to assess whether RBD and other sleep abnormalities occur in both symptomatic and asymptomatic carriers of the p.A53T alpha-synuclein gene (SNCA) mutation, using both subjective and objective measures of sleep.

**Methods:** We have assessed 15 p.A53T carriers (10 manifesting PD and 5 asymptomatic carriers) with simultaneous Video/PSG recording, Epworth Sleepiness Scale to assess the daytime sleepiness, RBD Screening Questionnaire (RBDSQ) to assess clinical features of RBD, Montreal Cognitive Assessment (MOCA) and the University of Pennsylvania Smell Identification Test (UPSIT) to assess olfaction.

**Results:** 9/10 PD carriers had evidence of sleep disorder in PSG: In 4/10 PSG showed RBD (2 were treated with antidepressants and only 2 scored >5 in RBDSQ), in 4/10 PSG showed RWA (only 1 scored >5 in RBDSQ) and in 2/10 showed PLM. Only 1/5 asymptomatic carriers manifested RWA in PSG. 7/8 PD carriers with RBD/RWA had abnormal olfactory testing.

**Conclusion:** RBD or RWA occur in the majority of PD p.A53T carriers, at a higher percentage compared to idiopathic PD and in contrast with other genetic forms of PD. No evidence of a sleep disorder in most of asymptomatic carriers may indicate that such carriers have not yet reached the prodromal phase of the disease. Hyposmia in almost all subjects with RBD/RWA, may be indicative of the pattern of disease progression.

**Disclosure:** Nothing to disclose

## EPO3172

### Adherence to pharmacotherapy and subtypes of non-demented patients with Parkinson's disease

I. Straka<sup>1</sup>, V. Boleková<sup>1</sup>, M. Škorvánek<sup>2</sup>, M. Grofik<sup>3</sup>, K. Danterová<sup>1</sup>, J. Benetin<sup>1</sup>, M. Minar<sup>1</sup>, A. Gažová<sup>1</sup>, J. Kyselovič<sup>1</sup>, P. Valkovic<sup>1</sup>

<sup>1</sup>Bratislava, Slovakia, <sup>2</sup>Kosice, Slovakia, <sup>3</sup>Department of Neurology, University Hospital Martin, Martin, Slovakia

**Background and aims:** Non-adherence to pharmacotherapy in Parkinson's disease (PD) is associated with worsen clinical state and poor quality of life (QoL). Identification of risk patients for non-adherence is key role in clinical practice.

**Methods:** We included 124 cognitively intact patients (72 men, mean PD duration 7.42y, LEDD 1191.05mg). PDQ-8, GDS, NMSS, WOQ-9, MDS-UPDRS III and IV were used. Level of adherence was detected by 8-Item Morisky Medication Adherence Scale. K-Means grouping (cluster analysis) was used to create empirical subtypes.

**Results:** Using cluster analysis we identified 4 PD subtypes. Subtype 1 was characterized by worsen motor state, frequent nonmotor symptoms (NMS) and poor QoL, but without complications. Subtype 2 was characterized by higher LEDD and complications (other parameters were with lower scores). Subtype 3 was characterized by low score in observed parameters (relatively good clinical condition). Subtype 4 was characterized with higher scores in all observed parameters. Patients from each subtype were assigned to groups according to levels of adherence ( $V=0.262$ ,  $p=0.009$ ). We identified that patients from subtypes 1 and 4 were with lower adherence to pharmacotherapy and patients from subtype 3 were with higher levels of adherence.

**Conclusion:** Patients with worsen motor state, presence of NMS and complications are more prone to worse adherence which is associated with poorer QoL. Therefore, in these patients is necessary to choose appropriate interventions for improving the rate of adherence.

Reference: Morisky DE et al. Predictive Validity of a Medication Adherence Measure in a Patient Setting. J Clin Hyper 2008.

**Disclosure:** This work was supported by the Grant of the Ministry of Health of the Slovak Republic 2018/32-LFUK-6, VEGA 1/0704/17, and by the research grant from Novartis Slovakia s.r.o.

## EPO3173

### Electrochemical skin conduction alterations characterize idiopathic Parkinson's disease

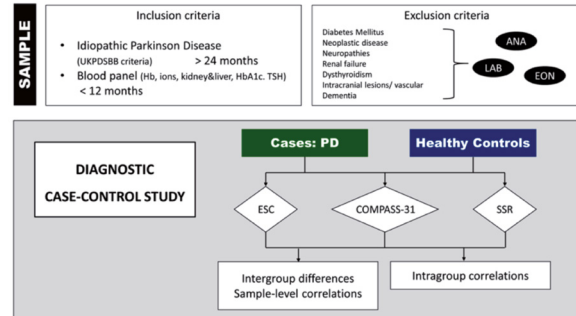
M. Tagliapietra<sup>1</sup>, L.G. Bongiovanni<sup>1</sup>, D. Tropepi<sup>2</sup>, C. Tiziana<sup>3</sup>

<sup>1</sup>Department of Neurosciences, Biomedicine and Movement Sciences, University of Verona, Verona, Italy, <sup>2</sup>Unit of Clinical Neurology and Neurophysiology, Sacro Cuore-Don Calabria Hospital, Negrar, Italy, <sup>3</sup>Department of Neurology, Azienda Ospedaliera Universitaria Integrata, Verona, Italy

**Background and aims:** Autonomic dysfunction is an important feature of idiopathic Parkinson's disease (PD) and determinant of the quality of life. Early on, forewarns a more progressive course.

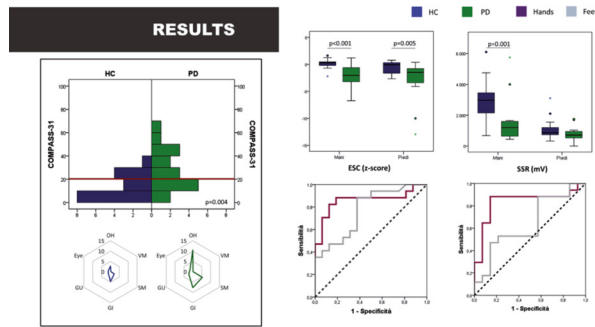
Electrochemical skin conductance (ESC) is a novel technique that rapidly assesses sympathetic function as sudomotor activity and can be used in a routine outpatient visit. We characterized the sympathetic involvement in PD using ESC and compared its accuracy to Sympathetic Skin Response (SSR) and COMPASS-31, a questionnaire on autonomic dysfunction.

**Methods:** 17 mild-to-moderate PD and 16 healthy control subjects were enrolled. Peripheral or central nervous system disorders were excluded based on history, biochemical panel and examination. Both groups were evaluated with ESC, SSR and COMPASS-31.

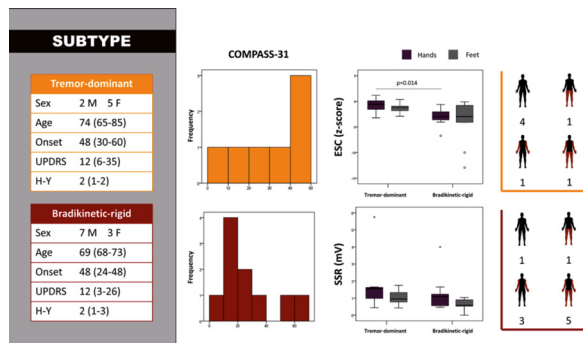


Flowchart of the study

**Results:** PD patients had more vegetative symptoms on the questionnaire (27.69 vs 12.19  $p=0.004$ ) and sympathetic dysfunction as observed both on ESC (z-score hands -2.07 vs 0.14  $p<0.001$ , feet -1.49 vs -0.07,  $p=0.005$ ) and SSR (amplitude hands 1.494mV vs 3.003mV,  $p=0.001$ , feet 0.783mV vs 1.121mV,  $p=0.2$ ) with a trend toward higher impairment in the upper extremities (ESC  $p=0.060$ , SSR  $p=0.061$ ). A moderate-to-elevate agreement between the 2 neurophysiological studies was observed (hands  $\rho=-0.711$ , feet  $R=0.437$ ). SSR ( $p=0.083$ ) but not ESC showed a lateralization concordant with the dominant motor side. Tremor-dominant PD showed a substantial sparing of sudomotor dysfunction compared to bradikinetik-rigid PD (ESC hands -0.56 vs -3.01).



Main results



Results according to subtype

**Conclusion:** ESC alterations are a common finding in PD that correlates with a bradikineti-rigid phenotype, showing a characteristic upper limb prevalence.

**Disclosure:** Matteo Tagliapietra receives a training grant from Pfizer

EPO3174

**Constipation and urinary dysfunction segregate with cognitive impairment in de novo Parkinson’s disease: evidence for a cholinergic subtype from the MoNS-PD cohort**

N. Titova<sup>1</sup>, E. Katunina<sup>1</sup>, D. Efremova<sup>2</sup>, Y. Bezdolny<sup>3</sup>, K.R. Chaudhuri<sup>4</sup>

<sup>1</sup>Department of Neurology, Neurosurgery and Medical Genetics, Federal State Budgetary Educational Institution of Higher Education «N.I. Pirogov Russian National Research Medical University» of the Ministry of Healthcare of the Russian Federation, Moscow, Russian Federation, <sup>2</sup>Federal State Budgetary Educational Institution of Higher Education “A.I. Yevdokimov Moscow State University of Medicine and Dentistry” of the Ministry of Healthcare of the Russian Federation FSBEI HE A.I. Yevdokimov MSMSU MOH Russia, Moscow, Russian Federation, <sup>3</sup>Department of health, Municipal Polyclinics, Moscow, Russian Federation, <sup>4</sup>Parkinson’s Foundation Centre of Excellence, King’s College Hospital, London United Kingdom

**Background and aims:** There is evidence of neurotransmitter dysfunction based nonmotor symptoms (NMS) dominant clinical endophenotypes in Parkinson’s disease (PD) and the cholinergic-type is driven by cognitive impairment (CI). Constipation and urinary dysfunction (UD) also have cholinergic basis. We investigated the co-occurrence of these NMS in cognitively impaired denovo MoNS-PD cohort from Moscow Russia in international collaboration with the UK.

**Methods:** Data for 132 denovo untreated PD (mean age 70.1±8.4, disease duration 1.8±1.3 yrs, median Hoehn-Yahr stage 2, mean unified PD rating scale (UPDRS II+III, 26.3±12.9) and NMS scale score (59.6±38.7) were analysed along with assessments for CI (MOCA, a battery for mild CI (MCI), constipation (NMSQuestionnaire (NMSQuest) question №5, NMSS question 21) and UD ((NMSQuest question 8+9, NMSS (domain 7)).

**Results:** Screening with MOCA (cutoff 26) showed CI in 95 (72%) and enriched assessments with MMSE, semantic fluency, cognitive domains of NMSS, NMSQuest and CISI-PD (clinical impression of severity index) revealed CI in 31.3% (MCI 27.6% and dementia 3.7%). Constipation (46.3% in CI versus 25.8% in non-CI PD (p<0.05)) and UD (65.9% versus 42.2% in non CI-PD (p<0.05)) were significantly more prevalent in CI PD.

**Conclusion:** Our data supports occurrence of CI in denovo PD with higher rates than previously published and notes for the 1st time the clinical presentation of a cholinergic CI dominant endophenotype with associated constipation and urinary dysfunction.

**Disclosure:** The work is supported by an educational personal fellowship grant to Dr Nataliya Titova from Parkinson’s Disease Nonmotor Group (PDNMG).



## EPO3175

## Changes in Activities of Daily Living and Motor Function in Patients Switching from Entacapone or Placebo to Opicapone who Ended BIPARK-I Extension on Opicapone 50mg

E. Tolosa<sup>1</sup>, J.J. Ferreira<sup>2</sup>, A. Lees<sup>3</sup>, F. Stocchi<sup>4</sup>, A.-T. Santos<sup>5</sup>, J.-F. Rocha<sup>6</sup>, D. Magalhães<sup>6</sup>, P. Soares-Da-Silva<sup>5</sup>

<sup>1</sup>Parkinson Disease and Movement Disorder Unit, Hospital Clinic, University of Barcelona, Barcelona, Spain,

<sup>2</sup>Laboratory of Clinical Pharmacology and Therapeutics, Faculty of Medicine, University of Lisbon, Lisbon, Portugal,

<sup>3</sup>Department of Clinical and Movement Neurosciences, National Hospital for Neurology and Neurosurgery, London, United Kingdom, <sup>4</sup>Department of Neurology, IRCCS San Raffaele Pisana, Rome, Italy, <sup>5</sup>Research and Development Department, BIAL – Portela & Ca S.A., Coronado, Portugal,

<sup>6</sup>Global Parkinson's Disease Department, BIAL – Portela & Ca S.A., Coronado, Portugal

**Background and aims:** Opicapone (OPC) proved to be effective in treating end-of-dose motor fluctuations in Parkinson's disease (PD) patients in two large multinational trials (BIPARK-I and II) [1,2].

**Methods:** Following completion of the double-blind phase of BIPARK-I, placebo (PLC)- and entacapone (ENT)-treated patients switched to OPC in a 1-year open-label extension (OLE) study. This exploratory post-hoc analysis evaluated the impact on Unified Parkinson's Disease Rating Scale (UPDRS) parts II (activities of daily living) and III (motor function) in levodopa-treated PD patients who switched from PLC or ENT to OPC and ended the 1-year OLE on OPC 50mg. Results were analysed using a linear mixed-effect model for repeated measurements with region as factor and baseline as covariate.

**Results:** In the OLE study, 199 patients switched from PLC (n=99) or ENT (n=100) to OPC (Table 1). Overall, 44/98 (44.9%), 40/100 (40.0%) and 38/98 (38.8%) patients treated with PLC, ENT and OPC 50mg in the double-blind trial who entered the OLE study ended it on OPC 50mg, respectively (Full Analysis Set). PLC switchers experienced improvements in UPDRS-II (-2.7; p=0.0004) and UPDRS-III (-5.1; p<0.0001) scores, whereas, in ENT switchers, the changes were -0.6 (UPDRS-II; p=0.4179) and -1.4 (UPDRS-III; p=0.2404) (Table 2).

**Table 1.** Baseline characteristics (Safety Set)

Characteristic	DB PLC/OL OPC N=99	DB ENT/OL OPC N=100	DB OPC 50-mg/OL OPC N=98
<b>At double-blind baseline</b>			
Male gender, n (%)	61 (61.6)	64 (64.0)	61 (62.2)
Age, mean years	64.4	63.2	63.3
Disease duration, mean years	8.3	7.6	7.4
Daily OFF-time, mean hours	6.2	6.4	6.2
<b>At OLE baseline</b>			
Daily OFF-time, mean hours	5.1	4.9	4.3
Hoehn & Yahr stage (ON), mean	2.4	2.2	2.3
Presence of dyskinesia <sup>a</sup> – yes, n (%)	39 (39.4)	43 (43.0)	41 (41.8)
Daily levodopa dose, mean mg	661.2	606.0	675.2

<sup>a</sup>From Unified Parkinson's Disease Rating Scale IV item 32

DB, double-blind; ENT, entacapone; OL, open-label, OLE, open-label extension; OPC, opicapone; PLC, placebo

Table 1

**Table 2.** Change from OLE baseline to OLE endpoint in UPDRS parts II and III scores in patients who ended the OLE on OPC 50-mg (MMRM; Full Analysis Set)

Characteristic	DB PLC/OL OPC N=44	DB ENT/OL OPC N=40	DB OPC 50-mg/OL OPC N=38
<b>UPDRS-II</b>			
n	42	37	37
LS mean change from baseline	-2.7	-0.6	0.1
SE	0.7388	0.7908	0.7943
95% CI	-4.2, -1.2	-2.2, 0.9	-1.5, 1.7
p-value	0.0004	0.4179	0.8808
<b>UPDRS-III</b>			
n	43	38	38
LS mean change from baseline	-5.1	-1.4	-1.5
SE	1.0836	1.1550	1.1664
95% CI	-7.3, -3.0	-3.6, 0.9	-3.8, 0.8
p-value	<0.0001	0.2404	0.1999

CI, confidence interval; DB, double-blind; ENT, entacapone; LS, least squares; MMRM, mixed-effect model for repeated measurements; OL, open-label, OLE, open-label extension; OPC, opicapone; PLC, placebo; SE, standard error of the least squares mean

Table 2

**Conclusion:** Patients switching from ENT or PLC to OPC who ended 1-year OLE on OPC 50mg either experienced significantly less disability (PLC) or no worsening (ENT) in UPDRS parts II and III.

1. Ferreira et al., *Lancet Neurol.* 2016;15(2):154-165.
2. Lees et al., *JAMA Neurol.* 2017;74(2):197-206.

**Disclosure:** Study supported by Bial - Portela & C<sup>a</sup>, S.A.

## EPO3176

### Off-time independently affects to QOL in advanced Parkinson's Disease (APD) patients, but not in non-APD patients; An explanatory analysis of the JAQPAD study.

Y. Tsuboi<sup>1</sup>, M. Ishido<sup>2</sup>, J. Watanabe<sup>2</sup>, Y. Yoshinaga<sup>2</sup>, T. Hashimoto<sup>2</sup>, K. Kurihara<sup>1</sup>, T. Mishima<sup>1</sup>, S. Fujioka<sup>1</sup>

<sup>1</sup>Faculty of Medicine, Fukuoka University, Fukuoka, Japan,

<sup>2</sup>Medical, Abbvie GK, Tokyo, Japan

**Background and aims:** The “5- (times oral levodopa tablet intake/day) or 2- (hours of OFF time/day) or 1 (hour/day of troublesome dyskinesia)” criteria identify advanced Parkinson's disease (APD) patients with lower QOL level (EAN 2019). However, which PD symptom is impacting more negatively APD and non-APD patients' QOL is still unknown. The objective of this explanatory analysis is to identify the factors that play key roles in QOL of non-APD and APD patients.

**Methods:** We used JAQPAD study database which was a cross-sectional survey of large population (n=3,457) assessing the impact of PD on QOL in Japan. APD was defined by 5-2-1 criteria. The multiple regression analyses were separately conducted with non-APD and APD patients using QOL questionnaires PDQ-8 as the main outcome measure with age, gender, H&Y stage, PD duration, employment, off-time duration, troublesome dyskinesia duration, number and frequency of PD medication per day, nursing care level, WOQ-9, SE-ADL, and NMSQ.

**Results:** Patient's age, PD duration and NMSQ score significantly contributed to both non-APD and APD patients' QOL. Off-time contributed to only APD patients, while work status did just to non-APD patients.

**Conclusion:** This study shows that factors which worsen patients' QOL may differ between non-APD and APD. With respect to patient's QOL, NMS significantly affected in all stages of PD, while off-time may have a negative impact only in the advanced stage. The results of this study could offer new insights for providing appropriate therapy and improving satisfaction for PD patients.

**Disclosure:** This work was funded by AbbVie GK. AbbVie participated in the study design, research, data collection, analysis and interpretation of data, writing, reviewing, and approving the publication. Y. Tsuboi has served as an advisor for AbbVie GK and receives research support from the Japan Agency for Medical Research and Development and Kyowa Kirin. M. Ishido, J. Watanabe and T. Hashimoto are employees of AbbVie GK and may receive stock or stock options. Y. Yoshinaga is a former AbbVie GK employee. K. Kurihara and T. Mishima report no COI. S. Fujioka received research support from Kyowa Kirin and JSPS KAKENHI [15K19501].

## EPO3177

### Constipation in de novo Parkinson's Disease predicts dementia: a PPMI study.

D. Urso, V. Leta, L. Batsu, T. Yousaf, D.J. Van Wamelen, R. Chaudhuri

Department of basic and clinical neurosciences, Institute of Psychiatry, Psychology, Psychiatry, Psychology & Neuroscience, King's College London, London, United Kingdom

**Background and aims:** Constipation is a common and bothersome multi-factorial non-motor symptom (NMS) of Parkinson's disease (PD) and may occur even in the prodromal phase. Similar to a range of other NMS, such as cognitive impairment and olfactory dysfunction, cholinergic and other non-dopaminergic pathways could be implicated in its development; however, the relationship between constipation and cognitive dysfunction in PD has been poorly investigated so far.

**Methods:** Data for 396 de novo PD patients was obtained from the Parkinson's Progression Markers Initiative (PPMI) database. SCOPA-AUT (item 5 and 6) was used to assess constipation at baseline. At follow-up (up to 6 years) patients were categorised as having normal cognition or dementia, according to the PPMI protocol. Multivariate Cox survival analyses were carried out including constipation scores at univariate and, as covariates previously validated clinical and non-clinical predictors of cognitive impairment, including age, RBD, CSF Aβ42, UPSIT and 123I-FP-CIT caudate uptake.

**Results:** During a mean follow-up of 4.9 years, 37 subjects developed dementia. Conversion to dementia was highly associated with constipation (hazard ratio [HR] 1.379; confidence interval [CI] 1.104-1.723; p=0.005). Other predictors of change in cognitive status were: UPSIT (HR 0.921; 95% CI 0.876-0.968; p=0.001), CSF Aβ42 (HR 0.999; 95% CI 0.998-1.000; p=0.021) and mean 123I-FP-CIT caudate uptake (HR 0.264; 95% CI 0.124-0.564; p=0.001).

**Table 1.** Analysis of the association between baseline constipation (and other clinical features and biomarkers) and conversion to dementia from normal cognitive status in de novo Parkinson's disease patients.

Univariable analysis			Multivariable Analysis		
Variables	HR (95% CI)	p value	Variables	HR (95% CI)	p value
Constipation score	1.510 (1.251-1.822)	<0.001	Constipation score	1.379 (1.104-1.723)	0.005
Age	1.064 (1.024-1.106)	0.001	Age	1.034 (0.986-1.084)	0.169
RBDSQ	1.186 (1.064-1.322)	0.002	RBDSQ	1.058 (0.947-1.181)	0.319
CSF Aβ42	0.999 (0.998-1.000)	0.002	CSF Aβ42	0.999 (0.998-1.000)	0.021
UPSIT	0.899 (0.861-0.939)	<0.001	UPSIT	0.921 (0.876-0.968)	0.001
Mean <sup>123</sup> I-FP-CIT caudate uptake	0.189 (0.100-0.357)	<0.001	Mean <sup>123</sup> I-FP-CIT caudate uptake	0.264 (0.124-0.564)	0.001

Abbreviations: RBDSQ: REM Sleep Behavior Disorder Questionnaire Score; UPSIT: University of Pennsylvania Smell Identification Test; CSF: Cerebrospinal fluid; Aβ42: Amyloid β 1-42

Table

**Conclusion:** Our findings provide evidence that constipation may be an independent predictor of conversion to dementia in PD, suggesting that constipation and cognitive impairment could share a common pathophysiological substratum.

**Disclosure:** Nothing to disclose

## EPO3178

**Acute craniocervical dystonia and hemichorea secondary to a right fronto-insular ischaemic lesion**

M. Vargas, P. Alves, L. Kauppila, D. Sousa, P. Canhao  
*Department of Neurosciences (Neurology), Hospital de Santa Maria, Lisbon, Portugal*

**Background and aims:** Hyperkinetic movement disorders are rare in acute stroke. The cases of acute dystonia described in the literature were mostly associated with posterior circulation strokes involving the basal ganglia

**Methods:** Case report of craniocervical dystonia and left hemichorea secondary to right fronto-insular ischaemia.

**Results:** A 72-year-old male, with a history of arterial hypertension and atrial fibrillation, came to the emergency department with left hemiparesis of sudden onset. On the neurological examination he was somnolent but easily arousable, had left sensitive and motor neglect, right-sided ocular deviation, left homonymous hemianopia, left central facial palsy and dysarthria (NIHSS:9). Brain CT-scan showed loss of cortical differentiation in the right middle cerebral artery (MCA) territory (M1, M2, M4 and insula). In the Angio-CT the right M1 segment was occluded. The patient underwent thrombectomy with total recanalization. 16 hours after the procedure, the previous deficits remitted, but he developed orofacial dystonia with blepharospasm, cervical dystonia, and ballistic movements of the left hemibody that in a few hours became choreic.(video) Brain MRI showed restricted diffusion of the right fronto-insular cortex. Treatment with sulpiride 50mg was initiated. After seven days there was an almost complete symptomatic remission

**Conclusion:** Although movement disorders in the setting of acute stroke are usually associated with basal ganglia ischaemia, there are reports of chorea in insular injury and craniocervical dystonia in lesions of the cerebellum and parietal cortex, but not in fronto-insular lesions. These manifestations may be caused by the disruption of the normal functioning of the cortico-basal circuits.

**Disclosure:** Nothing to disclose

## EPO3179

**Asymmetry index as a simple clinical predictor of efficacy and complications of Levodopa therapy of Parkinson's disease**

A. Rosinskaya<sup>1</sup>, E. Vasenina<sup>2</sup>, I. Coloman<sup>2</sup>, O. Levin<sup>2</sup>  
<sup>1</sup>Neurology, Primorskyi clinical hospital <sup>1</sup>, Vladivostok, Russian Federation, <sup>2</sup>Neurology department, Russian Medical Academy of Postgraduate Education, Moscow, Russian Federation

**Background and aims:** Levodopa is most effective in Parkinson's disease (PD) treatment, however this prescription is connected with development of complications: motor fluctuations and dyskinesias.

Search for clinical predictors of early complications development is essential for optimization of PD patients' treatment.

**Aim:** To identify clinical predictors of efficacy and early complications of Levodopa therapy.

**Methods:** 124 patients at the 3rd stage of PD. All patients were assessed for anamnestic data: age at onset, time of treatment prescription, succession of prescription of various anti-parkinsonic medication groups, rate of dosage increase, dosage by the 3rd stage, and characteristics of non-motor symptoms onset. At the time of inclusion all patients were assessed for: parkinsonism symptoms (MDS-UPDRS), with separation of axial and limb symptoms and assessment of asymmetry index by the 3rd stage.

**Results:** Asymmetry index was calculated based on the ratio of manifestations severity on left and right sides, the patients were divided into 2 groups: those that retained the manifestations asymmetry, and those that had manifestations severity leveled. The groups were comparable by age of onset and duration of the disease. Patients with manifestations asymmetry featured more severe parkinsonism based on MDS-UPDRS scores. However, despite the severity of clinical symptoms patients with asymmetry reacted better to Levodopa medications and required lower doses (table 1). At the same time, despite lower doses retention of asymmetry was linked to higher risk of therapy complications: motor fluctuations and dyskinesias (fig. 1).

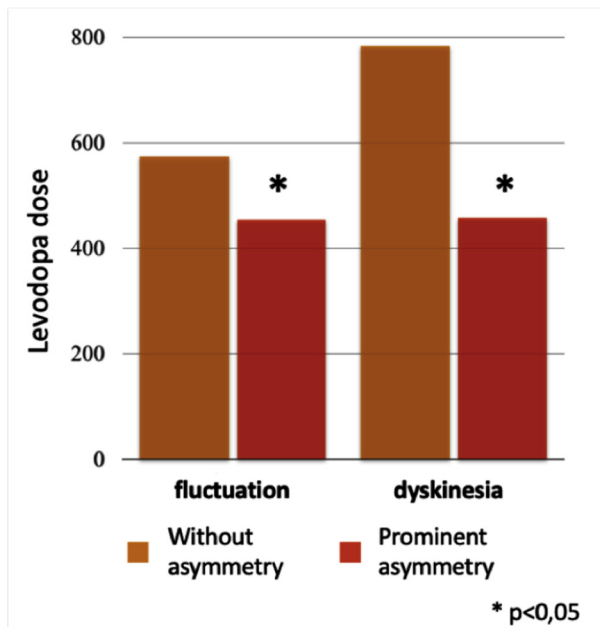


Fig.1 Levodopa dosage when complication occurred

	Low asymmetry (M±σ)	High asymmetry (M±σ)
Age, basic visit	62,4±8,6	60,9±8,7
Age of onset symptoms	53,9±9,9	51,4±10,4
Time of third stages, years	6,0±3,2	6,5±3,6
Levodopa dosage when 3 stage begins, mg	478,6±196,2	492,2±168,4
Levodopa dosage when fluctuation begins, mg	574,2±184,0*	454,6±179,7
Time of fluctuation begins, years	5,4±3,2	5,6±3,9
Levodopa dosage when dyskinesia begins, mg	783,0±416,1*	458,0±317,3
MDS-UPDRS 3 part, score	42,7±18,8	52,4±20,5*
MDS-UPDRS, summary score	88,6±26,3	99,7±29,3*
		* p<0,05

Tabl.1 Comparison of low and high asymmetry groups

**Conclusion:** Assessment of asymmetry index in PD patients will allow to predict efficacy and risks of complications of Levodopa therapy.

**Disclosure:** Nothing to disclose

## EPO3180

### Comparative transcriptomics of sporadic Parkinson’s disease and Tuberculosis gene expression data: a data – driven case for a second hit, outside in copper – phagosome disorder

G. Vavougiou<sup>1</sup>, S. Zarogiannis<sup>2</sup>, K. Krogfelt<sup>3</sup>, G. Stamoulis<sup>4</sup>, K. Gourgoulis<sup>5</sup>, T. Doskas<sup>6</sup>  
<sup>1</sup>Athens, Greece, <sup>2</sup>Physiology, University of Thessaly, Larisa, Greece, <sup>3</sup>Statens Serum Institut, Copenhagen, Denmark, <sup>4</sup>Department of Electrical and Computer Engineering, University of Thessaly, Lamia, Greece, <sup>5</sup>Respiratory Medicine, University of Thessaly, Larisa, Greece, <sup>6</sup>Athens Naval Hospital, Athens, Greece

**Background and aims:** The purpose of our study is to detect and compare common, significantly enriched pathways in peripheral blood mononuclears (PBMC) and CNS tissue donated by sporadic Parkinson’s disease (sPD) patients, and compare their transcriptomic profiles with those donated by tuberculosis (TB) patients.

**Methods:** We performed comparative transcriptomic analyses between gene expression studies published in the GEO Datasets repository, retrieved as queries of sPD and TB each vs healthy controls. Differential gene expression, multiple comparison’s testing and pathway enrichment analyses were performed via the GeneTrail2 software.

**Results:** Datasets retrieved involved (sPD): 2 PBMC studies, 1 Substantia Nigra (SN) and 1 Dorsal Motor Nucleus of the Vagus (DMNV) study, as well as (TB) 1 PBMC and 1 study with monocyte (Mc) gene expression profiles. Among significantly enriched pathways were the influenza A (IAV) associated “Viral mRNA Translation” and “L13a-mediated translational silencing of Ceruloplasmin expression”, common between DMNV, active Tb Monocytes (aTb Mc), post-treatment TB and both sPD PBMC datasets. Notably, these common pathways were detected across 2 different tuberculosis datasets and 3 different sPD datasets, with a CNS (vagus) dataset among the latter.

**Conclusion:** Our results support the hypothesis that remnant, postinfectious epigenetic changes on PBMCs inflicted by Mycobacterium Tuberculosis (Mtb) may alter their phenotype, facilitating non-abortive intracellular residency for a subsequent pathogen (i.e. IAV). This pathogen may then be transmissible to the CNS via sites such as the vagal projections, and prime sPD pathogenesis by disrupting metal ion homeostasis in a lifecycle – dependent manner.

**Disclosure:** Nothing to disclose

## EPO3181

## PRRT2 mutations are associated with a wide intrafamilial and interfamilial phenotypic variability

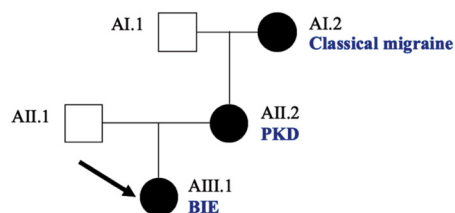
M. Vizziello<sup>1</sup>, R. Dilena<sup>2</sup>, A. Giacobbe<sup>3</sup>, E. Monfrini<sup>1</sup>, G. Franco<sup>1</sup>, A. Di Fonzo<sup>1</sup>

<sup>1</sup>UOC Neurologia, IRCCS Foundation Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy, <sup>2</sup>UOC Neurofisiopatologia, IRCCS Foundation Ca' Granda, Ospedale Maggiore Policlinico, Milan, Italy, <sup>3</sup>UO Neuropsichiatria dell'infanzia e dell'adolescenza, IRCCS Foundation Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy

**Background and aims:** Mutations in the Proline-Rich Transmembrane Protein 2 (PRRT2) gene are associated with a wide phenotypic spectrum including benign infantile epilepsy (BIE), Paroxysmal Kinesigenic Dyskinesia (PKD), hemiplegic migraine and episodic ataxia. We describe the different clinical syndromes associated with PRRT2 mutations in two families.

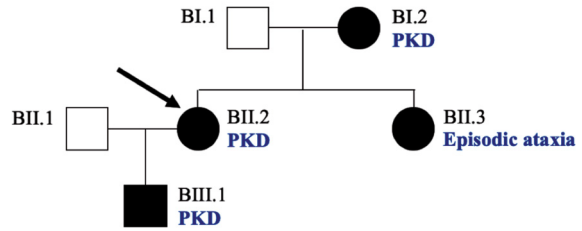
**Methods:** A neurologist collected clinical history and performed neurological examination. EEG and brain MRI of the probands were performed.

**Results:** Family A [figure 1]: The PRRT2 R217Pfs\*8 heterozygous mutation segregated with neurological disease in the family. AIII.1 presented infantile-onset epilepsy characterized by jaw and limb clonus. The neurological examination between crises and brain MRI were normal. AIII.1 started a therapy with CBZ which induced remission of seizures. Subject AII.2 was affected by PKD presenting dystonic crises triggered by movements and responsive to CBZ. The grandmother AI.2 was diagnosed with classical migraine. Family B [figure 2]: The PRRT2 p.A211Sfs\*14 heterozygous mutation segregated with neurological disease in the family. BII.2 experienced episodes of dysphagia and choreoathetosis triggered by fever and physical activity. The EEG showed fronto-temporal slow and sharp-wave alterations on the left hemisphere. The mother BI.2 and the son BIII.1 were affected with the same disorder. The sister BII.3 was affected by episodic ataxia.



Family A ~ R217Pfs\*8 (NM\_001256443 c.649\_650insC)  
PKD: Paroxysmal Kinesigenic Dyskinesia; BIE: Benign Infantile Epilepsy.

Family A ~ R217Pfs\*8 (NM\_001256443 c.649\_650insC) PKD: Paroxysmal Kinesigenic Dyskinesia; BIE: Benign Infantile Epilepsy.



Family B ~ p.A211Sfs\*14 (NM\_001256442 c.629dupC)  
PKD: Paroxysmal Kinesigenic Dyskinesia.

Family B ~ p.A211Sfs\*14 (NM\_001256442 c.629dupC) PKD: Paroxysmal Kinesigenic Dyskinesia.

**Conclusion:** Considering the intrafamilial variability reported here, all the phenotypic differences among patients having PRRT2 mutations cannot be explained by the different causative mutations only. Many other factors, such as genetic modifiers and early environmental triggers, can be responsible for the wide clinical spectrum associated with PRRT2 mutations.

**Disclosure:** Nothing to disclose

### EPO3182

#### The main reasons of dissatisfaction with Deep brain stimulation in Parkinson's disease although with great motor improvement

V. Vuletic

Clinical Department of Neurology, UHC Rijeka, Medical faculty University of Rijeka, Rijeka, Croatia

**Background and aims:** In the last 33 years, Deep Brain Stimulation (DBS) has been proven by numerous studies to be a successful method of treating Parkinson's disease. Although patients and family members are properly informed before surgery, after surgery we can meet unrealistic expectations. We wanted to test the most often reasons for being unsatisfying with DBS results although we could witness great motor improvements.

**Methods:** We did interviews about their main problems before DBS and satisfaction with DBS in 200 operating patients before DBS, 3 months, 6 months and 1 year after DBS. In the same time, we compared all their personal data, Functional Independence Measure (FIM) instrument, Unified Parkinson Disease Rating Scale (UPDRS), and quality of life scale (QoL) (PDQ-39) as main outcome instruments.

**Results:** From 200 interviewed patients, 2 patients (1%) after 3 months, 7 (3.5%) after 6 and 5 (2.5%) after 1 year weren't satisfied with DBS. All had great improvement in motor symptoms (UPDRS III 55%, UPDRS II 35%, FIM 50%, QoL 35%). The reasons of dissatisfaction were changes in family (divorce, breaking the relationship, changing roles), work (needlessness for managing role after years of absenteeism, changing the roles), hard dealing with new good symptoms control and independencies, losing a picture of chronically ill person, and hidden expectations

**Conclusion:** The main reasons for "patients' unsatisfied results" are personal, professional, family and social maladjustments, and hidden preoperative expectations.

We need for better insight in preoperative expectation and to find good psychoeducation programme to improve overall outcome and quality of life.

**Disclosure:** Nothing to disclose

### EPO3183

#### Analysis of speech parameters in Parkinson's disease

M. Wójcik-Pedziwiatr

Andrzej Frycz Modrzewski Krakow University, Cracow, małopolskie, Poland

**Background and aims:** The development of computational tools, which analyse the symptoms of Parkinson's disease (PD) and might help to adjust the appropriate treatment, is very desirable.

The objective of this study was to determine whether the acoustic analysis of voice recordings may be useful tool to track the motor symptoms in PD patients during the levodopa treatment with reference to the Unified Parkinson's Disease Rating Scale (UPDRS).

**Methods:** 27 Polish-language PD patients (mean age: 64.0±10.2 years; mean disease duration: 8.4±3.9 years; mean UPDRS off/on: 33.3±12.8/15.7±10.4) were included to the study. Recordings of "a", "e", "i", "u" and "o" vowels were used for voice analysis. The severity of PD symptoms was evaluated by the UPDRS-III. Voice recordings were carried out simultaneously with the UPDRS-III assessment in off state and in on state after taking of a regular levodopa dose. The acoustic data were expressed using three vectors: noise content, periodicity and non-linearity, which were calculated based on voice parameters. The non-linear and the linear correlations between the vectors of voice parameters analysis and the UPDRS-III score were assessed by, accordingly, the Spearman's rank correlation coefficient (ρ) and the Pearson correlation coefficient (r).

**Results:** For each vowel we found significant correlations between each vector of voice analysis and the corresponding UHDRS-III score. See table 1.

Table 1. The results of Spearman's rank correlation coefficient (ρ) and the Pearson correlation coefficient (r) tests for specified vectors of voice parameters analysis and UPDRS-III score.

Vowels	Noise content		Periodicity		Non-linearity		All parameters	
	ρ	r	ρ	r	ρ	r	ρ	r
"a"	0.29*	0.22*	0.42*	0.41*	0.50*	0.42*	0.70*	0.63*
"e"	0.39*	0.38*	0.43*	0.52*	0.58*	0.52*	0.68*	0.66*
"i"	0.49*	0.41*	0.54*	0.40*	0.50*	0.46*	0.74*	0.62*
"o"	0.32*	0.32*	0.43*	0.48*	0.63*	0.58*	0.74*	0.62*
"u"	0.45*	0.42*	0.46*	0.42*	0.58*	0.52*	0.69*	0.57*

\*p<0.05

**Conclusion:** The acoustic analysis of voice is convenient and reliable method to follow motor fluctuations in PD patients and it may be helpful to adjust the treatment.

**Disclosure:** Nothing to disclose

## EPO3184

**Predictive measures for fall events in patients with cerebellar disorders**

M. Wuehr, K. Möhwald, J. Decker, F. Schenkel, K. Jahn, R. Schniepp  
*German Center for Vertigo and Balance Disorders, Munich, Germany*

**Background and aims:** Cerebellar patients are at high risk of recurrent and severe falls. The aim of the study was to identify relevant factors that are associated with fall events retrieved by clinical fall assessment, in-laboratory gait quantification, and off-laboratory mobility measures.

**Methods:** 93 patients with cerebellar disorders (mean age 57±18 years, 35 females) were included in the study. Each patient underwent a standardized fall risk assessment, an in-laboratory gait measurement on a pressure-sensitive gait mat and an off-laboratory monitoring of physical activity using a wearable inertial sensor. Fall events were prospectively assessed through a 6-month follow-up using fall calendars and telephone interviews. A logistic regression model was used to assess the fall status regarding relevant predictive variables.

**Results:** Patients showed a characteristic cerebellar gait disorder with broadened base of support and increased gait variability. 51 out of 80 patients reported fall events in the follow-up assessment with 23% occasional, 41% frequent, and 23% severe fallers, which made medical attention necessary. In the regression model, most significant variables were the fall status before initial assessment (OR 4.49,  $p=0.02$ ), the self-assessed fear of falling (OR 1.14,  $p=0.048$ ), and gait variability (OR 4.67,  $p<0.01$ ).

**Conclusion:** Our results emphasize the association between fall events and increased gait variability in cerebellar patients. Furthermore, previous fall events and self-assessed fear of falling are relevant and easy to obtain markers predictive for falls. In future studies, these findings may be used to develop a fall risk management and prevention programs to reduce falls in cerebellar patients.

**Disclosure:** Nothing to disclose

## EPO3185

**Hyperekplexia in patient with GNAO1-related syndromes.**

M. Zawadzka, M. Mazurkiewicz-Beldzińska, A. Matheisel, E. Pilarska, M. Szmuda, E. Trybała, A. Lemska, S. Modrzejewska  
*Medical University of Gdańsk, Gdańsk, Poland*

**Background and aims:** The phenotypic spectrum of GNAO1-related neurodevelopmental disease includes early onset epileptic encephalopathy and a range of movement disorders with or without epilepsy. In most cases movement disorders fluctuate and are poorly responsive to medical therapy. Hyperekplexia (pronounced startle responses to tactile or acoustic stimuli and hypertonia) is not characteristic symptom of GNAO1-related syndromes. Our objective is to report a case of 7-year-old girl with severe hyperekplexia and GNAO1-related syndrome.

**Methods:** 7-year-old girl was born to non-consanguineous patients after uncomplicated premature birth. She was referred to our hospital because of epilepsy with rare seizures and psychomotor developmental delay. 1st seizure in our patient appeared in 2nd week of age. startle response started from 3 years of age. Frequency of startle response fluctuated. In some periods the symptoms appeared many times a day, even after a slight acoustic stimulus like the sound of the car outside the window. In neurological examination she showed generalized hypotonia and involuntary movements of the face and limbs more prominent in the upper extremities (chorea). Occasional dystonic features (cervical dystonia) were seen. During hospitalization we observed multiple pronounced startle responses. 1stly we suspect reflex epilepsy. We made electroencephalography, registering the startle response, but we did not find any elektophysiological and clinical correlation.

**Results:** Whole-exome sequencing revealed de novo mutation in GNAO1 gene (the gain-of-function, c.607G>A). In our patient early onset focal epilepsy, developmental delay, hypotonia and movement disorders coexists with further development of hyperekplexia.

**Conclusion:** Hyperekplexia can be one of the symptom in GNAO1-related neurodevelopmental disease.

**Disclosure:** Nothing to disclose

## MS and related disorders 6

## EPO3186

**Relationships between selected parameters of spectral optical coherence tomography and patients' disability in the natural history of multiple sclerosis.**

Ł. Rzepiński<sup>1</sup>, J. Kucharczuk<sup>2</sup>

<sup>1</sup>Department of Neurology, 10<sup>th</sup> Military Research Hospital and Polyclinic, Bydgoszcz, Poland, <sup>2</sup>Department of Ophthalmology, The 10<sup>th</sup> Military Research Hospital and Polyclinic, Bydgoszcz, Poland

**Background and aims:** Spectral optical coherence tomography (SOCT) is a useful marker of neurodegeneration in multiple sclerosis (MS). Most studies conducted to date assess SOCT in patients receiving disease-modifying therapies. The aim of the study was to evaluate relationships between peripapillary retinal nerve fiber layer (pRNFL) thickness, total macular volume (TMV) and disability of treatment-naive patients with clinically isolated syndrome (CIS) and various MS types.

**Methods:** We enrolled 15 CIS patients and 111 MS patients (Table 1). The history of optic neuritis (ON) was confirmed in the case of: 3 eyes from the CIS patients, 35 eyes from the relapsing-remitting MS patients, 12 eyes from the 2ndary progressive MS patients, 1 eye from the primary progressive patients and 14 eyes from the benign MS patients. All participants underwent SOCT (Copernicus HR-SOCT) with pRNFL thickness and TMV evaluation. Disability of subjects was assessed using the Expanded Disability Status Scale (EDSS).

Investigated subgroups	No. of patients	The median disease duration (years)	The median EDSS score (points)
CIS	15	1	0
Relapsing-remitting MS (RRMS)	65	3	2.0
Secondary progressive MS (SPMS)	14	9.5	4.3
Primary progressive MS (PPMS)	11	4	5.0
Benign MS (BNMS)	21	16	2.0

Table 1. The clinical characteristics of the investigated patients.

**Results:** In the eyes without ON, a low statistically significant correlation (SSC) between mean pRNFL thickness and mean EDSS score as well as a moderate SSC between mean TMV and mean EDSS score were found

( $R=-0.33$ ,  $p<0.0001$  and  $R=-0.42$ ,  $p<0.0001$ , respectively). A high SSC was found between mean TMV and mean EDSS score in the eyes after ON ( $R=-0.51$ ,  $p<0.0001$ ). There was no SSC between mean pRNFL thickness and mean EDSS score in the eyes after ON ( $R=-0.16$ ;  $p=0.207$ ).

**Conclusion:** In MS natural history, the mean TMV more closely correlates with patients' disability than the mean pRNFL thickness, especially in eyes after ON.

**Disclosure:** Nothing to disclose



# EPO3187

## Rural-urban inequalities in socioeconomic status of Polish multiple sclerosis patients.

Ł. Rzepiński, S. Wawrzyniak

Department of Neurology, 10<sup>th</sup> Military Research Hospital and Polyclinic, Bydgoszcz, Poland

**Background and aims:** The diagnosis of multiple sclerosis (MS) affects socioeconomic aspects of patients' daily lives during their greatest social and professional activity. Routine assessment of socioeconomic status may be helpful in determining MS type and severity of the disease. There is little data on rural-urban inequalities in socioeconomic status of MS patients. The aim of the study was to determine selected socioeconomic consequences of MS in Poland in relation to the disease type and patients' place of residence. **Methods:** A retrospective, observational study to assess a cohort of 375 Polish MS patients (260 women and 115 men). Socio-economic data was collected based on the patients' responses to questions from a questionnaire. Clinical data was obtained from available medical records. The course of MS was classified as relapsing-remitting (RRMS), secondary progressive (SPMS) and primary progressive (PPMS).

**Results:** Those with relapsing-remitting MS had a significantly longer time of occupational activity, higher economic status, higher level of education, better relationships with life partner and were less likely to benefit from disability pension as well as to be a member of MS Society than patients with progressive types of the disease (Table 1). Those living in rural areas had a significantly shorter time of occupational activity, more often experienced a drop in income, received disability pension and were less educated than urban residents (Table 2).

Type of socio-economic parameter	Countryside	Place of residence Small city	Big city	p-value
<b>Educational level N(%)</b>				
Primary	7 (5.9%)	1 (1.0%)	6 (3.8%)	<0.0001
Vocational	42 (35.3%)	20 (20.6%)	23 (14.5%)	
Secondary	42 (35.3%)	44 (45.4%)	56 (35.2%)	
Higher	28 (23.5%)	32 (33.0%)	74 (46.5%)	
<b>Relationship with life partner after MS diagnosis N(%)</b>				
Improvement	17 (17%)	16 (18.2%)	21 (15.7%)	0.6052
Deterioration	19 (19%)	13 (14.8%)	25 (18.7%)	
No change	64 (64%)	59 (67%)	88 (65.6%)	
<b>Economic status N(%)</b>				
High	41 (34.5%)	40 (41.2%)	68 (42.8%)	0.2553
Average	73 (61.3%)	48 (49.5%)	82 (51.6%)	
Low	5 (4.2%)	9 (9.3%)	9 (5.7%)	
<b>Occupational activity N(%)</b>				
Unemployed	60 (50.4%)	43 (44.3%)	61 (38.4%)	0.0592
Employed before MS diagnosis	41 (34.5%)	45 (46.4%)	80 (50.3%)	
Employed after MS diagnosis	6 (5%)	6 (6.2%)	11 (6.9%)	
Never working	12 (10.1%)	3 (3.1%)	7 (4.4%)	
<b>Drop in income due to MS N(%)</b>				
	57 (47.9%)	38 (39.2%)	59 (37.1%)	0.0067
<b>Disability pension N(%)</b>				
	59 (49.6%)	42 (43.3%)	54 (34.0%)	0.0294
<b>Knowledge about existence of MS Society in the place of residence N(%)</b>				
	36 (30.3%)	40 (41.2%)	93 (58.5%)	<0.0001
<b>Membership in the MS Society in the region of residence N(%)</b>				
	16 (13.5%)	23 (23.7%)	27 (17.0%)	0.1383

Table 2. Socio-economic aspects of study cohort according to patients' place of residence.

Type of parameter	Total	RRMS	SPMS	PPMS	p-value
<b>The median duration of the disease (range), years</b>					
	9.0 (0.5-44)	6.0 (0.5-42)	15.0 (1-44)	8.5 (1- 38)	<0.0001
<b>Mean EDSS score (median)</b>					
	3.7 ±1.7 (3.5)	2.6 ±1.0 (2.5)	5.3 ±1.1 (5.0)	5.3 ±1.3 (5.5)	<0.0001
<b>Educational level N(%)</b>					
Primary	14 (3.7%)	8 (57.1%)	4 (28.6%)	2 (14.3%)	<0.0001
Vocational	85 (22.7%)	31 (36.5%)	36 (42.4%)	18 (21.2%)	
Secondary	142 (37.9%)	77 (54.2%)	39 (27.5%)	26 (18.3%)	
Higher	134 (35.7%)	98 (73.1%)	25 (18.7%)	11 (8.2%)	
<b>Relationship with life partner after MS diagnosis</b>					
Improvement	56 (17.4%)	37 (20.4%)	12 (13.0%)	7 (14.3%)	0.0555
Deterioration	59 (18.3%)	24 (13.3%)	25 (27.2%)	10 (20.4%)	
No change	207 (64.3%)	120 (66.3%)	55 (59.8%)	32 (65.3%)	
<b>Economic status</b>					
High	149 (39.7%)	106 (49.5%)	30 (28.8%)	13 (22.8%)	0.0002
Average	203 (54.2%)	99 (46.3%)	66 (63.5%)	38 (66.7%)	
Low	23 (6.1%)	9 (4.2%)	8 (7.7%)	6 (10.5%)	
<b>Occupational activity N(%)</b>					
Unemployed	164 (43.7%)	49 (22.9%)	75 (72.1%)	40 (70.2%)	0.0001
Employed before MS diagnosis	166 (44.3%)	126 (58.9%)	24 (23.1%)	16 (28.1%)	
Employed after MS diagnosis	23 (6.1%)	22 (10.3%)	1 (1.0%)	0 (0%)	
Never working	22 (5.9%)	17 (7.9%)	4 (3.8%)	1 (1.7%)	
<b>Drop in income due to MS</b>					
	154 (41.1%)	53 (24.8%)	70 (67.3%)	31 (54.4%)	0.0001
<b>Disability pension N(%)</b>					
	155 (41.3%)	47 (22.0%)	78 (75.0%)	30 (52.6%)	0.0001
<b>Knowledge about existence of MS Society in the place of residence N(%)</b>					
	169 (45.1%)	85 (39.7%)	59 (56.7%)	25 (43.9%)	0.0336
<b>The membership in the MS Society N (%)</b>					
	66 (17.6%)	23 (11%)	28 (27%)	15 (26%)	0.0003

Table 1. Clinical and socio-economic characteristics of patients according to MS variant.

**Conclusion:** The disease variant and, to a lesser extent, the place of residence affect the socio-economic consequences of MS.

**Disclosure:** Nothing to disclose

## EPO3188

**Effects of pulse methylprednisolon therapy on fatigue during multiple sclerosis relapse**

S. Sabanagic-Hajric, E. Mehmedika-Suljic,  
G. Sulejmanpasic, N. Subasic  
*Sarajevo, Bosnia and Herzegovina*

**Background and aims:** Fatigue is a common disabling symptom of multiple sclerosis (MS) patients and may be present at all stages of MS. We aimed this study to determine the effects of pulse methylprednisolon (MP) therapy on fatigue during MS relapse.

**Methods:** All patients received 1000mg intravenous MP for 5 days, followed by tapering dose of oral prednisolone for 3 days. Fatigue severity scale (FSS) scores were measured before, 7 and 21 days after treatment.

**Results:** 60 patients (42 females) in relapse were included. Mean age was  $38.43 \pm 11.26$  years. Mean baseline FSS score was  $4.66 \pm 1.57$ . 58.3% patients had fatigue ( $FSS \geq 4$ ). Mean baseline Expanded Disability Status Scale (EDSS) score was  $4.15 \pm 1.62$ . Mean age in fatigue patients was  $39.43 \pm 12.03$  and  $36.82 \pm 9.92$  in no fatigue ( $FSS < 4$ ), with no significant difference ( $t = -0.870$ ,  $p = 0.387$ ). Disease duration in fatigue group was  $7.22 \pm 5.56$  years and  $7.17 \pm 5.53$  in no fatigue group, no significant difference ( $t = -0.037$ ,  $p = 0.969$ ). Mean FSS score improved on 7 ( $3.79 \pm 1.56$ ) ( $p < 0.001$ ) and 21 ( $3.675 \pm 1.65$ ) ( $p < 0.001$ ) day after therapy.

**Conclusion:** Our results proved that pulse MP therapy has an effect on fatigue during MS relapse, with significant improvement occurring early after therapy initiation. This could be caused partially due to the disability improvement but also as a result of underlying inflammatory condition treatment. There was no correlation between fatigue and gender, age and disease duration in our study.

**Disclosure:** Nothing to disclose

## EPO3189

**Effectiveness and health care utilization of patients with MS treated with subcutaneous interferon beta-1a (sc IFN beta-1a) according to age: A cohort study using a US claims database**

M. Sabidó<sup>1</sup>, A. Allignol<sup>1</sup>, K. Marhardt<sup>2</sup>, P. Vermersch<sup>3</sup>,  
E. Boutmy<sup>1</sup>

<sup>1</sup>Merck Healthcare KGaA, Darmstadt, Germany, <sup>2</sup>Merck GmbH, Vienna, Austria, <sup>3</sup>Univ. Lille, INSERM U1172, CHU Lille, FHU Imminent, Lille, France

**Background and aims:** This study compared by age the proportion of multiple sclerosis (MS) patients free of relapse, and health care utilization, over 2 years (y) after subcutaneous interferon beta-1a (sc IFNβ-1a) initiation.

**Methods:** This cohort study using MarketScan<sup>®</sup> Databases included patients with MS that initiated sc IFNβ-1a between Jul2010-Dec2015, with at least 6-months history before initiation. Follow-up was until end of study period, insurance, occurrence of event, treatment discontinuation. Hazard ratio (HR) and 95% confidence interval (CI) were used to compare time to first relapse.

**Results:** Among 5,340 patients included, 14.5% were aged 18-30y, 27.5% 31-40y, 30.5% 41-50y, and 27.5% were 51+y. Relapse-free probability at 2-y ranged from 91.44% in 18-30y to 92.82% in 51+y. Compared to 18-30y, the HR for relapse at 2-y, 95%CI were in 31-40y: 1.00 (0.70, 1.43), 41-50y: 0.79 (0.55, 1.12), 51+y: 0.86 (0.60, 1.24). In all age groups, hospitalization due to MS were  $\leq 0.01$  and neurology visits 0.2 episodes per patient per month, over 2-y. Mean number of magnetic resonance imaging (MRI) performed per patient per month over 2-y ranged from 0.25 (0.16-0.34) in 18-30y to 0.14 (0.12-0.16) in 51+y and outpatient visits due to MS from 0.68 (0.57-0.78) to 0.75 (0.67-0.82).

**Conclusion:** The trend observed suggest that relapses rate might decrease with increasing age. Outpatient care related to MS increased with age while MRI performed decreased. These results might suggest that older patients initiating sc IFNβ-1a have more stable MS disease, reflected in lower relapses, and less need to request for MRI than younger patients.

**Disclosure:** The study was sponsored by Merck KGaA, Darmstadt, Germany.

## EPO3190

### Late Onset of Neuromyelitis Optica Spectrum Disorders: A retrospective study in Tunisia

E. Sansa, Z. Saied, F. Nabli, C. Jeridi, F. Hentati, S. Ben Sassi, S. Belal

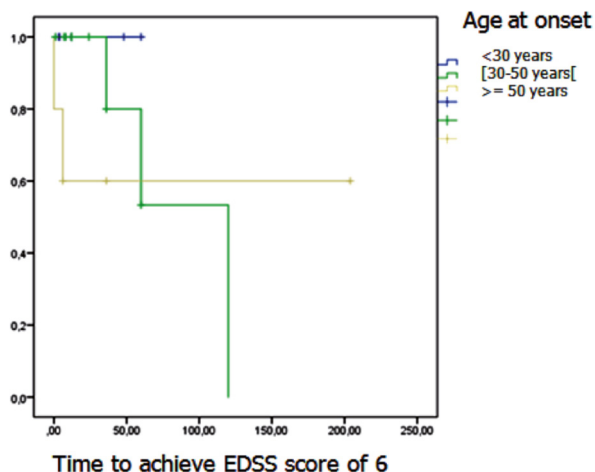
*Neurology, National Institute Mongi Ben Hamida, Tunis, Tunisia*

**Background and aims:** Although the age of neuromyelitis optica spectrum disorder (NMOSD) onset is usually between 30 and 40 years, there have been rare recent studies regarding late-onset neuromyelitis optica spectrum disorder (LO-NMOSD).

We aimed to investigate the clinical characteristics of and the prognosis for LO-NMOSD in a Tunisian cohort.

**Methods:** 30 patients, followed for NMOSD in the Neurology Department of the National Institute of Neurology of Tunis Mongi Ben Hmida, were reviewed retrospectively. Clinical, laboratory, and magnetic resonance imaging (MRI) parameters were investigated.

**Results:** A total of 30 patients were included in this study and were divided into 2 subgroups based on their age of onset: LO-NMOSD ( $\geq 50$  years of age at onset) versus early-onset neuromyelitis optica spectrum disorder (EO-NMOSD) ( $< 50$  years of age at onset). We found that 4 patients (13%) had an age of onset of more than 50 years. Compared with EO-NMOSD, all the patients with LO-NMOSD had a spinal cord involvement at onset (100% vs 35%), were positive for the anti-aquaporin 4 antibodies (AQP4) (100% vs 73%) and were negative for the antinuclear antibodies (100% vs 23%). The brain MRI revealed less lesions in the subgroup with late-onset ( $p=0.05$ ). Furthermore, the patients with LO-NMOSD had more susceptibility to a short term disability with a shorter time to achieve an EDSS score of 6.



**Conclusion:** Age of onset could be an important predictor of lesion location and clinical course of patients with NMOSD.

**Disclosure:** Nothing to disclose

## EPO3191

### Clinical predictors of polypharmacy in a single-center cohort of minimally disabled MS patients

F. Serrazina<sup>1</sup>, M. Salavisa<sup>1</sup>, G. Cabral<sup>1</sup>, F. Ladeira<sup>2</sup>, A.S. Correia<sup>1</sup>

<sup>1</sup>Neurology Department, Hospital Egas Moniz, Centro Hospitalar de Lisboa Ocidental, Lisbon, Portugal,

<sup>2</sup>Neurology Department, Centro Hospitalar de Lisboa Central, Lisbon, Portugal

**Background and aims: Background:** Multiple Sclerosis (MS) is associated with significant morbidity and disability accrual. Treatment with multiple therapies is frequent and has been consistently linked to higher degrees of disability.

**Objective:** To evaluate the frequency and clinical/demographic predictors of polypharmacy in a single-center cohort of minimally disabled MS patients.

**Methods:** Retrospective, observational study identifying consecutive MS patients under disease modifying therapy (DMT) with minimal disability, defined as Kurtzke Expanded Disability Status Scale (EDSS) value  $\leq 3$ . Clinical and demographic variables were collected from patient files. Logistic regression was performed to test for potential predictors of polypharmacy. We defined polypharmacy as the use of  $\geq 5$  medications, including DMT.

**Results:** 294 patients were reviewed and 174 patients fulfilled inclusion criteria: 126 were female (72.4%) with a mean age of 43.5 ( $\pm 11.53$ ) years, median duration of disease of 11 (IQR 10) years and median EDSS value of 2 (IQR 1). Polypharmacy was documented in 24.1% ( $n=42$ ) of patients. A median number of drugs of 6 (IQR 2). Increasing age (OR 1.111; CI 95% 1.068-1.157;  $p<0,01$ ), higher disease duration (OR 1.072; CI95% 1.021-1.125;  $p<0,01$ ), higher EDSS value (OR 1.965; CI95% 1.203-3.211;  $p<0,01$ ), presence of comorbidities (OR 21.310; CI95% 8.180-55.514;  $p<0,01$ ) and urinary sphincter impairment (OR 4.200; CI95% 1,427-8,025;  $p<0,01$ ) were significantly associated with higher risk of polypharmacy.

**Conclusion:** In our cohort of minimally disabled MS patients, polypharmacy was observed in 24.1% of cases. Age, higher degrees of disability, longer duration of disease, comorbidities and urinary symptoms were significantly associated with a higher risk of polypharmacy.

**Disclosure:** Nothing to disclose

## EPO3192

### Thalamic fraction volume predicts cognitive performance in a Portuguese cohort of Relapsing-Remitting MS patients

M. Salavisa<sup>1</sup>, A.F. Graça<sup>2</sup>, F. Serrazina<sup>1</sup>, J. Graça<sup>3</sup>, A.S. Correia<sup>1</sup>

<sup>1</sup>Neurologia, Hospital Egas Moniz, Lisbon, Portugal, <sup>2</sup>Núcleo de Engenharia Biomédica, Instituto Superior de Engenharia de Lisboa, Lisbon, Portugal, <sup>3</sup>Neuroradiologia, Hospital Egas Moniz, Lisbon, Portugal

**Background and aims:** Previous research has linked MS cognitive impairment to subcortical gray matter damage. We aimed to investigate whether thalamic volume is related to cognitive performance in a Portuguese cohort of RR MS patients.

**Methods:** Cross-sectional study, consecutive enrollment of RR MS patients, who underwent cranial MRI at our center between July/2018 and July/2019. Clinical examination was performed within 6 months from the MRI scan, testing for processing speed (Symbol Digit Modalities Test [SDMT]) and verbal memory (California Verbal Learning test II [CVLT-II]). Cognitive t-scores correcting for the effects of age, sex, and educational level, were calculated. Volumetric processing was performed with volBrain<sup>®</sup>, following standardized MR acquisition protocol including coronal 3D T1-weighted spoiled gradient recall (SPGR). Thalamic fraction volume (TFV) was computed as thalamic volume/normalized whole-brain volume (nWBV) ratio. Linear regression models were created to investigate possible predictors of cognitive performance.

**Results:** 44 patients studied, 35 of which female (79.5%), median age of 41 years (IQR 15), median disease duration of 7 years (IQR 11) and median EDSS 2.0 (IQR 1.5).

Statistical analysis revealed significant correlations between TFL and CVLT ( $r=0.479$ ;  $p=0.001$ ) and SDMT ( $r=0.318$ ;  $p=0.035$ ) scores. A regression model accounting for the effects of age, disease duration and nWBV, showed that TFV ( $p=0.004$ ) predicted CVLT t-score ( $R^2=0.239$ ;  $p=0.031$ ). A model exploring the relationship between SDMT t-score, age, EDSS and TFV highlighted TFV ( $p=0.039$ ) as an independent predictor of SDMT ( $R^2=0.173$ ;  $p=0.05$ ).

**Conclusion:** TFV independently predicted cognitive test performance in this cohort, suggesting a specific relationship between cognitive function and thalamic atrophy

**Disclosure:** Nothing to disclose

## EPO3193

### Dimethyl Fumarate in Multiple Sclerosis – The experience of a portuguese center

A. Silva<sup>1</sup>, I. Correia<sup>1</sup>, A. Jorge<sup>1</sup>, S. Batista<sup>1</sup>, C. Nunes<sup>1</sup>, M.C. Macário<sup>1</sup>, I. Campelo<sup>2</sup>, L. Sousa<sup>1</sup>

<sup>1</sup>Neurology Department, Coimbra University and Hospital Center, Coimbra, Portugal, <sup>2</sup>Pharmaceutical Department, Coimbra University and Hospital Center, Coimbra, Portugal

**Background and aims:** Dimethyl fumarate (DMF) is an oral drug approved in relapsing remitting multiple sclerosis (RRMS). It has proven efficacy in clinical trials but real-world data is missing. Our aim is to report effectiveness of DMF in a real-world population with RRMS.

**Methods:** Retrospective study including patients with RRMS treated with DMF. Demographic and clinical data were collected.

**Results:** A total of 149 patients were included, 72.5% female ( $n=108$ ), with mean age of 36.16 years (SD 9.7) and mean disease duration of 3.77 years (SD 5.29). DMF was the first treatment in 45.6% ( $n=68$ ). The remaining patients were previously treated with 1.53 treatments (SD 0.84), and started DMF mainly for convenience (71.6%,  $n=58$ ) and due to side effects (14.8%,  $n=12$ ). After a mean treatment time of 14.57 months (SD 11.88), ARR significantly decreased (0.66 vs. 0.15,  $p<0.01$ ), without significant EDSS changes (1.5 vs. 1.5,  $p=0.61$ ). In the subgroup of patients with previous treatments, a significant decrease in ARR (0.38 vs. 0.09,  $p<0.01$ ) was observed, also without changes in EDSS. Side effects were reported in 18.1% of patients ( $n=27$ ), with flushing ( $n=12$ ) and gastrointestinal ( $n=11$ ) being the most common. Suspension of DMF was required in 8.7% of patients ( $n=13$ ), due to therapeutic ineffectiveness ( $n=5$ ), side effects ( $n=4$ ) and pregnancy ( $n=4$ ).

**Conclusion:** In our population, DMF proved to be effective, with reduction in ARR, without progression of disability and reduced frequency of side effects.

**Disclosure:** Nothing to disclose

## EPO3194

**Neuromyelitis optica spectrum disorders patient register in Russian Federation**

T. Simaniv, I. Kochergin, M. Zakharova

*Research Center of Neurology, Moscow, Russian Federation*

**Background and aims:** Neuromyelitis optica spectrum disorder (NMOSD) is a unifying term for demyelinating diseases that mainly involve optic nerve and spinal cord. In 2015 the International Panel for NMO Diagnosis was convened to revise the diagnostic criteria and to define the nomenclature. According to the revised by Wingerchuk et al. diagnostic criteria, NMOSD diagnosis can be established even with unknown AQP4-IgG status. There is no global epidemiological studies, so the definite prevalence of NMOSD is still unknown. Whereas there is no data about NMOSD in Russia, the aim was to create the NMOSD register to describe the demographic and clinical characteristics of Russian patients with NMOSD

**Methods:** Multi-center retrospective analysis of NMOSD cases from the Russia was conducted. The register for each patient include the following sections: informed consent, demographic data, environmental factors, family history, accompanying illnesses, date of first clinical manifestations, date of diagnosis, AQP-IgG serological status, core clinical characteristics, neuroimaging characteristics, annual relapse rate, severity of disability and pathogenetic therapy.

**Results:** At the moment 72 patients with NMOSD included in register. Data will be updated and systematized to the April of 2020

**Conclusion:** The register is a unique data source. Register will help to evaluate the incidence and prevalence of NMOSD in Russia and compare to other countries.

**Disclosure:** Nothing to disclose

## EPO3195

**The frequency of myocardial ischemia in female patients with primary progressive multiple sclerosis**

C. Sioka, A. Tsoumani, L. Lakkas, A. Papadopoulos, L. Astrakas, M.-P. Giannakakis, C. Tagkas, K. Pappas, A. Fotopoulos, A. Kyritsis, V. Kostadima  
*University Hospital of Ioannina, Ioannina, Greece*

**Background and aims:** The aim of the present study was to use myocardial perfusion imaging (MPI) in female patients with primary progressive multiple sclerosis (PPMS), in order to evaluate their myocardial status.

**Methods:** MPIs with <sup>99m</sup>Tc tetrofosmin stress – rest single photon emission computer tomography (<sup>99m</sup>Tc – SPECT), were evaluated in 20 female MS patients with atypical cardiac symptoms and compared with 36 age-matched individuals without known cardiac disease exhibiting similar symptoms (control group). Smoking, hypertension, diabetes mellitus, dyslipidemia, obesity and cardiac heredity were also compared between the 2 groups. MPI was assessed using 17 segment polar map and with a scale of 0 to 4 scoring.

**Results:** Among the 20 MS patients, 8 (40%) had abnormal MPI in contrast to 7/36 (19.4%) in the control group, demonstrating a trend towards statistical significance ( $p=0.09$ ). In addition, a small trend of statistical significance with SSS and diabetes mellitus was noted in patients with MS ( $R=0.303$ ,  $p=0.193$ ), while in control group the abnormal MPI correlated with obesity and cardiac heredity ( $R=0.376$ ,  $p=0.024$  and  $R=0.351$ ,  $p=0.036$  respectively).

**Conclusion:** PPMS female patients may be at increased risk for cardiovascular events, independently of the presence of other cardiological risk factors. Furthermore, MS patients with diabetes mellitus may be at an additional risk and should be screened with MPI in early stages of their disease for appropriate diagnosis and management. Due to the small number of our patients, these results should be considered preliminary and verified with larger number of patients.

**Disclosure:** Nothing to disclose

## EPO3196

### Efficacy outcomes in cladribine tablets-treated patients in CLARITY were similar between patients who did vs. did not enter CLARITY extension

G. Comi<sup>1</sup>, P. Soelberg Sorensen<sup>2</sup>, K. Rammohan<sup>3</sup>, G. Giovannoni<sup>4</sup>, D. Damian<sup>5</sup>, D. Jack<sup>6</sup>, F. Dangond<sup>5</sup>, A. Galazka<sup>7</sup>, D.L. Jones<sup>8</sup>, P. Vermersch<sup>9</sup>

<sup>1</sup>Department of Neurology and Institute of Experimental Neurology, Università Vita-Salute San Raffaele, Ospedale San Raffaele, Milan, Italy, <sup>2</sup>University of Copenhagen, Rigshospitalet, Copenhagen, Denmark, <sup>3</sup>MS Research Center, University of Miami School of Medicine, Miami, FL, USA, <sup>4</sup>Queen Mary University of London, Blizard Institute, Barts and The London School of Medicine and Dentistry, London, United Kingdom, <sup>5</sup>EMD Serono, Inc, Billerica, USA, <sup>6</sup>Merck KGaA, Darmstadt, Germany, <sup>7</sup>Merck KGaA, Aubonne, Switzerland, <sup>8</sup>EMD Serono, Inc., Rockland, USA, <sup>9</sup>Univ. Lille, INSERM U1172, CHU Lille, FHU Imminent, Lille, France

**Background and aims:** Patients with relapsing-remitting multiple sclerosis treated with cladribine tablets (CT) 10mg (3.5mg/kg cumulative dose over 2 years, CT3.5) in CLARITY were rerandomised 2:1 to receive further CT or placebo in the CLARITY Extension (EXT) study. To address potential confounding and confirm that the patients entering EXT were a representative sample of the patients starting the core study, baseline characteristics and efficacy were compared in patients who entered EXT vs those who did not (non-EXT).

**Methods:** Baseline characteristics, clinical efficacy, and magnetic resonance imaging (MRI) outcomes over 96 weeks in CLARITY were compared between CT3.5-treated EXT (N=284, randomised set) and non-EXT patients (N=132).

**Results:** Disease characteristics at CLARITY baseline of both groups were similar; the use of disease-modifying drugs prior to study enrolment was notably higher in the non-EXT than in the EXT patients (Table 1). Clinical and MRI outcomes during CLARITY were similar in both groups, with overlapping confidence intervals and standard deviations (Table 2).

Table 1. Disease characteristics at CLARITY baseline in CT3.5-treated patients

	EXT (N=284)	non-EXT (N=132)
Disease duration, mean (SD)	4.36 (5.11)	5.09 (5.66)
EDSS score, mean (SD)	2.79 (1.24)	2.93 (1.27)
Number of T1 Gd+ lesions, mean (SD)	1.1 (3.1)	0.9 (1.9)
Volume of new/enlarging T2 lesions, mean (SD)	15.73 (17.32)	13.67 (14.53)
Use of disease-modifying drugs before study enrolment, %	21.5	34.1

EDSS, Expanded Disability Status Scale; Gd+, gadolinium enhanced; SD, standard deviation

Table 2. Patient outcomes during 96 weeks of CLARITY among CT3.5-treated patients

	EXT (N=284)	non-EXT (N=132)
Annualised qualifying relapse rate (95% CI)	0.11 (0.08-0.14)	0.17 (0.13-0.24)
6-month confirmed EDSS progression	8.8%	7.6%
Number of new T1 Gd+ lesions, mean (SD)	0.09 (0.32)	0.10 (0.27)
Number of new/enlarging T2 lesions, mean (SD)	0.32 (0.61)	0.45 (0.79)

CI, confidence interval; EDSS, Expanded Disability Status Scale; Gd+, gadolinium enhanced; SD, standard deviation

**Conclusion:** Baseline characteristics and efficacy outcome data were similar in CT3.5-treated EXT vs non-EXT patients, suggesting that patients who were superior responders to CT3.5 during CLARITY were not preferentially enrolled into CLARITY EXT. These results may assist in the interpretation of durability of efficacy outcomes from CLARITY and CLARITY EXT.

**Disclosure:** This work was funded by EMD Serono, Inc., a business of Merck KGaA, Darmstadt, Germany (in the USA), and Merck Serono SA, Geneva, an affiliate of Merck KGaA Darmstadt, Germany.

## EPO3197

**Dimethyl Fumarate Responsive Combined Central and Peripheral Demyelination**

A. Soysal, S. Aksoy

*Neurology, Bakırköy Prof. Dr. Mazhar Osman Training and Research Hospital for Psychiatric and Neurological Diseases, Istanbul, Turkey*

**Background and aims:** Combined central and peripheral demyelination (CCPD) is an autoimmune demyelinating disease, affecting both central and peripheral nervous system. The pathogenesis is largely unknown, and treatment options are limited and usually ineffective.

**Methods:** Here, we present a patient with CCPD, responsive to dimethyl fumarate.

**Results: Case report:** A 39-year-old man presented with ascending paresthesia, proximal weakness and hyperreflexia in lower extremities, ataxia with positive Romberg sign and urinary incontinence. Multiple T2/FLAIR hyperintense periventricular and deep white matter lesions with contrast enhancement in cranial MRI, 1 in cervical and 3 lesions in thoracic MRI were found. Nerve conduction studies showed conduction block on median, tibial and right ulnar nerves. CSF examination showed 15 lymphocyte, high protein level (87mg/dl), normal IgG index. Oligoclonal band, anti-AQP4, anti-MOG, anti-neurofascin-155 and 186 were found to be negative. Intravenous methylprednisolone for 7 days was given and improved motor deficits. Because areflexia, glove and stocking hypoesthesia were found on follow-up examination on 4th month, with 2 new lesions on brainstem and cerebellum, interferon beta-1b was started. Due to additional neurological findings and new cervical and thoracic lesions with contrast enhancement on 8th month, interferon beta-1b was changed with dimethyl fumarate. He had no new attack or MRI lesion, 24 months after dimethyl fumarate. Control nerve conduction studies were found to be normal, except for mild prolongation of right tibial F-response latency.

**Conclusion:** Dimethyl fumarate may be considered as a treatment option in patients with antibody-negative CCPD.

**Disclosure:** Nothing to disclose

## EPO3198

**The role of serotonin in modulation of Th17-immune response in multiple sclerosis.**

A. Sviridova<sup>1</sup>, S. Molchanova<sup>2</sup>, D. Kasatkin<sup>2</sup>, M. Melnikov<sup>3</sup>, M. Pashenkov<sup>4</sup>, A. Boyko<sup>1</sup>

*<sup>1</sup>Department of Neuroimmunology, Federal Center of Cerebrovascular pathology and Stroke, Moscow, Russian Federation, <sup>2</sup>Neurology, Yaroslavl State Medical University, Yaroslavl, Russian Federation, <sup>3</sup>Department of Neurology, Neurosurgery and Medical Genetics, Pirogov Russian National Research Medical University, Moscow, Russian Federation, <sup>4</sup>Laboratory of Clinical Immunology, Institute of Immunology, Moscow, Russian Federation*

**Background and aims:** Serotonin may participate in multiple sclerosis (MS) pathogenesis by modulating immune cell activity. The aim of this study was to clarify the effects of serotonin and fluoxetine on Th17-cells which play crucial pathogenic role in MS.

**Methods:** 30 patients with relapsing–remitting form of MS during clinical remission and 20 healthy controls were examined. All patients were subjected to a standard neurological examination with assessment of the EDSS score. Levels of serotonin in plasma were determined by HPLC. The percentage of Th17-cells was determined by flow cytometry (CD4<sup>+</sup> CD26<sup>+</sup> CD161<sup>+</sup>). CD4<sup>+</sup>-T-cells were stimulated with anti-CD3/anti-CD28-antibodies in the absence/presence of serotonin/fluoxetine at concentrations of 10<sup>-4</sup>M, 10<sup>-5</sup>M and 10<sup>-6</sup>M whereafter levels of IL-17, IFN-gamma, GM-CSF and IL-21 in supernatants were assessed by ELISA. Statistical analysis was performed using Prism 6 software.

**Results:** The concentration of serotonin in plasma was not different between the groups. The percentages of Th17-cells as well as the production of cytokines were comparable. Serotonin at a concentration of 10<sup>-4</sup>M suppressed cytokine production in all groups (p<0.01) without affecting on cell viability and proliferative response. At concentrations of 10<sup>-5</sup>M and 10<sup>-6</sup>M, serotonin had no effect on cytokine production. Fluoxetine at a concentration of 10<sup>-6</sup>M suppressed IL-17, IFN-gamma and GM-CSF production by CD4<sup>+</sup>-T-cells in all groups (p<0.01) without affecting on cell viability and proliferative response. At concentrations of 10<sup>-4</sup>M and 10<sup>-5</sup>M fluoxetine suppressed cytokine production (p<0.001), but reduced cell viability and proliferative responses (p<0.01).

**Conclusion:** These data suggest anti-inflammatory effect of serotonin on Th17-cells in MS.

**Disclosure:** The reported study was funded by RFBR according to the research project № 18-315-00436.

## EPO3199

### A Systematic Literature Review of Brain Volume Loss and Disability or Cognition Outcomes in Patients With Relapsing-Remitting Multiple Sclerosis

D. Benjumea<sup>1</sup>, P. Janeczko<sup>1</sup>, P. Callahan<sup>1</sup>, D. Amari<sup>1</sup>,  
D. Silva<sup>2</sup>, T. Tencer<sup>2</sup>

<sup>1</sup>Genesis Research, Hoboken, USA, <sup>2</sup>Bristol-Myers Squibb, Summit, USA

**Background and aims:** Brain volume loss (BVL) develops during the course of multiple sclerosis, in both white and grey matter (GM), reflecting irreversible tissue damage. BVL, particularly GM, may be indicative of disease progression in relapsing-remitting multiple sclerosis. This systematic literature review (SLR) investigated the homogeneity of publications reporting the relationship between BVL and disability or cognition outcomes.

**Methods:** An SLR was conducted in Pubmed<sup>®</sup>, Web of Science<sup>®</sup>, and SCOPUS<sup>®</sup> from 01/01/1990 – 01/06/2019 for publications reporting statistical relationships between brain volume measures (total, GM, thalamic, or select others) and disability or cognition measures.

**Results:** A total of 2,087 records were screened; 137 met all criteria. Sample sizes ranged from 8–3,635 patients with a median of 58 (mean (standard deviation [SD]): 220.5 (544.9)). Cross-sectional studies were most common (36%, n=51), followed by prospective cohort (24%, n=33), clinical trial post-hoc (15%, n=21), and retrospective cohort (12%, n=17). Nearly half were single-centre studies (47%, n=65), 39% (n= 53) were multi-centre, and 13% (n=18) not specified. Most studies were conducted in Europe (58%, n=80). Normalized GM was the most commonly reported measure (38%, n=52) then total brain volume/percentage brain volume change (24%, n=33), and thalamic volume (14%, n=19). Expanded Disability Status Scale score was reported in 80% (n=110), with cognition endpoints less frequently reported (n=47, 34.3%). There were methodologic differences in the assessment of the statistical relationships.

**Conclusion:** There was significant methodologic heterogeneity in the studies reporting a relationship between BVL measures and disability or cognition outcomes, including a wide range of BVL measures and disability and cognition instruments.

**Disclosure:** DB, PJ, DA, PC: Genesis Research – employees DS & TT: Bristol-Myers Squibb – employees.

## EPO3200

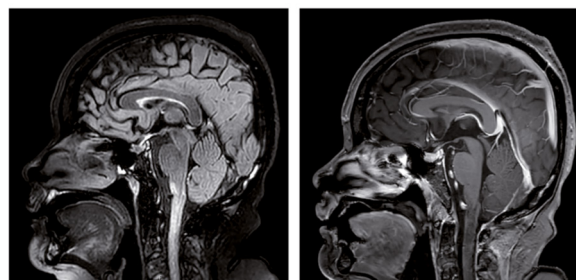
### Cannabis: a successful treatment for painful tonic spasms in neuromyelitis optica spectrum disorder

N. Tisavipat, S. Siritho, N. Prayoonwivat,  
J. Jitprapaikulsan

Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand

**Background and aims:** Painful tonic spasms (PTSs) occur in ¼th of neuromyelitis optica spectrum disorder (NMOSD) patients. Carbamazepine is the most effective medication despite the risk of severe adverse cutaneous reactions. We describe the 1st case of PTSs in NMOSD successfully treated with adjunctive cannabis extract.

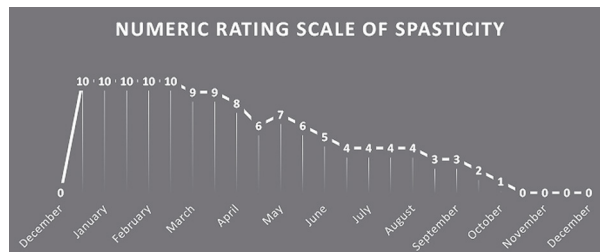
**Methods:** A 39-year-old female with longitudinally extensive transverse myelitis was diagnosed with aquaporin-4 IgG-positive NMOSD 10 months ago. 2 weeks prior to visiting, she experienced excruciating PTSs of all extremities, neck, and face every 3-5 minutes (accumulating to 100-200 times/day), lasting 50 seconds each. A spinal MRI revealed unchanged hyperintense signals on T2-weighted images without enhancement, rendering a relapse less likely. Having had carbamazepine-induced Steven-Johnson syndrome, she was treated with baclofen 50mg/day, clonazepam 5mg/day, pregabalin 450mg/day, and tizanidine 4mg/day. However, PTSs were not improved.



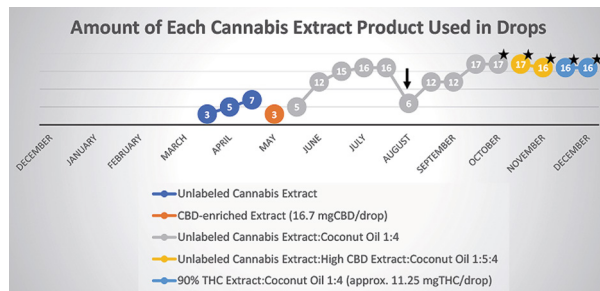
Sagittal MRI study of the brain and spinal cord demonstrated long segment of hyperintense signals from cervicomedullary junction to C3 level on T2-FLAIR (left) without definite enhancement on gadolinium-enhanced T1-weighted imaging (right).

**Results:** The patient took unauthorised cannabis extract sublingually for adjunctive treatment. The dose was titrated to the optimum of THC 60mg/dose 3 times daily, together with the previous anti-spastic medications. The symptom gradually subsided to 2 mild attacks a day. Within 6 months, self-reported numeric rating scale of spasticity improved from 10 to 0. Notably, the cannabis extract was discontinued twice during hospitalisation leading to PTSs recurrence within 2 days, thus the treatment was resumed.





Numeric rating scale of spasticity (0-10) reported retrospectively by the patient. The score was 0 for no spasticity and 10 for the worst possible spasticity.



Amount of each cannabis extract product used in drops. The arrow indicated when cannabis was discontinued during hospitalisation. Starting from late October, the patient received three times daily dosing, indicated by a star.

**Conclusion:** PTs were successfully treated with cannabis in an NMOsD patient. CB1 receptor agonists, including THC, had been proven to ameliorate spasticity in experimental autoimmune encephalomyelitis model. Besides the approval for spasticity in multiple sclerosis, cannabis is a potential treatment option for PTs in carbamazepine-allergic NMOsD patients.

**Disclosure:** Nothing to disclose

## EPO3201

### Evaluation of Falls and Fall Risk Factors in Multiple Sclerosis Patients

N. Kurtuluş<sup>1</sup>, A. Unal<sup>1</sup>, A. Aksoy Gündoğdu<sup>1</sup>, F. Dilek<sup>2</sup>, B. Topcu<sup>3</sup>

<sup>1</sup>Neurology, Tekirdağ Namık Kemal University Faculty of Medicine, Tekirdağ, Turkey, <sup>2</sup>Vocational school of Health Sciences, Tekirdağ Namık Kemal University, Tekirdağ, Turkey, <sup>3</sup>Statistics, Tekirdağ Namık Kemal University, Faculty of Medicine, Tekirdağ, Turkey

**Background and aims:** Falls in people with multiple sclerosis (MS) play an important role on fulfilling the daily activities. In literature it has been reported that more than 50% of people with MS fall in any 6 months period, especially in the 1s using walking aid. The present study was done to explore risk factors associated with falls in this population.

**Methods:** 50 RRMS patients and 30 healthy controls were included. Falls in the past year were recorded and prospectively monitored for 6 months. Extended Disability Status Scale (EDSS), Timed 25 - Foot Walking Test and MS Walking Scale-12 (MSWS) were used to determine physiological factors. Participants performed Static and dynamic balance test on the Korebalance computerized posturography system. Beck Depression Scale, Montreal Cognitive Assessment for cognitive factors and Falls Efficacy Scale- International (FES-I) for the fear of falling were used to evaluate neuropsychological factors.

**Results:** A total of 48 falls from 24 patients (48%) and 32 falls in 6 months period from 17 patients (34%) were recorded. Fall rates were similar between MS patients and healthy controls. FES-I scores were significantly higher and static balance scores were significantly lower in MS patients. In MS group, falls were related with higher MSWS and FES-I scores.

**Conclusion:** Fear of falling is an important factor related with falls in MS patients even in the 1s without aid. Patient rated measure of walking ability test MSWS is an effective tool to estimate fall risk and can be used in clinical practice.

**Disclosure:** Nothing to disclose

## EPO3202

### Neuropathic Pain and The Quality of Life in Multiple Sclerosis

C. Uzunköprü<sup>1</sup>, S. Demir<sup>2</sup>, Y. Beckmann<sup>1</sup>

<sup>1</sup>Neurology, Katip Çelebi University, Izmir, Turkey,

<sup>2</sup>Neurology, Sultan Abdülhamid Han Training and Research Hospital, İSTANBUL, Turkey

**Background and aims:** Pain is an unpleasant emotional sensation originating from a particular area of the body related to or not due to tissue destruction about a person's past experiences. There 2 types of pain: nociceptive and neuropathic pain. Neuropathic pain (NP) is 1 of the common complaints affecting the quality of life, and the prevalence of NP is almost 30% among patients with multiple sclerosis (MS). In this study, we aimed to evaluate the frequency and severity of NP in MS patients and the effect of NP over the quality of life.

**Methods:** We enrolled the patients with MS who were fulfilling the 2017 McDonald diagnostic criteria. We collected demographic and clinical data. The frequency and severity of NP were assessed with Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) and Douleur Neuropathique 4 questions (DN4) and we used SF-36 to evaluate the efficacy of NP over the quality of life.

**Results:** We enrolled 100 patients, 68 of them were female. The mean age was 37.12±14.08 years, the mean disease duration was 7.08 ±5.87 years, and the mean EDSS was 2.1±1.2. The evaluation of the LANSS and DN4 questionnaires showed that 40.2% of MS patients had NP, and SF-36 showed that quality of life impaired in 35.7% of the patients due to the NP.

**Conclusion:** NP is common among patients with MS. NP may affect the quality of life. MS patients should be evaluated for NP.

**Disclosure:** Nothing to disclose

## MS and related disorders 7

## EPO3203

**MOG IgG Related Disorders: Different Clinical Presentations**

S. Demir<sup>1</sup>, H. Gumus<sup>2</sup>, S. Sen<sup>3</sup>, C. Uzunköprü<sup>4</sup>, R.E. Toğrol<sup>1</sup>, Y. Beckmann<sup>4</sup>, M. Terzi<sup>3</sup>

<sup>1</sup>Neurology, Sultan Abdulhamid Han Research and Training Hospital, Istanbul, Turkey, <sup>2</sup>Neurology, Selcuk University, Konya, Turkey, <sup>3</sup>Neurology, Mays University, Samsun, Turkey, <sup>4</sup>Neurology, Katip Çelebi University, Izmir, Turkey

**Background and aims:** Myelin Oligodendrocyte Glycoprotein (MOG) is the type1 integral membrane protein located on the extracellular surface of oligodendrocytes and the outermost side of the myelin sheath. Only available in CNS. There are many different clinical presentations associated with anti-MOG antibodies. We found it worthy to present patients with anti-MOG antibody positivity with different symptoms.

**Methods:** Anti-MOG antibody positivity was detected in 12 patients (9F/3M). The ages of the patients were between 19-54.

**Results:** 20-year-old and 25-year-old female patients presented with unilateral optic neuritis and also had oligoclonal band type 2 positive and MS lesions. The 1st patient was started with fingolimod and the other patient with glatiramer acetate. Patients with bilateral optic neuritis had no demyelinating lesion. Azathiopurine was started in 2 patients. 1 patient who had unilateral optic neuritis had an attack of optic neuritis in the other eye for 2 months and the other patient 4 months later and started on azathiopurine. The patient presented with hemihypoesthesia and had atypical brain lesions and is still being followed without medication. Rituximab was initiated in 2 patients with NMOSD, 2 patients with transverse myelitis and patient with bilateral optic neuritis. No new attack was observed in the patients who received preventive treatment and were followed up without medication.

**Conclusion:** As seen in our patients with anti-MOG antibody positivity, these patients may present with different clinical presentations. therefore, anti-MOG antibody positivity alone does not appear to be a definitive diagnostic parameter. It supports the presence of autoimmunity. Treatment decision should be made according to the patient.

**Disclosure:** Nothing to disclose

## EPO3204

**The Usability of Body Fluid Biomarkers in Multiple Sclerosis Clinical Practice Guideline Recommendations: First Results from a Systematic Review.**

A. Ivashynka<sup>1</sup>, A. Cagol<sup>2</sup>, B. Hemmer<sup>3</sup>, F.M. Boneschi<sup>2</sup>, A. Cucovici<sup>4</sup>, M. Leone<sup>5</sup>, S. D'alfonso<sup>1</sup>

<sup>1</sup>Department of Health Sciences, University of Eastern Piedmont, Novara, Italy, <sup>2</sup>Department of Neurology and MS Research Unit, IRCCS Policlinico San Donato, Milan, Italy, <sup>3</sup>Department of Neurology, Klinikum Rechts der Isar der TU München, Munich, Germany, <sup>4</sup>Department of Medical and Surgical Sciences, University of Foggia, Foggia, Italy, <sup>5</sup>Department of Medical Sciences, Neurology Unit, Foundation IRCCS "Casa Sollievo Della Sofferenza", San Giovanni Rotondo, Italy

**Background and aims:** The last decades have been marked by the development of Disease-Modifying Therapy (DMT) and the search for Body Fluid Biomarkers (BFBs) for patients with Multiple Sclerosis (MS). More than 80 BFBs were studied, of which more than 30 were validated. Clinical Practice Guidelines (CPGs) help integrate current best evidence in making decisions about the care of individual MS patients. We aimed to know how BFBs are used in CPG recommendations to guide decisions in the management of patients with MS, including prevention, diagnosis, and therapy.

**Methods:** We performed a systematic and extensive literature search without language restrictions of guidelines used in MS since 1993, when the first DMT was marketed, up to March 15, 2019. The following databases were searched: MedLine, EMBASE, LILACS, PEDro, NGCH, GIN, and Google Scholar.

**Results:** We identified 404 records, 76 CPGs were included for the review. The only 24 CPGs had at least one recommendation suggesting the use of Body Fluid Testing (BFT). Cerebrospinal fluid oligoclonal IgG bands analyses were used in 7 CPGs for MS diagnosis and prognosis, JC virus antibody and DNA - in 5 CPGs for differential diagnosis and therapeutic decision-making, neutralizing antibodies to Interferon-beta or Natalizumab - in 7 CPGs for DMT efficacy monitoring, myelin basic protein - in 1 CPG. Other CPGs recommended using routine BFT to monitor overall MS patients' health.

**Conclusion:** There remain unmet needs for BFBs in CPG recommendations for the diagnosis and treatment of patients with MS despite the number of experimental, validated and clinically useful MS BFBs.

**Disclosure:** Nothing to disclose

## EPO3205

**Menopause in multiple sclerosis patients**

C. Oreja-Guevara<sup>1</sup>, S. López Coello<sup>1</sup>, I. Gómez Estévez<sup>1</sup>, R. Rodríguez Rabanal<sup>2</sup>, J. Díaz-Díaz<sup>1</sup>

<sup>1</sup>Neurology, Hospital Clínico San Carlos, Madrid, Spain, <sup>2</sup>Gynecology, Hospital Clínico San Carlos, Madrid, Spain

**Background:** There is increasing evidence that sex hormonal variations and age have an influence in the course of the disease. MS patients are getting older and MS and menopausal symptoms could be overlapped, therefore is a great need to understand the impact of menopause in MS patients.

**Aim:** To study menopausal and MS symptoms in MS women and their influence in the disease evolution.

**Methods:** Retrospective study. MS women with perimenopause and menopause (no more than 5 years) were recruited from our center. We collected demographic information, menarche, DMTs, quality of life, MS and menopause symptoms.

**Results:** 30 patients were included, 15 in perimenopause (mean age 48) and 15 in menopause (mean age 49). 40% of all patients have a decrease of quality of life and increase of depressive symptoms, 50% reported worsening of the disease comparing with the non menopause period.

Most frequent symptoms in menopause MS patients were: Hot flashes (85%), vaginal dryness (70%), weight increase (60%) and adverse mood (60%). 85% of patients have no changes in fatigue, pain, spasticity and urinary symptoms. Differences in number of children and smoking status have no correlation with an increase of menopausal symptoms

**Conclusion:** As stated above there is no increase in typical MS symptoms in these patients, however menopausal symptoms are present in most of them, leading to report a worsening in the disease and their well-being. Therefore, it is important to recognize the menopausal symptoms and to treat them to improve the quality of life and well being of our patients

**Disclosure:** Nothing to disclose

## EPO3206

**The Evaluation of Anxiety in Multiple Sclerosis by a Useful Method: State-Trait Anxiety Inventory**

Y. Beckmann<sup>1</sup>, E.N. Özlem<sup>1</sup>, C. Uzunköprü<sup>2</sup>

<sup>1</sup>Izmir, Turkey, <sup>2</sup>Neurology, İzmir Katip Çelebi University, Izmir, Turkey

**Background and aims:** The present study aims to examine psychometric properties of the Spielberger State-Trait Anxiety Inventory (STAI-1 and STAI-2, respectively) in a Multiple Sclerosis (MS) population and to assess the anxiety level which might be related to cognitive decline and depression.

**Methods:** A prospective study evaluated 44 patients with relapsing remitting MS and 47 age-, sex-, and education-matched healthy adults. All MS patients and HCs completed the STAI-Y-1 and the STAI-Y-2. To evaluate global cognitive status, MS patients underwent the Brief International Cognitive Assessment for MS (BICAMS). The BICAMS includes the following 3 tasks: the Symbol Digit Modalities Test (SDMT), California Verbal Learning Test (CVLT2), and the revised Brief Visuospatial Memory Test (BVMTR). All patients also completed the Fatigue Severity Scale (FSS) to assess subjective fatigue; the Beck Depression Inventory-II (BDI-II) to assess depressive symptoms. Moreover, daily living was evaluated by a MS quality of life (MSQoL).

**Results:** When compared to the control group, the high level of state anxiety in MS patients occurred in 37.1%, and the high level of trait anxiety in our MS sample was found in 48.3%. we found that total score of both scales correlated weakly or moderately with scores of the cognitive battery, depression, and the fatigue scale.

**Conclusion:** Our data showed that the STAI-1 and the STAI-2 are useful methods to measure the severity of anxiety in MS patients in clinical practice.

**Disclosure:** Nothing to disclose

## EPO3207

**Safety of Ixazomib Targeting Plasma Cells in Multiple Sclerosis**

G. Struga, L. Bianchi, F. Ammoscato, J. Bestwick, G. Giovannoni, S. Gnanapavan  
*Blizard Institute, London, United Kingdom*

**Background and aims:** Ixazomib, a proteasome inhibitor, is licensed for the treatment of multiple myeloma, a malignant plasma cell disorder. In MS, the production of antibodies by plasma cells and B cells play a critical role in its pathogenesis and disease progression.

The purpose of this study is to investigate the safety of ixazomib and if it can reduce or clear oligoclonal bands (OCBs) from the cerebrospinal fluid in MS.

The Phase Ia/Ib trial using Ixazomib will be carried out in relapsing remitting multiple sclerosis, primary progressive multiple sclerosis and secondary progressive multiple sclerosis. The primary outcome will be safety, followed by effect on cerebrospinal fluid OCBs.

**Methods:** It is a double-blind, randomised and placebo ed control trial with 76 participant (50 on active drug; 26 on placebo) for up to 24 months. 1 cohort of patients (n=38) will have relapsing MS and the other cohort (n=38) will have progressive MS.

Measures of adverse events will be compared between active and placebo. The efficacy will be measured with the proportion of OCB IgG compared between active and placebo. The outcome will be monitored with sequential MRI and EDSS comparing the treatment group to placebo.

**Results:** The trial is due to commence in early 2020.

**Conclusion:** The trial will be targeting a novel disease pathway in MS; that of long lived plasma cells. There is not any convincing evidence yet that currently DMT eliminate intrathecal OCB. If successful it would be the first drug of its kind to be used in MS.

**Disclosure:** Nothing to disclose

## EPO3208

**Reliability of the manual muscle test of the Neurostatus EDSS**

N. Van der Maas<sup>1</sup>, M. D'souza<sup>2</sup>, R. Steinlin Egli<sup>3</sup>, D. Vogt<sup>4</sup>

*<sup>1</sup>Brügg BE, Switzerland, <sup>2</sup>Neurology, University Hospital Basel, Basel, Switzerland, <sup>3</sup>Physiotherapie Langmatten, Binningen, Switzerland, <sup>4</sup>Clinical Trial Unit, University Hospital Basel, Basel, Switzerland*

**Background and aims:** This study evaluated the reliability of three manual muscle tests of the Neurostatus EDSS. The influence of fatigue and spasticity on reliability was explored.

**Methods:** This was a single-center, prospective cross-sectional and longitudinal study. The inter- and intra-rater reliability was evaluated using a 1-way random effects ANOVA model. The influence of fatigue and spasticity was evaluated exploratively by using plots and in subgroups using a linear mixed effects model (LME) for each test separately. We used the Modified Tardieu Scale (MTS) for the evaluation of spasticity and a numeric rating scale for the evaluation of fatigue.

**Results:** The interrater reliability is mainly moderate. The Intra-class Correlation Coefficient (ICC) of the overall interrater reliability is 0.52 [0.30, 0.72]. The ICC for subgroups with high and low spasticity is higher for low spasticity than for high spasticity. However, the statistical evidence is not strong enough to conclude that there is a difference between these subgroups.

The pooled overall value for the intra-rater reliability is ICC=0.74 [0.59, 0.83]. Plots of the overall ratings of the muscle test against the sum scores of the MTS as well as the LME analysis do not indicate an influence of spasticity on the intra-tester reliability.

We did not find an influence of fatigue on the test results.

**Conclusion:** The study demonstrated that the evaluated three muscle tests of the neurostatus EDSS can only be a reliable outcome tool when it is applied by 1 tester. Fatigue didn't influence the reliability. Spasticity might influence intertester reliability and needs further evaluation.

**Disclosure:** This study received a grant from the Swiss MS-Society and was financially supported by the specialized groupe physiotherapy and MS of physioswiss and the Institute for Physiotherapy Research

## EPO3209

### One-Year Interim Analysis of Health-Related Quality of Life in RRMS Patients Treated With Alemtuzumab in a Real-world Clinical Setting (LemQoL Study)

B. Van Wijmeersch<sup>1</sup>, T. Harrower<sup>2</sup>, J. Hobart<sup>3</sup>, R. Kizlaitiene<sup>4</sup>, G.A. Marfia<sup>5</sup>, F. Patti<sup>6</sup>, O.R. Pearson<sup>7</sup>, V. Van Pesch<sup>8</sup>, P. Vanderdonck<sup>9</sup>, L. Vécsei<sup>10</sup>, S. Shor<sup>11</sup>, A. Achiron<sup>12</sup>

<sup>1</sup>Rehabilitation and MS-Centre Overpelt, BIOMED, Hasselt University, Hasselt, Belgium, <sup>2</sup>Royal Devon and Exeter NHS Foundation Trust, Exeter, United Kingdom, <sup>3</sup>Plymouth University Peninsula Schools of Medicine and Dentistry, Plymouth, United Kingdom, <sup>4</sup>Vilnius University Hospital, Vilnius University, Vilnius, Lithuania, <sup>5</sup>Multiple Sclerosis Center, Department of System Medicine, Tor Vergata University Hospital, University of Tor Vergata, Rome, Italy, <sup>6</sup>Multiple Sclerosis Center, University of Catania, Teaching Hospital Policlinico, Catania, Italy, <sup>7</sup>Swansea Bay University Health Board, Swansea, United Kingdom, <sup>8</sup>Cliniques Universitaires Saint-Luc, Uclouvain, Brussels, Belgium, <sup>9</sup>AZ Groeninge, Kortrijk, Belgium, <sup>10</sup>Department of Neurology, University of Szeged, Szeged, Hungary, <sup>11</sup>Sanofi, Amsterdam, Netherlands, <sup>12</sup>Multiple Sclerosis Center, Sheba Medical Center, Tel Hashomer, Israel

**Background and aims:** The real-world LemQoL study utilises patient-reported outcomes (PROs) to evaluate health-related aspects of life quality (HRQL) in alemtuzumab-treated RRMS patients in Europe and Israel. Here we report Year 1 (Y1) LemQoL interim results.

**Methods:** LemQoL is an ongoing 36-month, prospective, open-label, observational, multicentre study. PROs assessed include (lower scores indicate improvement) MS Impact Scale-29 (MSIS-29; scale 0–100), MSIS-29 bladder/bowel dysfunction (scale 0–5), Modified Fatigue Impact Scale-5 (MFIS-5; scale 0–20), Patient-Determined Disease Steps (PDDS; scale 0–8), and Hospital Anxiety/Depression Scale (HADS; scale 0–21). Symbol Digit Modalities Test (SDMT; scale 0–1, higher score indicates improvement) and Health-Related Productivity Questionnaire-MS V2 were also evaluated.

**Results:** As of August 2019, enrolment was complete (N=319) and Y1 data were evaluable in 275 patients. Mean MSIS-29 physical and psychological impact scores improved at Y1 from baseline (mean change [95% CI], -6.5 [-9.1, -3.9] and -6.7 [-9.8, -3.6], respectively, coprimary endpoints). Mean scores for other PROs improved at Y1 (mean change [95% CI] from baseline, MFIS-5: -1.5 [-2.0, -1.0]; HADS Anxiety: -0.8 [-1.3, -0.3]; PDDS: -0.3 [-0.5, -0.1]). Scores were stable for MSIS-29 bladder/bowel dysfunction (-0.1 [-0.2, 0.04]), SDMT (0 [-0.01, 0.01]), and HADS Depression (-0.3 [-0.7, 0.1]). Mean weekly lost employment productivity hours decreased at Y1 (-3.1 [-5.6, -0.6]). Incidence of adverse events was 85.9%, with serious adverse events reported in 13.5% of patients.

**Conclusion:** These interim real-world data demonstrate that productivity and major HRQL outcomes improved or were stable in alemtuzumab-treated RRMS patients. Alemtuzumab safety through Y1 was generally consistent with the pivotal studies.

**Disclosure:** STUDY SUPPORT: Sanofi

## EPO3210

### Comparative transcriptomics of multiple sclerosis vs. Viral infections: common roles for nuclear transport, neuroactive peptide signalling and the spliceosome

G. Vavougiou<sup>1</sup>, M. Breza<sup>1</sup>, S. Zarogiannis<sup>2</sup>, K. Krogfelt<sup>3</sup>, S. Pelidou<sup>1</sup>, T. Doskas<sup>4</sup>

<sup>1</sup>Athens, Greece, <sup>2</sup>Physiology, University of Thessaly, Larisa, Greece, <sup>3</sup>Statens Serum Institut, Copenhagen, Denmark, <sup>4</sup>Paiania Attikis, Greece

**Background and aims:** There are accumulating evidence in the literature that viral infections provide an environmental trigger for the onset of multiple sclerosis (MS) in genetically susceptible individuals. The purpose of this study is to discover common pathways between multiple sclerosis and viral infections, on a genomic and functional level.

**Methods:** The Gene Expression Omnibus (GEO) database was inquired using a query containing the keywords “Virus”, “Multiple Sclerosis”, “Infection”. Included studies involved ex vivo samples of peripheral blood mononuclear cells (PBMCs) following a case – control design. Finally, in order to create a transfection model, a study from active demyelinating plaques was used for comparative genomics.

**Results:** The initial search retrieved 35 studies. Applying the predetermined inclusion criteria, 2 MS vs Healthy Controls (HC) studies and 3 studies of viral infection vs. HC (Dengue, SARS Coronavirus and Rotavirus infections). Multiple common, differentially expressed genes (DEGs) and associated significantly enriched pathways emerged between the MS vs viral infection subgroups. The “Epstein Barr infection” pathway was salient among MS-related viral infection pathways (False Discovery Rate (FDR) <0.05). Furthermore, comparative transcriptomics revealed 4 common gene signatures of 80 to 150 genes, associated with nuclear transport, neuroactive peptide binding and the spliceosome (FDR<0.0001).

	Multiple sclerosis vs. HC (II)	SARS Coronavirus vs HC	Acute Rotavirus infection vs. HC	Multiple Sclerosis vs. HC
<b>KEGG Pathways</b>				
Spliceosome	3.36e-8	1.69e-10	0.0435	0.0287
Neuroactive ligand-receptor interaction	7.55e-6	1.06e-7	0.0095	6.25e-6
<b>Biological Process</b>				
RNA export from nucleus(6)	0.0017	2.28e-4	0.0167	0.0171
nuclear export(8)	2.22e-5	0.0140	9.30e-4	0.0122

**Conclusion:** Ours is the first study to directly compare viral infection mechanisms with the molecular pathophysiology of MS in a transcriptomic level. Our results indicate a “response to infection” phenotype in MS PBMCs, associated with alternative splicing and disruptions of transcriptional homeostasis.

**Disclosure:** Nothing to disclose

## EPO3211

**Biomarkers of neurodegeneration predict early disability in Multiple Sclerosis patients.**

E. Virgilio<sup>1</sup>, D. Vecchio<sup>1</sup>, I. Crespi<sup>2</sup>, A. Zagami<sup>1</sup>, P. Naldi<sup>1</sup>, R. Cantello<sup>1</sup>, U. Dianzani<sup>3</sup>, C.N. Comi<sup>3</sup>

<sup>1</sup>Institute of Neurology, University of Eastern Piedmont, Novara, Italy, <sup>2</sup>Novara, Italy, <sup>3</sup>Interdisciplinary Research Center of Autoimmune Diseases, University of Piemonte Orientale, Novara, Italy

**Background and aims:** Neurodegeneration in Multiple Sclerosis (MS) occurs from early disease stages. Several molecules have been investigated as suitable biomarkers of axonal damage in MS, but none is routinely used in clinical practice. Moreover, Tau Protein and beta-amyloid protein (Abeta) are markers currently used in other neurodegenerative diseases. The aim of our study is to evaluate if cerebrospinal fluid (CSF) Tau protein and Abeta protein, at the diagnosis could predict early MS disability.

**Methods:** CSF Abeta and Tau levels were determined with commercial enzyme-linked immunosorbent assay in newly diagnosed MS patients. We collected demographic, clinical data. We calculated disability outcomes at last follow-up (minimum 1year): MS severity score (MSSS) and MSSS age-related (ARMSS) to correct increase of disability related to age.

**Results:** We enrolled 55 patients, 34 with a relapsing-remitting disease course. Mean follow-up was 2years (SD±1.5y). Mean value of Tau and Abeta were respectively 128.5±69pg/ml and 557.7±258.6pg/ml. Patients with higher CSF Tau levels at diagnosis developed higher disability evaluated with ARMSS (R=0.4, p=0.002) and MSSS (R=0.4, p=0.06). A weak correlation was found with lower CSF Abeta and higher MSSS (R=-0.2, p=0.2). Lower Abeta was found in patients with spinal lesions dissemination (p=0.07).

**Conclusion:** Our study established a prognostic role of neurodegenerative CSF markers, in particular Tau protein, in predicting early disability in MS patients independently from age. Longer follow-up and larger population are needed to confirm our preliminary data.

**Disclosure:** Nothing to disclose

## EPO3212

**Search of biomarkers of cognitive impairment in Multiple Sclerosis at diagnosis: preliminary findings**

E. Virgilio<sup>1</sup>, D. Vecchio<sup>1</sup>, I. Crespi<sup>2</sup>, P. Naldi<sup>1</sup>, R. Cantello<sup>1</sup>, U. Dianzani<sup>3</sup>, C.N. Comi<sup>3</sup>

<sup>1</sup>Institute of Neurology, University of Eastern Piedmont, Novara, Italy, <sup>2</sup>Novara, Italy, <sup>3</sup>Interdisciplinary Research Center of Autoimmune Diseases, University of Piemonte Orientale, Novara, Italy

**Background and aims:** Cognitive impairment (CI) is a frequent and disabling symptom in Multiple Sclerosis (MS). Axonal damage may contribute in CI development from early stages. Nevertheless no biomarkers are at the moment available to track CI in MS patients. To evaluate the correlation of cerebrospinal fluid (CSF) axonal biomarkers, in particular: light-chain neurofilaments (NFL), Tau and Beta amyloid protein (Abeta) in MS patients with CI at the diagnosis.

**Methods:** We enrolled 30 newly-diagnosed MS patients and evaluated cognition using Brief International Cognitive Assessment for MS (BICAMS) battery. NFL, Abeta and Tau levels were determined with commercial enzyme-linked immunosorbent assay.

**Results:** Of our patients (mean age of 38.2±10.8 years), twelve (40%) had CI defined as a T-score below 35 (equivalent to z-score below -1,5) in at least one test of BICAMS. Patients with CI had greater neurodegeneration marked with: higher mean levels of NFL (1,238.7±706.9 vs 1,154.3±943.8pg/ml, p=0.3), higher mean levels of Tau (176.5±70.3 vs 133.9±76.9pg/ml, p=0.1), lower mean levels of Abeta (567.7±431.7 vs 586.6±211.6pg/ml, p=0.1). Patients with impairment in verbal memory showed higher Tau levels (R -0.3, p=0.07).

**Conclusion:** CI has important burden on quality of life of MS patients and should be looked for even at diagnosis. BICAMS easily detects CI in MS patients. Few data regarding NFL, Abeta and CI in MS, are reported in literature, but our preliminary results are consistent with a correlation. Axonal damage biomarkers seems to reflect cognition from early stages and Tau, at the moment, seems the more informative.

**Disclosure:** Nothing to disclose

## EPO3213

### Lymphocyte Levels Across Age Groups in Teriflunomide-treated Patients: Pooled Analysis from the Clinical Trials and the Real-World TERI-PRO Study

S. Vukusic<sup>1</sup>, J. Oh<sup>2</sup>, J. De Seze<sup>3</sup>, A. Parajoles<sup>4</sup>, Y. Al Malik<sup>5</sup>, R.A.L. Macdonell<sup>6</sup>, P. Vermersch<sup>7</sup>, E.M. Poole<sup>8</sup>, Y. Pyatkevich<sup>8</sup>, A. Miller<sup>9</sup>

<sup>1</sup>Hôpital Neurologique, Hospices Civils de Lyon and Université Lyon, Lyons, France, <sup>2</sup>University of Toronto, Toronto, Canada, <sup>3</sup>Strasbourg University, Hôpital Civil, Strasbourg, France, <sup>4</sup>Hospital San Juan de Dios, San José, Costa Rica, <sup>5</sup>King Saud bin Abdulaziz University for Health Sciences/King Abdulaziz Medical City, Riyadh, Saudi Arabia, <sup>6</sup>Austin Health and Florey Institute of Neurosciences and Mental Health, Melbourne, Australia, <sup>7</sup>Univ. Lille, INSERM U995, CHU Lille, Lille, France, <sup>8</sup>Sanofi, Cambridge, USA, <sup>9</sup>Icahn School of Medicine at Mount Sinai, The Corinne Goldsmith Dickinson Center for Multiple Sclerosis, New York, USA

**Background and aims:** Teriflunomide is a once-daily oral immunomodulator approved for treating relapsing MS and relapsing-remitting MS, depending on the local label. Efficacy and safety of teriflunomide were established in phase 3 trials of patients with relapsing forms of MS (TEMPO [NCT00134563], TOWER [NCT00751881], TENERE [NCT00883337]) and clinically isolated syndrome (TOPIC [NCT00622700]). Treatment satisfaction increased after switch to teriflunomide in the real-world TERI-PRO study (NCT01895335). Here, we assess lymphocyte levels in teriflunomide-treated patients stratified by age.

**Methods:** Patients were stratified by age at study entry (pooled TEMPO/TOWER/TENERE/TOPIC and TERI-PRO:  $\leq 25$ ,  $>25$  to  $\leq 35$ ,  $>35$  to  $\leq 45$ ,  $>45$  years; TERI-PRO included an additional age group of  $>55$  years). Lymphocyte levels (baseline and Year 1) and safety outcomes were assessed. Lower limit of normal (LLN) was defined as  $<1.0 \times 10^9$  cells/L.

**Results:** In phase 3 and TERI-PRO patients,  $\geq 92\%$  and  $\geq 90\%$ , respectively, maintained lymphocyte levels above LLN at Year 1 after teriflunomide, regardless of age group. Across age groups, mean lymphocyte levels were  $\geq 1.63 \times 10^9$  cells/L and  $\geq 1.66 \times 10^9$  cells/L at year 1 in phase 3 and TERI-PRO teriflunomide-treated patients, respectively. In phase 3 teriflunomide-treated patients, safety was similar across age groups; however, TERI-PRO patients aged  $>35$  years had higher incidences of infections than those  $\leq 35$  years ( $\geq 29\%$  vs  $\leq 24\%$ ).

**Conclusion:** Teriflunomide did not lower lymphocyte counts below LLN in most phase 3 and TERI-PRO patients over 1 year, regardless of patient age at study entry. The safety profile with teriflunomide was similar across age groups in phase 3 patients, but age-related increases in infections were observed in TERI-PRO patients.

**Disclosure:** STUDY SUPPORT: Sanofi

## EPO3214

### The role of optical coherence tomography in differential diagnosis of multiple sclerosis and CNS involvement in autoimmune connective tissue diseases

P. Wildner<sup>1</sup>, E. Zydorczak<sup>2</sup>, M. Oset<sup>1</sup>, M. Siger<sup>1</sup>, M. Wilczyński<sup>2</sup>, M. Stasiołek<sup>1</sup>, M. Matysiak<sup>1</sup>

<sup>1</sup>Department of Neurology, Medical University of Lodz, Łódź, Poland, <sup>2</sup>Department of Ophthalmology, Medical University of Lodz, Łódź, Poland

**Background and aims:** The purpose of this study was to assess whether application of optical coherence tomography (OCT) measurements can provide a useful biomarker for distinguishing multiple sclerosis (MS) from central nervous system (CNS) involvement in autoimmune connective tissue diseases (CTDs).

**Methods:** Spectral domain OCT examination was performed in 59 patients with MS, 30 patients with CNS involvement in CTD, and 32 healthy controls. Thickness of RNFL, ganglion cell complex (GCC), ganglion cell layer-inner plexiform layer (GCIPL), and volume of the macula were analyzed in non-optic neuritis eyes and compared between groups.

**Results:** Patients with MS had significantly smaller thickness of macular RNFL ( $p=0.0146$ ) and superior optic disc RNFL ( $p=0.0202$ ), as well as GCC and GCIPL ( $p<0.001$  and  $p=0.0002$ , respectively) among the examined groups. MS group was also characterized by a significantly smaller macular volume ( $p=0.0149$ ). The post-hoc analysis with multiple comparisons of mean ranks test revealed significant differences in all abovementioned parameters only between MS and healthy controls group (2-sided p-values with a Bonferroni adjustment: 0.0163 and 0.0176, 0.0006, 0.0001, 0.0129 respectively). The comparison of OCT results between patients with MS and CTDs group revealed no statistically significant difference.

**Conclusion:** A prominent retinal thinning, demonstrated with OCT, may constitute a useful biomarker of MS in general population. However, among individuals with a confirmed CNS involvement, the use of OCT is not a sufficient tool to discriminate between MS and CNS involvement in autoimmune CTD.

**Disclosure:** Nothing to disclose



## EPO3215

**A 164 second smartphone based film successfully conveys the importance of early intervention in MS**

D. Wilkie<sup>1</sup>, R. Middleton<sup>2</sup>, J. Cook<sup>3</sup>, R.S. Nicholas<sup>1</sup>

<sup>1</sup>Brain Sciences, Imperial College London, London, United Kingdom, <sup>2</sup>UK MS Register, Swansea University, Swansea, United Kingdom, <sup>3</sup>James Cook Film Production, Newcastle upon Tyne, United Kingdom

**Background and aims:** Early treatment in MS aims to stop later disability and often needs to be considered in the absence of symptoms. This preventative approach is a complex concept to convey to a naïve population. We produced a film appealing to a modern audience: 164 second duration, conceptual, without dialogue and accessible across formats. We assessed its success at delivering the message to people with MS (pwMS) and a wider population.

**Methods:** 3 populations were included: pwMS from the UK MS Register, pwMS from outpatient clinics and a general population (Ethical approval ref: 19/LO/0282). Based upon industry standard, pre-specified outcomes were 50% viewer retention (viewing for  $\geq 30$  seconds) and 50% understanding of the concepts. The film was embedded into a website, participants were asked to review the film and the four concepts were explained. Participants answered questions about the concepts.

**Results:** In the total population 887/1102 (80%) watched  $\geq 30$  seconds with an average duration of 149/164 seconds (91%), significantly above the pre-specified outcome percent ( $p < 0.0001$ ). In the MS Register population 757/959 (78.9%) pwMS had total understanding (4/4 concepts) versus 29/42 (69%) in pwMS from outpatients and 136/149 (91%) in the general population. Understanding in all cohorts were significantly above the expected outcomes ( $p < 0.0001$ ) with significantly greater understanding in the general population compared to pwMS ( $p < 0.0001$ ).

**Conclusion:** As part of a preventative medicine strategy, a short, targeted film can successfully convey the importance of early intervention to both pwMS and a general audience.

**Disclosure:** R Nicholas is funded by the Imperial Biomedical Research Centre (BRC) and R Nicholas and D Wilkie are funded by Multiple Sclerosis Trials Collaboration (MSTC).

## EPO3216

**Exacerbations of Multiple Sclerosis during pregnancy**

T. Yakushina, S. Kotov, V. Lizhdvoy  
Moscow, Russian Federation

**Background and aims:** According to Confavreux (1998), the frequency of exacerbations of multiple sclerosis (MS) during pregnancy is significantly reducing. The reason for this is accompanied by immunosuppression immune and hormonal change in the body of a woman during pregnancy.

**Methods:** 173 pregnant women suffering from MS were examined. Before pregnancy 119 women received disease-modifying therapy (DMT): glatiramer acetate – 70 people, interferons - 42 women, fingolimod - 3 patients, cladribine – 2 people, natalizumab – 2 patients.

**Results:** Exacerbations of MS confirmed clinically and by MRI data were registered for 24 pregnant women. Exacerbation occurred in the I trimester of pregnancy for 12 patients, for 6 – in the II trimester, for 6 women in the III trimester of pregnancy. Among them 13 people (3 – glatiramer acetate, 8 - interferon  $\beta$  1-b, 1 - fingolimod, 2 - natalizumab) received therapy with DMT before pregnancy, 9 women did not receive therapy. For women receiving drugs of the II line of therapy (aggressive course), exacerbations were registered in 60% of cases. The patient receiving fingolimod therapy before pregnancy had 3 exacerbations: one in each trimester. All patients received corticosteroid therapy from 5000 to 7000mg per course. 23 patients after exacerbation and corticosteroid therapy had healthy children. According to ultrasound procedure pathologies were not revealed.

**Conclusion:** Management of pregnancy and childbirth for MS patients does not differ from those of the general population. More often exacerbations occur for women who have not previously received DMT and with the initially aggressive course of the disease.

**Disclosure:** Nothing to disclose

## EPO3217

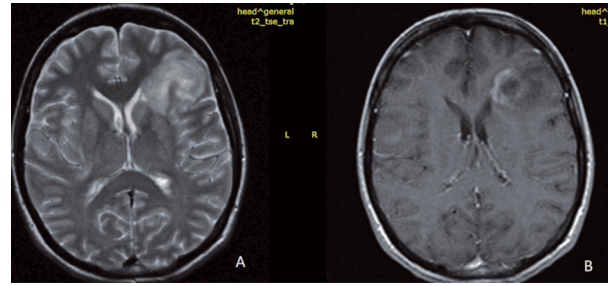
### Levamisole-Induced Leukoencephalopathy in Russian Population: 24 cases

I. Zakroyshchikova<sup>1</sup>, E. Zhirva<sup>1</sup>, L. Askarova<sup>1</sup>, A. Moroz<sup>1</sup>, N. Stoyda<sup>1</sup>, M. Zakharova<sup>1</sup>, R. Konovalov<sup>2</sup>  
<sup>1</sup>Research Center of Neurology, Moscow, Russia, Moscow, Russian Federation, <sup>2</sup>Radiology, Research Center of Neurology, Moscow, Russian Federation

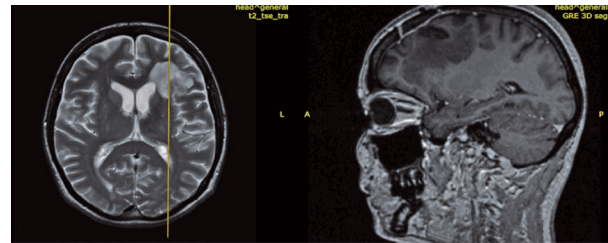
**Background and aims:** Levamisole is a synthetic imidazothiazole derivative that has been used as an antihelminthic agent since 1970s. Due to its immunomodulatory effect that includes T-cell activation and proliferation as well as macrophage and neutrophil function increase it is also used in several inflammatory and malignant conditions treatment. Demyelinating leukoencephalopathy is a severe complication of levamisole use.

**Methods:** A single-center retrospective analysis of 24 levamisole-induced leukoencephalopathy cases medical history, clinical presentation, brain MRI, and CSF analysis was performed.

**Results:** All patients had a history of levamisole use as an anthelmintic 1–4 weeks prior to the symptoms onset. The dose range was of 50–150mg. The female:male ratio was 16:8, the mean age of symptoms onset was 47.2±11.4 years. The presenting symptoms are shown in the Figure 1. CSF analysis was available in 6 patients, with normal CSF pattern polyclonal IgG in 3 patients, oligoclonal bands in CSF with normal serum pattern in 2 patients, and common oligoclonal bands both in serum and CSF in 1 patient. Lymphocytic pleocytosis up to 107/3 cells was found in 5 patients and mild increase of protein level up to 0.6g/l was found in 3 patients. All brain MRI were abnormal with hyperintense T2 and FLAIR lesions, some lesions hypointense on T1, and all lesions enhancing contrast (Figure 2). Follow-up MRI showed decrease of lesions volume and ring-like or total regression of contrast enhancement (Figure 3).



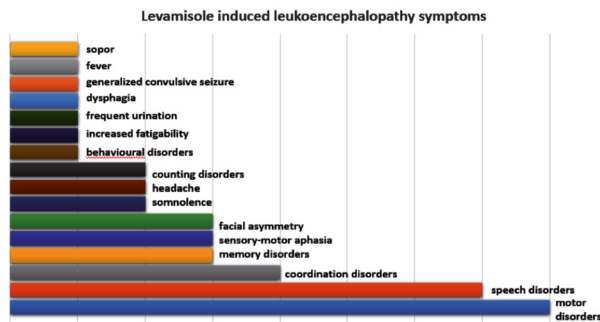
Brain MRI with hyperintense T2 and FLAIR lesions and all lesions enhancing contrast in T1



Follow-up MRI

**Conclusion:** Due to potential severe complications associated with immunomodulatory effect, levamisole use as an antihelminthic is not recommended.

**Disclosure:** Nothing to disclose



Levamisole induced leukoencephalopathy symptoms

## EPO3218

**Is OCT a real marker of neurodegeneration in MS?**

O. Zheshko<sup>1</sup>, O. Shulga<sup>1</sup>, O. Yurko<sup>1</sup>, M. Dubinets<sup>1</sup>, I. Vydoborets<sup>2</sup>

<sup>1</sup>Department of Neurology, Volyn Regional Clinical Hospital, Lutsk, Ukraine, <sup>2</sup>Department of Radiology, Volyn Regional Clinical Hospital, Lutsk, Ukraine

**Background and aims:** The search for reliable and inexpensive method of evaluation of neurodegeneration in MS is still ongoing.

The purpose of the study was to evaluate the changes of the retinal nerve fiber layer (RNFL) thickness within 4 years of observation by optical coherence tomography (OCT) and to compare it with cortical thickness of the brain.

**Methods:** Prospective study was conducted from January 2016 to January 2020. The OCT and MRI were performed once per year. 30 treatment naive patients (10 males and 20 females) with average age  $45.13 \pm 7.23$  years, average duration of the disease  $12.67 \pm 4.99$  years with a relapsing-remitting course of the disease according to McDonald 2010 criteria were involved in this study. Statistical analysis was performed using Microsoft Excel. Following characteristics were included: the severity of disease by the EDSS, average thickness of RNFL, thickness of the gray matter by linear measurement in T2-weighted images in upper frontal, pre-central, postcentral, occipital gyri in the both hemispheres.

**Results:** According to the obtained data, atrophic processes on the RNFL were observed withing 4 years of observation ( $r=0.65$ ,  $p=0.02$ ). No significant difference was observed between disability (EDSS step) and RNF thickness as well cortical thickness

Degenerative process of the brain cortex was observed in right postcentral ( $p=0.03$ ), left postcentral ( $p=0.02$ ) and left occipital gyri ( $p=0.03$ ).

**Conclusion:** Degenerative processes in MS pathiens occur in retina and brain cortex. However these 2 processes proceed independently. The 4-year period is not sufficient to determine the relationship between neurodegeneration on OCT and brain MRI.

**Disclosure:** Nothing to disclose

## EPO3219

**Effectiveness of dimethyl fumarate as first line therapy in MS patients**

D. Sałacińska<sup>1</sup>, A. Pogoda<sup>2</sup>, J. Żółkiewicz<sup>2</sup>, A. Stępień<sup>1</sup>

<sup>1</sup>Department of Neurology, Military Institute of Medicine, Warsaw, Poland, <sup>2</sup>Medical University of Warsaw, Warsaw, Poland

**Background and aims:** Interferon- $\beta$ , glatiramer acetate and dimethyl fumarate are 1st line of disease-modifying therapies in patients suffering from relapsing-remitting multiple sclerosis (RRMS). Currently, there are no precise guidelines for modifying treatment in this group of patients. The aim of this study was to evaluate and compare activity of multiple sclerosis 1 year before and 1 year after switching treatment from interferon- $\beta$  or glatiramer acetate to dimethyl fumarate.

**Methods:** 62 adult patients were included in this study, age 19-61 years. All of them had been initially treated with disease-modifying drugs (DMDs) by injection: interferon or glatiramer acetate. Analyses were done with SAS v.9.4 and Statistica, v.13.1.336.0.

**Results:** The most common reason for drug change in interferon- $\beta$  group were adverse effects or clinical ineffectiveness (55% of patients) and in glatiramer acetate - new lesions on MRI scans (60% of patients). We observed significantly lower incidence of adverse effects after switching therapy to DMF. Moreover, there was no statistically significant correlation between radiological relapses and EDSS score over entire time of our observation. Presented study shows a statistically significant decrease in radiological relapses as a consequence of changing treatment from glatiramer acetate to dimethyl fumarate ( $P=0.01$ ). Concurrently, switching from interferon to dimethyl fumarate reduced the number of clinical relapses ( $P=0.01$ ).

**Conclusion:** The results of our study show that altering the treatment from both interferon- $\beta$  and glatiramer acetate in patients with disease progression was beneficial for them. Further research is necessary to develop precise therapeutic guidelines regarding switching between first line DMDs.

**Disclosure:** Nothing to disclose

## Muscle and neuromuscular junction disease 3

### EPO3220

#### Different effects of cardiolipin and myristoyl-L-carnitine on the humane carnitine palmitoyltransferase II variants S113L, P50H and Y479F

B. Meinhardt<sup>1</sup>, L. Motlagh Scholle<sup>1</sup>, F. Seifert<sup>2</sup>, M. Pietzsch<sup>2</sup>, S. Zierz<sup>1</sup>

<sup>1</sup>Department of Neurology, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany, <sup>2</sup>Department of Pharmaceutical Technology and Biopharmacy, Institute of Pharmacy, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany

**Background and aims:** Muscle carnitine palmitoyltransferase II (CPT II) deficiency is associated with various mutations in *cpt2* gene. The recombinant CPT II variant S113L shows a reduced thermostability compared to the wild type (WT) and can be stabilized by myristoyl-L-carnitine (MC). In the present work, the variants P50H and Y479F have been characterized. Additionally, the effect of cardiolipin (CLP) on the 3 variants and the WT was analysed.

**Methods:** The enzyme activity of recombinant CPT II (WT, S113L, Y479F, P50H) was determined spectroscopically under different conditions. Nano differential scanning fluorimetry (nanoDSF) was used to investigate the protein stability.

**Results:** All CPT II variants showed normal activity. WT and Y479F showed stable activity at 1mg/ml at 30°C for 60min. However, activity of S113L and P50H strongly decreased to 60% and 0%, respectively. Increasing temperatures up to 42°C correlated with shorter half-lives of all variants compared to WT. Addition of CLP resulted in stabilisation of CPT II activity at various temperatures. This effect was less for the variants compared to WT. Addition of MC stabilized activities of WT and variants even more. This effect was least pronounced for P50H. The reduced thermostability of the variants, particularly that of P50H ( $\Delta T_m=10^\circ\text{C}$ ), was confirmed with nanoDSF.

**Conclusion:** All variants clearly differed in their thermostability. However, clinical symptoms were similar in all genotypes. The functional consequences of the stabilisation by CLP and MC in vivo remain open.

**Disclosure:** Nothing to disclose

### EPO3221

#### Non-dystrophic myotonias: clinical features and mutation spectrum of a large cohort of German patients

F. Montagnese<sup>1</sup>, N. Vereb<sup>2</sup>, D. Gläser<sup>3</sup>, K. Stahl<sup>4</sup>, B. Schoser<sup>2</sup>

<sup>1</sup>Munich, Germany, <sup>2</sup>Neurology, Friedrich-Baur Institute, LMU Munich Germany, Munich, Germany, <sup>3</sup>Institute of Human Genetics, Ulm, Germany, <sup>4</sup>Neurology, Friedrich-Baur-Institut, Department of Neurology, Ludwig-Maximilian University, Munich, Germany

**Background and aims:** Non-dystrophic myotonias (NDM) are clinically and genetically heterogeneous diseases caused by mutations in *CLCN1* and *SCN4A*. The study aim was to describe the clinical and genetic spectrum of NDM in the German population.

**Methods:** We retrospectively identified all patients with genetically confirmed NDM, diagnosed in our center in the past 25 years. The following data were analyzed: demographics, muscular symptoms, cardiac involvement, CK, EMG, genetic results, medications.

**Results:** 69 patients (age 44.8±14.8 years; 53.6% males) were included in the study. 47 patients had *CLCN1*-myotonia, 22 *SCN4A*-myotonia. The most frequent presenting symptom was myotonia in *CLCN1* (81%) and weakness in *SCN4A* (42%). With disease progression myalgia were present in 43% *CLCN1* and 44% *SCN4A*. Cardiac involvement was present in 15% of patients (8 *CLCN1* and 2 *SCN4A*). CK was normal in 69% of *CLCN1* and 62% of *SCN4A*, hyperCKemia was higher in *SCN4A* than *CLCN1* (1268±837U/L vs. 374±110U/L). EMG detected myotonic runs in 89% of *CLCN1* and 74% of *SCN4A* patients without cooling test. 42% of *CLCN1*-myotonia had the common c.2680C>T (p.Arg894X) mutation. 7 new mutations were identified. 39/69 patients were taking anti-myotonic drugs; half of the patients had previously tested an average of 3 anti-myotonic drugs without satisfactory results.

**Conclusion:** The clinical features of our cohort were comparable to literature data, however the prevalence of cardiac involvement requires further investigation. The mutation spectrum was similar to the Scandinavian patients, furthermore 7 new mutations were found. Besides this genetic heterogeneity, the limited response to anti-myotonic drugs also constitutes a challenge for clinicians.

**Disclosure:** Nothing to disclose

## EPO3222

### 3 individuals with mutation in exon 1f of PLEC and myasthenic phenotype

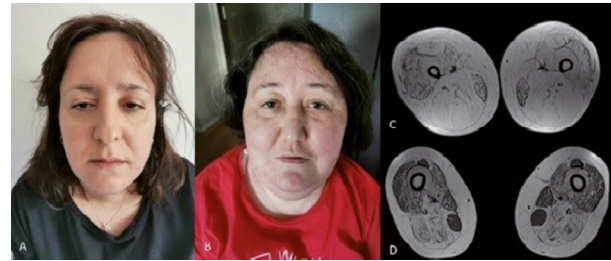
M. Mroczek<sup>1</sup>, H. Durmuş<sup>2</sup>, A. Topf<sup>1</sup>, J. Duff<sup>1</sup>, Y. Parman<sup>2</sup>, V. Straub<sup>1</sup>

<sup>1</sup>Newcastle University and Newcastle Hospitals NHS Foundation Trust, John Walton Muscular Dystrophy Research Centre, Translational and Clinical Research Institute, Newcastle upon Tyne, United Kingdom, <sup>2</sup>Istanbul Faculty of Medicine, Istanbul University, Department of Neurology, Istanbul, Turkey

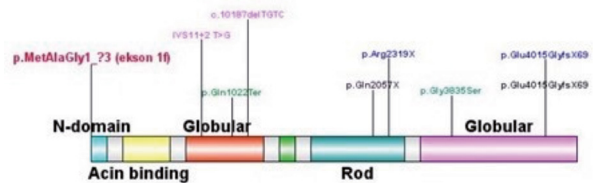
**Background and aims:** Plectin (PLEC) is one of the largest proteins and consists of the N-terminal domain encoded by multiple short exons undergoing alternative splicing and a constant C-domain. PLEC 1f plays an important role in stabilizing the neuromuscular junction (NMJ). We identified a recessive known c.1\_9del PLEC gene mutation, which was previously associated with limb girdle muscular dystrophy 17 (LGMD17R) in 3 females displaying LGMD and myasthenic phenotype.

**Methods:** Exome sequencing was performed at the Broad Institute's Genomics Platform, using Illumina exome capture on a cohort of >1800 patients with limb girdle muscle weakness as part of the MYO-SEQ Project. DNA samples were submitted to the Newcastle MRC Centre Biobank for Neuromuscular Diseases (ethical approval number 08/H0906/28).

**Results:** We identified a recessive known c.1\_9del PLEC gene mutation containing an initiation codon in exon 1f in 3 females from consanguineous families. The patients were not related, but from the same geographical region by the Black Sea in Turkey. All individuals presented with slowly progressive limb girdle muscular dystrophy without any dermatologic component, calf pseudohypertrophy and dystrophic changes observed in muscle biopsy. Additionally, neurological examination revealed ptosis, facial weakness easily fatigability and muscle cramps in all 3 cases. In 1 patient a repetitive nerve stimulation showed a borderline decrement and a slight improvement under the treatment with salbutamol was observed in all three individuals.



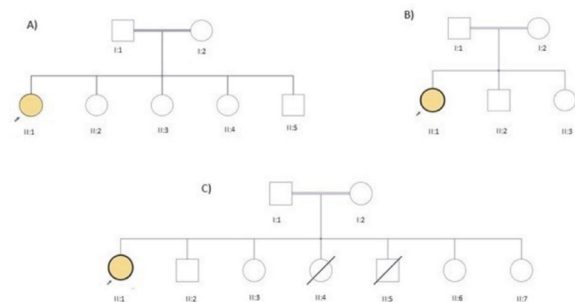
A) and B) Ptosis and facial weakness C) and D) Transformation of the adductor magnus, adductor longus, biceps, semitendinosus and semimembranosus muscles. Sparing of sartorius and gracilis muscles.



Location of PLEC mutations associated with myasthenic phenotypes. Identified by us mutation c.1\_9del in red.

**Conclusion:** We further characterize LGMD R17 plectin-related phenotype in terms of myasthenic symptoms and muscle MRI. Our findings support the hypothesis of a crucial role of plectin 1f isoform in NMJ.

**Disclosure:** MYO-SEQ was funded by Sanofi Genzyme, Ultragenyx, the LGMD2I Research Fund, Samantha J Brazzo Foundation, the LGMD2D Foundation, the Kurt+Peter Foundation, Muscular Dystrophy UK, and the Coalition to Cure Calpain 3.



Pedigrees of 3 c.1\_9del PLEC individuals.

## EPO3223

### 5-year prospective study of quality of life in patients with myotonic dystrophy type 2

A. Palibrk, S. Peric, A. Cocic, I. Bozovic, I. Basta, D. Lavrnjic, V. Rakocevic Stojanovic  
*Neurology Clinic, Clinical Center of Serbia. Faculty of Medicine, University of Belgrade, Belgrade, Serbia*

**Background:** Although myotonic dystrophy type 2 (DM2) is clinically milder than DM1, quality of life (QoL) is similarly impaired in these 2 disorders. There are no prospective studies that assessed QoL in DM2.

**Aim:** To determine QoL in patients with DM2 during a 5-year follow-up period.

**Methods:** Study comprised 49 DM2 patients at baseline. After 5 years, 7 of them died, 8 were lost to follow-up, 2 developed another disease, 1 moved to another country, and 1 refused to be tested. Thus, SF-36 and INQoL questionnaires were administered in 30 patients at baseline (47% males, 49±10 years old, disease duration 13±11 years) and at follow-up (54±10 years old).

**Results:** After 5-year follow-up, none of the subscales on SF-36 and INQoL questionnaire differed compared to baseline testing ( $p>0.05$ ). Percentage of deceased was higher among males compared to females (42% vs. 7%,  $p<0.01$ ). Muscle strength was better in survivors ( $p<0.01$ ). Following SF-36 subscales were worse at baseline in patients who later died: physical functioning, general health, social functioning, mental health, physical and mental composite scores and SF-36 total score ( $p<0.01$ ). INQoL activities subscore was worse in non-survivors ( $p<0.01$ ). Independent predictors of lethal outcome were male gender and INQoL activities score ( $\beta=0.41$  and  $\beta=-0.39$ , respectively; R square adjusted=0.35).

**Conclusion:** SF-36 and INQoL questionnaire did not show good responsiveness in DM2 patients during a 5-year follow-up period. INQoL activities score may be considered as a predictor of the lethal outcome in DM2.

**Disclosure:** Nothing to disclose

## EPO3224

### Myasthenia gravis associated with other autoimmune diseases - what we found out from our clinical practice?

I.E. Petre<sup>1</sup>, M. Marian<sup>1</sup>, A. Dulamea<sup>1</sup>, C. Banica<sup>1</sup>, V. Boscaiu<sup>2</sup>

<sup>1</sup>Neurology, Fundeni Clinical Institute, Bucharest, Romania,

<sup>2</sup>Statistics, Institute of Mathematical Statistics and Applied Mathematics of Romanian Academy „Gheorghe Mihoc - Caius Iacob”, Bucharest, Bucharest, Romania

**Background and aims:** Autoimmune diseases (AD) are chronic conditions caused by the loss of immunological tolerance to self-antigens. Recent epidemiological studies have shown a possible shift of one AD to another or the fact that more than 1 AD may coexist. Myasthenia Gravis (MG) is an autoimmune neuromuscular disease, caused by antibody mediated activity that lead to a reduction of acetylcholine at the neuromuscular junction. Extensive literature search did not reveal many case reports of an association between MG and other autoimmune diseases, so our goal is to highlight it and it's possible clinical implications.

**Methods:** This is a retrospective and observational study with a lot of 51 patients divided in 2 groups (by blood tests and imaging explorations): MG vs associated AD.

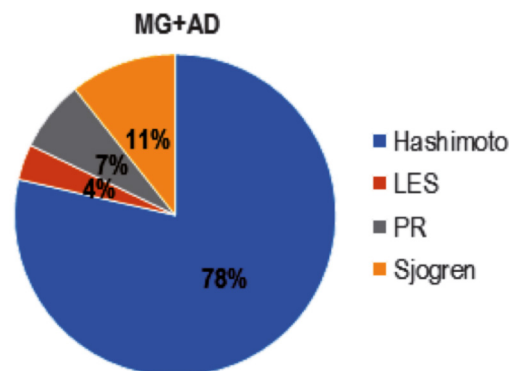


Fig. 1: Autoimmune disease association

**Results:** In our group of 51 patients with MG, other AD were associated in 49% of cases. The most prevalent one was Hashimoto's thyroiditis followed by Sjogren, rheumatoid polyarthritis and systemic lupus erythematosus. There was a female predominance. In both groups the majority of patients had generalized type of MG (96%) with ocular onset (68% vs 50%). On the other hand in the AD group there were more patients with spinal onset than in the other group (23% vs 16%) with an average myasthenia gravis deficit score (QMG) of 8.5 (vs 9.87), most of them with QMG below 10 points (59%). There were more tymectomies in the AD group (48% vs 38%).

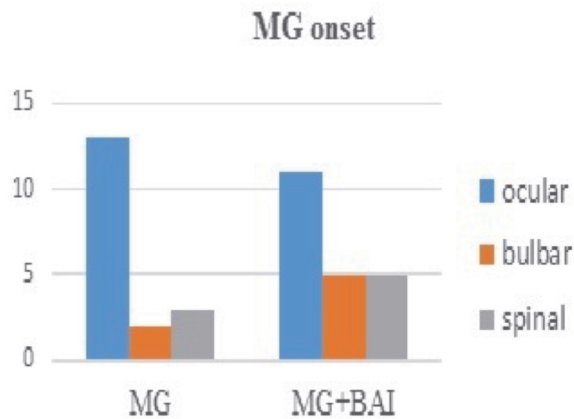


Fig.2: Myasthenia gravis onset

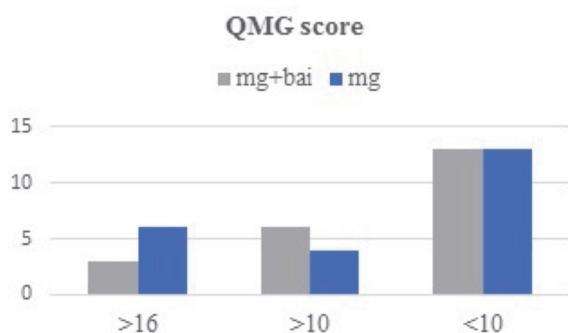


Fig.3: QMG score

**Conclusion:** Screening for AD should be done in everyday practice at patients with an MG, because of the greater risk of developing another AD disease and its clinical implications.

**Disclosure:** Nothing to disclose

## EPO3225

### King Denborough syndrome-myopathy with dysmorphic features suggesting risk of malignant hyperthermia.

J. Żelewska<sup>1</sup>, A. Potulska-Chromik<sup>1</sup>, A. Wójcicka<sup>2</sup>, A. Kostera-Pruszczyk<sup>1</sup>

<sup>1</sup>Department of Neurology, Medical University of Warsaw, Warsaw, Poland, <sup>2</sup>Warsaw Genomics, Warsaw, Poland

**Background and aims:** King Denborough syndrome (KDS) is a rare, genetic disease characterized by a susceptibility of malignant hyperthermia (MH), myopathy and variable dysmorphic features including short stature, lumbar lordosis, thoracic kyphosis, pectus carinatum, cryptorchidism. Disease is predominately associated with various mutations in RYR1- that encodes a ryanodine receptor. Product of this gene plays a relevant role in excitation- contraction coupling and its disorders are associated with several neuromuscular diseases (MH, central core disease, minicore myopathy).

**Methods:** We present 2 patients with characteristic phenotype accompanied by myopathy.

Patient 1 is 4.5y old boy with delayed motor development, characteristic dysmorphic features, elevated CK (max. 422 U/l, normal range 39-308U/l). His muscle MRI showed features of asymmetrical atrophy and fat degeneration in the proximal muscles of lower limbs.

Patient 2: 3.5y old boy with motor (started to walk at the age of 30 months) and speech delay. The neurological examination revealed predominant lumbar lordosis and hyperextension of knees, hypoplastic mandible and significant muscles hypotonia. CK was normal.

**Results:** Patient no 1 NGS revealed heterozygous change in RYR1 gene (c.11933G>A; p.Arg3978His). Genetic test analysis in patient no 2 indicated 2 heterozygotic variants of unknown pathogenicity c.4178A>G and c.13644+105C>T in RYR1 gene.

**Conclusion:** Considering the severity of MH, children with myopathy and characteristic dysmorphic features should be suspected of KDS. The RYR1 test should be performed at the beginning of diagnostic process and before any surgery with general anesthesia, especially those performed in case of KDS for cryptorchidism and skeletal deformities.

**Disclosure:** Sanofi Grant

## EPO3226

### Different alterations in DMD gene in 62 Russian children with Duchenne muscular dystrophy as a result of a two-stage molecular genetic analysis

A. Pushkov, K. Savostyanov, L. Kuzenkova, A. Kurenkov, T. Podkletnova, N. Zhurkova, A. Alexeeva, D. Sladkov, A. Pakhomov, L. Pak, A. Fisenko  
*FSAI National Medical Research Center for Children's Health, Moscow, Russian Federation*

**Background and aims:** Duchenne muscular dystrophy (DMD) is a rare muscle disorder inherited by X-linked recessive type and affecting approximately 1 in 3,500 male births worldwide.

**Methods:** The study included 73 boys, aged from 3 months to 11 years with elevated creatinine phosphokinase (CPK), according to laboratory tests. After medical genetic counseling molecular genetic analysis was performed for all patients. The MLPA method was used to detect large deletions and duplications in the DMD gene, the analysis of point mutations was carried out by next generation sequencing (NGS), if the MLPA method did not reveal pathogenic variants.

**Results:** Totally, in all 62 patients we revealed different alterations in DMD gene. Among them 36 (58%) patients had gross deletions and 4 (6%) had gross duplications in the DMD gene. Interestingly, more than half of the patients had deletions in the region of exons 45-51 of the DMD gene. The remaining 22 (36%) patients had point mutations which were revealed by NGS. It was 12 nonsense, 5 splicing mutation, 3 small deletions and 2 small duplication. Among point mutations 8 (36%) were novel.

**Conclusion:** Our study showed the high efficiency of the 2-stage molecular genetic diagnosis algorithm, while revealing a large percentage of novel point mutations in Russian patients with Duchenne muscular dystrophy.

**Disclosure:** Nothing to disclose

## EPO3227

### 27 years of molecular diagnosis of dystrophinopathies by multiplex PCR in Morocco

Y. Selouani, Y. El Kadiri, I. Ratbi, J. Lyahyai, F.-Z. Laarbi, A. Sefiani, A. Sbiti  
*Département de génétique médicale, Institut National d'Hygiène, Agdal, Rabat, Morocco*

**Background and aims:** Dystrophinopathies, X-linked recessive disorders, are the most common genetic neuromuscular disorders during childhood. They gather 2 phenotypes of different severity; Duchenne Muscular Dystrophy (DMD, MIM#310200) and Becher Muscular Dystrophy (BMD, MIM#300376). These diseases are caused by a large spectrum of heterogeneous mutations in the dystrophin gene on the Xp21.2 chromosome. Deletions involving the Dystrophin (DMD) gene are the most common underlying cause of these disorders, representing 68% of mutations. The goal of this study is to determine the frequency of different deletions of the DMD gene in Moroccan patients.

**Methods:** We analyzed the data of 365 male Moroccan patients suspected for dystrophinopathies, seen in our department between November 1992 and January 2019. These patients were screened for deletion of the Dystrophin (DMD) gene using a multiplex polymerase chain reaction (PCR).

**Results:** Among the 365 patients screened, 159 (43.5%) had a deletion of the DMD gene. Deletions spanning 1 exon made up 29% of deletions. Followed by 3-exon deletions (19%) and the rest of deletion types <10% each. 91% of deletions were in 1 of the known mutation hotspots. 73% of the deletions were found in the 5' hotspot (Exon 44 to Exon 52), 18% were located on the 3' hotspot (Exon 3 to Exon 19) and only 6% of deletions spanned both hotspots.

**Conclusion:** We report here our experience in the molecular diagnosis of dystrophinopathies by the multiplex PCR technique. It is a good first-line strategy in our public health due to its low- cost with a good cost-to-benefit ratio.

**Disclosure:** Nothing to disclose



## EPO3228

**International standards of care for Duchenne muscular dystrophy implementation in Ukraine**

V. Svystilnyk  
Kiev, Ukraine

**Background and aims:** It is known that Duchenne muscular dystrophy (DMD) is an X-linked recessive disorder that affects 1:3,500-1:5,000 live male births in the world. According to statistic dates, 226 patients with DMD were registered in 2018 in Ukraine. When the population consisted 42 million 249 thousand. Taking into consideration that not all patients have already been examined by genetic testing, we have decided to improve diagnostics and treatment DMD in our country according to International standards of care.

**Methods:** Nowadays we have been continuing to create medical centres for DMD patients in Ukraine. The multidisciplinary team which is working in the centre gives DMD patients a comprehensive care. It includes functional assessment for ambulatory and non-ambulatory patients, respiratory function measurement, corticosteroid therapy; prevention scoliosis and contractures, management of contractures with stretches and with orthotics. We applied clinical, neurophysiologic, laboratory methods and genetic techniques: multiplex ligation-dependent probe amplification (MLPA) and next generation sequencing (NGS).

**Results:** We have examined new 33 DMD patients. Delayed motor milestones, calf pseudohypertrophy, toe walking, Gower's sign have been found during a neurological examination. 23 deletions, 4 duplications have been identified. Moreover, 6 nonsense mutations have been found. Every patient started to receive physiotherapy and corticosteroid therapy after his motion functional assessment. Consequently, the disease-modifying therapy (ataluren) has been prescribed for the patients with confirmed DMD nonsense mutation.

**Conclusion:** The application of the International standards of care for DMD patients in Ukraine is important step to fill in the gap in diagnostics and support of the DMD patients.

**Disclosure:** Nothing to disclose

## EPO3229

**Serum immunoglobulin free-light chains in myasthenia gravis: a biomarker of B-cell activity?**

D. Vecchio<sup>1</sup>, I. Crespi<sup>2</sup>, O. Rena<sup>3</sup>, N. Clemente<sup>4</sup>,  
U. Dianzani<sup>5</sup>, C. Comi<sup>6</sup>, R. Cantello<sup>6</sup>

<sup>1</sup>Novara, Italy, <sup>2</sup>Clinical Chemistry Laboratory, University of Eastern Piedmont, Novara, Italy, <sup>3</sup>University of Piemonte Orientale, Novara, Italy, <sup>4</sup>Department of Health Sciences, University of Piemonte Orientale, Novara, Italy, <sup>5</sup>Interdisciplinary Research Center of Autoimmune Diseases, University of Piemonte Orientale, Novara, Italy, <sup>6</sup>Institute of Neurology, University of Eastern Piedmont, Novara, Italy

**Background:** Autoreactive B-cells produce excess of free-light chains (FLC) during immunoglobulin synthesis excreted by kidneys with a half-life of 2-6 hours. Increased FLC serum levels could be considered a marker of B-cells activity. Myasthenia gravis (MG) is an autoimmune disease affecting the neuromuscular junction mainly mediated by antibodies (Abs) against the acetylcholine receptor (AChR). The clinical presentation is variable and not related to Ab level.

**Aims:** To evaluate serum kappa and lambda FLC in AchR-MG at disease onset according to a possible role as biomarkers of disease activity.

**Methods:** We assessed serum FLC levels (by nephelometry) from 20 AChR-MG patients in comparison with 20 multiple sclerosis (MS) and 10 healthy controls (HC). The following demographic and clinical features were collected at MG diagnosis: age and gender, symptom-onset (according to MG Foundation of America classification), neurophysiological results, AchR-Ab level (evaluated with enzyme-linked immunosorbent assay) and disease severity (according to Osserman).

**Results:** We found a statistically significant increase in kappa and lambda FLC in AChR-MG patients in comparison to MS and HC. None of the demographic and clinical features we collected related to FLC levels.

**Conclusion:** Kappa and lambda FLC resulted a sensitive marker of AchR-MG. Further investigations are need to evaluated their role as biomarkers of disease activity.

**Disclosure:** Nothing to disclose

## EPO3230

**Magnetic Resonance Imaging (MRI) in Periodic Paralysis**

V. Vivekanandam<sup>1</sup>, J. Morrow<sup>1</sup>, E. Matthews<sup>1</sup>, S. Shah<sup>2</sup>, T. Yousry<sup>2</sup>, M. Hanna<sup>1</sup>

<sup>1</sup>MRC Centre for Neuromuscular Diseases, ION, London, United Kingdom, <sup>2</sup>Neuromuscular MRI Research Group, UCL Institute of Neurology, London, United Kingdom

**Background and aims:** Periodic paralysis (PP) consists of 3 conditions (hypokalaemic periodic paralysis, hyperkalaemic periodic paralysis and Andersen Tawil Syndrome). To date, very few small studies describe neuromuscular MRI changes in these groups. Characterising MRI changes may provide a biomarker for future trials and insight into pathogenesis

**Aims:** 1. Define the presence, frequency and pattern of lower limb neuromuscular MRI abnormalities in patients with genetically proven PP.

2. Describe differences in MRI abnormalities in the subsets.  
3. Describe longitudinal changes.

**Methods:** Ethics approval was attained from the Joint National Hospital for Neurology and Neurosurgery (NHNN) Research Ethics Committee. Patients with genetically proven PP underwent scans after review at the Muscle Channelopathy service at the NHNN. 38 muscles per scan were scored using the Modified Mercuri semi-qualitative scale by a blinded Neuromuscular Radiologist. 10% of scans were reviewed by a 2nd blinded Neuromuscular Radiologist with a subsequent consensus meeting. Clinical data was retrospectively collated from electronic medical records.

**Results:** There were a total of 77 scans. 20 patients had longitudinal imaging. Analysis is ongoing. Analysis to date, suggests that distinct changes exist consisting predominantly of fatty infiltration. Changes are more marked in the thighs over calves, and are most severe in patients with hypokalaemic PP. Atrophy is seen in patients with sodium channel mutations. Qualitative patterns suggest posterior compartment predominance and pelvic muscle involvement.

**Conclusion:** This will be the largest review of neuromuscular MRI in patients with PP. There are definite STIR signal and fatty infiltration changes in patients with periodic paralysis with differences between subsets.

**Disclosure:** Nothing to disclose

## EPO3231

**Frequency of myoedema in patients with muscular disorders**

S. Xirou, G. Papadimas, P. Dimopoulou, E. Kararizou, C. Papadopoulou

<sup>1</sup>st Department of Neurology, Medical School, National and Kapodistrian University of Athens. Athens, Greece, Athens, Greece

**Background and aims:** Myoedema is the short local ridge that is observed immediately after muscle percussion. It was 1st described in 1871 by Tait L. in patients with tuberculosis but it is not correlated to any specific neurological condition. As far as its clinical significance is concerned, myoedema is an electrically silent physiological phenomenon which is not indicating a neuromuscular disorder.

**Methods:** 891 individuals were included retrospectively in the study. The aim was to record the frequency of this phenomenon among patients with different muscular disorders and to evaluate its correlation with some specific entities.

**Results:** Myoedema was found in 60 patients out of 891 (6.7%) in biceps brachii muscle. Nine of them (15%) were excluded since they did not complete the diagnostic examinations. As far as the group that myoedema was revealed is concerned, the most frequent diagnosis were asymptomatic hyperckemia 13/60 (21.6%), LGMD (LGMDD1, LGMDD3, LGMDR2) 10/60 (16.6%), myotonic Dystrophy type 1 and 2, 4 (6.6%), FSHD1, 2 (3.3%), Autoimmune inflammatory myopathy 2 (3.2%), other myopathies 3/60 (5%), other primary muscle disorders 2/60 (3.2%) whereas 6/60 (10%) patients had evidence of myopathy in biopsy but not specific diagnosis could be made. In 8.3% (5/60) myoedema was not due to primary muscle disorder.

**Conclusion:** Myoedema is a nonspecific clinical sign that can be observed in various diseases. It is not pathognomonic of a disease and the exact pathophysiological mechanism is not yet known. It is thought to be the result of local mechanical irritation of the muscle fibers and probably Ca<sup>2+</sup> concentration plays a key role.

**Disclosure:** Nothing to disclose

## EPO3232

### The detection of intention for finger moving with machine learning on myotonic dystrophy type 1.

K. Yoshida, Y. Suzuki, K. Kuroda, T. Kimura  
Neurology, Asahikawa Medical Center, Asahikawa, Japan

**Background and aims:** The premotor potential reflects motor planning. Myotonic dystrophy patients in the advanced stage show the difficulty of communication. We investigated the efficacy of electroencephalogram and machine learning about detecting the intention for finger moving in myotonic dystrophy type 1 patient.

**Methods:** The task was to push the key with the right index finger with an auditory signal every 10 seconds. The control was the auditory signal only. Each task repeated 100. Electroencephalogram divided into epochs that include one 2nd before the signal. We constructed the classifier with a support vector machine. We evaluated a voting classifier which made from some classifiers. The voting classifiers consisted of 2 ways. The 1st includes 4 channels that showed the best performance as the best channel classifier. The 2nd constructed from fixed channels that Fp1, Fp2, C3, and C4 as the fixed classifier.

**Results:** 3 patients participated. We selected 4 channels for each patient and constructed the best channel classifier. The sensitivity and specificity with these classifiers were 1.0 and 0.93 on case 1, 1.0 and 0.94 on case 2 and 1.0 and 0.86 on case 3 (table1). The sensitivity and specificity with the fixed classifiers were 1.0 and 1.0 on case1, 1.0 and 1.0 on case2 and 1.0 and 0.90 on case 3 (table2). The fixed classifiers did not show good performance for the other.

		Case 1	Case 2	Case 3
Case 1	Sensitivity	1.0	0.36	0.36
	Specificity	1.0	0.35	0.59
Case 2	Sensitivity	0.29	1.0	0.36
	Specificity	0.62	0.93	1.0
Case 3	Sensitivity	0.61	0.36	1.0
	Specificity	0.31	0.54	0.86

table1. The best channel classifier

		Case 1	Case 2	Case 3
Case 1	Sensitivity	1.0	1.0	1.0
	Specificity	1.0	1.0	0.77
Case 2	Sensitivity	0.68	1.0	1.0
	Specificity	0.41	1.0	1.0
Case 3	Sensitivity	1.0	0.0	1.0
	Specificity	0.89	0.67	0.89

table2. The fixed classifier

**Conclusion:** This study demonstrated the usefulness of Electroencephalogram for detecting premotor signals in myotonic dystrophy type 1 patient.

**Disclosure:** Nothing to disclose

## EPO3233

**Clinical And Genetic Characteristics of Bethlem Myopathy Patients from Turkey**

G. Yunisova<sup>1</sup>, S. Ceylaner<sup>2</sup>, F. Deymeer<sup>1</sup>, P. Oflazer<sup>1</sup>,  
H. Durmuş<sup>1</sup>, Y. Parman<sup>1</sup>

<sup>1</sup>Department of Neurology, Istanbul University, Istanbul Faculty of Medicine, Istanbul, Turkey, <sup>2</sup>INTERGEN Genetics and Rare Diseases Diagnosis Research & Application Center, Istanbul, Turkey

**Background and aims:** Collagen VI related myopathies are the rare hereditary disorders characterized by early contractures, slow progressive proximal muscle weakness and skin involvement. The most common groups are Bethlem myopathy (BM) and Ullrich congenital muscular dystrophy (UCMD). BM usually begins in the 1st 2 years and shows generally AD inheritance.

**Methods:** Herein, we evaluated clinical and genetic findings of 9 patients from 9 unrelated families diagnosed with BM at the Department of Neurology, Istanbul Faculty of Medicine between 1989-2018.

**Results:** 4 of them were sporadic cases whereas 5 patients were autosomal recessive. The mean onset age was 5.9±2.6 years. The most common initial signs were waddling gait with difficulty climbing stairs and standing up from a squatting position. The distribution of the contractures was in both-the proximal and distal joints, most significantly elbow, knee, wrist and finger joints. Deltoid, biceps, triceps, gluteus maximus, iliopsoas and hip adductors muscles were most severely affected muscles. Rigid spine and scoliosis (3/9), gastrocnemius hypertrophy (3/9), gluteus maximus atrophy (4/9) and keloid scar (2/9) were noted. MRI findings showed fatty atrophy in the gluteus maximus with partial preservation of the gracilis and sartorius muscles (5/6), 'sandwich sign' in vastus lateralis (3/6) and 'central shadow' sign in rectus femoris (1/6) muscles. 9 mutations were found in Col6A1/Col6A2/Col6A3 genes, 5 of them (c.838G>T;c.901-1G>C;c.8377\_8379delGTC,C.955-10C>7; c.2092\_2097delGCGGGCinsACAGGT) were novel. Splicing site mutations were common in our cohort. The most frequently mutated gene was COL6A3 in BM patients from Turkey.

**Conclusion:** Our study indicated genotypic and phenotypic heterogeneity of collagen VI related myopathies in Turkey and revealed novel mutations.

**Disclosure:** Nothing to disclose

## Neurogenetics 2

EPO3234

**Withdrawn**

EPO3235

**Clinical cases of MELAS in adult neurological practice: rare disease with own rules**

V. Goldobin, E. Klocheva, N. Tertyshnaya  
*Neurology, NWSMU n.a. I.I.Mechnikov, StPetersburg, Russian Federation*

**Background and aims:** Mitochondrial encephalomyopathy with lactic acidosis and stroke-like episodes (MELAS) is rare inherited mitochondrial disease with variety of manifestations. Mostly often cause of MELAS is missense mitochondrial DNA (mtDNA) mutation (m.3243A>G) in MT-TL1 gene encoding mitochondrial transfer RNAs for leucine.

**Methods:** 2 patients with MELAS (age 18; male and female) were managed into department due to recurrent episodes of stroke-like episodes, recurrent seizures, myopathy and lactic acidemia. In both patient diagnoses were made in childhood and confirmed by molecular-genetic investigation.

**Results:** Due to improvement in diagnostics and treatment patients with MELAS grow up and after 18 years age went from pediatric neurologists to adult neurology practice. Adequate management of 2 patients observed required multidisciplinary team: neurologist, cardiologist (cardiomyopathy), endocrinologist (hypothyroidism, hypogonadotropic hypogonadism), ENT specialist (sensorineural hearing loss), ophthalmologist (optic atrophy, pigmentary retinopathy), physical and occupational therapists. There is no evidence-based approach for treating such patients and usual principles of stroke management for MELAS stroke-like episodes are absolutely inapplicable, that make difficulty to stroke center neurologists. NO-production stimulation: L-arginine and citrulline; multimodal energy donors (neuromyoprotectors): idebenon, lipoic acid, succinic acid derivatives and L-carnitine administration in high dosage were successfully used in our patients with clear improvement of neurological manifestations.

**Conclusion:** Nowadays patients with MELAS are rare, but life expectancy of them increases therefore their number in adult neurology practice will increase also. Their management require multidisciplinary approach and administration of specific medicines, despite lack of their effectiveness evidence.

**Disclosure:** Nothing to disclose

EPO3236

**Novel mutation in DJ-1 (PARK7) gene in patients with Parkinson's disease**

E. Iakovenko, N. Abramycheva, S.N. Illarioshkin,  
 E. Fedotova  
*Neurogenetics, Research Center of Neurology, Moscow, Russian Federation*

**Background and aims:** Mutations in DJ-1 gene (PARK7) lead to early-onset autosomal recessive Parkinson's disease (PD) characterized by age of onset before 30 years, combination of motor and non-motor symptoms (psychosis, anxiety and cognitive impairment) and rapid progression. The pathogenic role of DJ-1 heterozygous mutations is still under discussion. More than 20 rare mutations in DJ-1 have been described, predominantly missense mutations and deletions, and PARK7 remains an extremely rare form of PD worldwide.

**Methods:** We present 2 sporadic cases of late-onset PD. In both cases we performed MLPA genetic testing.

**Results:** We found heterozygous duplication of DJ-1 exon 1, a mutation not previously described.

Patient R., female, 74-year-old, age at the disease onset 54 years, Hoehn-Yahr stage 2, treated with piribedil, exhibited rest and postural hand tremor, predominantly in the right hand, moderate left-sided bradykinesia and rigidity, and mild cognitive impairment. Treatment with L-dopa had significant positive effect on tremor.

Patient S., female, 55-year-old, age at the disease 53 years, Hoehn-Yahr stage 1, drug-naive, exhibited rest tremor in the left hand and the leg, slight left-sided bradykinesia and rigidity, anxiety and depression, without cognitive impairment. Treatment with L-dopa reduced tremor and bradykinesia.

**Conclusion:** These 2 patients carrying exon 1 duplication in DJ-1 gene are characterized by a mild disease course with slow progression of symptoms, tremor-dominant phenotype and good response to L-dopa treatment. We suggest that partial dysfunction of DJ-1 protein in heterozygous carriers of mutations leads to the development of the more benign form of PD.

**Disclosure:** Nothing to disclose

## EPO3237

**Genotype-Phenotype correlation in FTD: a rare GRN mutation identified in Italian Population**

D. Ippolito<sup>1</sup>, A. De Mase<sup>1</sup>, M. De Stefano<sup>1</sup>,  
D. Buonanno<sup>1</sup>, A. Giordano<sup>1</sup>, F. Trojsi<sup>1</sup>, M.P.M. Cirillo<sup>1</sup>,  
D. Ricciardi<sup>1</sup>, F. Matrone<sup>1</sup>, C. Femiano<sup>2</sup>,  
M.P.G. Tedeschi<sup>1</sup>, S. Esposito<sup>1</sup>

<sup>1</sup>Department of Medical, Surgical, Neurological, Metabolic and Aging Sciences, University of Campania "Luigi Vanvitelli", Naples, Italy, <sup>2</sup>Naples, Italy

**Background and aims:** Frontotemporal lobar degeneration (FTLD) defines a group of neurodegenerative brain disorders with predominant degeneration of frontal and/or temporal lobes<sup>1</sup>. Since the first demonstration of FTLD-associated progranulin gene (GRN) mutation<sup>2</sup>, over 150 GRN mutations were identified (82 pathogenic). We report the cases of 2 patients carrying the same frameshift mutation in exon 6 of GRN (c.468\_474del).

**Methods:** #Patient1

A right-handed 63-years-old man presented with a 1-year history of progressive attention deficit associated with apathy.

His mother received late onset Alzheimer's Dementia diagnosis (70aa). Mini-Mental State Examination (MMSE) score was 23.53/23.8; Frontal Assessment battery (FAB) and Aachen Aphasia test (AAT) highlighted no pathological alterations. Brain magnetic resonance imaging (MRI) showed left-frontal lobar atrophy. Patient was diagnosed with Behavioral variant of Frontotemporal Dementia (BvFTD)<sup>3</sup>. Given his family history, we performed the genetic analyses for GRN and microtubule-associated protein tau gene (MAPT) mutations, identifying mutation (c.468\_474del) of GRN.

**Results:** #Patient2

A right-handed 61-years-old woman presented with a 1-year history of a progressive speech impairment. She reported no significant familial history. MMSE score was 20.46/23.8; FAB 13.01/12. AAT showed deficits in naming, writing, and repetition. Brain MRI showed left-frontal and temporal lobes atrophy. The patient was diagnosed with Progressive Non Fluent Aphasia<sup>3</sup>. Given the early onset, we performed GRN and MAPT genetic examination and identified GRN mutation (c.468\_474del).

**Conclusion:** To date, according to our knowledge, GRN (c.468\_474del) mutation was not identified in the Italian population. Our cases highlight the heterogeneous spectrum of clinical presentations associated to this mutation.

**Disclosure:** Nothing to disclose

## EPO3238

**Adult-onset Krabbe disease presented with homonymous hemianopsia**

J.W. Jung<sup>1</sup>, J.K. Park<sup>2</sup>

<sup>1</sup>Neurology, Soon Chun Hyang University Hospital Gumi, Gumi, Korea, Republic of, <sup>2</sup>Neurology, Soon Chun Hyang University Hospital Cheonan, Cheonan, Korea, Republic of

**Background and aims:** Krabbe disease(KD) is an autosomal recessive lysosomal storage disease (LSD). According to deficiency of galactocerebrosidase, it causes demyelination in both central and peripheral nervous system. Adult-onset KD is very rare. We present a case of adult-onset KD with initially presented with visual disturbance.

**Methods:** A 58-year-old woman was visited our hospital for visual disturbance. She had no medical history. On examination, left-sided homonymous hemianopsia was found in visual field test. Her eye movements were normal. Other neurologic examinations were normal. Her other complaints were prolonged general weakness and hearing difficulty since childhood.

**Results:** Brain MRI revealed symmetric white matter high signal intensities in bilateral parieto-occipital lobes of T2, and callosal dysgenesis involving posterior body and splenium. Spine MRI was normal. Visual-evoked-potentials showed prolonged latencies and distorted shapes on bilateral side and nerve-conduction-studies of extremities were normal. Laboratory studies for metabolic disease were performed, and found that the activity of galactocerebrosidase was reduced (0.17umol/h/L). Genetic testing of GALC gene found homozygous c.1901T>C(p.Leu634Ser) variants.

**Conclusion:** Adult-onset KD often chronic and slowly progressive. Our patient showed no typical symptoms of KD, there were only visual disturbance. Her characteristic MRI findings have allowed us to suspect metabolic storage diseases. In adult-onset KD, MRI shows parietooccipital periventricular white matter and posterior corpus callosal signal changes.

We report an adult-onset KD unusually presented by visual disturbance for the 1st time in Korea. If MRI findings suggestive of metabolic disease with corticospinal tract involvement, clinicians need to further investigate the possibility of genetic variant of adult-onset LSD, including KD.

**Disclosure:** Nothing to disclose

## EPO3239

**The single – nucleotide – variant – susceptibility – map in Multiple sclerosis patients in polish population – pilot study.**

M. Chorazy<sup>1</sup>, N. Wawrusiewicz-Kurylonek<sup>2</sup>, J. Tarasiuk<sup>1</sup>, K. Kapica-Topczewska<sup>3</sup>, A. Krętowski<sup>4</sup>, J. Kochanowicz<sup>3</sup>, R. Posmyk<sup>2</sup>, A. Kułakowska<sup>3</sup>

<sup>1</sup>Neurology, Medical University of Białystok, Białystok, Poland, <sup>2</sup>Clinical Genetics, Medical University, Białystok, Poland, <sup>3</sup>Neurology, Medical University of Białystok, Białystok, Poland, <sup>4</sup>Medical University, Białystok, Poland

**Background and aims:** Heterogenetic background of autoimmunity pathway components has been suggested in MS pathogenesis. The main aim of our study was to evaluate the association between selected polymorphisms (SNP, single nucleotide polymorphisms) in candidate genes and our MS patients.

**Methods:** The study group consisted of 94 relapsing-remitting MS patients and the same number of healthy volunteers. DNA was extracted from the peripheral blood leukocytes using a classical salting out method. The all SNPs were genotyped by TaqMan SNP genotyping assay using the real-time PCR method in OpenArray technology.

**Results:** Among the analyzed polymorphisms, we have observed the enhanced frequency of some genotypes in cases of several variants in MS group in compare to the healthy controls. Distribution of all genotypes of this SNP in MS group and in controls: CC – 46% vs 66%; CT – 42% vs 26%; TT – 6.4% vs 2.1%. Analysis of 3 polymorphisms in the CTLA4 gene showed, in the case of only 1, statistically significant differences in the frequency of occurrence of the risk genotype. In rs3087242 genotype AA was more frequent in MS patients group in compare to controls (68.1% vs 6.4%,  $p < 0.001$ ). None of the CD40, FCRL5, IL13, IGIF, FCRL5 and PADI4 variants, were associated with the risk of MS compared to controls.

**Conclusion:** The results indicated that PTPN22 and CTLA4 variants were correlated with MS susceptibility in Poland. This is a pilot study – the 1st stage of our research.

**Disclosure:** Nothing to disclose

## EPO3240

**Sensorineural hearing loss and late onset ataxia as the initial presentation of a novel ATP1A3 mutation**

S. Mangat<sup>1</sup>, M. Bonello<sup>1</sup>, B. Michael<sup>2</sup>

<sup>1</sup>The Walton Centre NHS Foundation Trust, Liverpool, United Kingdom, <sup>2</sup>The Walton Centre, Liverpool, United Kingdom

**Background and aims:** A 50-year-old male presented to the neurology clinic with features of cerebellar ataxia. He suffered sensorineural hearing loss of unknown cause since the age of 20. Gait abnormalities had been noted over a period of 3 years and recently the patient had experienced precipitated episodes of disequilibrium. Along with sensorineural hearing loss, the patient also had visual field deficits, brisk lower limb reflexes, bilateral Babinski responses and pes cavus.

**Methods:** A targeted next generation panel sequencing ataxia gene panel identified a novel heterozygous missense mutation in the ATP1A3 gene (c.823 G>A) with bioinformatic tools predicting a pathogenic change in the cytoplasmic loop in between the 1st and 2nd transmembrane domains of the  $\alpha 3$  isoform.

**Results:** This genotype contributes to the evolving clinical spectrum of ATP1A3-related neurological disorders. Distinct phenotypes have been identified including ‘Rapid-Onset Dystonia Parkinsonism’ (DYT12), ‘Relapsing Encephalopathy with Cerebellar Ataxia’ (RECA), ‘Alternating Hemiplegia of Childhood’ (AHC) and ‘Cerebellar Ataxia, Areflexia, Pes Cavus, Optic atrophy and Sensorineural hearing loss’ (CAPOS) syndrome. Overlapping phenotypes are often seen. These are inherited in an autosomal dominant manner and our patient had a deceased 1st-degree relative who suffered from idiopathic late-onset cerebellar ataxia.

**Conclusion:** Currently ATP1A3-related disorders are thought of as paediatric conditions whereas the 1st symptom of neurological decompensation in our patient developed in early adulthood. Our patient also had a slow clinical course which is uncharacteristic of the previously described syndromes. This case adds to the clinical spectrum of ATP1A3-related disorders and documents a novel ATP1A3 related phenotype.

**Disclosure:** Nothing to disclose

## EPO3241

**SCN1A mutation and focal epilepsy: diagnosis and application in adults**

J. Miranda Santiago<sup>1</sup>, P. Gamez Beltran<sup>1</sup>,  
A. Echavarría Iñiguez<sup>1</sup>, D. Pascual Carrascal<sup>1</sup>,  
L. Aguado Garcia<sup>1</sup>, A. Hernando Asensio<sup>1</sup>,  
D. Conejo Moreno<sup>2</sup>

<sup>1</sup>Neurology, Burgos University Hospital, Burgos, Spain,  
<sup>2</sup>Pediatrics, Burgos University Hospital, Burgos, Spain

**Background and aims:** SCN1A gene mutations cause a spectrum of epileptic seizures, from febrile, focal or generalized seizures, with benign evolution, to generalized epilepsy with febrile seizures plus, or Dravet syndrome, with a worse prognosis. Our aim is to present 2 clinical case reports in a family with mutation in SCN1A gene.

**Methods:** We reviewed the medical history, physical examination and complementary tests performed.

**Results:** We present a 4-year-old girl with normal psychomotor development and 1st febrile seizure at 10 months, with generalized clonic semiology. Later on, she developed generalized, right hemiclonic, and tonic-clonic seizures. With 2 years and 8 months, bilateral fronto-centro-temporal epileptiform activity and a focal motor seizure were registered in the EEG. Valproic acid treatment was initiated, with significant improvement in seizures control. Etiological study was completed with a normal brain MRI, and a genetic study where a mutation in the SCN1A gene was found. Her mother, 26 years old, had a prior history of generalized tonic-clonic febrile seizures with 15 months, with normal psychomotor development and partial response to valproic acid treatment. In successive EEG a left parieto-temporal epileptic focus was evidenced, with normal brain MRI. After pregnancy, her treatment was changed to Levetiracetam. After the diagnosis of her daughter, the same mutation was found in her genetic study.

**Conclusion:** In adults with epilepsy and personal or familiar history of febrile seizures during childhood, the study of the SCN1A gene should be considered, as it may have prognostic and therapeutic implications, both in patients and their offspring.

**Disclosure:** Nothing to disclose

## EPO3242

**A mutation in a novel lysosomal gene causes adult-onset generalized dystonia in an Italian patient**

E. Monfrini<sup>1</sup>, F. Cogliamanian<sup>2</sup>, S. Salani<sup>1</sup>, L. Straniero<sup>3</sup>,  
A. Bordoni<sup>1</sup>, M. Aureli<sup>4</sup>, L. Borellini<sup>2</sup>, S. Corti<sup>1</sup>,  
G.P. Comi<sup>1</sup>, S. Duga<sup>3</sup>, N. Bresolin<sup>1</sup>, A. Di Fonzo<sup>1</sup>

<sup>1</sup>IRCCS Foundation Ca' Granda Ospedale Maggiore Policlinico, Dino Ferrari Center, Neuroscience Section, Department of Pathophysiology and Transplantation, University of Milan, Milan, Italy <sup>2</sup>IRCCS Ca' Granda Ospedale Maggiore Policlinico di Milano, Milan, Italy, <sup>3</sup>Humanitas Clinical and Research Center, Rozzano, Milan, Italy, <sup>4</sup>Department of Medical Biotechnology and Translational Medicine, University of Milan, Milan, Italy

**Background and aims:** The advent of next-generation sequencing (NGS) provided an impressive step forward in the identification of the genetic causes of inherited dystonias, leading to the description of many novel genes in the last ten years. Our aim is to find the genetic cause of adult-onset generalized dystonia in an adult Italian patient through a NGS approach.

**Methods:** The subject underwent a neurological examination, a brain MRI and neurophysiological studies. Whole-exome sequencing (WES) was performed on genomic DNA of the patient. Functional studies (immunoblotting, enzymatic activities, and electron microscopy) were conducted on patient-derived fibroblasts to prove mutation pathogenicity.

**Results:** From the age of 30 years the proband developed involuntary dystonic movements affecting the right limbs. After 5 years from disease onset, dystonia became generalized, involving the trunk, limbs, neck, and vocal cords. Brain MRI displayed atrophy and marked symmetrical hypointensity in T2- and T2\*-weighted sequences of basal ganglia. The suspected consanguinity of the parents suggested a homozygous mutation as the cause of the disease. A filtering analysis for rare homozygous variants with protein impact unraveled only one candidate variant in a gene involved in lysosomal and autophagic pathways. Functional studies on patient-derived fibroblasts showed a striking defect of lysosomal and autophagic functions.

**Conclusion:** This work represents the 1st association of a mutation in a novel lysosomal gene with a form of adult-onset generalized dystonia and provides strong in vitro evidence of mutation pathogenicity. The identification of this novel gene confirms the important role of lysosomes and autophagy in the pathogenesis of neurodegenerative dystonias.

**Disclosure:** Nothing to disclose



## EPO3243

### Familial Creutzfeldt-Jakob disease homozygous to the E200K mutation: Clinical characteristics and disease course

Z. Nitsan<sup>1</sup>, O. Cohen<sup>2</sup>, J. Chapman<sup>3</sup>, E. Khana<sup>1</sup>, R. Milo<sup>4</sup>, A.D. Korczyn<sup>5</sup>, M. Osherov<sup>6</sup>, H. Rosenmann<sup>7</sup>, S. Appel<sup>8</sup>

<sup>1</sup>Neurology, Barzilai Medical Center, Ashkelon, Israel,

<sup>2</sup>Neurology, Shamir Medical Center, Zerifin, Israel,

<sup>3</sup>Neurology, Sheba Medical Center, Ramat Gan, Israel,

<sup>4</sup>Department of Neurology, Barzilai Medical Center

Ashkelon, Ashkelon, Israel, <sup>5</sup>Tel Aviv, Israel, <sup>6</sup>Ashkelon,

Israel, <sup>7</sup>Neurogenetics, Hadasha medical center, Jerusalem,

Israel, <sup>8</sup>Neurology, Barzilai Medical center, Ashkelon, Israel

**Background and aims: Introduction:** Most cases of Creutzfeldt-Jacob disease (CJD) in Israel are familial, due to an unusual cluster of the disease among Jews of Libyan origin carrying the E200K mutation in the gene encoding for the prion protein (PRNP).

**Objective:** To characterize the demographic, clinical features and disease course of familial Creutzfeldt-Jacob disease (fCJD) patients homozygous to the E200K mutation.

**Methods:** The Israeli National CJD Database was screened for patients homozygous to the E200K mutation. Patients' demographic data, clinical presentation, neurological findings and tau protein levels were assessed.

**Results:** 10 homozygous E200K patients were identified (80% men). Average age of onset was 47.5±6.1 years (range 40-56) and the average age of death was 49.3±7.7 years (range 42-63) with average disease duration of 27.7±9.7 months (range 2-97). Initial clinical presentation included behavioral change in 4/10 patients, cognitive decline in 3/10 patients and focal neurological deficit in 2/10 patients. Compared to 228 heterozygous E200K fCJD patients, homozygous patients were significantly younger at disease onset (47.5 years vs 59.7 years, p<0.001), had longer disease duration (27.7 vs 8.5 months, p<0.001) and presented more frequently with behavioral change (4/10 vs. 34/228, p=0.05). Levels of tau protein in the CSF did not differ between groups.

**Conclusion:** Homozygous E200K fCJD is characterized by younger age of onset and longer disease duration. Behavioral change as a presenting symptom was more common in homozygous patients. homozygous CJD patients do not seem to have a more severe and shorter disease course than heterozygous CJD disease.

**Disclosure:** Nothing to disclose

## EPO3244

### Kabuki syndrome: epilepsy features

G. Odintsova<sup>1</sup>, E. Snegova<sup>2</sup>, M. Zhitomirskaya<sup>3</sup>

<sup>1</sup>Epileptology, Almazov National medical research center,

Saint Petersburg, Russian Federation, <sup>2</sup>Neurology, Child

diagnostic center, Saint Petersburg, Russian Federation,

<sup>3</sup>Neurology, Child diagnostic center, Санкт-Петербург,

Russian Federation

**Background and aims:** West syndrome is polietiological disease. Epilepsy isn't specific for Kabuki syndrome (KS).

**Purpose:** To investigate features of a West syndrome in a patient with a Kabuki syndrome.

**Methods:** Anamnesis, EEG, MRI data of patient M were investigated.

**Results:** Patient M, 20 months, had seizures 1 per day. The perinatal anamnesis was not burdened, the expressed delay of development was noted since birth. From 1.5 months of serial epileptic spasms 2-3 times per day began. The atypical (modified) hypsarhythmia was defined on EEG. Atrophic changes in frontal departments of both hemispheres were revealed by MRI. Diagnosis the atypical West syndrome was established. Therapy with vigabatrin, levetiracetam, valproic acid didn't achieve seizure control. A short-term course of hormonal therapy was conducted with a positive effect at the 7-8 months. However, the course was discontinued due to adverse events. Phenotypical characteristic of a KS (a long palpebral fissure, an ectopia of a lower eyelid, arks eyebrows, a wide nose bridge, skeletal abnormalities, fetal type of fingers, mental retardation) was noted. Epilepsy panel was conducted with a negative result. KMT 2D gene mutation on the 12th chromosome was revealed by sequenation of a genome. At genetic inspection of parents, the similar mutation was found in the father who is clinically healthy.

**Conclusion:** This clinical case has shown a refractory form of epilepsy rare for genetic Kabuki syndrome - West syndrome with the early beginning of spasms with the good answer to hormonal therapy and insufficient efficiency of vigabatrin and other AEDs

**Disclosure:** The reported study was funded by Russian Foundation for Basic Research (RFBR) according to the research project № 18-013-00222.

## EPO3245

**POLG and PRKN gene mutations in Early-onset Parkinson's disease: A case report.**

M.A. Palacios Mendoza, E. Luque Buzo, M. Gonzalez Sanchez, J. Pérez Sánchez, A. Contreras Chicote, B. De la Casa Fages, F.J. Grandas Pérez  
*Neurology, Hospital General Universitario Gregorio Marañón, Madrid, Spain*

**Background and aims:** POLG gene mutations may cause variable neurological manifestations, being rare in patients with typical Early-onset Parkinson's disease (EOPD). EOPD related to PRKN mutations require homozygous or compound heterozygous mutations, although single heterozygous pathogenic variant has been proposed as a genetic susceptibility factor. We present a case of EOPD with combination of heterozygous POLG variants and heterozygous PRKN mutation.

**Methods:** Case report.

**Results:** A 37-year-old man, without relevant personal or family history, presented with right-side predominant hand tremor at the age of 29 years, followed by lower limbs and head tremor, clumsiness and rigidity in both hands. The neurological examination revealed right-side predominant rest tremor, mild bilateral postural tremor in hands and rigidity and bradykinesia in right limbs. Blood tests and magnetic resonance imaging were normal. Brain DaT-SCAN SPECT imaging showed loss of presynaptic dopamine transporters, predominantly in both putamen. The genetic test showed two heterozygous pathogenic variants in POLG gene (c.752C>T (p.Thr251Ile) and c1760C>T (p.Pro587Leu)) and a heterozygous pathogenic variant in PRKN gene (c.155del (p.Asn52MetfsTer29)). He started treatment with rasagiline and rotigotine with good response during follow-up.

**Conclusion:** Heterozygous variants in POLG gene found in this patient have been previously described as pathogenic and may have a causal relationship with EOPD. PRKN mutation, given its heterozygous status, could act as a susceptibility factor. Several combinations of genetic variants linked to polygenic EOPD have been reported. We highlight this case due to the unusual combination of genes involved, which could have a double impact on the development of EOPD.

**Disclosure:** Nothing to disclose

## EPO3246

**The X-linked form of Charcot-Marie-Tooth disease with GJB1 and PMP22 gene mutation.**

Z. Števková<sup>1</sup>, G. Krastev<sup>1</sup>, J. Haring<sup>1</sup>, P. Durina<sup>2</sup>  
<sup>1</sup>*Department of Neurology, University Hospital Trnava, Trnava, Slovakia,* <sup>2</sup>*Department of clinical genetics, University Hospital Bratislava, Bratislava, Slovakia*

**Background and aims:** The X-linked form of Charcot-Marie-Tooth disease (CMTX) is the 2nd common form of hereditary motor- sensory neuropathies. The clinical features of CMTX include progressive muscle atrophy and weakness, sensory loss and also the central nervous system manifestation can be found. Males are more severely affected than females. We report one Slovak family with X-linked Charcot-Marie-Tooth neuropathy who had typical clinical features, but females were more severely disabled than males.

**Methods:** Clinical examination, electrophysiologic studies, MRI of the brain and molecular genotyping testing was performed.

**Results:** Motor-nerve conduction velocities were significantly slowed and evoked muscle action potentials were severely reduced. 2 mutations were identified in 2 different genes. The patient was confirmed heterozygote for the Thr118Met substitution in the PMP22 gene and heterozygote for the Val95Met in the GJB1 gene. However, the pathogenic effect of Thr118Met substitution in the PMP22 gene is disputable according to some studies. In this report we will confirm that the Val95Met substitution in the GJB1 gene is pathogenic in this family.

**Conclusion:** X-linked form of Charcot-Marie-Tooth disease is caused by mutations in the GJB1 gene. A lot of allelic variants can be identified using of exome sequencing, thus focusing us on possible not yet confirmed rare clinical manifestation of both genes mutations (PMP22 and GJB1) with females more affected.

**Disclosure:** Nothing to disclose

## EPO3247

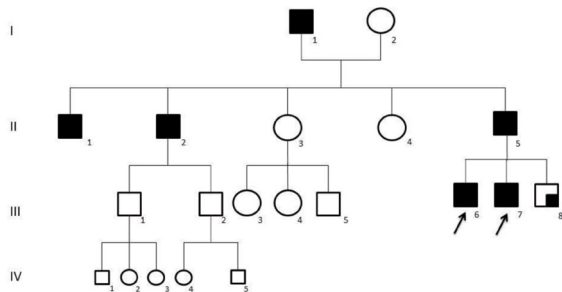
### A novel mutation of VCP gene is responsible for Autosomal Dominant (AD) Hereditary Spastic paraplegia (HSP) in a family from Southern Italy.

G. Straccia, M.A.B. Melone

Department of Advanced Medical and Surgical Sciences, 2<sup>nd</sup> Division of Neurology, Center for Rare Diseases and InterUniversity Center for Research in Neurosciences, University of Campania "Luigi Vanvitelli", Naples, Italy

**Background and aims:** Hereditary spastic paraplegias are a group of heterogeneous disorders, with the clinical hallmark of progressive spasticity in the lower limbs. Gene panels and exome/genome-based approaches have provided valid support to diagnosis and have expanded knowledge about the genetic background of these disorders. Variants in VCP gene, known to be responsible for Amyotrophic Lateral Sclerosis type 14 and Inclusion Body Myopathy with Paget Disease and Frontotemporal Dementia type 1, have recently been described in three cases of HSP.

**Methods:** We describe 2 brothers with slowly progressive spastic gait since their 2<sup>nd</sup> and 3<sup>rd</sup> decade of life. The grandfather of the probands, their father and 2 of his brothers have suffered from a similar disorder since their 4<sup>th</sup> decade, suggesting an AD inheritance.



Pedigree of the family here described with a 3-generation history of progressive isolated spastic gait. Solid symbols indicate affected individuals. Arrows indicate the probands

**Results:** An extensive diagnostic protocol excluded secondary causes of spastic paraplegia and showed no evidence of lower motor neuron degeneration, myopathy, cognitive deficits or skeletal involvement. Both brothers revealed to carry the novel heterozygous variant c.446-4G>A of VCP gene. Segregation study, performed in the mother and a cousin of the probands, both asymptomatic, confirmed the pathogenicity of the new variant. Significantly, a 3<sup>rd</sup> sibling of the probands, deceased in his 20<sup>ties</sup>, suffered from severe skeletal dysmorphism, possibly suggesting a juvenile Paget disease.

**Conclusion:** We describe 2 cases of HSP due to a novel mutation of VCP gene, within a large family with a history of autosomal dominant gait disorder. Our finding supports the already suggested role of VCP mutations in HSP pathogenesis and further expands the list of known causative variants.

**Disclosure:** Nothing to disclose

## EPO3248

### Spastic paraplegia type 7 presenting as subacute cerebellar syndrome

D. Tulbă<sup>1</sup>, D. Mitrea<sup>2</sup>, A. Trifa<sup>3</sup>, N. Dima<sup>4</sup>, A. Lefter<sup>4</sup>, L. Cozma<sup>1</sup>, I. Olaru<sup>1</sup>, C. Mitu<sup>4</sup>, B.O. Popescu<sup>5</sup>

<sup>1</sup>Department of Clinical Neurosciences, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania,

<sup>2</sup>Neuroaxis Neurology Clinic, Bucharest, Romania,

<sup>3</sup>Department of Genetic Explorations, "Prof. Dr. Ion Chiricuta" Institute of Oncology, Cluj, Romania,

<sup>4</sup>Department of Neurology, Colentina Clinical Hospital,

Bucharest, Romania, <sup>5</sup>Laboratory of Molecular Medicine, "Victor Babes" National Institute of Pathology, Bucharest, Romania

**Background and aims:** Mutations in the SPG7 gene encoding a mitochondrial protein called paraplegin are responsible for a recessive form of hereditary spastic paraplegia (HSP). The complicated phenotype of HSP includes cerebellar signs, which is unsurprising since paraplegin is highly expressed in Purkinje neurons. Moreover, recent evidence suggests that SPG7 mutations are a common cause of undiagnosed spastic ataxia.

**Methods:** A 28-year-old woman was admitted to our clinic for severe gait disturbance and balance impairment with progressive evolution for the last 9 months. She underwent a surgical intervention for endometriosis 5 years prior and had unremarkable family history. Neurological examination revealed gait and limb ataxia, hyperreflexia and bilateral Babinski sign. Brain MRI identified moderate cerebellar atrophy.

**Results:** Workup for infectious (HIV and syphilis screening), metabolic (including serum ceruloplasmin and copper) and autoimmune disorders (e.g. antineuronal and antiGAD antibodies, oligoclonal bands) was negative. Several genetic tests including spinocerebellar ataxia multigene panel and Friedreich ataxia repeat expansion test were performed. 2 heterozygous SPG7 variants were detected by next generation sequencing and confirmed by classical Sanger sequencing, namely c.233T>A/p.Leu78Ter (pathogenic mutation) and c.2104-2A>C (uncertain significance; splice acceptor). The parents are to be tested genetically in order to confirm the trans configuration of the two heterozygous variants.

**Conclusion:** Mutation analysis of SPG7 gene should be considered in patients with subacute spastic ataxia. The background of our patient suggests that the c.2104-2A>C variant might be pathogenic, thusly pointing to a novel compound heterozygous SPG7 genotype.

**Disclosure:** Nothing to disclose

## EPO3249

**AARS2 mutation-related leukodystrophy: further insight into a rare disorder**

R. Ventura, M. Viana Baptista

*Neurology, Hospital Egas Moniz, Centro Hospitalar Lisboa Ocidental, Lisbon, Portugal*

**Background and aims:** Alanyl-tRNA synthetase 2 (AARS2) gene mutations can present as combined oxidative phosphorylation deficiency 8 (a mitochondrial disease characterized by a lethal infantile hypertrophic cardiomyopathy) and childhood to adult-onset leukoencephalopathy (a neurodegenerative disorder marked by progressive neurologic deterioration and ovarian failure in female patients). Few patients have been reported worldwide so far.

**Methods:** N/A

**Results:** A 36-year-old male Portuguese patient, with normal psychomotor development and no known family history of neurologic disease or consanguinity, presented to our outpatient clinic with a progressive cognitive decline during the previous year. It was initially interpreted as a depressive disorder, and he was undergoing antidepressive treatment, albeit with no clinical improvement. 3 months after our evaluation he was also reported to have developed an obsessive-compulsive behavior. On examination there was gait ataxia in tandem walking, brisk reflexes and Babinski sign on the right side, with gaze-evoked horizontal nystagmus. A brain MRI revealed extensive symmetrical white matter changes with a butterfly-shaped pattern and frontal predominance, without contrast enhancement. Blood and CSF analysis were unremarkable. Next generation sequencing genetic testing revealed 2 heterozygous compound mutations in AARS2 gene (c.2255+1G>A; c.595C>T).

**Conclusion:** Adult-onset leukodystrophies are rare and pose a diagnostic challenge. AARS2 mutation related leukodystrophy is not only rare but still poorly understood, with a variable clinical presentation. We present the 1st Portuguese case of AARS2-related adult-onset leukodystrophy, presenting with neuropsychiatric symptoms, and due to a compound heterozygosity casting further insight into the characterization of this new entity.

**Disclosure:** Nothing to disclose

## EPO3250

**Two Cases of X-Linked Adrenoleukodystrophy Confirmed by Genomic Analysis of the ABCD1 Gene: the 1<sup>st</sup> to be Reported from East Africa**

F. Yakub, S. Mbugua, J. Hooker, D. Sokhi

*Department of Medicine, Aga Khan University Medical College of East Africa, Nairobi, Kenya*

**Background and aims:** Non-infectious causes of chronic progressive non-traumatic spastic paraparesis (PNSP) are rarely reported from sub-Saharan Africa (SSA) due to the severe lack of diagnostic services, particularly magnetic resonance imaging (MRI). A rare cause of PNSP is X-linked adrenoleukodystrophy (X-ALD), of which only a few cases have been reported from North Africa.

**Methods:** We describe 2 unique cases from SSA presenting with PNSP who, after extensive investigations, were found to have X-ALD confirmed through both biochemical and genetic testing.

**Results:** Case 1: A 36-year-old female presented with a decade of PNSP and urinary urgency, all exacerbated during pregnancy. Neurological examination confirmed spastic paraparesis with extensor plantars, and absent large-fibre sensation to the knees. MRI neuraxis revealed severe thoracic cord atrophy, and serum very long chain fatty acids (VLCFA) analysis revealed increased C26, C24:C22 and C26:C22 levels. Genomic sequencing of the ABCD1 gene showed heterozygosity for p.(Arg617His),c.1850G>A, confirming X-ALD.

Case 2: A 38-year-old male presented with 20 years of PNSP, eventually leading to quadriplegia and bulbar dysfunction in the latter decade, and was now wheelchair-bound. Neurological examination revealed spastic quadriplegia and global ataxia. MRI neuraxis revealed large symmetrical parieto-occipital and splenial hyperintense signals with cervical cord atrophy. VLCFA were similarly abnormal to Case 1, and ABCD1 genetic analysis showed hemizyosity for c.1469\_1471dup,p.(val490dup) in-frame variant in exon 5, confirming X-ALD.

**Conclusion:** Our cases are the 1st to illustrate that X-ALD exists in SSA. Access to appropriate diagnostics provides patients with an explanation for their PNSP and possible implications for their families.

**Disclosure:** Nothing to disclose

## EPO3251

### Clinical presentation of adult-onset leukoencephalopathy with axonal spheroids and pigmented glia associated with an A792D mutation in the CSF1R gene.

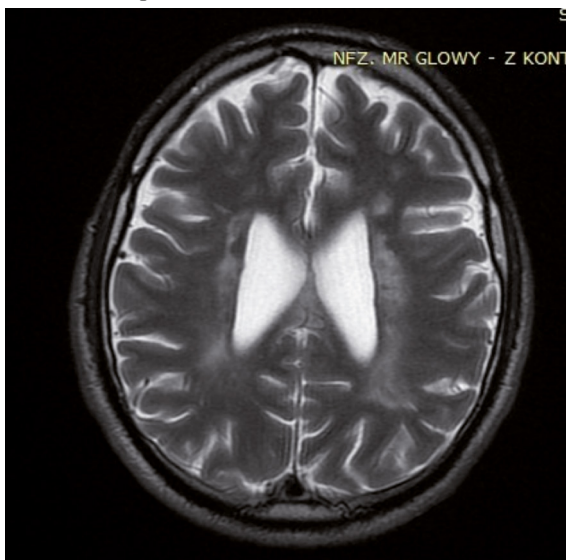
K. Zur-Wyrozumska<sup>1</sup>, B. Wach<sup>2</sup>, M. Klus<sup>2</sup>

<sup>1</sup>Department of Medical Education, Jagiellonian University Medical College, Cracow, Poland, <sup>2</sup>Department of Neurology, 5<sup>th</sup> Military Hospital, Cracow, Poland

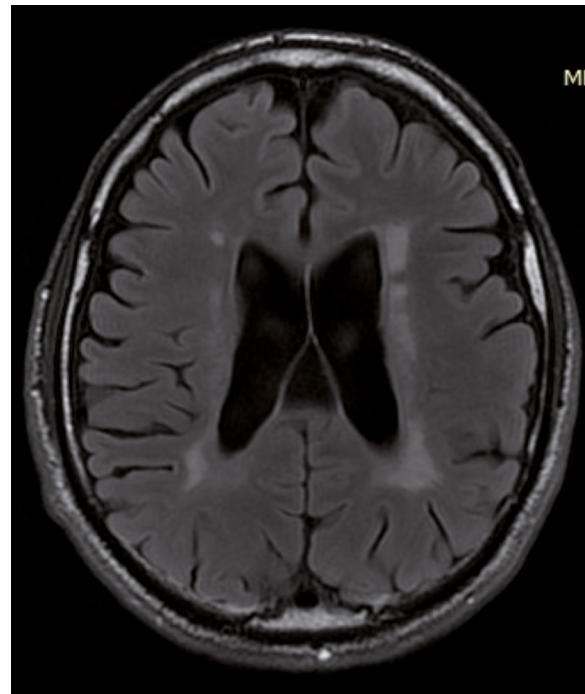
**Background and aims:** Adult-onset leukoencephalopathy with axonal spheroids and pigmented glia is a rare, autosomal dominant, white matter disease with a wide spectrum of clinical presentation. Here, we report the phenotypic description of a rapidly progressive Caucasian patient with an A792D mutation in the CSF1R gene. This variant has been described in Japanese families and was previously characterized by slow progression and late onset.

**Methods:** The genotype was identified through sequencing exons of the CSF1R gene.

**Results:** In 2017, a 38-year-old, Caucasian male with no familial history of neurological disorders, presented with symptoms of dysarthria, bradykinesia and gait disturbances. In 2018 he began to show cognitive dysfunction and became overemotional. In 2019 he presented with urinary incontinence and erectile dysfunction. A brain MRI scan revealed multifocal signal abnormalities in the periventricular and deep cerebral white matter, with a large confluent lesion in the right hemisphere. There was incomplete sparing of the subcortical white matter and multifocal diffusion restricted lesions. Neuropsychological examination showed subcortical cognitive deficits suggesting damage to fronto-subcortical networks. After 3 years of symptoms, the onset EDSS score was 5. In November 2019, the patient received an allogenic bone marrow transplantation.



Multifocal signal abnormalities in the periventricular white matter.



Disease progression after 6 months. T2 FLAIR

**Conclusion:** This report presents a case study of a 38-year-old Caucasian male who presented with rapid, progressive, adult-onset leukoencephalopathy with axonal spheroids and pigmented glia related to an A792D mutation in the CSF1R gene.

**Disclosure:** Nothing to disclose

## Neuroimmunology 3

## EPO3252

**Eight-and-a-half syndrome as manifestation of Neurobehçet**

B. Meira<sup>1</sup>, M. Fernandes<sup>1</sup>, A. Caetano<sup>1</sup>, J. Costa<sup>2</sup>, A.S. Correia<sup>1</sup>

<sup>1</sup>Neurology, Hospital Egas Moniz - CHLO, Lisbon, Portugal, <sup>2</sup>Ophthalmology, Hospital Egas Moniz - CHLO, Lisbon, Portugal

**Background and aims:** Behçet's disease is a chronic systemic inflammatory disease of unknown cause. Eight-and-a-half syndrome is characterized by the combination of one-and-a-half syndrome (conjugated horizontal gaze palsy and internuclear ophthalmoplegia) with ipsilateral facial palsy. Although rare, it allows precise anatomical location at the lower level of the ipsilateral pontic tegment. Aetiology is usually vascular or demyelinating.

**Methods:** Case Report: Male, 26-years-old, with history of recurrent oral aphthous ulcers, admitted after acute onset of facial asymmetry, horizontal double vision and fever.

**Results:** On examination, there was right conjugate gaze palsy and internuclear ophthalmoplegia on left gaze, right facial palsy with Bell's sign, right hypoacusia and slight right hemiataxia. Brain MRI revealed a tumefactive lesion extending from right paramedian pontine territory to right middle cerebellar peduncle, hyperintense on T2 and FLAIR, showing contrast enhancement and normal DWI-MRI. CSF analysis revealed pleocytosis (400cells/ $\mu$ l, polymorphonuclear predominance), mild hyperproteinorachie (59mg/dL) and normal glycorrhachia. In the following days, the patient presented fever, recurrence of oral and genital ulcers and increased inflammatory blood parameters. Neuroophthalmologic evaluation revealed signs of right vitritis and peripheral retinal vasculitis. The diagnosis of Behçet's Disease with CNS involvement was assumed and corticosteroid therapy and monthly cyclophosphamide cycles were started with improvement.

**Conclusion:** Although CNS disease rarely occurs in Behçet's disease, when this happens there is a predilection for brainstem involvement. This case highlights the eight-and-a-half syndrome as a clinical manifestation of neurobehçet and, being a potentially treatable disease, illustrates the importance of early diagnosis and treatment of this disease.

**Disclosure:** Nothing to disclose

## EPO3253

**The influence of catecholamines on Th17-cells in multiple sclerosis**

M. Melnikov<sup>1</sup>, A. Sviridova<sup>2</sup>, V. Rogovskii<sup>3</sup>, A. Volkov<sup>2</sup>, A. Boyko<sup>2</sup>, M. Pashenkov<sup>4</sup>

<sup>1</sup>Department of Neurology, Neurosurgery and Medical Genetics, Pirogov Russian National Research Medical University, Moscow, Russian Federation, <sup>2</sup>Department of Neuroimmunology, Federal Center of Cerebrovascular pathology and Stroke, Moscow, Russian Federation, <sup>3</sup>Department of Molecular Pharmacology and Radiobiology, Pirogov Russian National Research Medical University, Moscow, Russian Federation, <sup>4</sup>Laboratory of Clinical Immunology, Institute of Immunology, Moscow, Russian Federation

**Background and aims:** Catecholamines may participate in multiple sclerosis (MS) pathogenesis by modulating immune cell activity. The aim of this study was to clarify the effects of catecholamines on Th17-cells which play crucial pathogenic role in MS.

**Methods:** 35 MS patients and 20 healthy controls were examined. Levels of dopamine and norepinephrine in plasma were determined by HPLC. The percentage of Th17-cells was determined by flow cytometry (CD4<sup>+</sup>CD26<sup>+</sup>CD161<sup>+</sup>). CD4<sup>+</sup>-T-cells were stimulated with anti-CD3/anti-CD28-antibodies in the absence/presence of dopamine/norepinephrine at concentrations of 10<sup>-4</sup>M, 10<sup>-5</sup>M and 10<sup>-6</sup>M whereafter levels of IL-17, IFN-gamma, GM-CSF and IL-21 in supernatants were determined by ELISA. Some samples of CD4<sup>+</sup>-T-cells were pre-incubated with antagonists of D1(SCH23390)- or D2(sulpiride)-like dopaminergic receptors (both at 10<sup>-5</sup>M) whereafter dopamine (10<sup>-5</sup>M) and anti-CD3/anti-CD28-antibodies were added to the cultures. Statistical analysis was performed using Prizm 6 software.

**Results:** The concentrations of dopamine and norepinephrine in plasma were not different between the groups. The percentages of Th17-cells as well as the production of cytokine were comparable. Dopamine and norepinephrine at concentration of 10<sup>-5</sup>M suppressed cytokine production in both groups (p<0.001) without affecting cell viability and proliferative response. At concentration of 10<sup>-4</sup>M dopamine and norepinephrine suppressed cytokine production (p<0.001), but reduced cell viability and proliferative responses, while at concentration of 10<sup>-6</sup>M, dopamine and norepinephrine had no effect on cytokine production. Blockade of D1-like receptors enhanced the inhibitory effect of dopamine (p<0.001) while blockade of D2-like receptors abolished the effect of dopamine in both groups (p<0.001).

**Conclusion:** These data suggest an inhibitory effect of catecholamines on Th17-cells in MS.

**Disclosure:** This study was supported by grant from the Russian Science Foundation (project №19-75-00075).

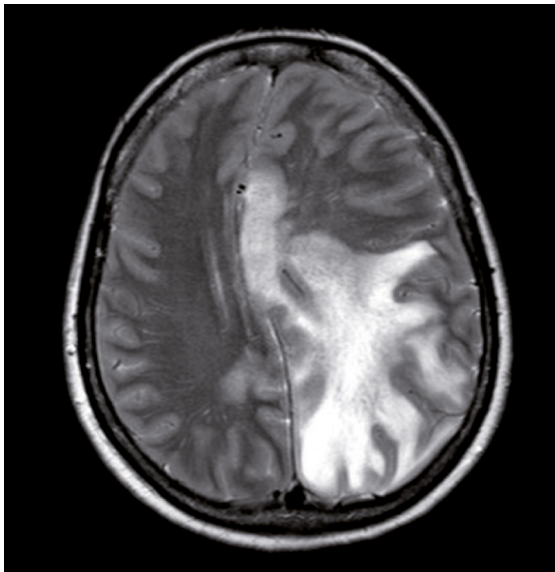
EPO3254

### Disseminated necrotizing leukoencephalopathy associated with methotrexate therapy

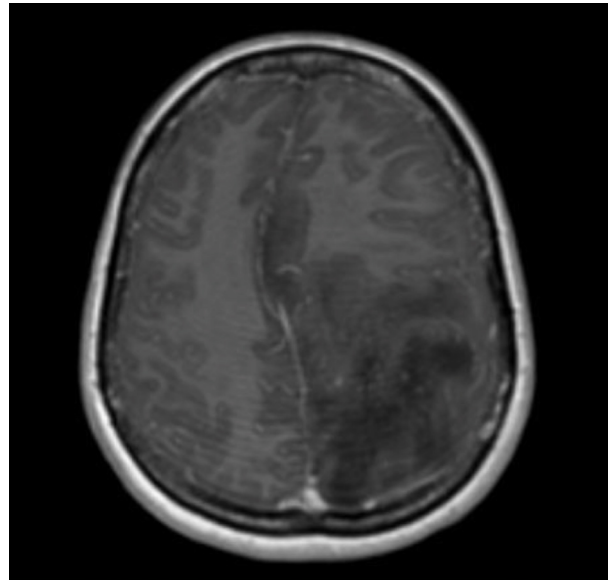
L. Mokosova, J. Haring  
Trnava, Slovakia

**Background and aims:** Leukoencephalopathy is a potentially serious complication of chemotherapy, especially when methotrexate is used. The mechanism of origin is unknown, but may involve a direct toxic effect on axons, oligodendrocytes and progenitor cells, as well as secondary immunological reactions, oxidative stress and microvascular damage. Disseminated Necrotizing Leukoencephalopathy (DNL) is a term reserved for severe, typically progressive and fatal form of the disease.

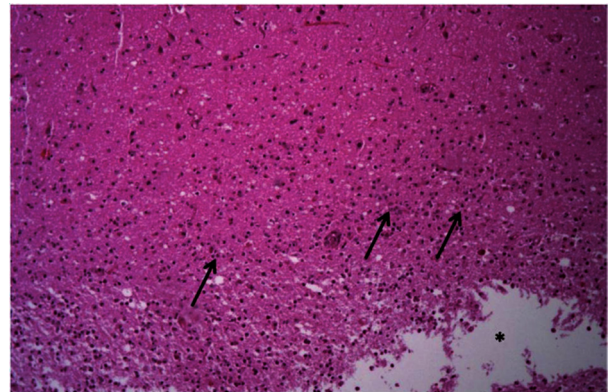
**Methods:** MRI may be helpful in differentiation lighter forms of leukoencephalopathy and distinguishing them from DNL, which is characterized by hyperintensity lesions in T2-weighted images with a nonvascular pattern, with restricted diffusion, mostly with intense tumor-like enhancement and severe mass effect. Histopathological study was done post mortem.



MRI T2 image



MRI T1 image



Histology, necrotic lesion with disintegration (\*) and brain tissue with gliosis (arrows) and edema

**Results:** In our case report we present a 46-year-old woman on long-term methotrexate therapy for Sjögren's syndrome and purpura vasculitis, who developed acute necrotizing leukoencephalopathy 2 weeks after exposure to influenza virus with dramatic clinical feature with fatal outcome.

**Conclusion:** The aim of the case report is to highlight a rare fatal disease whose diagnosis is based on high clinical suspicion in the absence of specific imaging or laboratory tests. This disease should be considered in the case of a fulminant clinical course of an expansive intracranial tumor-like process with a history of long-term exposure of the patient to methotrexate.

**Disclosure:** Nothing to disclose

## EPO3255

### Anti-Hu-associated paraneoplastic syndromes triggered by immune-checkpoint inhibitor treatment

N. Mongay Ochoa<sup>1</sup>, A. Vogrig<sup>2</sup>, S. Muñoz Castrillo<sup>2</sup>, J. Honnorat<sup>2</sup>

<sup>1</sup>Hospital Universitari de Bellvitge, Barcelona, Spain,

<sup>2</sup>Centre de Référence National pour les Syndromes Neurologiques Paraneoplasiques, Hôpital Neurologique, Lyon, France

**Background and aims:** Anti-Hu antibodies (Hu-Ab) are associated with diverse phenotypes of paraneoplastic neurological syndromes (PNS), usually in the context of small-cell lung cancer (SCLC). Recently, the introduction of immune checkpoint inhibitors (ICIs) has led to a paradigm shift in the management of many types of cancer. Side effects include neurological immune-related adverse events. Herein we present a sensory neuronopathy and a cerebellar degeneration after ICIs treatment.

**Methods:** Case series and a review of the literature.

**Results:** Case 1: A healthy 46-year-old male with SCLC received chemotherapy and 4 doses of pembrolizumab. Twelve weeks later he presented severe 4-limb ataxia and alteration of all sensory modalities. Electroneuromyography demonstrated a non-length-dependent axonal sensory neuronopathy, and Hu-Ab were detected in serum and cerebrospinal fluid (CSF) using immunohistochemistry and Western blot. The treatment with prednisolone and intravenous immunoglobulin (IVIG) temporarily improved his condition, but he eventually died due to pneumonia.

Case 2: A healthy 71-year-old male patient with SCLC was treated with chemotherapy and 3 doses of atezolizumab. 9 weeks after, examination revealed a cerebellar syndrome manifested as gaze-evoked nystagmus, mild dysarthria, and severe gait and trunk ataxia. The diagnostic exams revealed an inflammatory CSF with positive Hu-Ab in both serum and CSF. IVIG were administered, with mild clinical improvement

All previously reported ICI-related Hu-Ab cases were autoimmune encephalitis, and had at best a modest response to immunosuppressive drugs (Table).

**Table 1: Paraneoplastic neurological syndromes with anti-Hu antibodies after immune checkpoint inhibitors treatment**

Sex , age	Tumor	ICI (doses)	nirAEs	Treatment	mRS evolution	Ref
F, 71	SCLC	Nivolumab+ipilimumab (1)	LE	Methylprednisolone, Natalizumab	4→3	1
M, 46	Myxoid chondrosarcoma	Cemiplimab (4)	LE	Methylprednisolone, IVIG	3→6	2
M, 60	Pleomorphic carcinoma lung	Nivolumab (3)	LE	Methylprednisolone, plasma exchange	5→6	3
M, 58	NSCLC	Nivolumab (16)	AE	Dexametasona	4→3	4

*Abbreviations: AE, autoimmune encephalitis with extralimbic involvement; F, female; ICI, immune checkpoint inhibitor; IVIG, intravenous immunoglobuline; LE, limbic encephalitis; M, male; mRS, modified Rankin scale; nirAE, neurological immune-related adverse event; NSCLC, non-small-cell lung cancer; Ref, reference; SCLC, small-cell lung cancer.*

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Paraneoplastic neurological syndromes with anti-Hu antibodies after immune checkpoint inhibitors treatment

**Conclusion:** We might expect an increased incidence of HU-Ab PNS since the introduction of ICI in SCLC treatment, being imperative to be fully aware of their complex clinical presentation.

**Disclosure:** Nothing to disclose



## EPO3256

**Longitudinal extensive transverse myelitis: a new presentation of IgG4-related disease?**

V. Oliveira<sup>1</sup>, E. Pinto<sup>2</sup>, D. Pereira<sup>1</sup>, E. Neves<sup>3</sup>, E. Santos<sup>1</sup>  
<sup>1</sup>Neurology, Centro Hospitalar Universitário do Porto – Hospital de Santo António (CHUP-HSA), Porto, Portugal,  
<sup>2</sup>Neuroradiology, Centro Hospitalar Universitário do Porto – Hospital de Santo António (CHUP-HSA), Porto, Portugal,  
<sup>3</sup>Immunology, Centro Hospitalar Universitário do Porto – Hospital de Santo António (CHUP-HSA), Porto, Portugal

**Background and aims:** IgG4-related disease is an immune mediated disorder that can involve many organs, including the central and peripheral nervous systems. The most common neurological manifestations are pachymeningitis, hypophysitis and orbital disease.

**Methods:** Case report

**Results:** We report a 65-year-old male, that by 39 years of age developed a cerebellar syndrome, right motor and sensory deficits with pyramidal signs. Head-CT disclosed fronto-orbital contusions related to previous trauma. CSF had 5 lymphocytes and proteins 0.65g/dL. Suspecting multiple sclerosis, he was treated with adrenocorticotropic hormone, gradually recovering. At 54 years old he developed a paraparesis with urinary retention, bilateral pyramidal syndrome, pain sensory loss with T4 level and hypopallesthesia. MRI documented a spinal cord T2 extensive hypersignal from C2 to T11, suggesting a longitudinal extensive transverse myelitis (LETM). CSF had pleocytosis (88 lymphocytes, 38 eosinophils), proteins 0.82g/dL, normal IgG index without oligoclonal bands. He presented eosinophilia, high IgE (370U/mL) and IgG4 (231mg/dL), with negative anti-Aquaporin 4/anti-MOG antibodies and microbiological/parasite studies. Other immunological studies were normal. Chest-abdomen-pelvis CT and evoked visual potentials were normal. He was medicated with methylprednisolone (5 days), and 1mg/kg prednisolone afterwards (tapered slowly), maintaining 2.5mg/day in the last 8 years. He fully recovered and has been asymptomatic for 11 years of follow-up. Recently he maintained high IgG4 (319mg/dL), still without systemic involvement.

**Conclusion:** We report a case of LETM, in a patient with high levels of IgG4, in the absence of other auto-immune disease. To the best of our knowledge this is the 1st description of LETM associated to IgG4-related disease.

**Disclosure:** Nothing to disclose

## EPO3257

**Neuromyelitis optica Spectrum Disorders (NMOSD): two cases with atypical presentation**

R. Palumbo<sup>1</sup>, S. Pontecorvo<sup>1</sup>, A. Davoli<sup>1</sup>, M. Masciullo<sup>2</sup>, M. Capobianco<sup>3</sup>, S. Pirillo<sup>4</sup>  
<sup>1</sup>Neurology Unit, San Giovanni Addolorata Hospital, Rome, Italy, <sup>2</sup>Neurorehabilitation, IRCCS Foundation S.Lucia, Rome, Italy, <sup>3</sup>ORBASSANO (TO), Italy, <sup>4</sup>Radiology, San Giovanni Addolorata Hospital Roma, Rome, Italy

**Background and aims:** The association between NMOSD and other disorders have been described. However, peripheral neuropathy or Syringomyelia as complication of NMOSD have been rarely reported.

**Methods:** Clinical, laboratory and neuroimaging findings of 2 patients with NMOSD (anti-aquaporin-4 seropositive) associated with atypical disorders are described:

CASE 1. A 68-year-old woman had acute transverse myelitis: NMOSD with Syringomyelia-like syndrome was diagnosed

CASE 2. A 79-year-old woman had suddenly cervical pain, loss of strength of lower extremities. Symptoms worsened to severe quadriplegia and sensory loss with high cervical level. EMG findings were compatible with acute polyradiculoneuropathy. Concurrent NMOSD was diagnosed.

**Results:** In case 1, spinal cord MRI revealed hyperintensities in the cervico-thoracic spine with large cystic lesion (D1-D7).

In case 2, spinal cord MRI revealed hyperintensities in the cervico-thoracic spine (C2-D2). NMO was commonly believed to be confined to optic nerves and spinal cord, with no involvement of the peripheral nervous system (PNS).

**Conclusion:** CASE 1: Syringomyelia was reported predominantly located in the lower cervical and upper thoracic spinal cord. Non-communicating syringomyelia (NCS) has occasionally been described as an incidental finding pathology in patients with multiple sclerosis (MS). CASE 2: only few reports were reported describing characteristics of neuropathy as rare complication of NMO. Anti-AQP-4 antibody cannot cause neuropathy because AQP-4 is a cell membrane water channel expressed at the astrocyte foot process, and there are not astrocytes in the PNS. Pathogenesis of neuropathy may be T-cell immunomediated and related to epitope spreading from CNS to PNS myelin antigen as occurred in MS.

**Disclosure:** Nothing to disclose

## EPO3258

**Seronegative neuromyelitis optica spectrum disorders in a Thai patient**

R. Palumbo<sup>1</sup>, A. Salerno<sup>2</sup>, S. Pontecorvo<sup>2</sup>,  
E.G.M. Antonuccio<sup>3</sup>, S. Pirillo<sup>3</sup>

<sup>1</sup>Rome, Italy, <sup>2</sup>Neurology Unit, San Giovanni Addolorata Hospital, Rome, Italy, <sup>3</sup>Radiology, San Giovanni Addolorata Hospital, Rome, Italy

**Background and aims:** New diagnostic criteria for Neuromyelitis Optica Spectrum Disorders (NMOSD) have been published. The aim of this report was to discuss the role of new diagnostic criteria in clinical practice with focus in patient without anti-aquaporin-4 (AQP-4) antibody. Differential diagnosis from MS is needed.

**Methods:** Clinical manifestations, laboratory parameters and neuroimaging findings of a patient with NMOSD but no AQP-4 antibody, were collected.

**Results:** A 55-year-old Thai woman experienced nausea, hiccups and gastric pain. After 1 month daytime somnolence occurred, followed by gait ataxia, urinary retention, blurred vision. Brain magnetic resonance revealed hyperintense lesion in the 1st 2 cervical segments with rostral extension to brainstem. Anti-AQP-4 antibody were negative, CSF analysis showed pleocytosis (74 cells) and oligoclonal bands. Intravenous Methylprednisolone was given with clinical and radiological improvement

**Conclusion:** New diagnostic criteria for NMOSD have been recently published. Our patient did not fulfilled the 2006 diagnostic criteria. However, she presented 2 core clinical characteristics with neuroimaging findings in accordance with clinical data, as required for the diagnosis of seronegative NMOSD. The CSF findings were partially in agreement. In fact the panel considered CSF pleocytosis (useful for differential diagnosis) and the presence of oligoclonal bands, on the contrary, as a red flag for diagnosis of NMOSD. It is needed a careful monitoring of clinical (further relapse, response to therapy) and humoral (serological retesting) data to strengthen the diagnosis and to better characterize heterogeneity of seronegative NMOSD patients

**Disclosure:** Nothing to disclose

## EPO3259

**Agrypnia excitata as main feature in anti-LGI1 antibodies encephalitis: a case report.**

S. Piffer<sup>1</sup>, G. Cantalupo<sup>2</sup>, R. Tanel<sup>1</sup>, S. Filippini<sup>1</sup>,  
V. Poretto<sup>1</sup>, M. Pellegrini<sup>1</sup>, B. Giometto<sup>1</sup>

<sup>1</sup>Emergency urgency Department, Neurological Ward, APSS Provincia Autonoma di Trento, Trent, Italy, <sup>2</sup>Child Neurology, University of Verona, Italy, Verona, Italy

**Background and aims:** Seizures, faciobrachial dystonic seizures (FBDS), behavioural changes, mnemonic deficit represent the clinical hallmark of Leucine-rich-glioma-inactivated1 (LGI1) autoantibodies associated encephalitis. Agrypnia excitata (AE) is a rare condition, observed in few diseases, characterized by disruption of the sleep-wake cycle, autonomic hyperactivation and episodes of oneiric stupor (EOS). We describe a singular case.

**Methods:** Detailed clinical, video-polysomnography (video-PS), laboratory and radiological assessment and long-term follow-up were done.

**Results:** A healthy 58-year-old man arrived at the emergency room because of confusion and generalized tonic-clonic seizure. During last month he had developed insomnia, behavioral change, spasms.

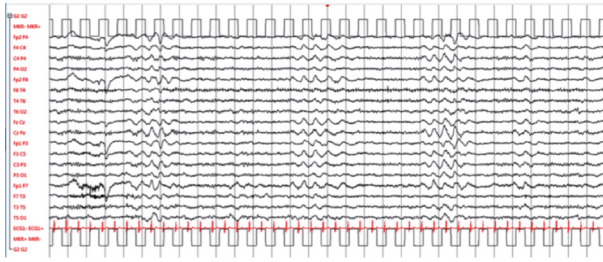
He was disoriented with deficit in episodic memory. During hospital-stay he showed FBDSs but, more significantly, a complete loss of the physiological sleep-wake cycle and dysautonomia with tachycardia and hyperhidrosis. During the day he fluctuated between an awake and a drowsy state and presented curious episodes of complex gestures mimicking various daily activities. Peripheral nerve hyperexcitability was absent.

Prolonged video-PS showed no epileptic patterns but only a mild slowdown of background activity and intermittent generalized delta slowdown without a regular wakefulness or sleep state.

Laboratory exam showed persistent mild hyponatremia. Brain positron emission tomography with fluorodeoxyglucose showed a hypermetabolism of hippocampi, amygdala and basal ganglia. Anti-LGI1 antibodies were found in cerebrospinal fluid.

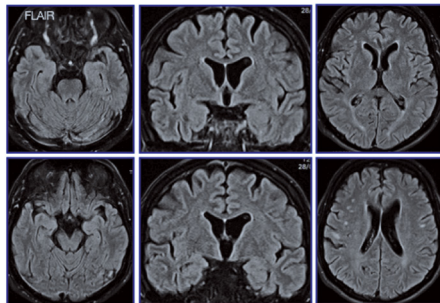
After high dose corticosteroids and plasma exchange a regular sleep-wake cycle was progressively achieved. Episodic memory and executive function deficits still persisted after 6 months of cyclophosphamide and rituximab therapy.

## Case Report - EEG



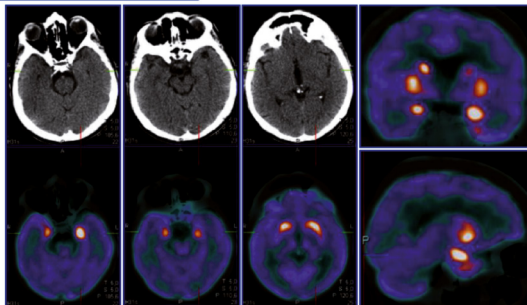
EEG

## Case Report - Brain MRI



brain MRI

## Case Report - Brain CT/PET/FDG



brain CT/PET with FDG

**Conclusion:** AE can be the major clinical feature of anti-LGI1 encephalitis. EOS represent a useful diagnostic marker.

**Disclosure:** Nothing to disclose

## EPO3260

## Probable autoimmune encephalitis with negative anti-neuronal antibodies: a diagnostic and therapeutic challenge

R. Pinheiro, F. Bernardo, S. Machado, A.N. Pinto,

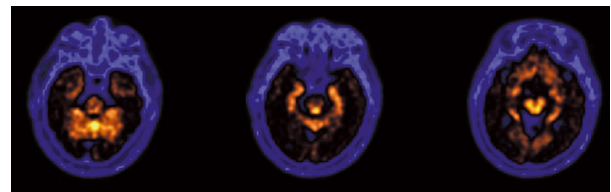
E.P. Parreira

Amadora, Portugal

**Introduction:** Autoimmune encephalitis (AE) is an increasingly recognized neurological disease. In the presence of a typical clinical presentation, with MRI, electroencephalographic and laboratory findings suggestive of encephalitis, particularly when an anti-neuronal antibody is identified, the diagnosis becomes evident. However, cases with negative anti-neuronal antibodies are a challenge with important prognostic implications.

**Methods:** (Case report - not applicable)

**Results:** Clinical Case: A 64-year-old alcoholic male presented with 2-months evolution of progressive cognitive impairment with memory, language and executive deficits, behavioural changes and consciousness fluctuations. The neurological examination revealed disorientation, global aphasia, attention impairment, facial hypomimia, axial and appendicular stiffness. MRI showed bilateral parietal and mesio-temporal atrophy and mild bilateral T2/FLAIR hyperintensity. EEG registered diffuse slowing of electrogenesis. The PET-FDG findings consisted of marked symmetric cortical hypometabolism. CSF analysis, extensive neuronal surface antibodies and occult neoplasia screening were negative. Because of the clinical and imaging findings suggestive of probable AE, he was treated with intravenous methylprednisolone followed by oral prednisolone, 2 cycles of intravenous human immunoglobulin and azathioprine. The patient recovered most of the initial deficits, maintaining slight verbal comprehension impairments.



PET-FDG: marked symmetric cortical hypometabolism

**Conclusion:** We present a case of possible AE with negative anti-neuronal antibodies and favourable clinical response after immunotherapy. Even in the absence of a specific anti-neuronal antibody, a typical clinical picture associated with imaging changes should raise the suspicion of AE and early immunotherapy initiated to improve functional response and reduce the likelihood of recurrence.

**Disclosure:** Nothing to disclose

## EPO3261

**Anti-GAD65 antibody-associated cerebellar ataxia as presentation of lung adenocarcinoma**

R. Pinheiro, F. Bernardo, S. Machado, A.N. Pinto,  
E.P. Parreira  
*Amadora, Portugal*

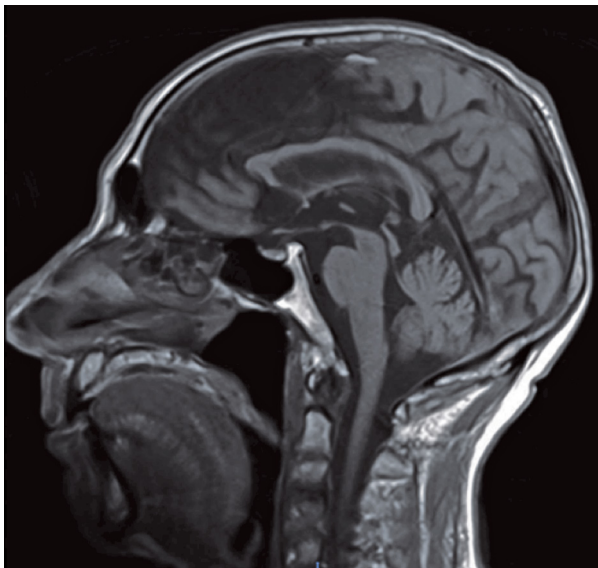
**Introduction:** Anti-GAD65 antibody-associated cerebellar ataxia is an immune-mediated cerebellar ataxia that occurs commonly in women with type 1 diabetes mellitus. Although not typically related to tumours, recent studies report a possible association of this clinical entity with occult neoplasms, resembling the classic paraneoplastic syndromes.

**Methods:** (Case Report - not applicable)

**Results:** Clinical Case: A 75-year-old male with heavy smoking and drinking habits presented with 3-month progressive worsening of gait imbalance, appendicular incoordination, dysarthria, dysphagia and weight loss greater than 10%. The neurological examination revealed moderate dysarthria, opsoclonus, hypermetric saccades, nystagmus and bilateral appendicular and axial ataxia. MRI revealed diffuse cerebral and cerebellar parenchymal atrophy. Spinal MRI, electromyographic and CSF findings were normal. The remaining investigation detected anti-GAD65 antibody, increased neuron-specific enolase and beta2-microglobulin. The search for an underlying tumour with whole body CT/PET-FDG revealed a right perihilar pulmonary mass and mediastinal-hilar adenopathies that were biopsied by bronchial echoendoscopy. The histopathological result was lung adenocarcinoma. The patient was initially treated with intravenous immunoglobulin, with transient improvement of the pancerebellar symptoms. Subsequently, with tumour chemotherapy there was total resolution of the symptomatology.

**Conclusion:** We present a case of anti-GAD65 antibody-associated cerebellar ataxia in a man with lung adenocarcinoma. Although rarely of paraneoplastic origin, the presence in an older male patient of constitutional symptoms and atypical neurological signs such as opsoclonus, should prompt active screening for occult neoplasm, due to the inherent therapeutic and prognostic implications.

**Disclosure:** Nothing to disclose



MRI: diffuse cerebral and cerebellar parenchymal atrophy

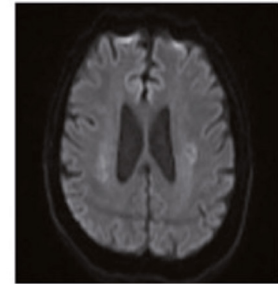
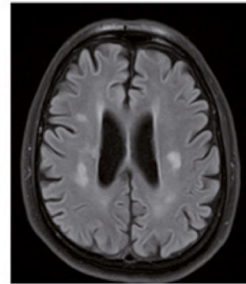
## EPO3262

**CNS Demyelination after Treatment with Nivolumab for Metastatic Melanoma**B. Popinhak<sup>1</sup>, G. Fernandes<sup>1</sup>, H. Andrade<sup>2</sup><sup>1</sup>Porto Alegre, Brazil, <sup>2</sup>Neurology, Moinhos de Vento Hospital, Porto Alegre, Brazil

**Introduction:** Immune checkpoint inhibitors (ICPIs) are agents against the ‘inhibitory’ co-stimulatory T-cell molecules currently approved for the treatment of advanced neoplasms such as metastatic melanoma, non-small cell lung cancer and Hodgkin’s lymphoma. However, they may trigger immune mediated neurological disorders, which may be fatal.

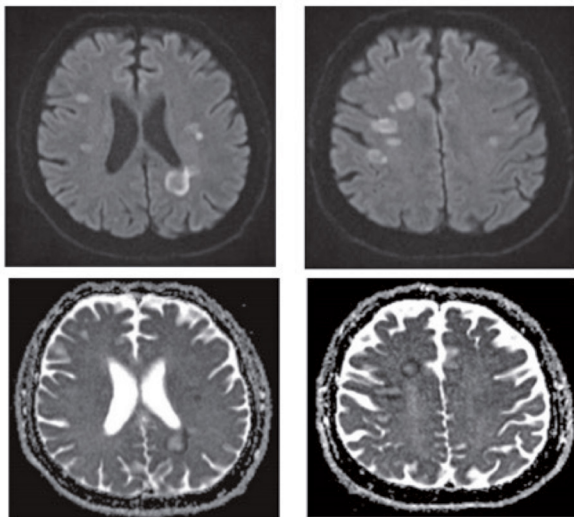
**Methods:** Case report of a patient diagnosed with central nervous system (CNS) demyelination after treatment with Nivolumab for metastatic melanoma.

**Results:** 65-year-old caucasian male, admitted with subacute onset of bradyphrenia, anomia and left lower limb paresis. Brain MRI showed multiple supratentorial nodular lesions with peripheral restricted diffusion, complete and incomplete halo of gadolinium enhancement, without significant edema (figure 1). Cerebrospinal fluid analysis showed normal cell count, glucose content and protein level. Oligoclonal bands were positive. A diagnosis of CNS demyelination was made. He was treated with methylprednisolone 1g daily for 5 days followed by intravenous human immunoglobulin 2g/Kg with complete clinical response a few days later. BrainMRI performed 6 months later showed resolution of gadolinium enhancement and significant decrease in the size of the lesions (figure 2). Since severe relapses have been reported, he was continued on azathioprine, still asymptomatic after one year of follow up.



**Conclusion:** Patients on ICPIs with neurological symptoms should be promptly evaluated for immune mediated disorders. Given its potential severity, we suggest aggressive immunomodulatory treatment with corticosteroids and IVIG in patients with severe symptoms. Continued immunosuppression should be considered.

**Disclosure:** Nothing to disclose



## EPO3263

**A fourth category of VGKC positive patients: A retrospective study from a south Indian population.**

R. Ramesh, P. Hazeena, S. Shanmugam, S. Venkatasubramanium  
*Neurology, Sri Ramachandra Institute of Higher Education and Research, Chennai, India*

**Background and aims:** Traditionally VGKC (Voltage Gated potassium channel) autoimmune encephalitis (AE) is categorized into LGI1, CASPR2, or both negative. We identified a 4th category of patients, who were positive for both LGI1 and CASPR2 and aim to highlight their clinical characteristics and outcomes.

**Methods:** We retrospectively selected patients admitted to a university hospital between January 2016 to December 2019 with a serologically proven diagnosis of VGKC positive AE. Patients with encephalopathy secondary to infection, structural lesions, drug/toxin related, nutritional or metabolic were excluded. Data on history, examination, baseline investigations, Cerebrospinal-fluid analysis, neuroimaging and outcomes were collected. Comparative analysis was done between the 3 VGKC autoimmune subgroups A) LGI1 positive B) CASPR2 positive and C) LGI1 and CASPR2 positive.

**Results:** 16 patients were included in the study, out of which 12 were positive for LGI1, 2 were positive for CASPR2, and 2 patients positive for both. Clinically 77% of LGI1 patients had behavioural changes, 55% had the characteristic facio-brachial dystonic seizures whereas 33% had GTCS (Generalised tonic-clonic seizures). Both the CASPR2 patients presented with behavioural changes, whereas one of them had hallucination, and fasciculation. In contrast patients who were positive for both antibodies, had isolated neuromyotonia. IVIG (Intravenous Immunoglobulin) was required for 2 patients from the LGI1 group, none from the CASPR2 group and for both dual positive patients.

**Conclusion:** The 4th subgroup highlighted in this study, describes patients with antibody positivity to both LGI1 and CASPR2, presenting with isolated neuromyotonia, with absence of seizure or behavioural disturbances, requiring IVIG, and making good recovery without relapses.

**Disclosure:** Nothing to disclose

## EPO3264

**Anti-IGLON5-Syndrom presenting fasciculations and oculomotor palsy associated with renal neoplasia**

E.H.U. Rauf<sup>1</sup>, A.B. Krahn<sup>1</sup>, W. Paulus<sup>2</sup>  
<sup>1</sup>*Clinical Neurophysiology, Georg-August-University, Göttingen, Germany,* <sup>2</sup>*Department of Neurology, Georg August Universität, Göttingen, Germany*

**Background and aims:** Anti-IGLON5-Syndrom is a new and likely underdiagnosed entity. Because of the unspecific symptom presentation patients often experience a grave disease progression until its diagnosis. Even if it is recognized in an early stage a fatal outcome still has a high incidence. The association with a paraneoplastic genesis can lead to the detection of early stage cancers, which offers a causal treatment for both, the neoplasia and the autoimmune encephalitis.

**Methods:** The following case report is based on clinical, neurophysiological and laboratory investigations as well as diagnostic imaging over a one year period.

**Results:** A 64-year-old patient presented with generalized fasciculations, incomplete palsy of the left N. abducens and the right N. oculomotorius, unsteady gait, hypo- and apnoea, catathrenia, fatigue, cognitive deficits, areflexia of the legs and ventricular premature beats. Extensive diagnostics led to the diagnosis of an HLA-DQB1\*05:01 positive anti-IGLON5-Syndrom with a significantly positive serum titre and the exclusion of competing differential diagnosis. After an initial treatment with high dose methylprednisolone for three days a partial recovery occurred. We initiated an immunosuppressive long-term treatment with azathioprine and intravenous immunoglobulin in 3-month cycles. A tumour screening revealed a left sided clear cell renal cell carcinoma (pT1a NX L0 V0 Ro G2). A complete resection without any complications was performed. Follow-up investigations showed a continuous decline of the serum titre and the symptoms.

**Conclusion:** Early immunosuppressive and eventually oncologic treatment is likely to reduce the symptoms and possibly leads to the depletion of antineuronal antibodies. A screening for malignancies should be performed repetitively.

**Disclosure:** Nothing to disclose

## EPO3265

**Assessment of immunomodulatory properties of Wharton's jelly mesenchymal stem cells in cultures with human oligodendroglia cell line MO3.13 and cerebrospinal fluids - regarding clinical applications in multiple sclerosis.**

K. Salwierał-Główna<sup>1</sup>, P. Piątek<sup>2</sup>, M. Namiecinska<sup>2</sup>, M. Matysiak<sup>2</sup>

<sup>1</sup>Lodz, Poland, <sup>2</sup> Department of Neurology, Laboratory of Neuroimmunology, Medical University of Lodz, Poland

**Background and aims:** Multiple sclerosis (MS) is a peculiar neurological disorder of immunological etiology. Experimental cell therapies using mesenchymal stem cells emerged as a response to the demand of a new treatment options, intrathecal rout of stem cells delivery in being tested. Wharton's jelly mesenchymal stem cells (WJ-MSCs) unique features (e.g. high proliferation rates, immunoregulatory potential) make them a very interesting research and therapeutic model. A model of WJ-MSCs and human oligodendroglia cell line MO3.13 (OLs) cultures incubated with cerebrospinal fluid (CSF) was designed to imitate the conditions of the subarachnoid space and reflect immunomodulatory particular properties of WJ-MSCs.

**Methods:** Cultures of WJ-MSCs and OLs conducted separately and simultaneously were incubated with 5% CSF collected from MS patients and healthy controls. After 48 hours of incubation supernatants were harvested and analyzed towards released 27 cytokines and trophic factors using Bio-Plex Multiplex Immunoassays (Biorad).

**Results:** In WJ-MSCs cultures we observed increased levels of cytokines: IL-1b, IL-5, IL-6, IL-8, IL-9, chemokines: IFN gamma, MCP-1, MIP-1b and trophic factors: G-CSF, FGF, VEGF. Addition of MO3.13 and MS CSF resulted in significant higher expression of IL-6, IL-8, eotaxin and MCP. In co-cultures incubated with control CSF IL-6 and IL-8 were hardly detectable.

**Conclusion:** Immunological and regenerative potential of WJMSCs are strongly dependent on the conditions of particular environment in which they are delivered. This features require further investigation to create a better model of cell therapy for MS patients.

**Disclosure:** Research was co-financed from a university grant for PhD student, Medical University of Lodz, Poland.

## EPO3266

**A case of a descending variant of Guillain-Barré syndrome masqueraded by Lyme disease**

J. Samuel, M. Dimitrova

Department of Neurology, UMHATEM "N.I.Pirogov", Sofia, Bulgaria

**Background and aims:** Guillain-Barré syndrome (GBS) is an acute immune-mediated polyneuropathy that usually presents with progressive ascending weakness. A descending presentation with onset in the face or arms, dysphagia, ophthalmoplegia and ptosis is less common. While there are many infections associated with GBS, the association with Lyme disease (LD) is rare.

**Methods:** A 39-year-old man presented with bilateral facial weakness, tingling in his fingers and neck pain. The patient underwent physical and neurological examinations (NE), Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) of the brain and cervical spinal cord, Nerve conduction studies (NCS), Cerebrospinal fluid (CSF) and serological tests for *Borrelia burgdorferi*.

**Results:** NE revealed bilateral peripheral Cranial Nerve (CN) VII palsy and decreased upper limb reflexes. No pathological changes were detected on the performed CT and MRI. CSF studies showed increased leukocytes and total protein. Due to positive serology and CSF for LD, he was started on antibiotic therapy. But while on therapy, he developed weakness in his hands. NCS showed demyelinating sensorimotor polyneuropathy in the upper limbs while NCS of the lower limbs were normal. A couple days later, due to complaints of tingling in his toes and difficulty walking, repeat NCS revealed demyelinating polyneuropathy in the lower limbs as well. IVIG was started, which halted progression of the weakness.

**Conclusion:** We aim to accentuate *Borrelia burgdorferi* as an important antecedent infection associated with the development of GBS. A wide spectrum of clinical features necessitates the exclusion of mimics to confirm a diagnosis of GBS.

**Disclosure:** Nothing to disclose

## EPO3267

### Use of a vaccinia virus gene product to neutralize interferon-alpha and improve the histopathology of HIV encephalitis in a mouse model

R. Shawahna

Pharmacology, An-Najah National University, Nablus, PALESTINIA

**Background and aims:** Interferon-alpha plays a key role in neurocognitive defects associated with human immunodeficiency virus (HIV) and HIV encephalitis. The aim of this study was to assess the effects of a novel inhibitor of interferon-alpha (B18R) in an HIV encephalitis severe combined immunodeficiency mouse model.

**Methods:** Human macrophages were cultured and infected with HIV-1. Mice (5 week old B6.CB17-Prkdcscid/SzJ) were inoculated with HIV-infected (n=16) or uninfected (n=8) macrophages. The B18R was produced by a modified recombinant procedure. Each B18R treated mouse received 50 mcg per day for 10 days. Brain sections were stained by an immunoperoxidase method. The genes ISG15, IFNA4, and Ifrg15 were analyzed using real-time polymerase chain reaction (PCR).

**Results:** Gene expression of interferon-alpha signaling was downregulated in the brain by B18R as shown by polymerase chain reaction (PCR). Mononuclear phagocytes were significantly decreased in mice treated with B18R when compared to untreated mice. However, neuronal arborizations were significantly retained in mice treated with B18R when compared to untreated mice. Significant increase in mononuclear phagocytes and loss of neuronal arborization are prominent signs of HIV encephalitis. Findings of this study indicated that the B18R crossed the blood-brain barrier, blocked interferon-alpha signaling in the brain, and improved defects associated with HIV encephalitis.

**Conclusion:** Findings of this study might suggest that B18R is a potential alternative to monoclonal antibodies used in the management of HIV encephalitis. Further studies are still needed to fully elucidate the effects of B18R in HIV encephalitis.

**Disclosure:** Nothing to disclose

## EPO3269

### A Phase 1 study to evaluate the safety, tolerability, pharmacokinetics, and pharmacodynamics of HBM9161 in Chinese healthy volunteers

D. Yap<sup>1</sup>, X. Zhou<sup>2</sup>, X. Chen<sup>2</sup>, M. Lee<sup>2</sup>, Y. Zhang<sup>2</sup>, M. Wang<sup>2</sup>

<sup>1</sup>Division of Nephrology, Department of Medicine, The University of Hong Kong, Hong Kong, Hong Kong (SAR of China), <sup>2</sup>Medicine, Harbour BioMed, Shanghai, China

**Background and aims:** Blockade of the binding between neonatal Fc receptor (FcRn) and IgG-Fc reduces circulating IgG, and thus emerges as a potential therapy for IgG-mediated autoimmune conditions.

**Methods:** This was a double-blind, randomised, single ascending dose study evaluating the safety, tolerability, pharmacokinetics (PK), and pharmacodynamics (PD) of HBM9161 (a fully human anti-FcRn monoclonal antibody) in healthy Chinese volunteers (NCT03971916). Subjects were given a subcutaneous (SC) dose of HBM9161 340, 510 or 680mg and then followed up for 85 days. Study endpoints included incidence of adverse event (AE), serum drug concentration, IgG, and anti-drug antibodies (ADA).

**Results:** A total of 24 subjects were enrolled. The observed PK profile is consistent with target mediated drug disposition (Figure 1). The median time to peak serum drug concentration was 36 hours (340mg) and 3.5 days (680mg). A dose-dependent IgG reduction started in 2 days and reached nadir within 2 weeks (Figure 2). The maximum mean IgG reductions were 23% (340mg), 35% (510mg), and 40% (680mg). The recovery of IgG started at Week 3 and returned to baseline by Week 8. All reported AEs were mild in severity. The most frequently reported AEs in the HBM9161 groups were influenza-like illness and rash (Table 1). Only 1 subject was tested ADA positive.

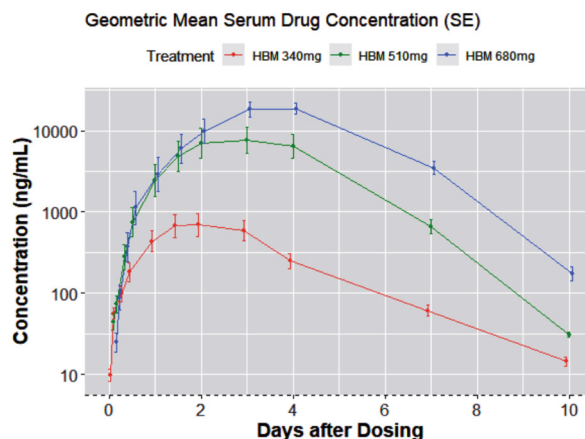


Figure 1. Mean Concentration-Time Profile Following Single Dose SC Administration of HBM9161



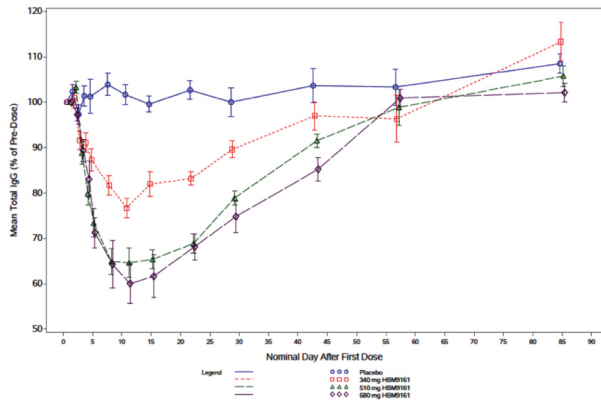


Figure 2. Mean IgG Concentration-Time Profile Following Single Dose SC Administration of HBM9161

	Placebo (N=6)	340 mg HBM9161 (N=6)	510 mg HBM9161 (N=6)	680 mg HBM9161 (N=6)	Overall (N=24)
Overall Total	5 (83.3%) (13)	5 (83.3%) (8)	5 (83.3%) (10)	2 (33.3%) (6)	17 (70.8%) (36)
Neurological disorders	2 (33.3%) (6)	1 (16.7%) (1)	0 (0)	1 (16.7%) (3)	4 (16.7%) (8)
Abdominal pain	1 (16.7%) (1)	0 (0)	0 (0)	0 (0)	1 (4.2%) (1)
Abdominal pain upper	1 (16.7%) (1)	0 (0)	0 (0)	0 (0)	1 (4.2%) (1)
Constipation	0 (0)	0 (0)	0 (0)	1 (16.7%) (1)	1 (4.2%) (1)
Diarrhea	1 (16.7%) (1)	1 (16.7%) (1)	0 (0)	1 (16.7%) (1)	3 (12.5%) (3)
Nausea/nausea/gastritis	1 (16.7%) (1)	0 (0)	0 (0)	0 (0)	1 (4.2%) (1)
Vomiting	0 (0)	0 (0)	0 (0)	1 (16.7%) (1)	1 (4.2%) (1)
General disorders and administration site conditions	1 (16.7%) (2)	1 (16.7%) (1)	5 (83.3%) (6)	1 (16.7%) (1)	8 (33.3%) (10)
Influenza like illness	1 (16.7%) (1)	1 (16.7%) (1)	0 (0)	1 (16.7%) (1)	3 (12.5%) (3)
Melasma	1 (16.7%) (1)	0 (0)	0 (0)	0 (0)	1 (4.2%) (1)
Immune system disorders	1 (16.7%) (1)	0 (0)	0 (0)	0 (0)	1 (4.2%) (1)
Hypersensitivity	1 (16.7%) (1)	0 (0)	0 (0)	0 (0)	1 (4.2%) (1)
Infections and infestations	1 (16.7%) (1)	0 (0)	1 (16.7%) (2)	0 (0)	2 (8.3%) (3)
Asymptomatic bacteriuria	0 (0)	0 (0)	1 (16.7%) (2)	0 (0)	1 (4.2%) (2)
Human papilloma virus	1 (16.7%) (1)	0 (0)	0 (0)	0 (0)	1 (4.2%) (1)
Investigations	1 (16.7%) (2)	2 (33.3%) (4)	1 (16.7%) (1)	0 (0)	4 (16.7%) (7)
Alanine aminotransferase increased	1 (16.7%) (1)	2 (33.3%) (2)	0 (0)	0 (0)	3 (12.5%) (3)
Aspartate aminotransferase increased	1 (16.7%) (1)	2 (33.3%) (2)	0 (0)	0 (0)	3 (12.5%) (3)
Gamma-glutamyl transaminase increased	0 (0)	0 (0)	1 (16.7%) (1)	0 (0)	1 (4.2%) (1)
Nervous system disorders	2 (33.3%) (2)	0 (0)	0 (0)	0 (0)	2 (8.3%) (2)
Headache	2 (33.3%) (2)	0 (0)	0 (0)	0 (0)	2 (8.3%) (2)
Respiratory, thoracic and mediastinal disorders	0 (0)	0 (0)	1 (16.7%) (1)	0 (0)	1 (4.2%) (1)
Dry throat	0 (0)	0 (0)	1 (16.7%) (1)	0 (0)	1 (4.2%) (1)
Skin and subcutaneous tissue disorders	1 (16.7%) (1)	2 (33.3%) (2)	2 (33.3%) (2)	1 (16.7%) (2)	6 (25.0%) (7)
Pruritus	0 (0)	0 (0)	0 (0)	1 (16.7%) (1)	1 (4.2%) (1)
Rash	1 (16.7%) (1)	2 (33.3%) (2)	1 (16.7%) (1)	1 (16.7%) (1)	5 (20.8%) (5)
Rash pruritic	0 (0)	0 (0)	1 (16.7%) (1)	0 (0)	1 (4.2%) (1)

Table 1. Summary of Adverse Events

**Conclusion:** A single SC dose of HBM9161 results in sustained and dose-dependent IgG reduction. HBM9161 is safe and well-tolerated at a dose up to 680mg in Chinese subjects. The data warrant further investigation for its effects in IgG-mediated autoimmune disorders including Myasthenia Gravis.

**Disclosure:** Dr. Desmond is the principal investigator of this trial sponsored by Harbour BioMed. The travel expense of Dr. Desmond for EAN is sponsored by Harbour BioMed. Xueying Zhou, Michael Lee, Yu Zhang, Meng Wang and Xiaoxiang Chen are full-time employees of Harbour BioMed.

## Infectious diseases 2

## EPO3270

**Locked-in syndrome after bacterial ventriculitis**

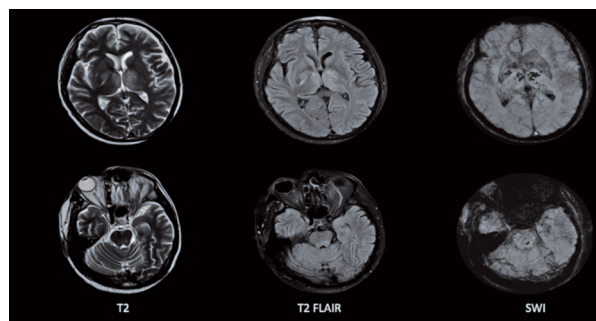
I. Luneva, J. Ryabinkina, M.A. Piradov

*Intensive Care Unit, Research Center of Neurology, Moscow, Russian Federation***Background and aims:** Ventriculitis is the inflammation of the ependymal lining of the cerebral ventricles.**Methods:** This is a case of a 32-years-old male. The debut of the disease with a headache, at the next increase in body temperature to 39,6°C. Brain MRI did not show pathology. Analysis of CSF revealed an increase in protein to 5g/L, cytosis 198/3, glucose 6.5mmol/L. On 7th day of the disease, disorientation, mydriasis and the absence of photoreactions appeared. The next day there was decrease in the level of conscious to coma, the patient was intubated and ventilated. Brain MRI showed ventriculitis, with signs of involvement of the membranes of the brain and spinal cord, and the next day the picture of dynamics in the form of an increase in occulal hydrocephalus, transtentorial wedging. PCR of CSF for *Listeria monocytogenes* was positive. On the 10th day the patient was admitted to our center. We prescribed ampicillin 12g/day plus gentamicin 5mg/kg weight/day. The patient had external ventricular drainage.**Results:** Against the background of therapy, the patient began to slightly shake his right hand, however, other movement his limbs were absent, muscle tone increased with formation of decerebral rigidity. Patient's condition was regarded as a type of locked-in syndrome. On Transcranial magnetic stimulation-EEG, the perturbation complexity index was corresponded to conscious activity. Nowadays, the patient can open eyes, walks with support, can speak, although his speech is dysarthritic.**Conclusion:** Ventriculitis is a serious disease secondary to infection. Timely identification of the agent and shunt placement with increasing hydrocephalus can improve outcomes.**Disclosure:** Nothing to disclose

## EPO3271

**Influenza-Associated Acute Necrotizing Encephalitis in Adult**

I. Luneva, J. Ryabinkina, M.A. Piradov

*Intensive Care Unit, Research Center of Neurology, Moscow, Russian Federation***Background and aims:** Seasonal flu is an acute respiratory infection caused by influenza viruses that circulate around the world. Acute necrotizing encephalitis is an extremely severe and rare complication of influenza in adults, with the high mortality rate.**Methods:** This is a case of a 59-years-old male patient. He developed fatigue, malaise, nasal congestion and a fever episode up to 39.1°C. On the 9th day of the disease he developed moderate cognitive impairment and dysarthria, and then his level of consciousness decreased to coma. The cerebrospinal fluid (CSF) analysis showed cytosis and protein 1.52g/L. CSF PCR for viruses was negative. Nasopharyngeal aspiration sample was positive for influenza virus.**Results:** On 17th day of the disease his neurological examination revealed generalized weakness and extreme drowsiness with severe confusion. He demonstrated meningeal syndrome, paresis of the downward gaze, anisocoria S>D, tetraparesis with low muscle tone and low tendon reflexes, myoclonus of the tongue and right hand. The patient was intubated and ventilated. Brain MRI showed hyperintense signal changes in thalami, left midbrain, right lenticular nucleus, internal capsules bilaterally, left para- and hippocampal gyri, and left frontal lobe. Those lesions had unclear margins and contained inclusions of hemosiderin in the thalami and right lenticular nucleus. Small petechial hemorrhages in both cerebral hemispheres were also found. Treatment with an influenza neuraminidase inhibitor was initiated along with IV corticosteroids.

Brain MRI, 17th day of the disease

**Conclusion:** As a result of the treatment, the patient's condition significantly improved. The patient was transferred to the rehabilitation department and has now fully recovered and returned to work.**Disclosure:** Nothing to disclose

## EPO3272

**Valacyclovir in the treatment of herpes simplex and varicella zoster encephalitides**

S. Maldonado Slootjes<sup>1</sup>, C. Bouvy<sup>1</sup>, L. Brassinne<sup>2</sup>, A. Broughton<sup>3</sup>, M.-P. Rutgers<sup>1</sup>

<sup>1</sup>Neurology, Europe Hospitals, Brussels, Belgium, <sup>2</sup>Clinical Biology, Europe Hospitals, Brussels, Belgium, <sup>3</sup>Nephrology, Europe Hospitals, Brussels, Belgium

**Background and aims:** Intravenous (IV) acyclovir is the standard treatment of varicella zoster and herpes simplex encephalitides (VZE and HSE respectively). Despite its high safety profile, IV acyclovir can cause severe nephrotoxicity and neurotoxicity. Yet, there are no clear recommendations in regard to alternative treatment when immediate IV acyclovir discontinuation is required.

**Methods:** Case report and brief literature review.

**Results:** An 82-year-old woman presented with delirium and a vesicular rash along left T6-T7 dermatomes. Polymerase chain reaction analysis of CSF was positive for varicella zoster virus (VZV). The patient was started on IV acyclovir 800mg 3x/day for VZE. Rapid improvement of her mental status ensued. However, after 48 hours of treatment, an abrupt 5fold raise in serum creatinine was noted. As acyclovir-induced nephrotoxicity was suspected, the drug was immediately discontinued. The following day, the patient showed psychomotor agitation and severe speech disturbances. Oral valacyclovir, the prodrug of acyclovir, was promptly initiated at a dose adapted to renal function. Mental status, serum creatinine and urine output progressively returned to normal after onset of the alternative antiviral therapy. The patient was discharged after a 10-day course of oral valacyclovir.

**Conclusion:** We report a case of VZV encephalitis successfully treated with oral valacyclovir after discontinuation of IV acyclovir due to drug-induced nephrotoxicity and discuss the potential of valacyclovir as continuation treatment and first-line treatment of VZE and HSE.

**Disclosure:** Nothing to disclose

## EPO3273

**Analysis on gender differences of the nervous system infections in the Moldovan tertiary neurology center**

E. Manole<sup>1</sup>, O. Grosu<sup>1</sup>, M. Gavriluc<sup>1</sup>, O. Odainic<sup>2</sup>

<sup>1</sup>Department of Neurology, Nicolae Testemitanu State University of Medicine and Pharmacy, Republic of Moldova, Chisinau, Moldova, <sup>2</sup>Neurology, National Institute of Neurology and Neurosurgery, Chisinau, Moldova

**Background and aims:** Scientific data suggests sex (biological) and gender (gender-based roles, behavior and power) differences in the manifestations of infections.

**Methods:** The study included 201 patients with neuroinfections admitted in the tertiary neurology center from 2007 to 2018. The diagnosis was confirmed based on clinical presentation, CSF, neuroimaging and laboratory testing. The data was analyzed with SPSS package for Windows.

**Results:** In the study sample 54.7% were men. No sex differences were noted in mean age (44.22±15.85 y), outcome and mortality rate (21.9%). Men were more likely to smoke (9.1% vs. 2.2%, p<0.05), drink alcohol (18.2% vs 6.6%, p<0.05), work outside the country (11.8% vs 1.1%, p<0.01) and have hepatitis (20.9% vs. 7.7%, p<0.01). The main clinical presentation was meningitis, mostly in men (64.5% vs 45.1%, p<0.01), in women – myelitis (16.5% vs 7.3%, p<0.05). Women presented more sensitive manifestations (19.8% vs 5.5%, p<0.01), cranial nerves palsies: n. III (17.6% vs. 8.2%, p<0.05), n.VI (13.2% vs 4.5%, p<0.05), seizures (17.6% vs 8.2%, p<0.05) and tetraparesis (41.9% vs. 19.4%, p<0.001). Neuroimaging shows encephalitic lesions in women (23.1% vs. 10.9%, p<0.05) and abnormalities of the adjacent structures in men (17.3% vs. 4.4%, p<0.01).

**Conclusion:** The analysis of our data revealed gender-based differences in exposure and clinical profiles in neuroinfections in a prospective cohort.

**Disclosure:** Nothing to disclose

## EPO3274

**Neurolisteriosis in a previously asymptomatic patient with serum IgM deficiency**

V.E. Papadopoulos<sup>1</sup>, T. Mavridis<sup>1</sup>, K. Patas<sup>2</sup>,  
A. Tountopoulou<sup>1</sup>, S. Chatzipanagiotou<sup>2</sup>,  
S. Vassilopoulou<sup>1</sup>

<sup>1</sup>Department of Neurology, Eginition Hospital, National and Kapodistrian University of Athens, Athens, Greece,

<sup>2</sup>Department of Medical Biopathology, Eginition Hospital, National and Kapodistrian University of Athens, Athens, Greece

**Background and aims:** *Listeria monocytogenes* (Lm), a Gram-positive facultative intracellular bacterium, is an uncommon, highly opportunistic human pathogen. In immunocompetent adults, the infectious process remains subclinical. However, Lm demonstrates a tropism for 2 immunologically tolerogenic sites: the fetoplacental unit in pregnant women and the CNS in elderly individuals or otherwise immunocompromised patients. We present a case of CNS infection caused by Lm (neurolisteriosis) in a previously asymptomatic adult patient.

**Methods:** Case report

**Results:** A 62-year-old male who had never experienced severe infections, presented with fever, confusion, irritation and severe occipital headache. The patient was put on empirical intravenous therapy with ceftriaxone, vancomycin, ampicillin and dexamethasone. PCR and culture of CSF showed infection by Lm. A diagnosis of neurolisteriosis was made and dexamethasone and ceftriaxone were discontinued. Further workup revealed reduced serum IgM levels that persisted well beyond the period of acute bacterial infection while levels of IgG and IgA isotypes were largely preserved. After 2 weeks, the patient was afebrile, fully oriented and free of headache. He was discharged in good clinical condition. Intriguingly, flow cytometry revealed a virtually absent membrane-bound IgM on B cells which substantially recovered after 12 months, suggesting that mechanisms other than defective membrane expression are underlying serum deficiency.

**Conclusion:** Opportunistic infections such as neurolisteriosis warrant thorough immunological examination, even in individuals at increased epidemiological risk. Inapparent predisposing factors such as serum IgM deficiency may underly this risk, as in our case. It is possible that circulating IgM has a role against Lm infection, particularly in the early course of host-pathogen interaction.

**Disclosure:** Nothing to disclose

## EPO3275

**Epilepsy in the M'bam Valley: some keys to unlock the mystery**

A. Morin<sup>1</sup>, M. Guillaume<sup>1</sup>, J. Senant<sup>1</sup>, B. Dupuy<sup>2</sup>,  
T. Tchoumi<sup>3</sup>, G. Nokam<sup>1</sup>, L. Guyant-Marechal<sup>1</sup>,  
L. Vallee<sup>4</sup>, E. Chokote<sup>5</sup>, M. Boussinesq<sup>6</sup>, R. Colebunders<sup>7</sup>,  
G. Gargala<sup>8</sup>, D. Parain<sup>9</sup>, A. Knjamnshi<sup>5</sup>

<sup>1</sup>Neurology, CHU ROUEN, Rouen, France, <sup>2</sup>Neurology, CHU CAEN, Caen, France, <sup>3</sup>Neurology, Hopital de Saintes, Saintes, France, <sup>4</sup>Neuropedatry, CHU Lille, Lille, France,

<sup>5</sup>Neurology, Université de Yaoundé, Yaounde, Cameroon, <sup>6</sup>Parasitology, Institute of Research for Development, Marseilles, France, <sup>7</sup>Infectious diseases, University of Antwerp, Antwerp, Belgium, <sup>8</sup>Parasitology, CHU ROUEN, Rouen, France, <sup>9</sup>Neurophysiology, CHU ROUEN, Rouen, France

**Background and aims:** Epilepsy in oncocercosis endemic African regions is overrepresented. Various types of epilepsy have been described across Africa based essentially on clinical descriptions.

We conducted an epidemiological, clinical and neurophysiologic study of epilepsy in the oncocercosis endemic region of Ntui, Cameroon in order to describe his electro-clinical phenotype.

**Methods:** Overall, 177 patients were explored based on the high prevalence of epilepsy in their family. Clinical data, standard EEG, and neuropsychological evaluation were recovered

**Results:** Epilepsy was clinically confirmed in 140/177 (79%) patients among whom 37 (24%) patients had encephalopathy associated epilepsy. A total of 108 EEG were recorded of which 36 (33%) considered abnormal: 27 (73%) revealed atypical specific abnormalities (bifronto-temporal spike and slow waves). Concerning the neuropsychological testings, 29% showed severe global cognition impairment, 28% severe episodic memory impairment and 66% severe frontal cognition impairment. Half of the patients suffered from mental disorder.

**Conclusion:** We described for the first time the electric and neuropsychologic pattern in oncocercosis associated epilepsy.

Surprisingly, epilepsy was associated with a specific EEG pattern in 73% of abnormal EEG, with mostly frontal and temporal involvement. We confirmed the impact of epilepsy on behavior and cognition with mostly frontal lobe involvement.

Those findings are consistent with a specific oncocercosis neurological tropism. Strong epidemiologic data in literature suggest causality between oncocercosis and CNS symptoms secondary to an autoimmune mechanism. We hypothesize that this mechanism involve mostly the frontal and temporal regions.

Preventing and curing oncocercosis might be a way to prevent immune reaction and reduce epilepsy in some African regions.

**Disclosure:** Nothing to disclose

## EPO3276

**Primary Amoebic Meningoencephalitis- A case report and review of literature**

N.C. Krishnadas<sup>1</sup>, F. Ghafoor<sup>2</sup>, M. Rafeequ<sup>2</sup>, A. Subir<sup>2</sup>  
<sup>1</sup>Perinthalmanna, India, <sup>2</sup>Neurology, MES Medical College, Perinthalmanna, India

**2-year-Background and aims:** A 12 year-old-girl with no significant past illness presented with fever, headache and mild disorientation of 3 days duration. On examination she had neck stiffness and mild blurring of nasal margin on fundus examination. There was no other localizing signs. The possibility of acute meningoencephalitis was considered and MRI Brain showed mild meningeal enhancement consistent with the clinical diagnosis. CSF study showed elevated opening pressure with polymorphonuclear pleocytosis, high protein and low glucose consistent with bacterial meningitis. However the CSF wet mount slide showed many mobile trophozoites of *Naegleria fowleri*. Diagnosis of PAM was made and child was immediately started on Amphotericin B, Rifampicin, Fluconazole and Azithromycin along with anti-oedema measures. Miltefosine was not available. She had no history of swimming in fresh water or exposure to any water sports. Guarded prognosis was explained to relatives. The child's sensorium progressively worsened and she succumbed to her illness in 12 hours due to cardiac arrest possibly secondary to brain oedema and central herniation.

**Methods:** none

**Results:** none

**Conclusion:** This is the classical presentation of PAM caused by *Naegleria fowleri*. The clinical picture, imaging and CSF study will very much resemble bacterial meningitis. This case illustrates the importance of routinely looking at the CSF wet mount in all meningitis cases. The mobile trophozoites can be easily visualised in wet mount which will confirm the diagnosis and helps in early initiation of treatment. Other protozoans like *Acanthamoeba* and *Balamuthia* usually presents as subacute meningitis and trophozoites are usually not visualized in CSF.

**Disclosure:** Nothing to disclose

## EPO3277

**Intracranial Aspergillosis presenting with multiple cerebral abscesses: A case report**

M. Nalbantoglu<sup>1</sup>, O. Gungor Tuncer<sup>1</sup>, E. Cevik<sup>2</sup>, F.D. Örken<sup>1</sup>

<sup>1</sup>Istanbul, Turkey, <sup>2</sup>Infectious Diseases and Clinical Microbiology, Istanbul Bilim University Medical Faculty, Istanbul, Turkey

**Background and aims:** Fungal brain abscess is a rare but serious condition which generally effects immuno-compromised patients.

**Methods:** Herein, we present a case of multiple intracranial aspergillus abscess who was treated with steroids after admission to hospital with hyponatremia and nephrotic syndrome.

**Results:** A 74-year-old female patient admitted to hospital with altered mental status, tendency to sleep and seizures. She had been hospitalized in nephrology department a week before with hyponatremia and nephrotic syndrome and was treated with steroids. In her cranial magnetic resonance imaging, peripheral contrast enhancing lesions and parenchymal oedema were observed in the left parietal lobe, insular cortex, putamen and right superior frontal gyrus, frontal lobe and precentral gyrus (Figure-1). Metastatic brain tumor was considered initially and biopsy was performed. The histopathologic examination was consistent with aspergillus infection (Figure-2). Thoracic and abdominal computed tomography and echocardiography findings revealed bilateral pleural and pericardial effusion, free fluid in the abdomen, diffuse subcutaneous oedema. SS-A and Ro-52 were positive. After the treatment with antifungal agents, Amphotericin B and then Voriconazole, brain oedema diminished and cranial lesions disappeared. Despite treatment the patient died at the 4th month of hospitalization.

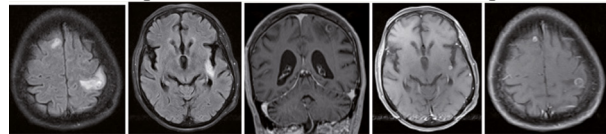


Figure -1

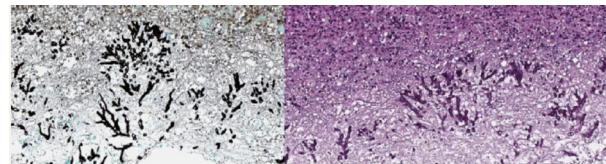


Figure -2

**Conclusion:** The clinical and laboratory diagnosis of cerebral aspergillosis is problematic and mortality is quite high, even in cases receiving appropriate treatment. Therefore, health professionals should be aware of the symptoms of *Aspergillus* induced brain abscesses, as early detection, accurate diagnosis and appropriate treatment may prove positive patient outcomes.

**Disclosure:** Nothing to disclose

## EPO3278

### Central Nervous System Involvement After Herpes Zoster Ophthalmicus: A Case Report

M. Nalbantoglu, D. Necioglu Orken  
Istanbul, Turkey

**Background and aims:** Herpes Zoster is a common infectious disease caused by the reactivation of latent varicella zoster virus (VZV) in dorsal sensory ganglia. In patients with active zoster infection a variety of neurologic complications may occur.

**Methods:** Here we report an immune-compromised patient who developed meningitis after herpes zoster ophthalmicus.

**Results:** A 75-year-old woman with known diabetes mellitus and hypertension admitted to hospital with headache, vertigo, vomiting. She was diagnosed as having ophthalmic herpes zoster and was treated with 3g of oral valacyclovir for 7-days, 2 weeks ago. On physical examination she had scars of herpetic eruption and pigmentation over the left orbita. On neurological examination she had left pupillary mydriasis, left semi-ptosis and limited upward gaze. MRI of the brain and orbita was performed with and without gadolinium contrast. T2-weighted-axial images showed increased signal in extra-ocular muscles on the left and enlargement of retro-orbital fat tissues, compatible with edema. MRI also revealed contrast enhancement of the dura adjacent to the left orbital roof and the left optic nerve sheath (Figure-1). Cytochemical analysis of cerebrospinal fluid (CSF) showed 84 white blood cells/ml and protein level was 104.8mg/dl. Polymerase chain reaction analysis of CSF was negative, Ig G antibody was positive for VZV. The patient was treated with intravenous acyclovir and recovered within one month.

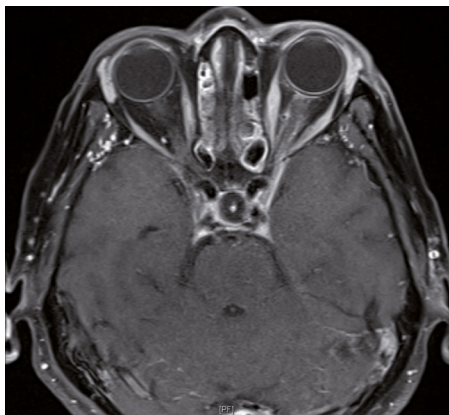


Figure- 1

**Conclusion:** An uncommon but serious complication of herpes zoster ophthalmicus is zoster meningoencephalitis. Early recognition of neurological complications especially central nervous system involvement is important because it is a potentially life-threatening complication and prompts acute, appropriate antiviral treatment.

**Disclosure:** Nothing to disclose

## EPO3279

### Tuberculoma of the central nervous system in the setting of miliary TB in an immunocompetent patient: Case report

H. Peran, U. Emre

Department of Neurology, Istanbul Training and Research Hospital, Istanbul, Turkey

**Background and aims:** Intracranial tuberculoma is a rare form of tuberculosis with non-specific clinical manifestation. Due to the similarity of its clinical features with many other infectious and non-infectious lesions in the brain, diagnosis is difficult.

**Methods:** Case report

**Results:** We report a case of intracranial tuberculoma in a 35-year-old immunocompetent patient, presented with 6 weeks of severe left hip pain and difficulty in walking. On admission, she had 4/5 strength in the left lower extremity and no meningeal signs. Her past medical history was significant for double J stent for 2 times due to ureteral stricture and pulmonary embolism. Cranial MRI revealed multiple contrast-enhancing ring-shaped lesions in supratentorial and infratentorial neuroparenchyma with surrounding oedema. Cerebrospinal fluid analysis revealed no WBC, protein 41g/dL, glucose 75mg/dL, a negative culture and polymerase chain reaction for Mycobacterium tuberculosis complex. In differential diagnosis metastasis and abscess were taken into consideration. MR spectroscopy demonstrated cerebral tuberculomas. Furthermore, thoracic computerized Tomography (CT) was highly suggestive of miliary tuberculosis and abdominal CT revealed tuberculous pyelonephritis as the potential cause of ureteral stricture. The patient had a good initial clinical response to quadruple anti-tuberculous treatment. The follow-up cranial MRI showed that the lesions had become smaller or disappeared.

**Conclusion:** Tuberculoma should be considered in the differential diagnosis, even in immunocompetent patients with non-specific clinical presentation and involvement of multiple systems such as genitourinary system or central nervous system. The significance of our case is due to the presence of intracranial tuberculomas in the setting of miliary tuberculosis.

**Disclosure:** Nothing to disclose

## EPO3280

**Neurological Measles Complications, Encephalitis in an Immunocompromised Host**

L. Popa, S. Petrescu, R.-S. Gurgu, G. Vulpe, I. Codita, C. Panea

*Neurology, Elias Emergency University Hospital, Bucharest, Romania*

**Background and aims:** In Romania, in the last decade, approximately 10 percent less children were vaccinated against measles, due to parents' refusal to vaccinate their children, as well as insufficient vaccine supply. Outbreaks of measles begin to occur once population immunity threshold decrease below 94%.

**Methods:** We present the case of a 19-year-old female, known with primary immune deficiency, with history of generalized skin eruption three months before, compatible with measles, admitted to the Neurology ward for vision field loss and balance disturbance, with a febrile episode 10 days before the debut of symptoms.

**Results:** Brain imaging performed at admission through native MRI revealed left cortical parietal and occipital T2 hypersignal. EEG evaluation was compatible with non convulsive epileptic status.

Subacute measles encephalitis affects both children and adults with defective cell mediated immune responses. The viral infection usually precedes the encephalitis 1 to 6 months and the cerebrospinal fluid may be normal and the levels of measles antibodies do not increase.

The history of measles type eruption, the febrile episode, the progressive deterioration of the neurological clinical status and the evolution of the brain lesions, despite the treatment, in an immunocompromised patient, were highly suggestive for measles inclusion body encephalitis.

**Conclusion:** Although neurological complications following measles infection are rare, they can be devastating. Measles vaccination is the most efficient prophylaxis against the infection and its complications. Protection of immunocompromised patients and children - before reaching the inoculation age, can be achieved by vaccinating a high percentage of population.

**Disclosure:** Nothing to disclose

## EPO3281

**Streptococcus suis meningitis in the Canary Islands: first two reported cases.**

I. Sánchez-Miranda Román, I. Martín Santana, R. Malo de Molina Zamora, L.M. Pérez Navarro, J. Castellano Santana, R. Jiménez Bolaños  
*Neurology, Complejo Hospitalario Universitario Insular Materno-Infantil, Las Palmas de Gran Canaria, Spain*

**Background and aims:** Streptococcus suis (S. suis) is a zoonotic pathogen that causes bacterial meningitis, especially in people having occupational contact with pigs or porcine products. The mortality rate is low, but many patients remain with hearing loss or ataxia. Although most cases occur in southeast Asia, human infection has also been described in Europe, less than 15 cases reported in Spain. We present 2 patients with S. suis meningitis (SSM) in the Canary Islands.

**Methods:** Report of 2 cases of SSM occurred in our center between 2014-2019 and literature review.

**Results:** 2 men, 54 and 56 years old, respectively, were admitted to the hospital. 1 worked as a butcher and had a 1-month-history of fever, hearing loss and gait instability. The other one manipulated raw pork without protection and had skin lesions in his hands. He was brought to the emergency department with a meningeal syndrome and altered mental status. Both cerebrospinal fluid analysis revealed pleocytosis and hyperproteinorrachia, with low glucose level in the 2nd case. S. suis was isolated from blood cultures in the 2 of them and they were treated with ceftriaxone for 2 weeks, with a favorable outcome. Repeated blood cultures were negative; however, both ended up with severe neurosensorial hearing loss and gait ataxia as sequelae.

**Conclusion:** To the best of our knowledge, these are the 1st 2 reported cases of SSM in the Canary Islands. Despite its infrequency in our country, we must remember the importance of recording the occupational history at anamnesis and start early treatment if suspected.

**Disclosure:** Nothing to disclose

## EPO3282

**Introduction of Multi-PCR - Impact on the dose of Acyclovir and Antibioti-infectives in adult patients with pleocytosis**H. Schmidt<sup>1</sup>, B. Wiebalck<sup>1</sup>, B. Volkmer<sup>2</sup><sup>1</sup>Neurologie, Elbe Kliniken Stade, Stade, Germany, <sup>2</sup>EKSB Forschungs- und Studienzentrum (FSE), Elbe Kliniken Buxtehude, Buxtehude, Germany

**Background and aims:** Cerebrospinal fluid (CSF) is needed for the work-up of meningitis, headache, disturbances of conscience, cranial nerve affections or autoimmune-related CNS-processes. Often, the initial treatment of pleocytosis consists of both antiviral and antibiotic agents until lab-results enable final diagnosis. Length of potentially harmful multimodal therapies is determined by the speed to arrival of lab-results. In this observatory, monocentric study, we report the impact of insourcing ME-PCR and Antibody-specific Indices (AI)-measurements for HSV and VZV in comparison to external laboratory analysis on length of hospital stay (LOS), interval to results, cumulative dose/duration of anti-infective agents.

**Methods:** 280 consecutive patients (m=136/f=144) with pleocytosis (leukocyte count > 4/ $\mu$ l) were analysed, N=114 with an external laboratory work-up, 166 with inhouse management. Groups were compared with 2-sided (t-test for normally distributed, U-test for not-normally distributed data) tests. Frequencies were compared with Chi-square-test.

**Results:** Age (61.6 $\pm$ 1.8 vs. 56.9 $\pm$ 1.6 years, p=0.06), renal-, liver-function-parameters and gender distribution (p=0.07) did not differ between the groups. Insourcing shortened the interval from LP to PCR- and AI-results significantly. Cumulative ABX and Acyc-use per patient were significantly lower in the inhouse than in the external-lab-group (both p<0.001). Likewise, the length of antibiotic and antiviral therapy was significantly lower in the inhouse than in the external-lab-group (both p<0.001).

**Conclusion:** Insourcing of ME-PCR and AI-determinations shortened significantly the interval of diagnostic uncertainty. Thereby, LOS and the exposure to anti-infective agents with their potential side-effects was lowered.

**Disclosure:** The study was sponsored by BioMérieux, Marcy l'Etoile, France

## EPO3283

**A case of Cryptococcal meningitis in a patient with ANCA-associated vasculitis and glomerulonephritis**V. Vasilev<sup>1</sup>, J. Samuel<sup>1</sup>, M. Dimitrova<sup>2</sup><sup>1</sup>Sofia, Bulgaria, <sup>2</sup>Neurology, UMHATEM "N.I.Pirogov", Sofia, Bulgaria

**Introduction:** Cryptococcal meningitis (CM) is a deadly systemic opportunistic fungal infection caused by members of the *Cryptococcus neoformans* species. Severe infections of the lungs and skin are common complications of immunosuppressive treatment for antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis while CNS infections are relatively rare. Common risk factors for infection are use of high-dose corticosteroids, antibiotics exposure and intrinsic disorders of cell-mediated immunity

**Methods:** A 44-year-old male with a history of ANCA-associated vasculitis and glomerulonephritis, undergoing daily immunosuppressive treatment with 40mg prednisolone presented to our neurology clinic with complaints of headache, neck rigidity, fever, nausea, vomiting, extreme fatigue, dysuria and periods of confusion. Concomitant diseases included corticosteroid-induced diabetes mellitus, arterial hypertension, and moderate chronic renal failure. He underwent physical and neurological examinations, Computed Tomography (CT) of the brain, ophthalmological tests, Cerebrospinal fluid (CSF) and blood microbial cultures, and consultations with the following specialists: infectious diseases, ophthalmologists and nephrologists.

**Results:** Neurological examination revealed positive meningeal irritation signs. No pathological changes were detected on the brain CT. CSF studies showed increased levels of leukocytes, total protein and decreased glucose levels. *Cryptococcus neoformans* was isolated from CSF and blood cultures. Ophthalmological tests revealed impaired vision and papilloedema. The patient tested negative for HIV. Initial antibiotic treatment with Ceftriaxone was replaced by combination therapy with Vancomycin and Fluconazole which lead to improvement in the patient's condition. He was discharged on prolonged oral Fluconazole therapy.

**Conclusion:** We present a successfully treated case of Cryptococcal meningitis in an immunosuppressed HIV negative patient with long-term corticosteroid therapy.

**Disclosure:** Nothing to disclose



## EPO3284

**A case of Cryptococcal meningitis in a patient with ANCA-associated vasculitis and glomerulonephritis**

V. Vasilev, M. Dimitrova

Neurology, UMHATEM "N.I.Pirogov", Sofia, Bulgaria

**Background and aims:** Cryptococcal meningitis (CM) is a deadly systemic opportunistic fungal infection caused by members of the *Cryptococcus neoformans* species. Severe infections of the lungs and skin are common complications of immunosuppressive treatment for antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis while CNS infections are relatively rare. Common risk factors for infection are use of high-dose corticosteroids, antibiotics exposure and intrinsic disorders of cell-mediated immunity.

**Methods:** A 44 year old male with a history of ANCA-associated vasculitis and glomerulonephritis, undergoing daily immunosuppressive treatment with 40mg prednisolone presented to our neurology clinic with complaints of headache, neck rigidity, fever, nausea, vomiting, extreme fatigue, dysuria and periods of confusion. Concomitant diseases included corticosteroid-induced diabetes mellitus, arterial hypertension, and moderate chronic renal failure. He underwent physical and neurological examinations, Computed Tomography (CT) of the brain, ophthalmological tests, Cerebrospinal fluid (CSF) and blood microbial cultures, and consultations with the following specialists: infectious diseases, ophthalmologists and nephrologists.

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**Conclusion:** We present a successfully treated case of Cryptococcal meningitis in an immunosuppressed HIV negative patient with long-term corticosteroid therapy.

**Disclosure:** Nothing to disclose

## EPO3285

**Serological and molecular genetic studies on the involvement of hepatitis E virus in the pathogenesis of neurological diseases**

S. Zhelyazkova-Glaveeva<sup>1</sup>, E. Golkocheva-Markova<sup>2</sup>,

A. Kevorkyan<sup>3</sup>, T. Tenev<sup>4</sup>, E. Shikova<sup>5</sup>, I. Tournev<sup>6</sup>

<sup>1</sup>Sofia, Bulgaria, <sup>2</sup>NRL „Hepatitis viruses”, National Center of Infectious and Parasitic Diseases, Sofia, Bulgaria,

<sup>3</sup>Department of Epidemiology, Faculty of Public Health,

Medical University, Plovdiv, Bulgaria, <sup>4</sup>NRL „Hepatitis

viruses”, National Center of Infectious and Parasitic

Diseases, Sofia, Bulgaria, <sup>5</sup>NRL “Herpes and Oncogenic

Viruses”, National Center of Infectious and Parasitic

Diseases, Sofia, Bulgaria, <sup>6</sup>Sofia Medical University,

Department of Neurology, University Hospital

Alexandrovskia, Department of Cognitive Science and

Psychology, New Bulgarian University, Sofia, Bulgaria

**Background and aims:** The aim of the present study was to determine the involvement of hepatitis E virus in the pathogenesis of neurological disorders.

**Methods:** Blood serum specimens and cerebrospinal fluid were tested for the presence of antibodies against HEV (anti-HEV IgM and IgG) and for infection with other hepatotropic viruses, cytomegalovirus and Epstein-Bar virus for accurate selection of the target population and detection of patients with co-infections and viral infections giving false positive results. Antibodies against HEV were demonstrated by the use of immunoassay methods - ELISA and real-time polymerase chain testing to determine the viral concentration of HEV.

**Results:** Of the 40 patients enrolled in the study, 21 (53%) tested positive for HEV antibodies (mean age 56 years; 4 females and 17 males), with 8 (40%) positive for anti-HEV IgM and anti-HEV IgG. Only in one anti-HEV IgM and IgG positive patient demonstrated HEV RNA in serum. Also tested for the presence of HEV RNA were 12 CSF, none of which gave a positive result. Of 21 HEV-positive patients, 11 were with Guillain-Barré syndrome, 1 with Miller-Fisher syndrome, 2 with acute motor-sensory axonal neuropathy, 5 with chronic inflammatory demyelinating polyneuropathy, 1 with myelitis and 1 with progressive multifocal leukoencephalopathy. Mild elevation in levels of liver enzymes was discovered only in one-third of our patients.

**Conclusion:** HEV infection was frequently associated with neurological complications and testing for this infection should be considered in all patients with Guillen-Barre syndrome and any likely inflammatory peripheral nerve disorder especially in cases with elevated liver enzymes.

**Disclosure:** The project was supported by grant D-104/03.05.2018 of the Medical University, Sofia, Bulgaria

## Neuro-oncology

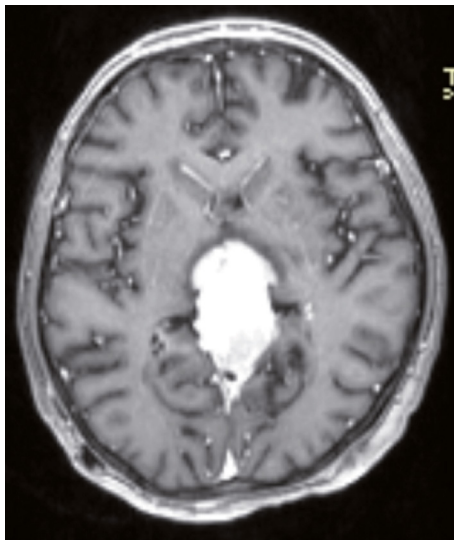
## EPO3286

**CNS Germinoma with synchronous lesions in the sellar and pineal regions**

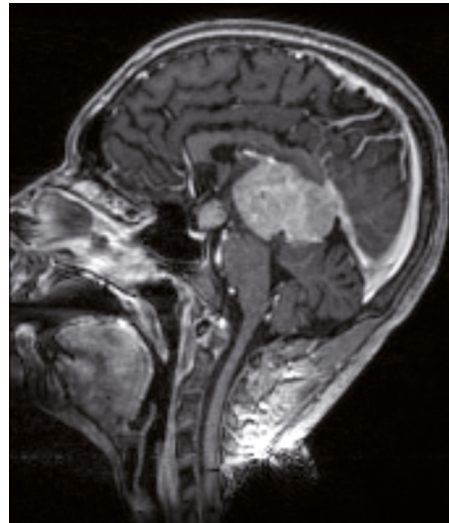
A. Simonyan<sup>1</sup>, A. Mikhaylova<sup>2</sup>, L. Lepsveridze<sup>1</sup>  
<sup>1</sup>Neurosurgery, Burnazian FMBC Research Center of FMBA of Russia, Moscow, RF, Moscow, Russian Federation,  
<sup>2</sup>Neurology, Burnazian FMBC Research Center of FMBA of Russia, Moscow, RF, Moscow, Russian Federation

**Background and aims:** Germinomas comprise approximately 2-5% of all CNS malignancies<sup>2</sup>, and have a favourable prognosis with a greater than 90% overall survival<sup>1</sup>. Most of them arise in the pineal and suprasellar region<sup>2</sup>. Synchronous lesions occurs in 5-10% of all cases<sup>2</sup>. Worse outcomes in case of CNS germinomas are relatively rare.

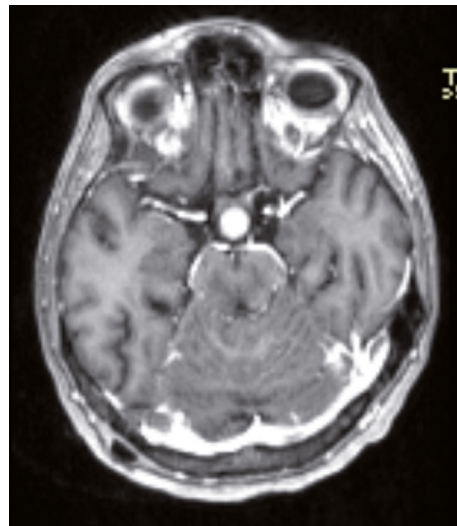
**Methods:** We report a case of 28-year-old male, presented with motor aphasia, visual impairment, dysphagia and hyperkinesia in left hand. In period of last 15 months patient underwent triventriculostomy, external ventricular draining, ventriculoperitoneal shunting due to occlusive hydrocephalus developed due to compression of cerebral aqueduct. MRI revealed volume formations of the pineal and sellar regions (Fig 1-3). Tumor markers from blood and CSF (AFP,  $\beta$ -HCG) were within the normal range. Tracheostomy was performed for prevention of aspirative pneumonia.



T1 WI C+, Axial MRI shows the strong, homogenous enhanced mass in pineal region with brain invasion



T1 WI, Sagittal MRI shows the mass hyperintense to GM in sellar and pineal regions



T1 WI C+, Axial MRI shows the strong, homogenous enhanced mass in sellar region

**Results:** Taking into account the severity of the patient's condition (Karnovsky index - 40%, massive bilateral iliofemoral thrombosis with subocclusion of the infrarenal segment of inferior vena cava), and extremely high risks of complications, consilium decided to refrain from surgical intervention and adjuvant therapy. Patient died after 3 months.

**Conclusion:** Histological changes in tumors corresponds to the germinoma. We don't undertake to judge whether there was diagnostic omission, or incorrect treatment in this case. But in our opinion, in case of suspected CNS germinoma, it is necessary to conduct more "aggressive treatment". Symptomatic treatment should be used in cases, where the treatment of main disease is impossible. We hope that this sad clinical case will help Neurosurgeons in making decisions in a difficult situation.

**Disclosure:** Nothing to disclose

## EPO3287

### Loss of IDH1 driver mutation during the progression of an anaplastic oligodendroglioma: an exceptional event associated with an aggressive phenotype

E. Munoz Musat<sup>1</sup>, G. Berzero<sup>1</sup>, F. Bielle<sup>2</sup>, L. Capelle<sup>3</sup>, M. Sanson<sup>1</sup>, M. Touat<sup>1</sup>

<sup>1</sup>Service de Neurologie, APHP Pitié-Salpêtrière, Paris, France, <sup>2</sup>GHPS, Paris, France, <sup>3</sup>Neurosurgery, Pitié Salpêtrière Hospital, Paris, France

**Background and aims:** IDH1/2 mutations are recurrent events typically described as the earliest genetic alteration in lower grade gliomas. Their loss during tumor progression is exceptional

**Methods:** We performed a longitudinal histomolecular analysis in a patient with anaplastic oligodendroglioma whose tumor lost its IDH1 mutation at recurrence.

**Results:** A 58-year-old female patient presented in November 2017 with cognitive impairment revealing a right fronto-callous enhancing lesion. She had a partial resection of the lesion and was diagnosed with anaplastic oligodendroglioma, IDH1-mutant and 1p/19q co-deleted. She received adjuvant chemotherapy with PCV from January until June 2018. In July 2019, tumor recurrence motivated a second resection. Surprisingly, the histological examination of the recurrent sample showed 2 distinct components: a sector of IDH1-mutant grade II oligodendroglioma, associated with areas of IDH1-wild-type glioblastoma. Sequencing confirmed the IDH1 mutation loss in the latter area. Radiochemotherapy treatment was started. Unfortunately, the tumor rapidly progressed with the development of subcutaneous metastases, leading to the patient's death only one month after the radiotherapy.

**Conclusion:** The loss of an IDH1/2 driver mutation is an exceptional event during the progression of gliomas, never reported to our knowledge in oligodendrogliomas. In this patient, 3 main hypotheses are considered: (i) the most likely, loss of the IDH1 mutation within a subclone leading to acquired resistance and recurrence; (ii) existence of an IDH1-wild-type founding clone which evolved in distinct contingents; (iii) development of 2 phylogenetically unrelated gliomas in the same patient. Complementary molecular analyses are ongoing to decipher the specific mechanism in this patient.

**Disclosure:** Nothing to disclose

## EPO3288

### The diagnostic journey towards an Osteoid Osteoma: a case presentation

B.-O. Nemes<sup>1</sup>, M.S. Ilut<sup>2</sup>, D.F. Muresanu<sup>3</sup>

<sup>1</sup>Neuroscience, County Emergency Hospital Cluj-Napoca, Cluj, Romania, <sup>2</sup>Neurology, "Iuliu Hațieganu" University of Medicine and Pharmacy, Cluj-Napoca, Romania, Cluj, Romania, <sup>3</sup>Cluj, Romania

**Background and aims:** Osteoid osteoma accounts for 10% of benign bone lesions with a male predilection that usually affects long bones.

**Methods:** A 30-year-old male patient was admitted for pain started a year ago in the right shoulder which irradiates in the hand. Pain is relieved by NSAID medication. Patient occupation involves heavy physical activity and the neurological examination reveals limitation at the abduction of the right arm.

**Results:** Electroneuromyography, right shoulder and humerus radiography normal. Cervical MRI showed cervical discopathy. Meanwhile the initial response to NSAID fade away, there was no response to propranolol, and the patient is put on corticoids for a short period of time with limited response. The patient was redirected to rheumatology. After clinical examination and muskolokeletal ultrasound they raise the possibility of a reflex sympathetic dystrophy and a MRI for the right shoulder is recommended. The MRI reveals a signal modification of the proximal humeral diaphysis (Fig.1) and a full upper limb MRI combined with CT are suggested. The upper limb MRI showed a nidus in the upper 1/3rd of the humerus (Fig.2), further confirmed by CT (Fig.3), suggestive for osteoid osteoma. The patient was redirected to orthopedy for surgery and the pathology report confirmed the final diagnostic of osteoid osteoma.

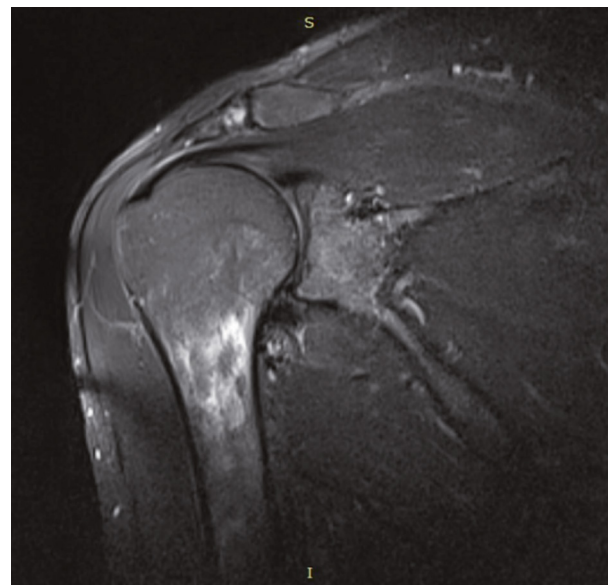


Fig.1

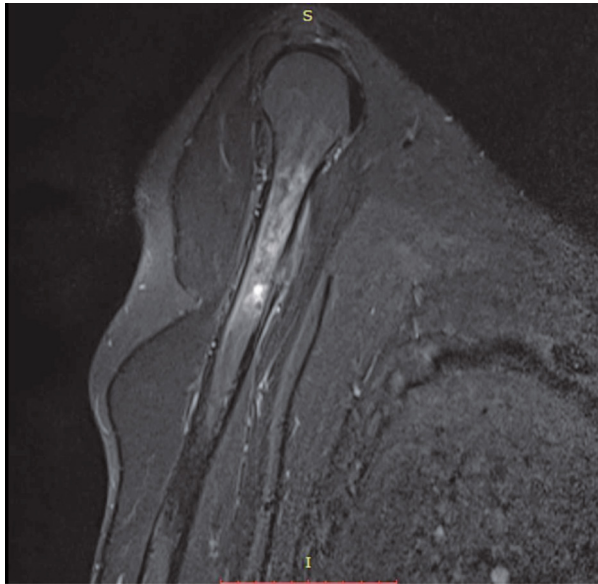


Fig.2

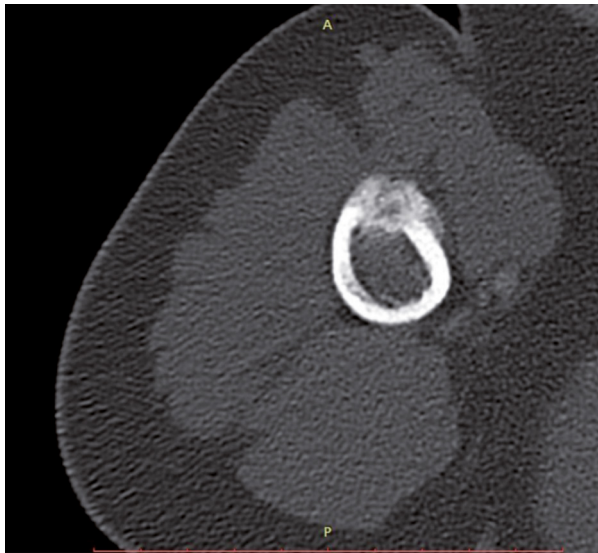


Fig.3

**Conclusion:** The particularities of the case are the unspecific symptomatology, the patient occupation that misguided our initial diagnostic and the latency of almost one year from initial symptoms to visible lesion on imagistic examination.

**Disclosure:** Nothing to disclose

## EPO3289

### Fourth ventricle ependymoma masquerading as Guillain-Barré syndrome

C. Predoiu<sup>1</sup>, I. Gobej<sup>1</sup>, A. Danau<sup>2</sup>, L. Dumitrescu<sup>3</sup>, R. Tanasescu<sup>4</sup>, B.O. Popescu<sup>5</sup>

<sup>1</sup>Neurosurgery, Clinical Hospital Colentina Bucharest, Bucharest, Romania, <sup>2</sup>Department of Neurology, Colentina Clinical Hospital, Bucharest, Romania, <sup>3</sup>Neurology, Clinical Hospital Colentina Bucharest, Bucharest, Romania, <sup>4</sup>Nottingham, United Kingdom, <sup>5</sup>“Carol Davila” University of Medicine and Pharmacy Bucharest, Bucharest, Romania

**Background and aims:** Ependymomas are relatively rare tumors, accounting for 9% of total gliomas, occurring at any age. They arise from the lining ependymal cells of the ventricular system and the ependymal canal. Topographically, ependymomas are spinal, supra- and infratentorial, the former being more common in adults and the latter in pediatric population. Histologically, WHO classifies ependymomas in 3 grades of malignancy: 1st grade are benign, 2nd either benign or malign and may cause relapse and 3rd are malign, relapses and metastases being frequent.

**Methods:** We report the case of a 30-year old caucasian male who 14 days prior to admission in our Clinic presented with ascending tetramelic dysesthesias and weakness. He had an undocumented history of posterior fossa tumor for which he underwent surgery 3 years before this admission. Neurological examination revealed tetraparesis and absent osteotendinous and plantar reflexes. Albuminocytological dissociation was found in the cerebrospinal fluid (CSF) examination. The presumptive diagnostic was Guillain-Barré syndrome, but clinical idiosyncrasies and lack of electroneuromyographic findings prompted imagistic evaluation of the cervical spinal cord followed by whole CNS magnetic resonance imaging (MRI).

**Results:** The MRI studies revealed contrast-enhancing polilobular cystic mass in the IV-th ventricle extending to C2-C3 intervertebral disk, consistent with an ependymoma. A small thoracic spinal cord mass suggesting an intrathecal metastasis was also found.



T2-weighted image sagittal section of the brain stem and upper spine showing a hyper-isointense mass with a cystic component in the 4th ventricle, extending to C2 level. A nodular T2 isointense intradural mass compatible with an ependymoma metastasis at T2 thoracic spinal cord

**Conclusion:** Temporary inhibition of gamma-motoneurons caused by a rapidly developing spinal cord lesion may result in spinal shock. Subacute presentation without pyramidal signs, more so in the presence of signs suggesting lower motor neuron dysfunction, may pose great challenges.

**Disclosure:** Nothing to disclose

## EPO3290

### Bilateral optic perineuritis and recurrent coma

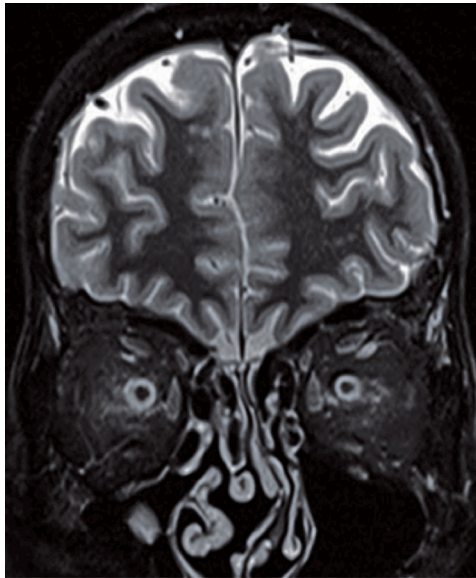
A. Rêgo<sup>1</sup>, Â. Abreu<sup>1</sup>, F. Bernardo<sup>1</sup>, R. Pinheiro<sup>1</sup>, C. Santos<sup>2</sup>, A. Alves<sup>3</sup>, S. Machado<sup>1</sup>

<sup>1</sup>Neurology, Hospital Prof. Doutor Fernando Fonseca, Amadora, Portugal, <sup>2</sup>Oncology, Hospital Prof. Doutor Fernando Fonseca, Amadora, Portugal, <sup>3</sup>Pathology, Hospital Prof. Doutor Fernando Fonseca, Amadora, Portugal

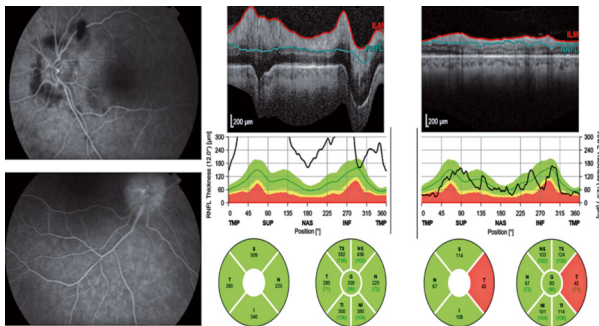
**Background and aims:** Bilateral optic perineuritis may easily be confounded with inflammatory optic neuropathy. However, this entity has a large differential diagnosis including intracranial hypertension and congenital, genetic and toxic neuropathies.

**Methods:** We present a clinical case of a 67-year-old man with a diagnosis of signet cell gastric adenocarcinoma submitted to chemotherapy and gastrectomy in the previous year without evidence for disease recurrence.

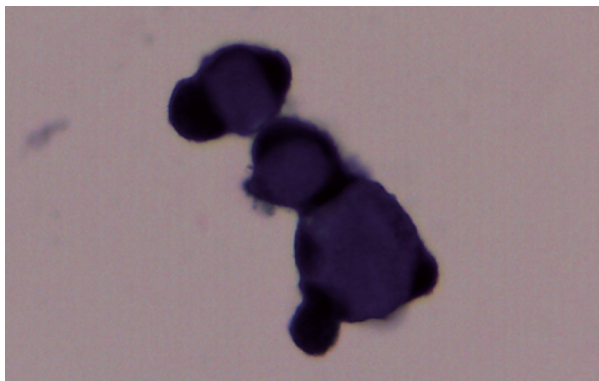
**Results:** The patient presented in the emergency department with 1 month of progressive worsening of the visual acuity. The neurological exam revealed left pupillary afferent defect and a bilateral optic disk oedema with papillary haemorrhages. The initial blood workup was normal. CT scan showed possible communicating hydrocephalus; spinal fluid analysis, vitamin blood levels, and infectious/autoimmune disease's panel were all unremarkable. Brain MRI showed bilateral optic nerve T2 hypersignal with gadolinium enhancement. The patient was started on prednisolone, only achieving partial response. 2 months later the patient started with headache, behaviour changes and transient episodes of coma with forced bilateral downward gaze deviation. Intracranial CT angiography and electroencephalogram were normal. Repeated lumbar puncture disclosed high opening pressure, pleocytosis and circulating signet cells. Body CT scan did not reveal extracranial neoplastic disease. The patient was started on intrathecal methotrexate with poor clinical response, being referred to Palliative care. He died 5 months after brain involvement.



Optic nerve sheet hypersignal with adjacent tissue involvement.



Funduscopy and optical coherence tomography (right and left eyes, respectively)



Signet cells compatible with gastric adenocarcinoma, according to the WHO classification.

**Conclusion:** Optic nerve sheet enhancement, adjacent tissue involvement, weak response to steroids and encephalopathy were strong points against an inflammatory disease, supporting a neoplastic process. Repeated lumbar punctures are essential for the correct diagnosis.

**Disclosure:** Nothing to disclose

## EPO3291

### Corticotherapy effect on biopsies of lymphoma of the CNS

M. Rosário<sup>1</sup>, A.I. Gonçalves<sup>2</sup>, J. Rosa<sup>3</sup>, R. Roque<sup>4</sup>, J. Pimentel<sup>4</sup>

<sup>1</sup>Neurology Department, CHLN, Lisbon, Portugal, <sup>2</sup>Neurology, Hospital Beatriz Ângelo, Lisbon, Portugal, <sup>3</sup>Lisbon, Portugal, <sup>4</sup>Laboratory of Neuropathology (department of Neurology), Hospital de Santa Maria do Centro Hospitalar de Lisboa Norte, Lisbon, Portugal

**Background and aims:** Primary lymphoma of the CNS is a rare form of lymphoma. Histopathologic diagnosis through stereotaxic biopsy is mandatory for treatment. Previous use of corticosteroids and amount of available tissue can influence biopsy yield.

**Methods:** Clinical case.

**Results:** 43-year-old man, HIV negative. History of subacute headache. MRI showed bilateral intra-axial lesions involving the corpus callosum with significant vasogenic edema, enhancing with contrast, suggestive of CNS lymphoma. The patient was started on dexamethasone symptomatically. Systemic workup was negative. The stereotactic biopsy of the lesion demonstrated unspecific findings of myelin loss, macrophagic and astrocytic reactive proliferation and presence of T lymphocytes, without pathologic findings of malignancy, and negative for toxoplasmosis. The patient was then admitted on the Neurology ward. Lumbar puncture was contraindicated due to risk of cerebral herniation. Plasmapheresis was started considering the possibility of primary demyelination pathology, but clinical worsening culminated in death. The autopsy showed diffuse proliferation of large lymphoid cells on the cerebral tissue, with immunohistochemistry in accordance with the diagnosis of primary lymphoma of the CNS.

**Conclusion:** We present a paradigmatic case of the relationship between corticotherapy and the diagnosis of lymphoma of the CNS through stereotactic biopsy. The cytolytic effect of steroids on lymphoma cells can lead to an equivocal biopsy. The lesion pathology demonstrated a demyelinating process with inflammatory infiltrate of T predominance, without tumor cells, which can't exclude the diagnosis. Therefore, when considering the hypothesis of primary lymphoma of the CNS, steroids must be avoided until after the biopsy, although its use is primarily determined by clinical findings.

**Disclosure:** Nothing to disclose

## EPO3292

**Paraneoplastic intestinal pseudo-obstruction as the presenting symptom of a lung malignancy in an elderly woman**C. Roy-Hewitson<sup>1</sup>, A. Smith<sup>2</sup>, S. Dasari<sup>2</sup><sup>1</sup>BURLINGTON, USA, <sup>2</sup>Neurology, University of Vermont, Burlington, USA

**Background and aims:** Anti-Hu paraneoplastic syndromes classically present with a sensory neuronopathy or a cerebellar syndrome. We present a patient who was admitted to the surgical service for weeks with a presumed small bowel obstruction as the heralding sign of an underlying lung malignancy.

**Methods:** A 72-year-old woman presented with weeks of constipation and days of vomiting. An exploratory laparotomy failed to reveal an obstruction. Neurology was consulted when she developed dysesthesias and allodynia in her hands 3 weeks after her admission. On exam she had asymmetric distal >proximal sensory loss in her upper extremities, pseudo-athetosis and areflexia. EMG/NCS showed evidence of an axonal non-length dependent sensory and motor neuropathy. Paraneoplastic panel was positive for antineuronal nuclear antibodies (ANNA-1, Anti-Hu). Imaging showed evidence of a mediastinal mass and the pathology was consistent with a limited stage small cell lung cancer. She was treated with 2 cycles of chemotherapy (carboplatin and etoposide) as well as IV solumedrol followed by IVIG, without improvement. Due to her inability to tolerate treatment and her worsening functional status, the decision was made to transfer to hospice.

**Conclusion:** We describe the case of a patient with intestinal pseudo-obstruction as the presenting symptom of an Anti-Hu mediated paraneoplastic syndrome associated with small cell lung cancer. Although previously described, this rare presentation lead to delays in diagnosis and initiation of anti-tumour treatment. This presentation should prompt an aggressive search for an underlying malignancy and early treatment initiation while patients still have a favorable functional status.

**Disclosure:** Nothing to disclose

## EPO3293

**Metastatic intracranial spread of adenocarcinoma mimicking sporadic human prion disorder: two cases of Creutzfeldt-Jakob disease-like presentations**R. Rusina<sup>1</sup>, I. Rektorova<sup>2</sup>, R. Matěj<sup>3</sup><sup>1</sup>Neurology, Charles University, Third Faculty of Medicine, Thomayer Hospital, Prague, Czech Republic, <sup>2</sup>Neurology, Masaryk University, Faculty of Medicine, St. Anne's University Hospital, Brno, Czech Republic, <sup>3</sup>Pathology and Molecular Medicine, Charles University, Third Faculty of Medicine, Thomayer Hospital, Prague, Czech Republic

**Background and aims:** We report 2 patients with rapid progressive dementia evoking sporadic Creutzfeldt-Jakob disease, in whom autopsy surprisingly revealed meningeal carcinomatosis and cortical micrometastases of lung tumors. The clinical diagnosis of human prion disease is in special cases still challenging task, as no causal treatment is available and early introduction of complex palliative care is crucial for the patient and his relatives.

**Methods:** A 54-year-old female, with a pulmonary adenocarcinoma in remission on biological treatment, developed rapidly progressive dementia, with spasticity and mutism. MRI found parieto-occipital cortical ribboning in diffusion weighted sequences and increased tau protein in the cerebrospinal fluid. She deceased 8 months after the 1st clinical manifestations. A 69-year-old female, with a history of non-small cell lung carcinoma, presented with delirium and myoclonus. The condition rapidly deteriorated towards mutism and severe limb rigidity. Cerebrospinal fluid analysis showed normal cell count, protein and glucose levels. MRI demonstrated right-sided frontal and possible caudate hyperintensities on diffusion weighted sequences. Death occurred after a 2 months disease course.

**Results:** Neuropathological examination revealed metastatic spread of pulmonary carcinoma in the form of meningeal carcinomatosis and widespread micrometastases in the brain cortex in both cases. Prion deposits were excluded by immunohistochemistry and by western blot.

**Conclusion:** Our findings confirm the necessity of considering rare manifestations of tumor generalization in atypical cases of dementias in clinical practice and the importance of clinico-pathological correlations.

**Disclosure:** Supported by grants NV19-04-0090 and NV18-04-0179 (Ministry of Health, Prague, Czech Republic) and DRO TH00064190 (Thomayer Hospital, Prague, Czech Republic).

## EPO3294

### Methotrexate myelopathy after intrathecal chemotherapy for hematological malignancies: our experience

R. Sainz Amo, B. Baena Álvarez, J. Gómez Corral, A. Celdrán de Castro García, N. García Barragán, F.J. Buisan Catevilla

*Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain*

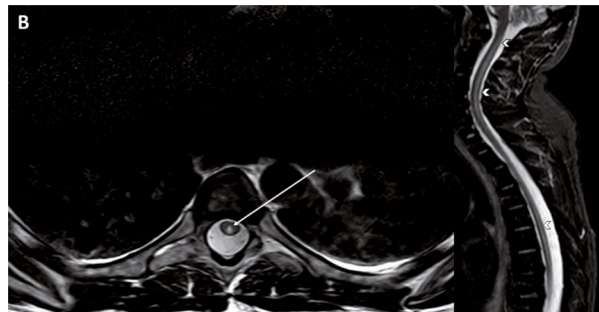
**Background and aims:** Triple intrathecal chemotherapy (methotrexate, cytarabine and glucocorticoids) is used after hematopoietic stem cells transplant to prevent relapses in the central nervous system. This treatment can produce neurotoxicity. Although the most common form of neurological toxicity is leukoencephalopathy, cases of myelopathy associated with this treatment have been described.

**Methods:** Retrospective registry of myelopathies after intrathecal chemotherapy

**Results:** 2 men of 30 and 59 years old were identified, both of them had received triple intrathecal chemotherapy after hematopoietic stem cell transplant for acute lymphoblastic leukemia and extranodal NK/T lymphoma. Subsequently, they developed a subacute paraparesis with hyperreflexia and lower limb hypopalessthesia. Lumbar puncture was performed in which no tumor infiltration was detected. A spinal MRI showed extensive dorsal column myelopathy, from D5 to conus medullaris in patient A and from C2 to conus medullaris in patient B. Both patients had reduced serum folate implicating methotrexate as the cause of neurotoxicity. Blood levels of vitamin B12 were normal. Patient B also developed methotrexate induced leukoencephalopathy in brain MRI. Treatment with folinic acid, cyanocobalamin, methionine, S-adenosylmethionine and even dextromethorphan in patient A was initiated without benefit. Both patients died from complications of immunosuppression.



Patient A: MRI showed T2 hyperintensity of dorsal column (arrow) from D5 to conus medullaris (arrowheads).



Patient B: MRI showed T2 hyperintensity of dorsal column (arrow) from C2 to conus medullaris (arrowheads)

**Conclusion:** Dorsal column myelopathy is a rare but distinctive complication with poor prognosis that should be considered in patients who have been treated with intrathecal methotrexate. While there is no effective treatment, early diagnosis can help for prevent further toxicity. Starting intrathecal chemotherapy at minimum effective dose should be considered.

**Disclosure:** Nothing to disclose



## EPO3295

### IgG4 positive dural marginal zone lymphoma: a rare cause of focal seizures

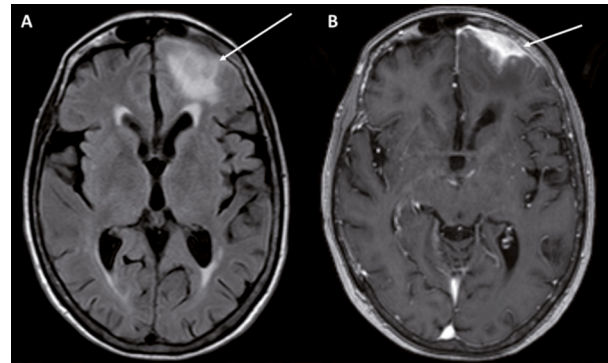
R. Sainz Amo<sup>1</sup>, I. Carretero Barrio<sup>2</sup>, H. Pian Arias<sup>2</sup>,  
B. Baena Álvarez<sup>1</sup>, J. Gómez Corral<sup>1</sup>,  
A. Caldrán de Castro García<sup>1</sup>, M. López Gutierrez<sup>3</sup>,  
R. Carrasco Moro<sup>3</sup>, M. García Cosío<sup>2</sup>,  
F.J. Buisan Catevilla<sup>1</sup>, N. García Barragán<sup>1</sup>

<sup>1</sup>Neurology, Hospital Universitario Ramón y Cajal, Madrid, Spain, <sup>2</sup>Hospital Universitario Ramón y Cajal, Madrid, Spain, <sup>3</sup>Neurosurgery, Hospital Universitario Ramón y Cajal Madrid, Madrid, Spain

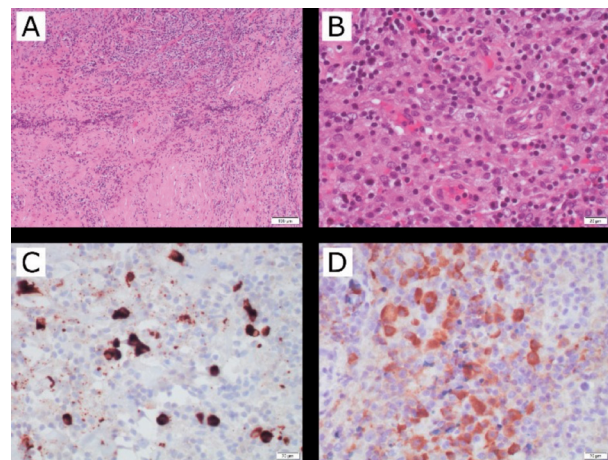
**Background and aims:** Dural marginal zone lymphomas (MZL) represent an uncommon group of low-grade B-cell neoplasms that radiologically often mimic meningiomas. The expression of IgG4 in these neoplasms has been recently described, posing differential diagnosis with IgG4 related disease.

**Methods:** A 73-year-old woman with no history of epilepsy was admitted to the emergency department with clustered focal frontal seizures with extension of right arm and flexion of left arm (figure 4 sign) that required intravenous benzodiazepines and phenytoin for control. Neurological examination showed frontal lobe dysfunction such as inattention, language impairment (echolalia and perseveration), anosognosia and difficulty in motor planning, conceptualization, sensitivity to interference and inhibitory control.

**Results:** Seizures were subsequently controlled with oral phenytoin. An initial MRI showed a leptomeningeal left frontal lesion that was homogeneously enhanced with gadolinium. Based on that findings, the presumptive radiologically diagnosis was “en-plaque meningioma”. Surgery of the lesion was performed and the dural-based solid mass was resected. The histological examination revealed a dense B lymphocyte infiltrate with numerous IgG4 positive plasma cells, clonal rearrangement of the variable IGH region was detected, supporting the diagnosis of MZL. The diagnostic study was completed with PET-CT and bone marrow biopsy which showed no alterations. The patient had an uneventful postoperative course. After follow up for one year she has remained seizure free.



A: FLAIR-weighted magnetic resonance image (MRI) showing a left frontal extra-axial mass with leptomeningeal, parenchymal and bone infiltration (arrow). B: T1-weighted MRI after gadolinium administration showing homogenous enhancement of the mass (arrow).



A. Hematoxylin-eosin, x10. Dense inflammatory infiltrate and storiform fibrosis. B. Hematoxylin-eosin, x40. Inflammatory lymphoplasmacytic infiltration with small lymphocytes, plasma cells and occasional eosinophils. C. Immunohistochemistry versus IgG4, x40. Numerous IgG4 plasma cells. D. Immunohistochemistry versus IgG.

**Conclusion:** IgG4 positive MZL is a rare meningeal neoplasm. It may manifest as seizure or focal signs and it should be considered in the differential diagnosis of meningeal tumors, since they have excellent long-term survival with local therapy.

**Disclosure:** Nothing to disclose

## EPO3296

**Non-Hodgkin lymphoma: an unusual cause of diplopia**

I. Sánchez-Miranda Román, A. Diaz Diaz, V.C. Mota Balibrea, J. Castellano Santana, R. Jiménez Bolaños, L.M. Pérez Navarro  
*Neurology, Complejo Hospitalario Universitario Insular Materno-Infantil, Las Palmas de Gran Canaria, Spain*

**Background and aims:** Metastatic infiltration of the extrinsic ocular musculature is an uncommon cause of diplopia. Skeletal muscle is considered an unusual location of secondary growth of solid tumors, however, in lymphomas and leukemia its involvement is frequent and associated with a higher degree of visceral involvement. Herein, we report a case of diplopia in a patient with a previous history of B-cell non-Hodgkin lymphoma (BNHL).

**Methods:** Case report and literature review.

**Results:** A 62-year-old male with high blood pressure and a low-grade BNHL in follow-up and expectant attitude since 2015, presents to the hospital with a 3-month history of blurred vision, without pain or other associated symptoms. Physical examination shows hypertropia of the right eye (RE), which conditions vertical binocular diplopia and a slight limitation in the infraduction of the RE. Magnetic resonance imaging of the orbit identifies a mass that depends on the right inferior rectus muscle. Infectious, metabolic, autoimmune and paraneoplastic causes are excluded, as well as meningeal carcinomatosis. Given the medical history of an oncohematologic disease, a muscle biopsy is performed, revealing lymphoid infiltration suggestive of a high-grade follicular lymphoma. Positron emission tomography scan confirms disease progression.

**Conclusion:** Although lymphomas are the most frequent malignant tumors in the orbit, exclusive involvement of an extraocular muscle is very uncommon. However, the possibility of metastatic infiltration should be included in the differential diagnosis of diplopia, especially in patients with previous history of oncohematologic disease.

**Disclosure:** Nothing to disclose

## EPO3297

**Adult-onset primary central nervous system germinoma with atypical neuroimaging findings**

E. Sanesteban Beceiro<sup>1</sup>, P. Mayo Rodríguez<sup>1</sup>, M. Fernández García<sup>1</sup>, M. Hernández Holgado<sup>1</sup>, M.V. García Yepes<sup>2</sup>, A. Gómez Esteban<sup>2</sup>, C. Fernández García<sup>3</sup>, M. Jorquera Moya<sup>4</sup>, I. Casado Fariñas<sup>5</sup>, A. Marcos Dolado<sup>2</sup>, E. Lopez Valdes<sup>1</sup>, R.R.C. Ginestal<sup>1</sup>

<sup>1</sup>*Neurología, Hospital Clínico San Carlos, Madrid, Spain,*

<sup>2</sup>*Neurology, Hospital Clínico San Carlos, Madrid, Spain,*

<sup>3</sup>*Neurosurgery, Hospital Clínico San Carlos, Madrid, Spain,*

<sup>4</sup>*Radiology, Hospital Clínico San Carlos, Madrid, Spain,*

<sup>5</sup>*Anatomic Pathology, Hospital Clínico San Carlos, Madrid, Spain*

**Background and aims:** Primary central nervous system germ cell tumours (GCT) are very rare tumours in adult population of Western countries.

**Methods:** Case report.

**Results:** A previously healthy 31-year-old man presented with a 3-month history of loss of appetite, polydipsia, polyuria and erectile dysfunction. The neurological examination only revealed a horizontal gaze-evoked nystagmus. Hormonal studies confirmed panhypopituitarism. Brain magnetic resonance imaging (MRI) studies showed enhancement of lateral and fourth ventricles subependymal regions and of midline structures, including the pituitary stalk (Figure 1). Lumbar puncture disclosed elevated protein levels and a mild lymphocytic pleocytosis (polyclonal mature lymphocytes in flux cytometry). Broad microbiological studies in blood and cerebrospinal fluid (CSF) (including PCR for neurotropic viruses and cultures for fungi and mycobacteria) were negative. Autoimmune studies, blood analysis including angiotensin converting enzyme, spinal cord MRI and thorax CT were normal. Whole body F-FDG-PET/CT only showed hypermetabolism in the MRI enhancing areas. The patient was discharged for outpatient follow-up. Months later, he was admitted presenting severe neuropsychiatric symptoms and bilateral internuclear ophthalmoplegia. A new MRI showed volume increase of the enhancement areas. A higher pleocytosis and a positive PCR for Epstein-Barr virus (EBV) were demonstrated in CSF. A brain biopsy revealed reactive polyclonal lymphocytes. Suspecting a persistent EBV-encephalitis, the patient was treated with ganciclovir and corticoids, resulting in a temporary improvement. Upon a new clinical worsening when tapering corticoids, a new brain biopsy confirmed the diagnosis of germinoma. Radiotherapy and chemotherapy were started.

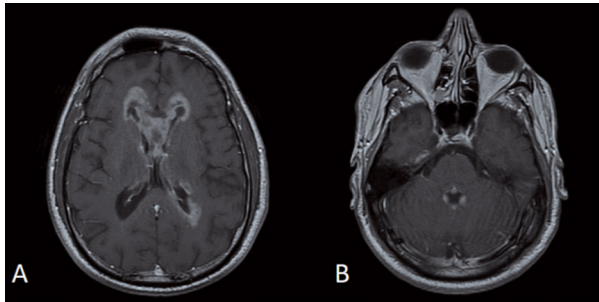


Figure 1

**Conclusion:** GCT are potentially curable and should be considered in cases of diffuse subependymal and midline enhancement.

**Disclosure:** Nothing to disclose

## EPO3298

### Intraventricular dysembryoplastic neuroepithelial tumor: an unusual location

D. Silva<sup>1</sup>, M. Machado<sup>2</sup>, S. Rodrigues<sup>3</sup>, F. Proença<sup>4</sup>, R. Sousa<sup>4</sup>, D. Simão<sup>5</sup>, R. Roque<sup>6</sup>, J. Pimentel<sup>6</sup>

<sup>1</sup>Department of Neurosciences and Mental Health, Hospital de Santa Maria, Centro Hospitalar Universitário de Lisboa Norte, Lisbon, Portugal, <sup>2</sup>Neurology, Centro Hospitalar de Lisboa Central, Lisbon, Portugal, <sup>3</sup>Hospital da Luz, Lisbon, Portugal, <sup>4</sup>Department of Neuroimaging, Centro Hospitalar Universitário Lisboa Norte, Hospital de Santa Maria, Lisbon, Portugal, <sup>5</sup>Neurosurgery Department, Hospital de Santa Maria, Lisbon, Portugal, <sup>6</sup>Laboratory of Neuropathology, Department of Neurology, Hospital de Santa Maria, Centro Hospitalar Universitário Lisboa Norte, Lisbon, Portugal

**Background and aims:** Dysembryoplastic neuroepithelial tumors (DNET) are cerebral cortical, benign slow-growing tumors of neuroglial origin. They are 1 of the most common surgical indications for epilepsy in younger age patients especially due to the favorable outcomes. Extracortical locations are extremely rare.

**Methods:** Case report description

**Results:** A 27-year-old woman had a car accident with no loss of consciousness or involuntary movements. In the emergency department, the patient was alert and with no deficits. Her past medical history was remarkable only for episodic headaches with no medical follow-up. A head CT scan showed an incidental intraventricular calcified lesion in the left frontal horn of the lateral ventricle. The brain MRI revealed a lobulated and well circumscribed lesion, hyperintense in T2/FLAIR, hypointense in T1, and anteriorly hypointense in T2\*. It enhanced heterogeneously with gadolinium administration. A complete tumor resection was performed. Pathological evaluation disclosed a tumor with small oligodendrocyte-like cells distributed throughout a mucin-rich background where few floating neurons and scattered astrocytes could be identified. Immunohistochemical staining showed synaptophysin and neurofilament, and GFAP reactivity, respectively within neurons and their processes and astrocytic elements. Oligodendrocytic-like cells were OLIG2 and GFAP reactives. The tumor showed no atypical histological features. The MIB-1 (Ki 67) proliferation index was <1%. ATRX was reactive (non-mutated) and IDH1 and CD34 non-reactives. The diagnostic was a DNET.

**Conclusion:** We report the case of an incidental diagnosis of an intraventricular DNET. This location is extremely rare and, therefore, determines an accurate differential diagnosis given its good post-surgical prognosis. Thus, we underwent an extensive immunohistochemical evaluation.

**Disclosure:** Nothing to disclose

## EPO3299

**Osimertinib activity on leptomeningeal metastasis**

L. Sirven-Villaros<sup>1</sup>, L. Grosset<sup>1</sup>, L. Doucet<sup>2</sup>, R. Ursu<sup>1</sup>, B. Blanchet<sup>3</sup>, J.P. Laaban<sup>4</sup>, I. Madalaine<sup>5</sup>, S. Culine<sup>2</sup>, C. Belin<sup>1</sup>, A. Carpentier<sup>1</sup>

<sup>1</sup>Neurology, Hopital Saint Louis, Paris, France, <sup>2</sup>Oncology, Hopital Saint Louis, Paris, France, <sup>3</sup>Pharmacology, Hopital Cauchin, Paris, France, <sup>4</sup>Pneumology, Hopital Cauchin, Paris, France, <sup>5</sup>Pharmacy, Hopital Saint Louis, Paris, France

**Background and aims:** Osimertinib is a 3rd generation epidermal growth factor receptor-tyrosine kinase inhibitors (EGFR-TKI) used as a 2nd-line therapy for non-small-cell lung cancer (NSCLC) harboring activating EGFR mutation and progressing over prior EGFR-TKIs.

**Methods:** We report here the cases of 2EGFR mutation-positive NSCLC patients, treated with osimertinib for leptomeningeal metastasis (LM) that occurred during first-line EGFR-TKI treatment.

**Results:** A 49-year-old female treated with afatinib (40mg/d) for 2years then bevacizumab-pemetrexed-carboplatin for 6 months presented an isolated LM confirmed by CSF analysis. The T790M mutation conferring resistance to EGFR-TKI was not detected. Switch to osimertinib (80mg/d) induced regression of leptomeningeal enhancement and normalization of CSF at 4 weeks, persisting at 1year. Osimertinib dosages showed normal blood exposure (142ng/mL) but low CSF penetration (1.4ng/mL), with a CSF:Blood ratio of 1%.

A 71-year-old male treated with erlotinib (150mg/d) for 9 months, then erlotinib-bevacizumab-pemetrexed-carboplatin for 12 months presented an isolated LM likewise diagnosed. T790M mutation was not detected. Osimertinib (80mg/d) was started but his condition worsened, with persistent carcinomatous cells in CSF. Osimertinib dosages showed normal blood exposure (174ng/mL) but low CSF penetration (1.3ng/mL) with a CSF:Blood ratio of 0.6%. A pulsatile schedule of high-dose of osimertinib (320mg every 4 days) failed to increase CSF penetration (ratio at 0.9%). The patient died 1 month later.

**Conclusion:** Osimertinib CSF penetration was low with CSF:blood ratio around 1%, similar to what was reported with others EGFR-TKIs. Despite this, osimertinib can induce clinical, radiological and biological response in NSCLC with LM. Pulsatile schedule didn't significantly increase CSF:blood ratio.

**Disclosure:** Nothing to disclose

## EPO3300

**Myelitis of spontaneous recovery after anti-CD19 CAR T-cells injection**

L. Sirven-Villaros<sup>1</sup>, C. Belin<sup>1</sup>, R. Di Blasi<sup>2</sup>, R. Ursu<sup>1</sup>, S. Bernard<sup>2</sup>, S. Cuzzubbo<sup>1</sup>, J. Paillassa<sup>2</sup>, C. Thieblemont<sup>2</sup>, A. Carpentier<sup>1</sup>

<sup>1</sup>Neurology, Hopital Saint Louis, Paris, France, <sup>2</sup>Hemato-Oncology, Hôpital Saint Louis, Assistance Publique-Hôpitaux de Paris (AP-HP.Nord), Paris, France

**Background and aims:** Anti-CD19 Chimeric antigen receptor (CAR) T-cells treatment for refractory/relapse diffuse large B-cell lymphoma (DLBCL) can develop heterogeneous neurological toxicities, called ICANS (immune cell-associated neurologic syndrome), which remain poorly defined.

**Methods:** We report here the case of a DLBCL patient treated who developed myelitis 2 weeks after anti-CD19 CAR-T cells therapy.

**Results:** A 41-year-old woman, diagnosed with DLBCL IPIaa 1, was treated with fludarabine-endoxan conditioned CAR-T cells infusion (tisagenlecleucel) after 3 relapses. 1 day after reinjection (D1), she presented an isolated grade 2 cytokine releasing syndrome (CRS) treated with Tocilizumab.

At D14, she presented urodynamic urges and limbs sensorimotor deficit. Spinal MRI found a D1 to D7 gadolinium-enhanced myelitis with negative etiologic explorations. No specific treatment was implemented due to the delay and spontaneous recovery. The 6 months controls found a disappearance of the gadolinium enhancement and a fading of the T2 hyper signal in the spinal cord, along with a complete response to CAR T-cell treatment.

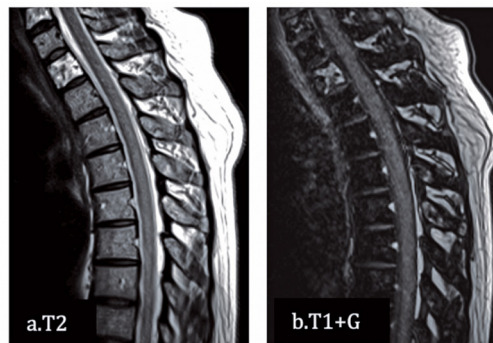


Figure 2: Evolution of spinal MRI pattern (6 months control):  
a. sagittal T2 sequence showing a slight persistent hypersignal.  
b. sagittal T1 sequence with gadolinium injection (no enhancement).

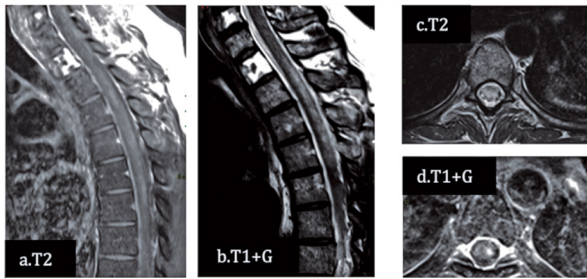


Figure 1: First spinal MRI showing the extensive myelitis:  
 a. sagittal T2 sequence showing the heterogeneous intra medullar hyper signal.  
 b. sagittal T1 sequence showing gadolinium enhancement.  
 c. axial T2 sequence showing the heterogeneous intra medullar hyper signal.  
 d. axial T1 sequence showing gadolinium enhancement.

**Conclusion:** We report here the 1st case of reversible myelitis after anti-CD19 CAR T-cells infusion, thus enriching the spectrum of CAR T-cells neurologic toxicity. Physicians should be aware that CAR T-cells patients can also develop medullar deficits. The spontaneous recovery in our case also suggests that steroids are not always required when developing neurological deficits, what may be interesting in these patients at increased risk of infections.

**Disclosure:** Nothing to disclose

## EPO3301

### Primary central nervous system lymphoma: a rare cause of subacute myelopathy

N. Valyraki<sup>1</sup>, C. Houillier<sup>1</sup>, M. Touat<sup>1</sup>, K. Hoang-Xuan<sup>1</sup>, D. Psimaras<sup>1</sup>, B. Mathon<sup>1</sup>, K. Mokthari<sup>2</sup>

<sup>1</sup>Neurology, University Hospital Salpêtrière, Paris, France,

<sup>2</sup>APHP, CHU Pitié-Salpêtrière, Paris, France

**Background and aims:** Primary central nervous system lymphoma with spinal cord localization is a rare, potentially curable disease that requires a timely and rigorous diagnostic process.

**Methods:** A 76-year-old female, presented with a progressive ataxia during 2 months, followed by flaccid paraplegia within 48 hours, as well as areflexia and sensation loss below T7 level.

The neurological examination also revealed a dysarthria and a cerebellar motor syndrom.

The MRI showed a spinal cord lesion, extending from T5 to conus terminalis with homogeneous contrast enhancement. The brain MRI showed 2 homogeneous gadolinium-enhancing lesions, in the supratentorial and infratentorial spaces. Further research excluded autoimmune, infectious and metabolic diseases. CSF examination demonstrated negative cytology, elevated protein (3g/L), whereas the values of IL-6 and IL-10 were 5000pg/mL and 24pg/mL, respectively. Clonality study and flow cytometry of the CSF were normal, as well as ophthalmologic examination, full body CT scan and FDG-PET scan.

A stereotactic brain biopsy was performed, confirming the diagnosis of a diffuse large B-cell lymphoma.

Treatment consisted of high-dose methotrexate-based chemotherapy based, achieving clinical and radiological improvement.

**Results:** The clinical and neuroimaging characteristics of this patient's spinal cord lymphoma had a wide range of differential diagnosis including inflammatory disease, CNS infection, paraneoplastic syndromes, vascular cause, or metabolic disease. The presence of associated brain lesions guided towards the diagnosis of lymphoma.

Primary spinal cord lymphoma is a rare cause of subacute myelopathy. The research of cerebral, meningeal, intra-ocular or systemic localization may allow early diagnosis which is essential to start a potentially successful treatment.

**Disclosure:** Nothing to disclose

## EPO3302

**Limbic encephalitis: high-grade glioma in disguise?**

R. Ventura<sup>1</sup>, A. Sobral Pinho<sup>1</sup>, G. Cabral<sup>1</sup>, T. Lorga<sup>2</sup>,  
F. Ladeira<sup>3</sup>, M. Viana Baptista<sup>4</sup>

<sup>1</sup>Neurology, Hospital de Egas Moniz, Lisbon, Portugal,

<sup>2</sup>Neuroradiology, Hospital de Egas Moniz, Lisbon, Portugal,

<sup>3</sup>Lisbon, Portugal, <sup>4</sup>Neurology, Hospital Egas Moniz, Centro Hospitalar Lisboa Ocidental, Lisbon, Portugal

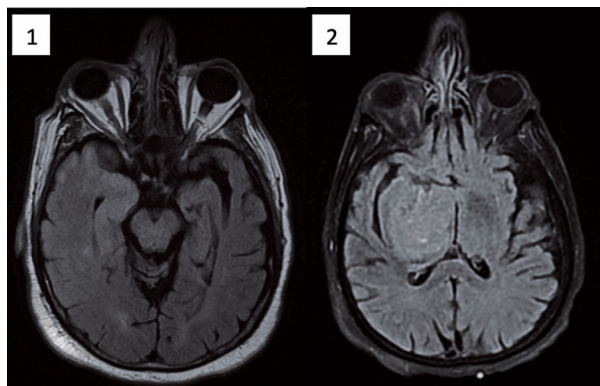
**Background and aims:** The subacute onset of fever, altered behavior, headache, and seizures should raise the possibility of infectious or para-infectious encephalitis. The differential diagnosis includes toxic, metabolic or immune-mediated parenchymal lesion, whereas tumoral lesion rarely presents with that constellation of symptoms. We present a case of a high-grade glioma mimicking encephalitis presentation.

**Methods:** N/A

**Results:** A 69-year-old male patient with no previous history of epilepsy was admitted to the emergency room with generalized tonic-clonic seizures, fever, confusion, and headache. A brain MRI showed the right medial temporal lobe, hippocampus, and insular cortex hyperintensities, without contrast enhancement. CSF examination including cell count, biochemical examination, autoantibody and PCR test for herpes and enterovirus was unremarkable. A diagnosis of viral encephalitis was considered based on clinical and radiological findings, and the patient was started on acyclovir and antiepileptic treatment with complete recovery. A second CSF evaluation performed a week after admission remained normal and the patient was discharged after completing antiviral treatment. 4 months later, he was readmitted with left hemiparesis, gait ataxia and sudden impairment of consciousness. A 2nd brain MRI was performed revealing a large space-occupying lesion in the right mesial temporal region suggestive of high-grade glioma.

high-grade gliomas. In the presence of a persistent innocent CSF examination and infectious and autoimmune workout, a repeated brain MRI should be considered, bearing in mind the possibility of an underlying malignancy.

**Disclosure:** Nothing to disclose



1 - Brain-MRI, FLAIR. Cortico-subcortical hypersignal at the right insula, frontobasal region and inner part of the right temporal lobe (including the hippocampus). 2 - Brain-MRI, FLAIR. Voluminous right medial temporal lesion, hyperintense, cortico-subcortical, with significant mass effect.

**Conclusion:** Our case highlights the importance of being aware of the clinical and radiological mimicking features of

## EPO3303

**Correlation of hypometabolism on brain FDG-TEP and neurotoxicity after treatment with CAR T-cells: a case report.**

V. Vernier<sup>1</sup>, R. Ursu<sup>1</sup>, C. Belin<sup>1</sup>, D. Maillet<sup>1</sup>,  
L. Sirven-Villaros<sup>1</sup>, R. Di Blasi<sup>2</sup>, C. Thieblemont<sup>2</sup>,  
A. Carpentier<sup>1</sup>

<sup>1</sup>Neurology, Hôpital Saint Louis, Assistance Publique-Hôpitaux de Paris (AP-HP.Nord), Paris, France, <sup>2</sup>Hemato-Oncology, Hôpital Saint Louis, Assistance Publique-Hôpitaux de Paris (AP-HP.Nord), Paris, France

**Background and aims:** CAR T-Cell therapy has recently brought new hope in DLBCL and the number of other indications is expanding. Neurotoxicity is commonly seen after CAR T-cells therapy and is almost always associated with CRS. Cerebral MRI is usually normal, underlying the need for paraclinical examinations that could help the diagnosis and map the cortical lesions.

**Methods:** A 68-year-old woman with treatment-refractory DLBCL was admitted for anti-CD19 chimeric antigen receptor (CAR) T-cell therapy.

**Results:** On day 4, a grade 1 CRS was diagnosed and treated with Tocilizumab. The neurological examination evidenced a patient oriented, with cognitive slowness. Symptoms progressively worsened. On Day 9, neurological examination showed a major cognitive slowness associated with ideomotor apraxia, decreased verbal fluency and comprehension disorders, cerebellar syndrome. MRI was normal and EEG showed a diffused slowing. At Day 14, brain FDG-PET showed bilateral diffused low fixation of the cortex, predominant in the parietal and temporal lobes. She was then treated with dexamethasone 10mg twice a day. Cerebellar syndrome and psychomotor slowness improved within 24 hours. At 4 months, neuropsychological tests are within normal limits and FDG-TEP was almost normal with a significant decreased of the parietal and temporal cortical hypometabolism.

**Conclusion:** Clinical experience for CAR T-Cell neurotoxicity remains limited. MRI does not usually show any abnormality, except in case of severe toxicity, and thus does not allow specific mapping of cortical impairments. Because brain FDG-PET can detect early cortical metabolic alteration, this case suggests that it might be used as a reference exam in CAR T-Cell neurotoxicity.

**Disclosure:** Nothing to disclose

## EPO3304

**Neurospecific enolase as serological biomarker of early cerebral complications after surgical removal of meningioma**

A. Zorkova, A. Kurakina, V. Grigoryeva, E. Guzanova  
*Department of Nervous System Diseases, Privolzhsky Research Medical University, Nizhny Novgorod, Russian Federation*

**Background and aims:** The purpose of the study was to investigate the predictive value of neuronspecific enolase (NSE) with respect to postoperative cerebral complications in the patients with meningiomas.

**Methods:** We observed 70 patients with meningiomas and 62 healthy people. The groups of patients and healthy individuals were comparable by age and gender. NSE level in serum was assessed by enzyme-linked immunosorbent assay in all observed individuals. Clinical, neuroimaging and laboratory examination of the patients was performed upon their admission to the hospital (T0) and in 5–6 days after tumor removal (T1). Continuous variables were expressed as median [quartiles].

**Results:** There was no statistically significant difference between the NSE levels in patients with meningiomas at T0 (3.1 [2.1-6.2] ng/ml) and healthy individuals (4.1 [2.3-7.1] ng/ml).

Cerebral complications such as severe cerebral edema in the area of surgery and/or 2ndary focal ischemia, tumor bed hematoma, epidural hemorrhage, meningitis were revealed in 13 of 70 (18.6 %) patients in the early postoperative period after craniotomy.

The NSE level at T1 statistically significantly increased compared to T0 in the patients with early postoperative complications, while in patients without such complications it has not changed significantly.

ROC (receiver operating characteristic) analysis suggested that the optimum NSE cut-off point for cerebral postsurgical complications was 9.8ng/ml with 71% sensitivity, 87% specificity.

**Conclusion:** Neurospecific enolase may be used as serological biomarker of early postoperative cerebral complications after surgical removal of meningioma.

**Disclosure:** Nothing to disclose

## Neurorehabilitation 2

### EPO3305

#### Electrostimulation of suprahyoid muscles in swallowing disorders after stroke (poster)

P. Konečný<sup>1</sup>, M. Elfmark<sup>2</sup>, S. Horák<sup>2</sup>, J. Vyskotová<sup>2</sup>, P. Gaul Aláčová<sup>2</sup>, P. Kanovsky<sup>1</sup>  
<sup>1</sup>Olomouc, Czech Republic, <sup>2</sup>Physiotherapy, Palacky University, Olomouc, Czech Republic

**Background and aims:** The aims of the study was to evaluate changes in swallowing, general neurological state, self-sufficiency and quality of life of patients after stroke with dysphagia after 4 weeks of orofacial rehabilitation with or without electrostimulation of suprahyoid muscles.

**Methods:** A prospective randomized study of dysphagic patients early in the stroke was performed from 1/2013 to 12/2016, with 54 patients (26 males, mean age 70 years) with standard orofacial rehabilitation and electrostimulation of suprahyoid muscles, and in the control group a group of 54 patients (31 males, mean age 69 years) underwent orofacial rehabilitation without electrostimulation.

**Results:** The difference in the changes after 4 weeks of therapy was statistically and clinically significant.

**Conclusion:** Electrostimulation of suprahyoid muscles improves swallowing, neurological status, overall self-sufficiency and quality of life of post-stroke patients with dysphagia.

**Disclosure:** This study was supported by The Junior Grant of Palacký University Olomouc (No. JG\_2019\_004) and the Internal Grant Agency of Palacký University Olomouc (No. IGA\_FZV\_2020\_008)

### EPO3306

#### Evaluation of motor rehabilitation using augmented reality in patients with ischemic stroke

E. Koroleva, I. Tolmachev, V. Alifirova, S. Kazakov, K. Kucherova

Department of neurology and neurosurgery, Siberian State Medical University, Tomsk, Russian Federation

**Background and aims:** Motor disorders are the most severe consequences of stroke and the cause of disability. Augmented reality (AR) is a new approach of using physiological stimuli during training with biofeedback.

We analyze the impact of visual stimuli created by AR on motor function paralyzed upper extremity in patients after stroke. We developed specialized software for assessing motor function during motor rehabilitation.

**Methods:** 59 patients in early recovery period of ischemic stroke (average age 63 (57 - 65)). The course of motor rehabilitation was 10 days. The course of motor rehabilitation - 10 days, 1 training session - 60 minutes.

We used spectral criterion as a method characterizing the variability of movements when following a given trajectory. The normalized ratio of the power of the fundamental harmonic of the spectrum to the other harmonics is calculated, which is considered as a characteristic of the accuracy of the main trajectory.

**Results:** Accuracy of movements - found a significant increase in the value of spectral criterion with an increase in the number of training sessions. It indicates a decrease in number of excess movements during the main task. We find significant increase in number of completed movements with each subsequent session. It indicates an increase in the speed of task over the course of rehabilitation, and reduction in rest period between the approaches performed during one training session.

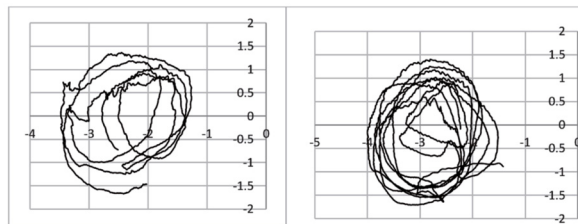


Illustration of the task in 1 and 8 training sessions

Training session	Value of the spectral criterion	Number of completed moves	Maximum duration of a series of tasks (seconds)
1	0.94[0.74:0.96]	23[9:30]	25[10-32]
2	0.95[0.74:0.97]	28[12:30]	27[12-30]
3	0.96[0.88:0.96]	34[20:38]	35[19-40]
4	0.96[0.71:0.97]	45[39:49]	38[20-44]
5	0.95[0.94:0.96]	46[38:52]	37[22-48]
6	0.95[0.92:0.96]	50[39:55]	43[30-49]
7	0.96[0.93:0.97]	53[45:58]	43[33-50]
8	0.96[0.95:0.97]	55[34:59]	45[38-68]
p	0.032	0.002	0.012

Calculated parameters reflecting the dynamics of changes in motor activity during training hands with paresis, Me [Q1; Q3]

**Conclusion:** The results of the study revealed a significant increase in accuracy of movements and an increase in endurance, which indicates the effectiveness of the approach used in the process of motor rehabilitation.

**Disclosure:** This study was supported by the Russian Science Foundation (RSF), grant No. 18-15-00082 "Laboratory for robotic rehabilitation"



## EPO3307

**Botulinum toxin A therapy of post-stroke hand spasticity in combination with brain-computer interface + exoskeleton**

S. Kotov, V. Lutsik, E. Zaytseva

*Department of Neurology, Vladimirsky Moscow Regional Research Clinical Institute, Moscow, Russia, Moscow, Russian Federation*

**Background and aims:** Post-stroke spasticity (PS) is one of most common motor disorders. PS limits the possibility of rehabilitation. The aim: to study the effectiveness of rehabilitation with brain-computer interface that controls the exoskeleton of hand (BCIE) in patients with PS paresis with the inclusion of botulinum toxin type A therapy (BTA).

**Methods:** There were included 84 post-stroke patients aged 18-85 who received rehabilitation with a brain-computer interface that controls the exoskeleton of the hand (BCIE). In 56 patients (group 1), BTA was applied 3-4 weeks before BCIE, in the group 2 (n=28) - only BCIE without BTA. We assessed neurological deficits before, after BTA, and after BCAA on Ashworth, Fugl-Meyer and Action Research Arm Test (ARAT) scale.

**Results:** After BTA, group 1 showed a statistically significant decrease in spasticity on the Ashworth scale ( $p < 0.05$ ), after BCIE – a further decrease in spasticity ( $p < 0.05$ ). In group 2, there was no decrease in PS after BCIE ( $p > 0.05$ ). Improvement of motor function of the hand on the Fugl-Mayer and ARAT scale after BCIE was found in patients of group 1 ( $p < 0.0001$ ) and group 2 ( $p < 0.05$ ), but the improvement in patients of group 1 was statistically significantly greater ( $p < 0.01$ ).

**Conclusion:** The use of BTA allowed to begin the rehabilitation process with a lower PS of the hand. The results in group 1 demonstrates significant effectiveness in reducing spasticity. It was significant improvement in the motor function of the hand after BTA. Reducing of PS allows to expand the window of rehabilitation opportunities and to increase the effectiveness of BCIE.

**Disclosure:** Nothing to disclose

## EPO3308

**Dynamics of EEG power during motion imagery in post-stroke patients**

S. Kotov<sup>1</sup>, E. Isakova<sup>1</sup>, E. Zaytseva<sup>1</sup>, E. Biryukova<sup>2</sup>, A. Frolov<sup>2</sup>, A. Kondur<sup>1</sup>, L. Turbina<sup>1</sup>

*<sup>1</sup>Department of Neurology, Vladimirsky Moscow Regional Research Clinical Institute, Moscow, Russia, Moscow, Russian Federation, <sup>2</sup>Institute of Higher Nervous Activity and Neurophysiology of RAS (IHNA&NPh RAS), Moscow, Russian Federation*

**Background and aims:** The recovery of movements after stroke is based on neuroplasticity. The brain-computer interface that controls the exoskeleton of the hand (BCIE), and the movement imagery (MI) have the greatest neuroplastic effect.

**Methods:** We examined 5 right-handed post-stroke patients and used the dynamics of the EEG power (EEGP) during the period of MI in the paretic right arm before and after rehabilitation. The control group - 5 healthy people.

**Results:** Initially, in the C3 lead, mu-rhythm event-related desynchronization (ERD) was registered for 1-3 seconds, then from 7 seconds - event-related synchronization (ERS), strong exciting interaction with frontal-parietal regions in both hemispheres was detected. After rehabilitation, it was found the restoration of EEGP in the primary motor cortex, reducing the pathological influence of the contralateral hemisphere. In the control group, normal ERD was observed in the C3 lead. There were registered a slight decrease in the power of the alpha rhythm and statistically insignificant fluctuations in the power of the beta and theta rhythm in the anterior and posterior frontal, upper-parietal leads of both hemispheres.

**Conclusion:** The reorganization of neural networks as a result of rehabilitation was manifested in the restoration of the interhemispheric balance of bioelectric activity. The strong exciting interaction of the primary motor cortex and the frontal-parietal regions in the affected and “intact” hemispheres after a stroke was probably a reflection of the dynamic reorganization of neural networks. Significant decrease in EEGP after course of rehabilitation coincided with a partial restoration of the impaired motor function of the right hand.

**Disclosure:** The work was supported by the Russian Foundation for basic research, RFBR grant № 19-015-00192\19a.

## EPO3309

**Assessment of serum BDNF and NGF in patients after motor rehabilitation in early recovery period of ischemic stroke**

K. Kucherova<sup>1</sup>, E. Koroleva<sup>1</sup>, V. Alifirova<sup>1</sup>, S. Kazakov<sup>1</sup>, A. Boyko<sup>2</sup>, A. Zajcev<sup>3</sup>, N.G. Brazovskaya<sup>4</sup>

<sup>1</sup>Department of neurology and neurosurgery, Siberian State Medical University, Tomsk, Russian Federation, <sup>2</sup>Research Institute of Mental Health Tomsk, Tomsk, Russian Federation, <sup>3</sup>Tomsk Research Institute of Balneology and Physiotherapy, Tomsk, Russian Federation, <sup>4</sup>Laboratory of Molecular Genetics and Biochemistry, Tomsk, Russian Federation

**Background and aims:** Brain-derived neurotrophic factor (BDNF) and Nerve growth factor (NGF) are neurotrophins that activate neuroplasticity after motor rehabilitation.

**Aim:** to detect clinical-laboratory correlation after motor rehabilitation in early recovery period of ischemic stroke.

**Methods:** The study involved 68 patients with ischemic stroke (average age 65 (59-68) years; Rankin scale 3 (2-3); NIHSS=4 (3-6) after early rehabilitation in Tomsk regional vascular center. 2 groups of patients: 48 moved to the 2nd stage of rehabilitation in Research Institute of Balneology; 20-rehabilitation without. Points of view: I-14th, II-45th days of stroke. Neurological examination was completed by Fugl-Meier Assessment (FMA). BDNF was determined by MAGPIX multiplex analyzer (Luminex, USA) using xMAP® Technology, NGF by SEA105Hu «Cloud-Clone Corp.» (USA)

**Results:** 1 group: FMA I=205 (192-211); FMA II=205 (192-213); p=0.753

BDNF I=2745 (1855-4686) pg/ml; BDNF II=1110 (679-1484) pg/ml; p=0.005

NGF I=2,1(1.6-2.3) pg/ml; NGF II=2,0 (1.9-2.1) pg/ml; p=0.225

2 group: FMA I=191 (177-201); FMA II= 199 (190-212); p=0.00

BDNF I=2768 (2009-3652) pg/ml; BDNF II=2175 (1730-2739) pg/ml; p=0.807

NGF I=1,5 (1,4-1,8) pg/ml; NGF II=3,0 (1,5-3,3) pg/ml; p=0.002

Strong positive correlation was found between NGF level and values on FMA (after motor rehabilitation in early recovery period of ischemic stroke ( $r=0.583$ ,  $p=0.012$ ).

**Conclusion:** The results are demonstrated the effectiveness of 2nd stage of motor rehabilitation in early recovery period of ischemic stroke in Research Institute of Balneology.

**Disclosure:** This study was supported by the Russian Science Foundation (RSF), grant No. 18-15-00082 “Laboratory for robotic rehabilitation”

## EPO3310

**The effectiveness of repeated courses of training using ExoAtlet exoskeleton for patients with multiple sclerosis**

V. Lizhdvoy, A. Gevorkyan, S. Kotov  
Moscow, Russian Federation

**Background and aims:** One of the directions in the recovery of consequences of multiple sclerosis is rehabilitation using robotic devices.

**Purpose:** To evaluate the effectiveness of repeated courses of training using Exoatlet exoskeleton for patients with multiple sclerosis who have impaired walking function.

**Methods:** The study included 9 patients in remission and with the presence of motor deficit in the lower extremities. To assess the severity of functional deficit were used the Kurtzke extended scale of disability and MSFC (MS functional composite) test before and after the 1st course and after 6 months (beginning of the next course) and in the end of the 2nd course. Each course consisted of 10 classes.

**Results:** The study of the index of dysfunction of the pyramid system showed a significant decrease in the degree by 1 point (31.2%) compared to the initial value ( $p<0.05$ ). Assessing the level of disability on the EDSS scale cyclical changes were observed with positive dynamics by the end of the rehabilitation course and returning to the initial value by the beginning of the next course. The improvement after each course was an average of 5%. According to the MSFC test there were positive changes in dynamics after the course of neurorehabilitation in relation to cognitive part. The dynamics of the test result compared to the initial value was 2.3%, 38.6%, 50% during the study.

**Conclusion:** The presented results showed the prospects for further studies of the effectiveness of robotic mechanotherapy for patients with multiple sclerosis and with motor disorders.

**Disclosure:** Nothing to disclose

## EPO3311

**Evaluation of the safety and effectiveness of the ExoAtlet robotic complex for patients in the early recovery period of ischemic stroke**

V. Lizhdvoy, S. Kotov, E. Isakova  
 Moscow, Russian Federation

**Background and aims:** The aim was to study the possibility of restoring movement and cognitive functions of patients in the early recovery period of ischemic stroke using robot therapy (ExoAtlet complex).

**Methods:** We used the ExoAtlet Pro Rev. robotic system for 40-80 minutes once per day during 10 days for 5 patients. To assess the dynamics, before and after treatment we used the estimative score scales of: muscle strength, Ashforth spasticity, Berg balance, Rankin, Bartel index (BI), Montreal Cognitive Assessment (MoCA), stabilometric study.

**Results:** Improvement of motor functions and functional state were achieved during classes with ExoAtlet Pro Rev. There was an increase of 1 point in muscle strength of 1 patient and functional activity on the Rankin scale of 2 patients. A more sensitive method was to evaluate daily activity using BI (positive dynamics of 15 points for 1 patient and 5 points for 3 patients). Positive trend was also detected in the whole group as an increase in the value of the Berg Balance scale indicator from 4 to 10 points - the increase in stability. 4 patients had an improvement in stabilometric parameters in the form of the decrease in length, speed, and area of the statokinesiogram. The data correlate with the Berg balance score. Positive dynamics was revealed in the form of regression of cognitive disorders on the MoCA scale.

**Conclusion:** The use of robot therapy for patients with ischemic stroke in the early recovery period contributes to the restoration of movement function, regression of cognitive disorders and is safe and effective.

**Disclosure:** Nothing to disclose

## EPO3312

**Clinical progress of individuals in minimally conscious state plus and minus. Description and comparison of the level of consciousness and disability**

C. Ippoliti<sup>1</sup>, E. Noe<sup>1</sup>, J. Ferri<sup>1</sup>, M.D. Navarro<sup>1</sup>, J. Olaya<sup>1</sup>, A.M. Maza-Pino<sup>2</sup>, R. Llorens<sup>2</sup>

<sup>1</sup>NEURORHB. Servicio de Neurorrehabilitación de Hospitales Vithas, Valencia, Spain, <sup>2</sup>Neurorehabilitation and Brain Research Group, Universitat Politècnica de València, Valencia, Spain

**Background and aims:** To describe and compare the clinical progress of a sample of patients diagnosed with Minimally Conscious State Plus (MCS+) and Minus (MCS) based on specific items of the Coma Recovery Scale-Revised (CRS-R).

**Methods:** 68 patients, 17 women and 51 men, with a mean age of 42.0±16.2 years old, who had sustained a traumatic (n=37) or non-traumatic brain injury (n=31) were included for analysis. All patients were monthly assessed with the CRS-R and the Disability Rating Scale (DRS) for at least 12 months after the injury or until recovery of consciousness.

**Results:** At admission, 23 patients were in MCS+, had a mean CRS-R of 15.3±1.8 and a DRS score of 21.9±1.8. 45 patients were in a MCS- and had a mean CRS-R of 9.5±1.8 and a DRS of 23.8±1.6. Both groups significantly differed in both CRS-R (p<0.01) and DRS score (p<0.01). 12 months after the injury, 45 patients had recovered consciousness (after a mean period of 169.9±83.2 days). A statistical significant effect of the clinical condition was found in the emergence of consciousness: while all patients in MCS+ recovered consciousness, only 22 patients in MCS- did. Patients who recovered consciousness had significantly higher CRS-R at admission (12.6±3.2 vs 9.1±1.9, p<0.01) and lower DRS (22.7±1.8 vs 23.9±1.9, p<0.05). No other significant differences were found.

**Conclusion:** Diagnostic criteria for MCS+ and MCS- defined based on CRS-R items was associated to different functional disability and recovery of consciousness.

**Disclosure:** This study was funded by Conselleria de Educació, Cultura y Deporte of Generalitat Valenciana of Spain (Project SEJI/2019/017) and Universitat Politècnica de València (Grant PAID-10-18).

# EPO3313

## Functional reciprocal electromyostimulation in adaptive kinesitherapy of post-stroke patients

V.V. Ponomarev, U. Lukashevich

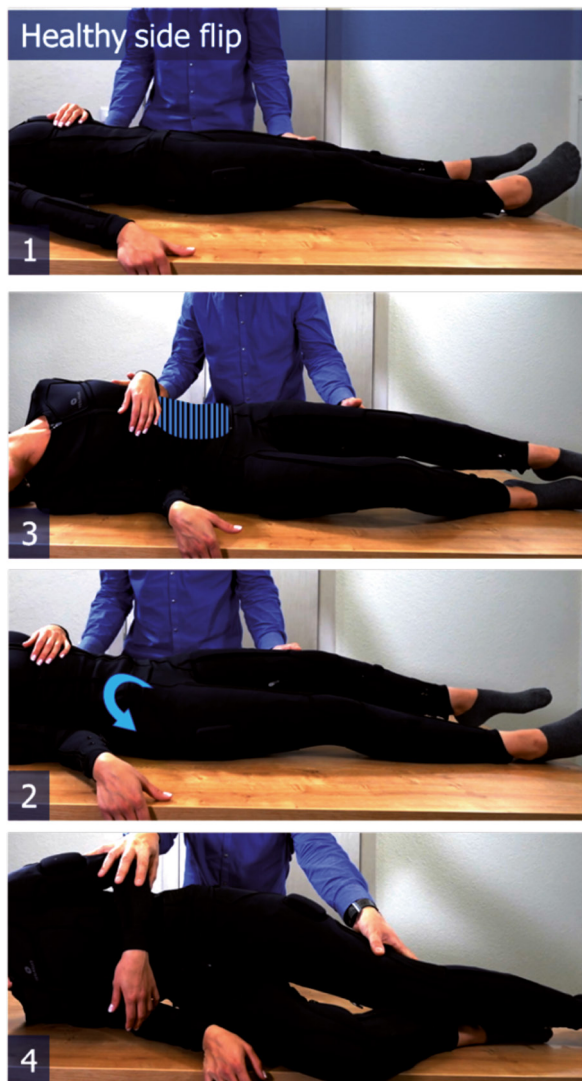
Minsk, Belarus

**Background and aims:** Various neuromuscular and musculoskeletal diseases lead to impaired human interaction with the environment (process of motor adaptation). Comprehensive medical rehabilitation program for this group of patients consist of numerous technologies and techniques, one of which is adaptive kinesitherapy(AK).

**Methods:** The study involved 24 male patients after a stroke with hemiparesis. The time after a stroke was 3-6 months. 10 patients received a standard rehabilitation program (group#1). 14 patients underwent AK using TESLASUIT smart suit (group#2). Using TESLASUIT technology, reciprocal electromyostimulation(EMS) of various muscle groups was performed. The AK program used 27 exercises to correct postural, vestibular, proprioceptive function, as well as mobility of joint functions, involuntary movement reaction functions, control of voluntary movement functions and gait pattern functions. Average AK time-3 weeks. The essence of the approach is that with active or passive movement, the motion capture system recognizes the performed locomotion and implements a specific pattern of muscle stimulation of agonists and antagonists in the form of functional EMS. For assessment were used: Modified Renkin Scale(MRS), Barthel Index(BI), Scandinavian stroke scale(SSS), 10 Meter Walk Test(10MWT).



Exercise example: THREE-STAGE HIP FLEXION



Exercise example: HEALTHY SIDE FLIP



Exercise example: TRUNK TURNS

**Results:** Results were obtained (before treatment : after treatment)

Group#1:

MRS -3,6:3,0;

BI - 56,1:46,8;

SSS - 17,9:23,5;

10MWT: 1,7 - 2,9

Group#2:

MRS -3,4:2,1;

BI - 54,7:36,4;

SSS - 18,7:27,9;

10MWT: 1,5 - 4,2

**Conclusion:** Application of TESLASUIT technology with the function of reciprocal EMS in the comprehensive AK program increases the effectiveness of rehabilitation after-stroke patients.

**Disclosure:** Nothing to disclose

## EPO3314

### Rehabilitation in Virtual Reality (VR): determinating number of exercises for simple arm movement

J. Krivec<sup>1</sup>, T. Kolar<sup>1</sup>, T. Poposek<sup>1</sup>, T. Oresnik<sup>1</sup>,

J. Karlovsek<sup>1</sup>, M. Rakusa<sup>2</sup>

<sup>1</sup>*Thermana d.d., Lasko, Slovenia,* <sup>2</sup>*Department of Neurology, University Medical Centre Maribor, Maribor, Slovenia*

**Background and aims:** Rehabilitation after ischemic stroke is a long and difficult process. In addition to standard physio- and occupational therapy, patients may perform tasks in VR. Aim of our study was to determine how many session using haptic device Bimeo is needed to improve reaching movement.

**Methods:** We included 13 patients 3 weeks after ischemic stroke. Patients had standard physio- and occupational therapy and performed reaching movement in VR using haptic device Bimeo. All patients held Bimeo in the affected arm and had 10 rehabilitation sessions doing reaching movements in the period of 14 days. mRS and modified Box&Blocks test score were evaluated at the beginning and the last session. Reaching parameters (movement quality index (MQI), velocity, smoothness and accuracy) were measured using Bimeo. Mean scores were compared using t-test and ANOVA.

**Results:** Patient's neurological conditions significantly approved after 14 days of rehabilitation. Final mean mRS score ( $1.5 \pm 0.6$  vs  $1.2 \pm 0.4$ ) and mean time of modified Box&Blocks test improved ( $27.92 \pm 16.81$ s vs  $20.31 \pm 7.62$ s). Similarly, several parameters of reaching measured with Bimeo improved. Our results indicate that MQI improves after 6 consecutive exercises, while smoothness, velocity and accuracy approved after 10 consecutive exercises.

**Conclusion:** We may conclude that Bimeo may be used for rehabilitation of the upper limb in patients with mild to moderate motor impairment ( $mRS \leq 3$ ). Patients need to practice with the device at least ten times in 14 days for optimal results.

**Disclosure:** Nothing to disclose

## EPO3315

**Factors influencing efficiency of rehabilitation in patients after ischemic stroke**

L. Novikova, A. Akopian, K. Sharapova  
*Bashkir state medical university, Ufa, Russian Federation*

**Background and aims:** Prediction of the success of rehabilitation treatment in the post-stroke period is determined by the factors of rehabilitation potential (RP). The aim is to study the factors influencing the effectiveness of rehabilitation treatment in patients in the acute period (AP) of ischemic stroke (IS).

**Methods:** 72 patients in the AP of IS in the Regional vascular center in Ufa were examined. The average age of patients is  $63.8 \pm 1.3$  years. The following scales were used: NIHSS, Renkin, Barthel, Rivermead mobility index, Montreal cognitive assessment, Spielberger-Khanin's anxiety scale, Beck's depression scale, Wayne A.M. and Ehlers questionnaire, the method of Schubert. Assessment of the RP was carried out using data analysis of the "Rehabilitation sheet".

**Results:** The majority of patients in the AP of IS, cognitive impairment (CI), anxiety-depressive disorders (ADD) and autonomic dysfunction were detected. During the treatment period, the number of patients with mild neurological deficit (MND), mild disability and mobility significantly increased. 82.9% of patients at the beginning of treatment had a medium to high degree of motivation for success. According to Ehlers, a success-oriented person prefers medium or low risk. Such patients were the majority 95.1%. Based on a combination of factors, 78% of patients had medium and high levels of RP.

**Conclusion:** A comprehensive and individual approach to the correction of various pathological disorders in patients in the AP of IS taking into account RP is the key to the effectiveness of rehabilitation treatment at the stages of rehabilitation.

**Disclosure:** Nothing to disclose

## EPO3316

**Using pressure algometry in the assessment of post-stroke shoulder pain**

T. Balueva<sup>1</sup>, V. Gusev<sup>2</sup>, V. Shirokov<sup>3</sup>, O. Lvova<sup>2</sup>  
<sup>1</sup>City Clinical Hospital, Yekaterinburg, Russian Federation,  
<sup>2</sup>Ural Federal University, Yekaterinburg, Russian Federation,  
<sup>3</sup>Yekaterinburg Medical Research Center for Prophylaxis and Health Protection in Industrial Workers, Yekaterinburg, Russian Federation

**Background and aims:** Post-stroke pain syndromes are difficult to rehabilitate. In connection with the formation of speech and cognitive impairments an objective assessment of pain in the post-stroke period is a certain problem. Pressure algometry is considered to be the relevant method for objectivization of pain syndrome in various studies.

**Aim of investigation:** to determine the correlation between the degree of pain syndrome (visual-analogue scale, VAS) and the factor of the pain threshold under pressure (PPT) in patients in the post-stroke period.

**Methods:** 120 volunteers were recruited (mean age: 68), 62 men. Inclusion criteria: a history of stroke (from 1 to 6 months after acute stroke); degree of arm paresis (from 1 to 4 points according to MRCS); pain syndrome in the shoulder area; signed informed consent.

To assess the effectiveness VAS was used. The indicator PPT is determined by applying controlled pressure to the trigger painful point in the certain muscle.

**Results:** In accordance with VAS 3 groups of patients were found: 30% (n=36) VAS under 4; 37.5% (n=45) VAS from 4 to 6; 32.5% (n=39) VAS above 6.

The PPT indices in the groups were distributed as follows:  $3.04 \text{ kg/cm}^2 \pm 0.38$  in the first group,  $2.97 \text{ kg/cm}^2 \pm 0.27$  in the second,  $2.89 \text{ kg/cm}^2 \pm 0.24$  in the 3rd. Spearman's rank correlation coefficient  $r = -0.71252$ .

**Conclusion:** The use of pressure algometry makes it possible to objectify the assessment of pain after a stroke, and can be useful for patients with speech and cognitive impairment.

**Disclosure:** Nothing to disclose

## EPO3317

**Endocannabinoid (Recompensatory) system. Bridging the gap between Cannabis plant molecules, cell metabolism, cognitive function and emotional experience. Mechanisms, healing pathways and multiplicity of health domains.**

E. Stankaitis  
*Livingston, United Kingdom*

**Background and aims:** A literature review paper that provides a bird's eye view of the Endocannabinoid System functions and presents the potential, which lies in the alchemy between Cannabis plant molecular compounds and the human body's innate abilities, to heal symptoms of maladies and/or to reverse undesired health disorders.

The main objective is to simplify and to organise (schematise) the multiplicity of aspects of human health and holistically present this interrelatedness to make an understanding of healing pathways easier to grasp.

**Methods:** The review paper is built on a framework of three domains of health. Physical health - Cell metabolism. Inflammatory processes, cancerous mutations, neural degeneration, and pain. Mental health – Cognition and consciousness. Neural function, stress management, learning and creativity improvement, increased awareness and modulation of neuropathic pain. Spiritual health – Emotional resilience, experience perception, enhancement of spiritual feelings of appreciation, love, peace, etc.

**Results:** Much of the scientific research data of Endocannabinoid System and molecular compounds of Cannabis, available today, clearly demonstrates therapeutical benefits of the plant. This review provides an overarching understanding of the function between the plant and the human body.

**Conclusion:** The knowledge of pathways of multifunctional mechanisms is paramount for successful therapy, its design, and education. Yet even more so important is the culture of consumption, dosage, ways of administration and legal status of the plant itself. Without much rhetoric, this also is briefly addressed.

**Disclosure:** Nothing to disclose

## EPO3318

**Goal-oriented therapy planning in neurorehabilitation: Adherence to personalized treatment pathways in subacute stroke – a feasibility study**

C. Tanner<sup>1</sup>, R. Schweinfurter<sup>1</sup>, J.C. Möller<sup>1</sup>, B. Ottiger<sup>2</sup>, T. Vanbellingen<sup>2</sup>, O. Stoller<sup>1</sup>

<sup>1</sup>*Rehaklinik Zihlschlacht, Zihlschlacht, Switzerland,*

<sup>2</sup>*Neurology and Neurorehabilitation, Lucerne Cantonal Hospital, Lucerne, Switzerland*

**Background and aims:** Therapy planning in neurorehabilitation is usually based on expert opinions instead of standardized assessments and/or clinical guidelines. We therefore developed a novel procedure integrating multidisciplinary and discipline-specific assessments, long-term goals and best clinical practice recommendations to define personalized treatment pathways. The aim of this feasibility study was to investigate whether such personalized treatment planning can be implemented within the major neurorehabilitation disciplines.

**Methods:** 23 patients with subacute stroke were included and 84 completed weeks of in-patient neurorehabilitation were analysed. The primary outcome was adherence to target treatment plan. Feasibility was assumed if deviations were <5%. The 2ndary outcome was participant satisfaction with the new procedure assessed 72 hours prior to discharge. Univariate descriptive analysis and multiple comparisons were performed.

**Results:** Relative deviations of the target treatment plans were +7.8% in physical therapy (p=0.480), -47.6% in neuropsychology (p=0.061), -49.8% in occupational therapy (p=0.003) and -83.1% in speech therapy (p=0.003), indicating that only physical therapy met the feasibility threshold of the novel procedure. Participants rated the novel procedure on a 5-point Likert scale as “very good” to “excellent” (mean 1.59, SD=0.73).

**Conclusion:** This study indicates that the adherence to personalized treatment pathways is challenging due to multidisciplinary resource allocation and implementation of efficient treatment settings. While physical therapy profits from efficient group settings and established technology-assisted therapies, other disciplines seem limited to cover requirements due to more individualized patient needs. Future work needs to refine the multidisciplinary prioritization and integrate efficient treatment solutions among disciplines.

**Disclosure:** Nothing to disclose

## EPO3319

**Efficiency of exercises on the “Exarta” kinesitherapeutic technology in patients with cervical osteochondrosis.**

M. Usmanov<sup>1</sup>, M. Bakhramov<sup>2</sup>, Y. Madjidova<sup>1</sup>, O. Kim<sup>2</sup>

<sup>1</sup>Department of Neurology, Child Neurology and Medical Genetics, Tashkent Medical Pediatric Institute, Tashkent, Uzbekistan, <sup>2</sup>Neurology, Tashkent Pediatric Medical Institute, Tashkent, Uzbekistan

**Background and aims:** To achieve reducing cervical pain and improve movement in cervical zone with exercises “EXARTA” kinesitherapeutic technology (EKT).

**Methods:** 28 patients with cervical osteochondrosis, from the age of 25 to 45 years were examined. They were divided into 2 groups: Main Group (10 patients) and Control Group (18 patients). The main group has done special exercises based on the EKT for cervical zone to reduce pain syndrome with classical physiotherapy, during 14 days. The control group has done classical physiotherapy only. To evaluate the functionality, we used: Visual Analogy Scale (VAS) and Neck Disability Index (NDI).

**Results:** At the end of 14 sessions of EKT patients underwent to a further evaluation aimed to compare the results. According to results, the VAS conducted in main group from 5.24±1.42 to 2.68±1.29, in control group 5.36±1.16; the NDI in main group from 11.61±3.9 to 7.13±4.14, in control group 11.50±3.86. A significant difference between the main and control groups  $p < 0.05$ .

**Conclusion:** EKT special exercise is considered effective a program that improves the functionality of the body in the form of reducing pain, fatigue; function improvement and quality of life in patients with osteochondrosis of the cervical spine. Nevertheless, the data collected indicate that the use of EKT with classical physiotherapy at the same time gives effectiveness in a shorter time.

**Disclosure:** Nothing to disclose

## EPO3320

**Potential Role of tDCS in increasing balance complexity to facilitate motor recovery in chronic stroke**

F. Yadollahi<sup>1</sup>, M. Mehrpour<sup>2</sup>

<sup>1</sup>Rehabilitation, Faculty of Medicine, Shahid beheshti University of Medical Sciences, Tehran, Iran, Islamic Republic of, <sup>2</sup>Department of Neurology, Faculty of Medicine, Iran University of Medical Sciences, Tehran, Iran, Islamic Republic of

**Background and aims:** Alterations in neuroplasticity and cortical excitability are important pathophysiological factors in stroke. Promising outcomes on motor performance have been identified in individuals with stroke following cortical stimulation. In this study, we aimed to examine the potential of tDCS in nonlinear dynamic postural stability in individuals suffering from chronic stroke. The hypothesis that tDCS can modify the efficacy of balance training in these individuals was tested.

**Methods:** In the present study, 22 individuals were included in this double-blind randomized controlled clinical trial. The anodal tDCS was applied to the leg motor cortex for 5 consecutive sessions concurrent with intensive balance training. we recorded: (1) functional outcomes using the Timed Up and Go test, as well as the Timed 10-Meter Walk Test and Berg balance score (2) Postural stability was assessed by a nonlinear approach using complexity index. Measurements were taken at baseline, after the 1st treatment session, and after the last treatment (5th) session.

**Results:** The results indicated that the active tDCS group showed significant differences in Timed 10-Meter Walk Test Scale ( $P < 0.05$ ). The multi-scale entropy analysis and complexity index provide significant differences between the 2 groups in closed eyes condition. Participants exhibited increased complexity of standing COP dynamics from baseline during eyes closed trial after 5 sessions of training ( $P < 0.05$ ).

**Conclusion:** Considering the results of the current study, it seems that tDCS affects the domain of stroke rehabilitation by increasing system complexity and provides a valuable adjunct therapy to boost ambulation recovery in individuals with chronic stroke.

**Disclosure:** Nothing to disclose



## EPO3321

**Rehabilitation of patients after stroke with use of Robotic Mechanotherapy Technology.**

O. Yunusov<sup>1</sup>, Y. Majidova<sup>1</sup>, U. Omonova<sup>1</sup>, Z. Abdullaev<sup>1</sup>, S. Shakhyusupov<sup>2</sup>

<sup>1</sup>Neurology, pediatric neurology and medical genetic, Tashkent Pediatric Medical Institute, Tashkent, Uzbekistan, <sup>2</sup>N, Tashkent Pediatric Medical Institute, Tashkent, Uzbekistan

**Background and aims:** The level of disability of patients after a stroke ranges from 76 to 85, and 25-30% remain disabled for the rest of their lives. Hardware and robotic rehabilitation are actively being introduced into practice. However, among experts there is no unanimous opinion on the effectiveness of the use of robotic systems.

Objective of research to study the effectiveness of robot mechanotherapy in the rehabilitation of post-stroke patients with motor disorders.

**Methods:** The results of treatment of 69 patients after ischemic stroke were analyzed. Of these, 42 (61%) are women and 27 (39%) are men. Patients were divided into 2 groups. Group 1 consisted of 35 patients who received robotomechanotherapy in addition to pharmacotherapy. Group 2 included 34 patients who received only basic therapy. Analysis of treatment results was carried out according to the following parameters: restoration of neurological functions, level of social and domestic adaptation, psycho-emotional state and quality of life of patients. The Barthel scale evaluated motor function and household adaptation.

**Results:** In group 1, a sufficient complete degree of restoration of neurological functions was observed in 66.3% of patients, and in group 2, 38.5% ( $p < 0.001$ ). In the 1st group, a fairly complete degree of household adaptation was noted in 64.2% of cases, and in the 2nd group in 36.2% of cases ( $p < 0.001$ ).

**Conclusion:** The use of robotic mechanotherapy in addition to pharmacotherapy significantly affects the effectiveness of the recovery potential of treating patients after a stroke.

**Disclosure:** Nothing to disclose

## EPO3322

**Dance steps as exercise treatment in patients with the late cerebellum ataxia**

O. Guseva<sup>1</sup>, N. Zhukova<sup>2</sup>

<sup>1</sup>Department of rehabilitation, Siberian Medical University, Tomsk, Russian Federation, <sup>2</sup>Department of neurology and neurosurgery, Siberian State Medical University, Tomsk, Russian Federation

**Background and aims:** There are no special physical exercises for the patients with the late cerebellum ataxia. The aims of the study were selection and evaluation of the clinical effect of the new exercise treatment based on dance steps for the balance and gait in the patients with the late cerebellum ataxia.

**Methods:** The group 1 (12 males, age  $49.3 \pm 8.8$  years) and the control group 2 (10 males, age  $50.1 \pm 10.0$  years) with the diagnosis of the late cerebellum ataxia were included in this study. The daily program for the group 1 was composed of the training lessons with the doctor every day and the independent task-repetitions to 5-6 times a day during 12 days. The evaluation of the clinical effect was conducted in the scale SARA before and on 12th day of the therapy.

**Results:** In the course of the study for the patients with the late cerebellum ataxia was compiled the program of the physical exercises based on the techniques of the steps of the dance. The total scores SARA, the scores of gait and stance in the group 1 decreased and did not change in the group 2.

**Conclusion:** The selection of the special physical exercises based on dance steps is important for the therapy of the late cerebellum ataxia.

**Disclosure:** Nothing to disclose

## Peripheral nerve disorders 2

## EPO3323

**Functional prognosis among the variants of Guillain-Barré Syndrome in a Mexican Population**

G. Martínez Herrera, Z. Medina Lopez  
Neurology, Medical Center Adolfo López Mateos, CIUDAD DE MEXICO, Mexico

**Background:** Guillain-Barré Syndrome (GBS) is an acute polyradiculoneuropathy mediated by immune mechanisms. It is heterogeneous in terms of severity and prognosis.

**Objective:** We compared functional prognosis at 30 days of the neurophysiological variants of the GBS.

**Material and methods:** We conducted a retrospective cohort study. We included patients with diagnosis of GBS with nerve conduction velocities (NCV) and lumbar puncture. We divided our population in axonal and demyelinating variant. We calculated Hughes, MRC, EGRIS and ERASMUS scales and followed the patients for 30 days. We made a comparison of the functional prognosis (defined by MRC Scale after 30 days) with the x2 test for comparison of proportions between both groups with a level of statistical significance  $p < 0.05$ .

**Results:** We included 51 patients. The axonal variant was present in 90.2% and 5.88% were demyelinating. The most frequent clinical variant was AMAN (n=32). About 60% had modified ERASMUS > 5 and 68% of patients had functional stage 4, according to Hughes score. Patients with axonal variant had worse functional outcome (32.39% Vs 4.22%) ( $p = 0.0121$ ).

**Conclusion:** Patients with axonal variant had worse functional prognosis assessed by MRC scale, compared with the demyelinating variant. There are important differences in the clinical presentation of our cohort when compared to others.

**Disclosure:** Nothing to disclose

## EPO3324

**Spastic paraparesis and periodic paralysis in siblings: the extensive phenotype due to MT-ATP6 mutations.**

P. Muller<sup>1</sup>, G. Baille<sup>2</sup>, B. Rucheton<sup>3</sup>, D. Sternberg<sup>4</sup>, C. Tard<sup>5</sup>

<sup>1</sup>Centre de référence des maladies neuromusculaires Nord Est Ile de France, CHU de Lille, France, university of Lille, Lille, France, <sup>2</sup>Neurologie, hôpital Delafontaine, St Denis, France, <sup>3</sup>Necker, Centre de référence des maladies neuromusculaires Nord Est Ile de France, Paris, France. , APHP, Paris, France, <sup>4</sup>Centre de génétique, APHP, Paris, France, <sup>5</sup>Neurophysiology Department, University of Lille, Lille, France

**Background and aims:** Defective oxidative phosphorylation is described as a potential genetic cause of hereditary spastic paraparesis (SPG). In the literature, the case of 3 siblings with SPG phenotype and periodic paralysis has been published. We report a 2nd family with siblings presenting distinguished phenotypes due to MT-ATP6 mutation.

**Methods:** Sibling n°1 (S1) is 36 years old and he has presented since the age of 20 a severe SPG associated with an axonal sensitivo-motor neuropathy. The 1st screening for genes related to SPG was negative.

Sibling n°2 (S2) is 26 years old and she has reported since childhood episodes of periodic paralysis associated with an axonal sensitivo-motor neuropathy. The screening of genes encoding ion channels was negative.

Sibling n°3 (S3) is a 19 years old man with 1 episode of transient lower-limb weakness. No neuropathy was displayed.

S1, S2 and S3 has different fathers, all are small and have a slight cognitive impairment. No medical history was reported.

MT-ATP6 and MT-ATP8 genes were screened.

**Results:** We detected a known pathogenic variant (m.9185T>C (p.Leu220Pro, L220P)) in MT-ATP6 gene, with homoplasmic aspect. S2 dramatically improved with acetazolamide treatment.

**Conclusion:** MT-ATP6 mutation are known to cause Leigh syndrome or optic neuropathy. Yet, in case of Charcot-Marie-Tooth-like or SPG phenotypes with negative gene testing, physician should think about this mitochondrial disease. Indeed, when the patients report transient motor weakness, the episodes of periodic paralysis could be mistaken with functional worsening. Oxidative stress due to MT-ATP6 mutations can lead to several phenotypes like axonal neuropathy, SPG and periodic paralysis.

**Disclosure:** Nothing to disclose

## EPO3325

**A tale of nodes and paranodes**

T. Munteanu<sup>1</sup>, G. Mullins<sup>2</sup>, H. El-Naggar<sup>2</sup>, S. Rinaldi<sup>3</sup>, N. Delanty<sup>4</sup>

<sup>1</sup>Neurology, Cork University Hospital, Cork, Ireland,

<sup>2</sup>Neurophysiology, Beaumont Hospital, Dublin, Ireland,

<sup>3</sup>Neuroimmunology, John Radcliffe Hospital, Oxford, United Kingdom, <sup>4</sup>Neurology, Beaumont Hospital, Dublin, Ireland

**Background and aims:** To describe a case of pan-neurofascin antibody-mediated neuropathy

**Methods:** Case presentation: A 78-year-old man, with no significant past medical history, presented to ED with gradual-onset symmetrical arm numbness, loss of hand muscle power and imbalance. On examination there was mild dysarthria, distal weakness and absent reflexes in the upper and lower limbs. He had normal eye movements. He had glove and stocking sensation loss to sharp touch and temperature, impaired sensation to vibration and marked sensory ataxia. He was started on IVIG on admission, but deteriorated and required ventilatory support. He recovered strength and was extubated within 2 days. However, he gradually deteriorated again on the ward and had to be reintubated, despite a repeated course of IVIG. He underwent plasmapheresis and received a third course of IVIG in consultation with the Immunology service.

**Results:** Investigations: CSF analysis on admission showed elevated protein (53mg/ml) with normal WCC and glucose. Initially, nerve conduction studies showed a demyelinating sensory-motor neuropathy. A subsequent study in ICU showed motor axon loss and denervation of all muscles sampled. MR spine imaging, CT TAP and antiganglioside antibodies were negative. A cell-based assay for nodal and paranodal antibodies was performed. This revealed the presence of an autoantibody cross-reactive with 3 isoforms of neurofascin (NF140, NF155, and NF186). Once the antibodies were identified, the patient received Rituximab, which led to a significant improvement in muscle power.

**Conclusion:** Pan-neurofascin antibodies are associated with severe neuropathies which often have an acute/sub-acute onset.

**Disclosure:** Nothing to disclose

## EPO3326

**The clinical and electrophysiological characteristics of Charcot Marie Tooth disease: A hospital cohort**

M. Naguez, A. Mouna, M. Mhiri, M. Frih-Ayed  
Neurology, Fattouma Bourguiba hospital, Monastir, Tunisia

**Background and aims:** Charcot Marie Tooth disease (CMT) is the most common sensitivomotor neuropathy of hereditary nervous system pathologies. Different forms of CMT are distinguished by the electro-clinical data. We propose to study the clinical and electro-physiological characteristics of patients with CMT.

**Methods:** This was a cross-sectional study including all the patients who had been followed for CMT in the neurology department at Fattouma Bourguiba Hospital in Monastir. All patients had an electroneuromyogram (ENMG).

**Results:** 10 patients (7 men) were collected. The average age at onset symptoms was 17.11 years [2.30]. 6 patients were born from an inbred marriage with the presence of similar family cases in 5 patients. Gait disorders were the most frequent reason for consultation. A distal amyotrophy was observed in 60% of cases.

5 patients had sensory symptoms (hypoesthesia in gloves and socks). 8 patients presented with bone deformities (hollow feet, an equine varus, scoliosis). 2 patients had unusual associated signs (an intellectual impairment and areflexia with bilateral Babinski). Neuropathy was axonal in 70% of cases, demyelinating and axonodemyelinating in 20% and 10% of patients respectively. A conduction block with temporal dispersion was present in only 1 patient. Sensory-motor neuropathy was the most common form (80%) followed by the pure motor forms (20%). 50% of patients with early onset CMT had an axonal form. The severity of motor deficit was not correlated with the onset age ( $p > 0.05$ ).

**Conclusion:** CMT remains common in countries with high inbreeding. New therapeutic approaches are needed for these patients with functional disabilities.

**Disclosure:** Nothing to disclose

## EPO3327

### Distal limb weakness and interosseus atrophy. A case of Multifocal Motor Neuropathy

F.J. Pareja Herrero<sup>1</sup>, M.D. Mendoza Grimón<sup>2</sup>,  
F.H. Cabrera Naranjo<sup>3</sup>, P. Costa Sáez<sup>4</sup>,  
M. Martínez Sánchez<sup>4</sup>, E. Gómez López<sup>5</sup>

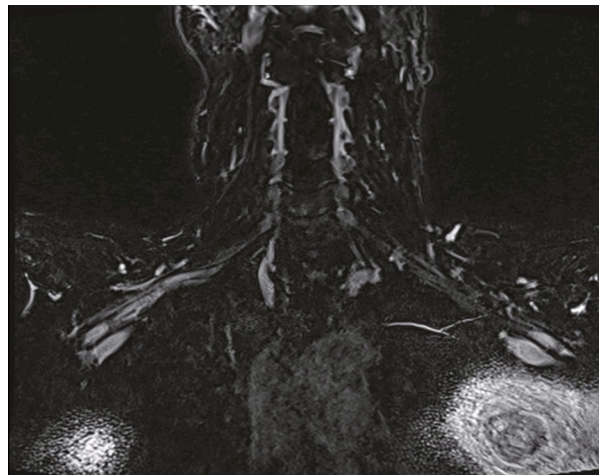
<sup>1</sup>Las Palmas De Gran Canaria, Spain, <sup>2</sup>Neurology, Hospital Universitario de Gran Canaria Doctor Negrín, Las Palmas De Gran Canaria, Spain, <sup>3</sup>Las Palmas de Gran Canaria, Spain, <sup>4</sup>Neurology, Hospital Universitario de Gran Canaria Doctor Negrín, Las Palmas de Gran Canaria, Spain, <sup>5</sup>Neurology, Hospital General Universitario Reina Sofía, Murcia, Spain

**Background and aims:** Multifocal motor neuropathy (MMN) is an uncommon and purely motor neuropathy with predilection for upper limb involvement, that predominantly affects young males. It is believed an underlying autoimmune etiology of MNM, and it is associated with anti-GM1 antibodies and with a robust response to immunomodulatory treatment.

Usually it appears as a slowly progressive weakness that is asymmetric and involving at least 2 separate motor nerve distribution. It is important to distinguish from motor neuron disease because both present with asymmetric, progressive, distal weakness without numbness.

**Methods:** We describe a case report of a 53-year-old male patient, ex-smoker, who refers pain located in right shoulder and 2 weeks later presents right hand weakness. In neurological examination it is found right hand paresia in the carpal extension, finger flexion, first finger abduction and interosseus atrophy with no associated sensory deficit.

**Results:** Electromyography shows 2 conduction blocks in right motor median (elbow) and right motor radial (forearm) nerves. Sensitive nerve conduction was normal. The anti-GM1 antibodies were negative. Magnetic Resonance Imaging (MRI) showed a T2 high signal of the Brachial Plexus Inferior Trunk. The patient was treated with intravenous immunoglobulin for 3 intervals with improvement of symptoms. No side effects were reported.



T2 Hyperintensity of the Brachial Plexus Inferior Trunk

**Conclusion:** MMN is an important treatable cause of neuropathy. MRI can demonstrate abnormalities of cervical root and plexus T2 hyperintensity and enlargement between 35 to 50% of patients. Its early recognition is vital as MMN must be differentiated from other mimicking conditions for which immunomodulatory therapy is ineffective.

**Disclosure:** Nothing to disclose

## EPO3328

**Vinca-alkaloids induced small nerve fibre impairment in young patients with malignant lymphoma**A. Rajdová<sup>1</sup>, E. Vlckova<sup>2</sup>, J. Bednarik<sup>1</sup><sup>1</sup>Department of Neurology, University Hospital Brno, Brno, Czech Republic, <sup>2</sup>Brno, Czech Republic

**Background and aims:** Chemotherapy-induced peripheral neuropathy is a frequent adverse consequence of anti-cancer treatment that severely impacts upon the quality of life of cancer survivors.

To assess the impact of the neurotoxicity of vinca-alkaloids (V-A) on small nerve fibres including autonomic nervous system in patients with malignant lymphoma.

**Methods:** A cohort prospective study included 18 patients with malignant lymphoma (12 men, 6 women, median age 36, range: 23–51 yrs). Detailed clinical examination, pain questionnaires, quantitative sensory testing (QST), lower leg skin-punch biopsy, corneal confocal microscopy (CCM) and spectral analysis of heart rate variability (SAHRV) were performed before chemotherapy including V-A and 6 months after the end of it.

**Results:** In the course of chemotherapy, 14 patients (78%) reported sensitive symptoms, mainly in distal extremities; these led to V-A dose reduction. QST abnormalities were found in 13 patients (72%) compared to 8 patients before chemotherapy, while intra-epidermal nerve fibre density in skin biopsy and corneal innervation did not differ significantly from initial examination. However, nerve thinning and fragmentation in skin biopsy were observed in 4 patients. Most of the patients (75%) developed no significant autonomic dysfunction persisting for 6 months after V-A treatment, as confirmed by SAHRV.

**Conclusion:** Skin biopsy and CCM did not demonstrate significant reduction of small fibres, also autonomic dysfunction was not confirmed. However, some structural changes in intra-epidermal innervation were detected, which appear to indicate incipient degeneration of the terminals of small-nerve fibres. These changes could contribute to sensitive abnormalities induced by V-A as detected by QST.

**Disclosure:** Nothing to disclose

## EPO3329

**CIDP and positive neurofascin-155 antibodies: description of two cases**M. Rodríguez Camacho<sup>1</sup>, R. Piñar Morales<sup>1</sup>, A. Carvajal Hernández<sup>2</sup>, J.L. Ruiz Del Amo<sup>1</sup>, M. Carrasco Garcia<sup>3</sup>, F.J. Barrero Hernandez<sup>1</sup><sup>1</sup>Neurology, Hospital San Cecilio, Granada, Granada, Spain, <sup>2</sup>Neurology, Hospital Universitario Virgen de las Nieves, Granada, Spain, <sup>3</sup>Neurology, Hospital Clínico San Cecilio, Granada, Spain

**Background and aims:** Chronic inflammatory demyelinating polyneuropathy (CIDP) is an immune-mediated demyelinating disorder characterized by the presence of sensorimotor deficits, predominantly proximal, subacute onset, and wide clinical variability. Autoantibodies against adhesion molecules on Ranvier node (neurofascin-155/140/186, contactin-1, contactin associated protein-1) have been described.

**Methods:** 2 cases of CIDP and positive anti-NF155 are described.

**Results:** 55-year-old female presenting with progressive weakness of lower limbs and gait disturbances. Elevated proteins, and normal cell count on CSF. Demyelinating sensorimotor polyneuropathy pattern on electrophysiological tests. Positive anti-NF155 antibodies. No response to corticosteroid treatment nor intravenous immunoglobulins. Weekly Rituximab (375mg/m<sup>2</sup>) was administered for 4 weeks with remarkable clinical improving.

41-year-old male presenting with progressive and predominantly distal paresthesias of 4 limbs, and gait instability. Elevated CSF protein with normal cell count was found. Electroneurography informed about severe demyelinating predominantly sensitive polyneuropathy. Intravenous immunoglobulin and plasmapheresis were not effective. Improvement and clinical stabilisation were possible after corticosteroid treatment.

**Conclusion:** AntiNF-155 antibodies (IgG4 subclass) directed to cell adhesion proteins of the Ranvier node have been described in up to 5.5% of patients with CIDP. Phenotypically, they present at a younger age with disabling tremor and sensory ataxia. Response to intravenous intravenous immunoglobulins is poor, and variable to corticosteroids, with remarkable response to Rituximab in some cases. Therefore, determination of these antibodies is an important consideration in patients with CIDP since it is a useful biomarker for diagnosis, prognosis and selection of treatment in these type of patients.

**Disclosure:** Nothing to disclose

## EPO3330

### Treatment-related fluctuations in GBS: stabilization with high-dose steroids

J.I. Rodriguez Moreno, A. Al-Rizaiza, J. Kornbluth, M. Vullaganti, P. Clervil-Clarke, O. Soto  
*Neurology, Tufts Medical Center, Boston, USA*

**Background and aims:** Treatment-related fluctuations (TRF) may reflect a mismatch between the magnitude and duration of the immunological attack and the efficacy of therapy in GBS. We report a patient who had several TRF's that only stabilized after high-dose steroids.

**Methods:** Case report.

**Results:** A 24-year-old male presented with distal paresthesias, rapidly progressive ascending weakness, and universal areflexia, with MRC sumscore (MRCS)=21 (normal=60), receiving IVIG (2grams/Kg over 5 days). On day 7, he was intubated. NCS's showed demyelinating features. CSF showed albuminocytologic dissociation. Clinical course was characterized by 3 TRF's over a 2 month period, for which he received PLEX (5 sessions), IVIG (2gram/kg), IVIG (1gram/kg), respectively (figure 1). Follow up NCS's showed diffuse motor inexcitability (figure 2) and active denervation. After the 3rd TRF, acute-onset-CIDP was suspected, and he received IV methylprednisolone 500mg/day 5 days, followed by prednisone 60mg/day with rapid improvement (MRCS=30). 2 weeks later he was able to stand with assistance (MRCS=49), and had a sustained improvement during a prolonged steroid taper over 18 months. 3 years later, he remains symptom-free with normal NCS. The clinical course is not considered consistent with CIDP.

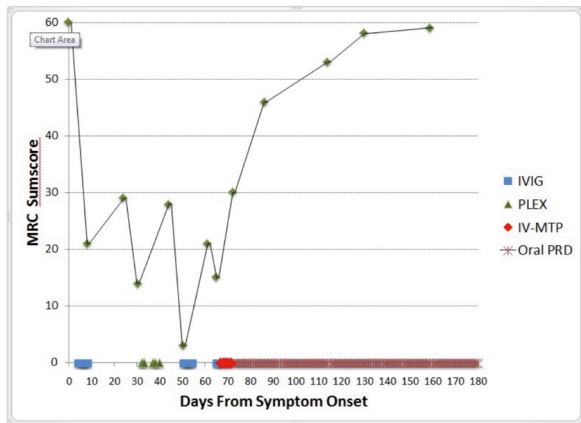


Figure 1: Clinical course and treatments received.

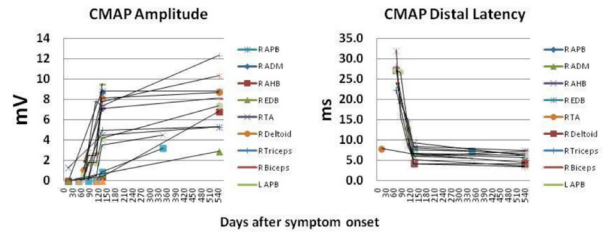


Figure 2: Electrodiagnostic data.

**Conclusion:** This case is noteworthy for several reasons: The patient had protracted symptoms with several TRF's that only stabilized with steroids. This suggests that some of the pathophysiologies underlying AIDP may be steroid-responsive. Universal motor inexcitability has poor prognostic value in some AIDP cases. Quick clinical and electrophysiological recovery suggests persistent distal motor conduction block not easily explainable with current axonal or demyelinating pathophysiologies.

**Disclosure:** Nothing to disclose

## EPO3331

**Neurological complications in women with breast cancer after radical mastectomy**

E. Kuznetsova, E. Salina  
Saratov, Russian Federation

**Background and aims:** The urgency of the problem in Russia is obvious: breast cancer occupies a leading position among malignant tumors in women (20.9%) and occupies 3rd place in the causes of the death of the female population from cancer processes.

**Methods:** We examined 124 women aged 33-79 years after a radical mastectomy for breast cancer. All patients underwent a detailed neurological examination and needle myography of the upper extremities.

**Results:** Burning pain bothered 86 patients, 52 people noted numbness on the inner surface of the shoulder or forearm. Anesthesia on the posteromedial surface of the shoulder and axillary region was detected in 25 people. Motor disturbances could clearly be identified only by 7-10 days after surgery. ENMG results showed the following disorders: anterior scalene syndrome, including vascular disorders, and middle scalene syndrome, which is manifested by neurological disorders; syndrome of the dorsal scapular nerve, long nerve of the chest and suprascapular nerve; axillary nerve syndrome; rib-clavicle syndrome (Folkoner-Weddell syndrome); minor pectoral muscle syndrome (Wright-Mendlovich syndrome); intercostal nerve syndrome. Autonomic disorders on the side of the mastectomy occurred in 65 patients no earlier than 7-10 days after the surgery: vascular hyperemia or pallor of the skin, dry skin, brittle nails.

**Conclusion:** Thus, neurological disorders in women undergoing surgery for breast cancer are characterized by polymorphism of the syndromes and are found in 70% of patients. However, our data revealed a clear correlation between the use of the nerve-sparing modification of the surgical aid and the decrease in the number of patients with peripheral nerve damage.

**Disclosure:** Nothing to disclose

## EPO3332

**Peripheral neuropathy and livedoid vasculopathy**

M. Suzuki, M. Takeuchi, M. Kobayashi, K. Kitagawa  
Neurology, Tokyo Women's Medical University, Tokyo, Japan

**Background and aims:** Livedoid vasculopathy (LV) is a rare thrombotic disease of the skin microcirculation resulting in painful ulcers, mainly affecting the lower legs. Recently, cases of peripheral neuropathy, most often mononeuritis multiplex, have been reported in association with LV.

**Methods:** We describe 4 cases of peripheral neuropathy associated with LV, and review the literature.

**Results:** All patients were female, ranging in age from 51 to 80 years old. Time between 1st cutaneous manifestations and diagnosis of neuropathy ranged from 2 to 9 years. No body weight loss was observed in any patients. Nerve biopsies in 3 cases revealed multiple axonal loss suggestive of ischemic processes without significant inflammation or necrotizing vasculitis. 1 patient presented with necrotizing vasculitis in nerve and muscle specimens and had been treated with corticosteroid.

**Conclusion:** Although LV was formerly considered a vasculitic disorder, recent advances have suggested primary hypercoagulable state rather than inflammation as a more likely primary cause of ischemic damage and cutaneous manifestations. A French study reported that 10 of 20 LV patients for whom results of neurophysiological investigations were available showed peripheral neuropathy, with 2 patients demonstrating specific thrombo-occlusive vasculopathy. 3 of our cases showed vasculopathy, but 1 developed vasculitic features in nerves and muscles. Our presentation will discuss the significance of LV with neuropathy along the spectrum of vasculitides based on the Chapel Hill Consensus Conference nomenclature.

Nerve biopsy is beneficial for confirming diagnoses and selecting adequate treatments in LV associated with peripheral neuropathy.

**Disclosure:** Nothing to disclose

## EPO3333

**Guillain-Barré syndrome and acute hepatitis E virus infection.**

G. Torres Iglesias<sup>1</sup>, A. Plaza Herráiz<sup>1</sup>, B. Fuentes<sup>1</sup>, J. Rodríguez Pardo de Donlebún<sup>1</sup>, M. Fernandez-Fournier<sup>1</sup>, E. Díez-Tejedor<sup>2</sup>

<sup>1</sup>Neurology, Hospital Universitario La Paz, Madrid, Spain,

<sup>2</sup>Neurology department and Stroke centerdepartment and Stroke center, Hospital Universitario la Paz, Madrid, Spain

**Background and aims:** To analyze a possible association between acute hepatitis E virus (HEV) infection and Guillain-Barré syndrome (GBS), which is identified as an emerging extrahepatic manifestation of infection due to HEV.

**Methods:** Retrospective study of patients with GBS and its variants, diagnosed in the Department of Neurology of a University Hospital. Cases were identified by searching ICD codes in medical records from January 2015 to December 2018. Medical charts were reviewed and following data were collected: age, sex, prodromes, liver damage markers, hepatotropic viruses, serology and others.

**Results:** A total of 36 patients were included. Mean age 47.3 years (SD 23.2), 52.8% males. Prodromic gastrointestinal symptoms were reported in 41.7%, with jaundice in only 1 patient (2.8%). The median time from prodromes to neurological symptoms was 7 days (range: 1-30). Increased levels of Aspartate transaminase (AST) and Alanine transaminase (ALT) were recorded in 19.4% and 27.8% respectively, only 2 patients (5.6%) presented high bilirubin levels. The frequency of evaluation of hepatotropic viruses was HBV (72.2%), HCV (72.2%), HAV (27.8%) and HEV (8.3%). CMV serology was analyzed in 86.3% and EBV in 83.3% being positive in 2 cases each. Despite HEV was the 1 less frequently analyzed, it was the 1 with the higher percentage of seropositivity (33.3%). It was observed statistically significant relationship between the increase level in AST ( $p=0,044$ ) and ALT ( $p=0.001$ ) with the seropositivity for the viruses studied.

**Conclusion:** HEV infection is possibly underdiagnosed in patients with GBS symptoms, since it is the hepatotropic virus in which the determination is made less frequently.

**Disclosure:** Nothing to disclose

## EPO3334

**Transient, recurrent Central Nervous System clinical manifestations of X-linked Charcot-Marie-Tooth disease presenting with very long latency periods between episodes. Prolonged sun exposure a provoking factor?**

A. Tziakouri<sup>1</sup>, K. Natsiopoulos<sup>2</sup>, K. Kleopa<sup>3</sup>, C. Michaelides<sup>1</sup>

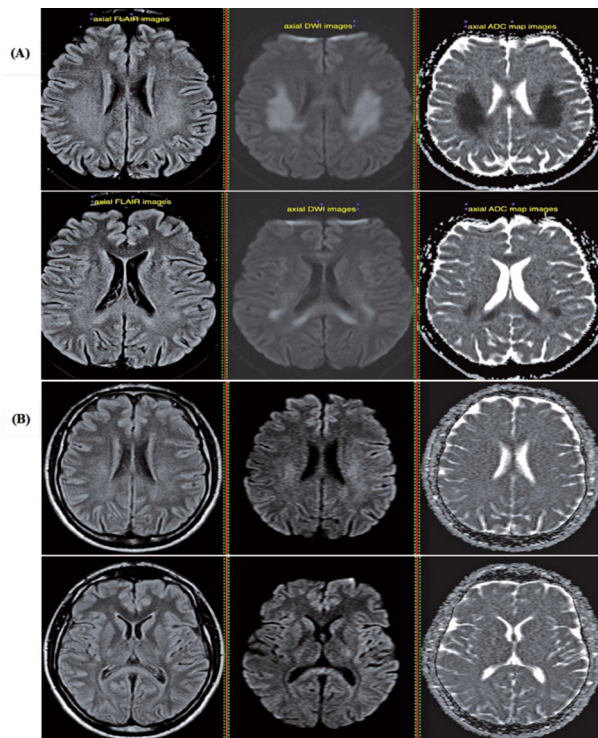
<sup>1</sup>Department of Neurology, American Medical Center, Nicosia, Cyprus, <sup>2</sup>Department of Radiology, American Medical Center, Nicosia, Cyprus, <sup>3</sup>Neurology Clinics and Neuroscience Laboratory, The Cyprus Institute of Neurology and Genetics and Cyprus School of Molecular Medicine, Nicosia, Cyprus

**Background and aims:** Charcot-Marie-Tooth disease is one of the most common inherited neurological disorders affecting the peripheral nervous system. Common clinical manifestations include distal muscle weakness and atrophy, often associated with a characteristic steppage gait and foot deformities. An X-linked type of CMT (CMTX1) is known to cause transient acute and recurrent, or chronic CNS (central nervous system) symptoms, predominantly dysarthria, dysphagia, motor weakness and ataxia. CMTX1 is caused by mutations affecting the GJB1 gene encoding for the gap junction protein connexin32 (Cx32) which is mainly expressed in the myelinating Schwann cells of the peripheral nerves, causing the typical polyneuropathy symptoms. Growing evidence suggest that dysfunctional gap-junction mediated coupling in the CNS accounts for the stroke-like manifestations of the disease. Predisposing factors such as exercise, fever and returning from areas of high altitude have been described as triggers of the CNS manifestations, however in many cases a substantial cause remains undetermined.

**Methods:** In this report we describe a patient with 3 attacks of transient CNS deficits at the ages of 11, 21 and 38 years, which were also accompanied by transient white matter abnormalities on MRI.

**Results:** The CNS symptoms preceded both the diagnosis and the clinical manifestation of the polyneuropathy in our patient and a novel relationship between prolonged, intense sun exposure and the attacks was detected.





(A) MRI FLAIR and DWI at symptom presentation: diffuse symmetric deep white matter involvement of the centrum semiovale. T2/FLAIR hyperintensity, restricted diffusion (1st row), extending to the splenium of the corpus callosum (2nd row). (B) 1 month follow-up MRI: significant symmetric improvement both in volume and intensity

**Conclusion:** In our knowledge this is the first documented case with such long latency periods between CNS attacks, and the only report describing intense sun exposure as a possible provoking factor.

**Disclosure:** Nothing to disclose

## EPO3335

### Unravelling the mechanisms of hyperreflexia in Guillain-Barré syndrome: A single-case study.

V. Versace<sup>1</sup>, S. Campostrini<sup>1</sup>, E. Rastelli<sup>1</sup>,  
L. Sebastianelli<sup>1</sup>, R. Nardone<sup>2</sup>, E. Pucks-Faes<sup>3</sup>,  
L. Saltuari<sup>1</sup>, M. Kofler<sup>3</sup>, A. Uncini<sup>4</sup>

<sup>1</sup>Neurorehabilitation, Hospital of Vipiteno-Sterzing, Vipiteno-Sterzing, Italy, <sup>2</sup>Department of Neurology, Paracelsus Medical University, Salzburg, Austria, <sup>3</sup>Neurology, Hospital Hochzirl, Zirl, Austria, <sup>4</sup>University "G. D'Annunzio", Chieti, Italy

**Background and aims:** We report a previously healthy patient who presented with symmetric ascending weakness without sensory loss following *Campylobacter jejuni* enteritis. He had bilateral hyperreflexia, bilateral Hoffmann's sign, and Babinski's sign on the right side. Electrodiagnostic studies concurred with an acute motor axonal neuropathy (AMAN) variant of Guillain-Barré syndrome (GBS). Following a standard regime of intravenous immunoglobulin the patient regained the ability to walk within 12 weeks. Hyperreflexia persisted throughout the course of the disease.

**Methods:** Electrophysiological studies were performed to assess central motor pathways and spinal segmental reflex activity.

**Results:** Spinal hyperexcitability was evidenced by disinhibition of soleus H reflex (increased Hmax/Mmax amplitude ratio, facilitation of excitability recovery). Contrary to previous reports, transcranial magnetic stimulation did not reveal prolonged central motor conduction time to distal limb muscles. Since no impairment of descending motor control was evident, enhanced segmental reflex activity was presumably due to a dysfunction of spinal inhibitory interneurons. Pre-synaptic inhibition of Ia afferents was indeed impaired, based on absent vibration-induced soleus H reflex suppression. Furthermore, peroneal nerve conditioning of the soleus H reflex documented defective reciprocal Ia inhibition from ankle dorsiflexors onto plantar flexors. Delayed and shortened cutaneous silent periods in soleus muscle following noxious sural nerve stimulation also concurred with spinal disinhibition.

**Conclusion:** Although spinal magnetic resonance imaging did not demonstrate structural alteration, neurophysiological findings highlighted a damage to the inhibitory interneuronal network and subsequent spinal hyperexcitability. The immune-mediated attack likely extended into the spinal anterior horn, which may be the etiopathogenetic mechanism underlying hyperreflexia as occasionally encountered in GBS patients.

**Disclosure:** Nothing to disclose

## EPO3336

**Characteristics of neuropathic pain and its impact on quality of life in patients with diabetic polyneuropathy**

Z. Vukojevic<sup>1</sup>, A. Dominovic-Kovacevic<sup>1</sup>, S. Peric<sup>2</sup>,  
I. Bozovic<sup>2</sup>, S. Grgic<sup>1</sup>, I. Basta<sup>2</sup>, D. Lavrić<sup>2</sup>

<sup>1</sup>*Clinic for Neurology, University Clinical Centre of Republic of Srpska, Faculty of Medicine, University of Banja Luka, Banja Luka, Bosnia and Herzegovina, Banja Luka, Bosnia and Herzegovina,* <sup>2</sup>*Neurology Clinic, Clinical Center of Serbia, School of Medicine, University of Belgrade, Belgrade, Serbia*

**Background and aims:** To determine characteristics of neuropathic pain and its impact on quality of life (QoL) in patients with diabetic polyneuropathy (DPN).

**Methods:** We examined 140 patients with DPN. 58 patients (41.4%) had clinical diagnosis of neuropathic pain based on the criteria of Haanpää et al. (2011). These patients were tested with 3 questionnaires for neuropathic pain (Pain Detect Questionnaire, Leeds Assessment of Neuropathic Symptoms and Signs and Douleur Neuropathique en 4 questions). We selected 32 patients who were positive on all 3 questionnaires (experimental group), and 32 patients with DPN who didn't have clinical diagnosis of neuropathic pain, and were negative on all 3 questionnaires (control group). Hamilton depression and anxiety rating scales and SF-36 questionnaire were also applied. Patients who had other significant comorbidities were excluded from the study.

**Results:** Patients with neuropathic pain (experimental group) had significantly severe form of DPN measured by The Lower Limb Neuropathy Impairment Score - NISS-LL score. The most distinctive feature of neuropathic pain was allodynia. Patients with neuropathic pain had significantly higher depression score, as well as worse QoL compared to the control group. The worst items on the SF-36 questionnaire were Role physical and General health. The most important predictors of quality of life in patients with DPN are the presence of depression ( $p<0.01$ ) and neuropathic pain ( $p<0.05$ ).

**Conclusion:** The most important feature of neuropathic pain was allodynia. Patients with neuropathic pain had worse QoL compared to the control group in physical and mental domains.

**Disclosure:** Nothing to disclose

## Sleep disorders

### EPO3337

#### Blood pressure in obstructive sleep apnea syndrome: implications for stroke risk

L. Avetisyan, L. Vardanyan, S. Khachatryan  
*Dept. of Neurology and Neurosurgery, National Institute of Health, Yerevan, Armenia*

**Background and aims:** Obstructive sleep apnea (OSA) is one of the most prevalent sleep disorders associated with higher risk of cerebrovascular (CV) disorders, being an independent risk factor for stroke. Blood pressure (BP) is an important CV risk factor. We aimed to assess CV risk among OSA patients using OSA severity and BP.

**Methods:** Polysomnographic (PSG) and home sleep apnea testing (HSAT) data and one-time blood pressure (BP) measurements of patients who attended a tertiary sleep center were retrospectively analyzed. OSA diagnosis was based on apnea-hypopnea index (AHI) using American Academy of Sleep Medicine scoring criteria. A sample of 67 participants (M/F-10.45%/89.55%) was divided into 2 groups according to AHI: mild-to-moderate OSA group (MOSAG) (AHI<30/h) and severe OSA group (SOSAG) (AHI≥30/h). Mann-Whitney U test was used for statistical analysis.

**Results:** Descriptives. MOSAG: n=29, mean age-46.8, F-10.3%; SOSAG n=38, mean age-52, F-10.5%. BMI for MOSAG/SOSAG-29.2/35.9kg/m<sup>2</sup>. Mean PSG-HSAT parameters for MOSAG/SOSAG groups: arousal index-27.2/46.3, AHI-15.5/69.6, ODI-16.1/70, oxygen saturation-92.6%/86.7% (p<0.05 for all), heart rate-68.5/73.3 (p>0.05). BP measurements: systolic BP, diastolic BP, mean BP and pulse findings in MOSAG/SOSAG groups: 121.2/119.7, 80/76.3, 174.5/170.6, 75.6/79 respectively (p>0.05). Despite expected worse PSG-HSAT results in SOSAG group, BP measurements and heart rate did not significantly differ between groups.

**Conclusion:** According to our data, we can presume that not only severe OSA, but also patients with mild-to-moderate OSA have high CV risk and equally need early diagnosis and treatment.

**Disclosure:** Nothing to disclose

### EPO3338

#### Regional differences in factors affecting insomnia: A cross-sectional study in South Korea

S. Cho, W.-J. Kim  
*Gangnam Severance Hospital, Seoul, Korea, Republic of*

**Background and aims:** Insomnia is influenced by multiple biological and socio-environmental factors. As rapid changes in industrial structure are a global phenomenon, there appears to be considerable gap between metropolis and rural areas not only in Korea but around the world. Herein, we compared the differences in factors affecting insomnia in large cities and rural areas.

**Methods:** A questionnaire-based cross-sectional survey was conducted among Koreans aged above 19 years on a national basis. We used the Insomnia Severity Index (ISI) to assess the clinical significance of sleep-related problems. I was regarded as having insomnia, if the ISI score was 8 or higher. We evaluated the risk factors of insomnia in urban and rural areas respectively by univariable and multivariable regression analysis.

**Results:** Of the total 1,590 subjects, the prevalence of insomnia was 16.2% in urban area, and 18.1% in rural area. Female gender, anxiety, depression and monthly income less than 3,000 USD were risk factors for insomnia in both urban and rural areas. Unemployment (Odds ratio [OR], 1.310; 95% CI, 0.995-1.724) was a risk factor in urban area, while age above 50 (OR, 1.728; 95% CI, 0.983-3.038) was associated with insomnia in rural area.

**Conclusion:** These results suggest that female gender, anxiety, depression and low income are common risk factors of insomnia in both urban and rural areas. Unemployment and older age are independent risk factors of insomnia which have a significant impact only in urban and rural area, respectively.

**Disclosure:** Nothing to disclose

## EPO3339

**Prediction of sleep disordered breathing in acute stroke patients: The accuracy of screening questionnaires**

M. Dekkers<sup>1</sup>, C. Horvath<sup>2</sup>, V. Woerz<sup>1</sup>, S. Duss<sup>1</sup>, M. Schmidt<sup>1</sup>, A.-K. Brill<sup>2</sup>, C. Bassetti<sup>1</sup>

<sup>1</sup>Neurology, University Hospital and University Bern, Berne, Switzerland, <sup>2</sup>Department of Pulmonary Medicine, University Hospital and University of Bern, Berne, Switzerland

**Background and aims:** Sleep disordered breathing (SDB) is highly frequent in stroke patients and negatively affects its outcome. How to best screen for SDB in this setting is a matter of debate. The objective of this study was to evaluate the performance of 5 SDB screening questionnaires after acute stroke.

**Methods:** A total of 438 acute stroke patients underwent a prospective sleep breathing assessment with polygraphy or apnealink within days of the event. 5 SDB screening tools (which have been validated in the general population) were used. The Berlin Questionnaire was completed by patients; the STOP-BANG, NoSAS, SACS, and NoApnea scores were calculated. Sensitivity, specificity, positive predictive values, negative predictive values and the area under the receiver operating characteristics (ROC) curve (AUC) were calculated for different SDB severities (according to the apnea-hypopnea and oxygen-desaturation (ODI) indexes).

**Results:** In this cohort, the Berlin questionnaire showed the poorest performance, with an AUC for the ODI thresholds of >5/h, >20/h or >30/h between 55-57%. The other 4 questionnaires performed significantly better and similar to one another. The best performance was found for the prediction of severe SDB (ODI >30/h) with an AUC ranging from 72% (STOP-BANG) to 74% (NoSAS).

**Conclusion:** Established questionnaires for SDB are moderately accurate in the prediction of SDB in acute stroke patients. The 2-item NoApnea test (neck circumference & age) showed a comparable performance to more complex screening tools. Further analyses will show whether the addition of other variables may improve the accuracy of current screening tools in this clinical setting.

**Disclosure:** This project was funded by the Swiss National Science Foundation

## EPO3340

**The role of comorbidities and risk factors in cognitive functioning in patients with obstructive sleep apnea**

M. Dimitrova<sup>1</sup>, K. Genov<sup>2</sup>, L. Traykov<sup>1</sup>, I. Staykov<sup>3</sup>

<sup>1</sup>Sofia, Bulgaria, <sup>2</sup>Clinic of Neurology, Second Multiprofile Hospital for Active Treatment, Sofia, Bulgaria, <sup>3</sup>Clinic of Neurology, Acibadem City Clinic Tokuda Hospital, Sofia, Bulgaria

**Background and aims:** It is a well documented fact that obstructive sleep apnea (OSA) results in cognitive impairment. OSA is associated with many comorbidities. Some of them are independent risk factors for cognitive decline and that is the reason why the role of comorbidities could not be clearly differentiated.

**Objective:** To find association between cognitive decline in patients with OSA and the presence of comorbidities and risk factors.

**Methods:** The cognitive deficit in a group of 103 patients with OSA was assessed by using neuropsychological battery. Comorbidities were analysed and then the patients were divided into groups consisting of individuals with or without certain comorbidity or harmful habit. The results from the neuropsychological tests were then compared between the groups with Independent Samples T-Test.

**Results:** The most frequent comorbidities accompanying OSA were arterial hypertension, diabetes mellitus and dyslipidemia. Smoking, obesity and alcohol use were analysed as lifestyle risk factors. Data analysis showed that 70.9% of all patients had arterial hypertension, 27.2 % had diabetes mellitus, 50.5 % had hyperlipidemia. Patients with arterial hypertension show deficit on SDMT test, Stroop test, TMTA and B. Patients with diabetes had more depressive symptoms and impairment on Stroop test when compared with non-depressive patients. Obesity was a main risk factor. We discovered statistical significance between obese and non-obese patients on all administered cognitive tests.

**Conclusion:** Hypertension, diabetes and obesity have significant impact on the cognitive function of patients with OSA. The effects of other risk factors remains to be established.

**Disclosure:** Nothing to disclose

## EPO3341

**Sleep Difference between Urban and Rural region of elderly population**

W.-J. Kim

*Seoul, Korea, Republic of*

**Background and aims:** Elderly population is rapidly increased after 20th century. Also urbanization is increasing, regional influence may influence to sleep status. Elderly population have more sleep disorder than younger population and vulnerable to regional environment. We study the sleep status of elderly population and compare with regional site.

**Methods:** The present study used data from the nationwide, cross-sectional study on sleep status among elderly Koreans aged 65 to 86 years. Epworth Sleepiness Scale (ESS) and Pittsburgh Sleep Quality Index (PSQI) were used to classify sleepiness. Insomnia Severity Index (ISI) was used for evaluation of insomnia symptoms and the Berlin Questionnaire for high risk of sleep apnea. Cambridge-Hopkins diagnostic questionnaire (CH-RLSq) was used to get prevalence of restless leg syndrome.

**Results:** We divided the region with metropolitan city, city and rural area. Total sleep time of weekday and weekend day are no difference. ESS and PSQI score were no difference between regions. But average of ISI score and poor sleepers were higher in rural region. Risk of obstructive sleep apnea and prevalence of restless leg syndrome were similar in each group.

**Conclusion:** This results showed in rural area poor sleeper and high ISI are common. We try to find out the causes and proper treatments.

**Disclosure:** Nothing to disclose

## EPO3342

**TAK-925, an orexin 2 receptor-selective agonist, has a threshold plasma concentration to induce arousal in a narcolepsy mouse model.**H. Kimura<sup>1</sup>, T. Ishikawa<sup>1</sup>, H. Hara<sup>1</sup>, K. Aoyama<sup>2</sup>, H. Yukitake<sup>1</sup>, M. Suzuki<sup>1</sup>

<sup>1</sup>Neuroscience Drug Discovery Unit, Research, Takeda Pharmaceutical Company Limited, Fujisawa, Japan, <sup>2</sup>Drug Metabolism and Pharmacokinetics Research Laboratories, Research, Takeda Pharmaceutical Company Limited, Fujisawa, Japan

**Background and aims:** Orexin 2 receptor (OX2R) agonism may represent a promising approach for the treatment of narcolepsy type 1 (NT1). TAK-925 is an OX2R-selective agonist with >5000-fold selectivity over orexin 1 receptor and ameliorates narcolepsy-like symptoms including fragmentation of wakefulness and cataplexy-like episodes in orexin/ataxin-3 mice, a narcolepsy mouse model with orexin deficiency. TAK-925 also increased wakefulness in patients with NT1. In this study, we conducted in vitro kinetic binding analyses and measured time-dependent changes in plasma concentration and wake-promoting effects in orexin/ataxin-3 mice, to understand the pharmacokinetic (PK)/pharmacodynamic (PD) relationship of TAK-925.

**Methods:** The dissociation rate of TAK-925 from OX2R was characterized using OX2R selective radioligand. TAK-925 was administered subcutaneously (SC) to orexin/ataxin-3 mice at zeitgeber time 12, and the sleep/wakefulness states were evaluated based on electroencephalogram/electromyogram measurements. In a separate PK study, blood samples were collected at various time points after SC administration of TAK-925 in mice. Plasma concentration of TAK-925 was quantified with high-performance liquid chromatography-tandem mass spectrometry.

**Results:** TAK-925 showed fast dissociation from OX2R. In orexin/ataxin-3 mice, TAK-925 significantly increased wakefulness time, and ameliorated fragmentation of wakefulness during active phase. In these mice, comparison of change over time in PK versus wakefulness found that the wake-promoting effect of TAK-925 was observed when plasma concentration exceeded a threshold concentration.

**Conclusion:** TAK-925 showed fast dissociation from OX2R, suggesting minimal residual OX2R stimulation after elimination from plasma. TAK-925 induced wake-promoting effects when its plasma concentration exceeded a threshold concentration in orexin/ataxin-3 mice.

**Disclosure:** Nothing to disclose

## EPO3343

### Alterations of white matter integrity including thalamus, brainstem, and cerebellum are associated with worse cognitive function in untreated obstructive sleep apnea

D.L. Koo<sup>1</sup>, R. Cabeen<sup>2</sup>, E.Y. Joo<sup>3</sup>, H. Kim<sup>4</sup>

<sup>1</sup>Seoul, Korea, Republic of, <sup>2</sup>University of Southern California, Los Angeles, USA, <sup>3</sup>Neurology, Samsung Medical Center, Sungkyunkwan University School of Medicine, Samsung Biomedical Research Institute, Seoul, Korea, Republic of, <sup>4</sup>Neurology, USC Stevens Neuroimaging and Informatics Institute, Keck School of Medicine, University of Southern California, Los Angeles, USA

**Background and aims:** A major consequence of obstructive sleep apnea (OSA) is impaired cognitive functioning. To investigate the relationship between fiber tract abnormalities and cognitive deficits, we applied diffusion tensor imaging (DTI) tractography for the white matter tracts of subcortical structures in patients with untreated OSA.

**Methods:** We enrolled 106 patients with OSA and 104 controls, who were diagnosed by polysomnography. Fractional anisotropy (FA) and mean diffusivity (MD) maps were obtained from whole-brain DTI including white matter tracts of thalamus, brainstem, and cerebellum. All participants underwent a battery of neuropsychological tests. To evaluate the association between FA/MD values and clinical, polysomnographic, and neuropsychological parameters in the OSA group, correlation analyses were performed after controlling age and BMI.

**Results:** OSA group showed significantly reduced FA values in the subcortical white matters in corpus callosum, thalamus, and brainstem. FA values of thalamic radiations, which are connected to parietal, prefrontal, and premotor area, were significantly decreased in OSA group ( $p=0.044$ ,  $p=0.007$ , and  $p=0.027$ , respectively). FA values of OSA patients decreased in medial lemniscus, middle longitudinal fasciculus, and superior longitudinal fasciculus ( $p=0.049$ ,  $p=0.040$ , and  $p=0.040$ ). The composite score of visual memory revealed a positive correlation with FA values in the rostrum of corpus callosum ( $p=0.016$ ).

**Conclusion:** Untreated OSA could impact negatively on the white matter integrity of corpus callosum, thalamus, and brainstem. Fiber tract abnormalities of the rostral corpus callosum were significantly associated with the impairment of visual memory.

**Disclosure:** Nothing to disclose

## EPO3344

### Self-Reported Short Sleep Duration and Lipid Profile: Data from the Epidemiological Study

L. Korostovtseva, A. Alieva, O. Rotar, M. Bochkarev, M. Boyarinova, Y. Sviryaev, A. Konradi, E. Shlyakhto  
Almazov National Medical Research Centre, St Petersburg, Russian Federation

**Background and aims:** Dyslipidemia is one of the main cardiovascular risk factors. Fat metabolism might be affected by lack of sleep as sleep plays an important role in modulating energy metabolism. In this analysis, we evaluated the relation between self-reported sleep duration and lipid profile in the population-based sample.

**Methods:** Among 1600 participants (population-based sample of the epidemiological study ESSE-RF), we selected 1433 subjects without previously known cardiovascular events, who reported their sleep duration, underwent blood tests and did not take lipid-lowering drugs (35% males; mean age-46.2±11.7years). All subjects underwent a structured interview about lifestyle, medical history, complaints, sleep duration (How long have you been sleeping per night during last month?). Sleep duration <6h/night was considered short. Lipid assessment included total cholesterol, low-density and high-density lipoproteins (HDL), Apolipoprotein AI (ApoAI) and ApoB and ApoB/ApoAI ratio. For statistical analysis we applied parametric statistics, frequency and contingency analyses (Chi-square), correlation analysis.

**Results:** Only 5.1% (n=73) reported sleep duration <6h. Short-sleepers and those sleeping ≥6h did not differ by age, gender, body mass index. Short-sleepers demonstrated lower HDL (1.17 (0.7-3.4) vs 1.38 (0.5-2.9) mmol/l,  $p=0.005$ ) and ApoAI (1.44 (0.25-4.19) vs 1.57 (0.32-4.27) g/l,  $p=0.015$ ) compared to those with sleep duration ≥6h. There were no differences in any other lipid parameters between the groups. Correlation analysis did not show association between sleep duration (as continuous variable) and any of the lipid indices.

**Conclusion:** In our population-based sample, self-reported sleep duration is not directly associated with lipid metabolism disturbance.

**Disclosure:** The analysis is supported by the grant of the Russian Foundation of Fundamental Investigations RFFI, project #20-013-00874 A.

## EPO3345

**Prevalence of sleep disorders and determinant of sleepiness in a multicentric cohort of Italian physicians**

R. Lecca<sup>1</sup>, M. Maestri<sup>2</sup>, E. Battaglia<sup>3</sup>, M. Figorilli<sup>1</sup>, G. Gioi<sup>1</sup>, P. Congiu<sup>1</sup>, P. Cocco<sup>4</sup>, E. Bonanni<sup>2</sup>, M.M.F. Puligheddu<sup>1</sup>

<sup>1</sup>Dipartimento di Scienze Mediche e Salute Pubblica - Università di Cagliari, Centro di Medicina del Sonno, Cagliari, Italy, <sup>2</sup>Department of Clinical and Experimental Medicine, Neurology Unit, University of Pisa, Italy, Pisa, Italy, <sup>3</sup>Pneumology, ASST Santi Paolo e Carlo PO San Carlo Borromeo, Milan, Italy, <sup>4</sup>Unit of Occupational Medicine, Dept. of Medical Sciences and Public Health, University of Cagliari, Cagliari, Italy

**Background and aims:** In Italy 60% of hospital employees are engaged in shiftwork. Sleepiness in hospital physician can be a risk factor for decreased cognitive performance, leading to potential increase of risk of medical errors. So far no studies had investigated this issue in Italian physicians. The objective of our multicenter study is to assess the prevalence and the determinants of somnolence in a cohort of Italian hospital physicians.

**Methods:** 196 physicians were recruited. Participants filled two questionnaires: the AIMS “questionnaire for the evaluation of alertness for the occupational medicine”, investigating sleep habits and disturbances, shift working routine, and the Epworth Sleepiness Scale (ESS) for somnolence. With non parametric tests we explored the association between personal characteristics, history of nightshift work and ESS.

**Results:** The population was composed for 62% of females, mean age 46.9 years (SD 11.1). All participants had been working 2-4 nightshifts/month, no fixed rotation scheme, with an average 35 nights/year (SD 12.1). The prevalent chronotype was intermediate (58%); 19% were larks, 23% owl chronotype. Being older than 50, overweight, and having a lark chronotype were significantly associated with an increase in the ESS score ( $p < 0.001$ ). A history of 15 or more years of nightshift work engagement was also more likely to result in a higher ESS score ( $p = 0.04$ ).

**Conclusion:** Our results might provide clues useful for the definition of selection criteria for fitness to nightshift work and design shiftwork schedules, in order to reduce its impact on the performances and health of hospital physicians.

**Disclosure:** Nothing to disclose

## EPO3346

**The relationship between Restless Legs Syndrome and Hypertension, Diabetes mellitus, Ischemic vascular disease.**

H.J. Lee, Y. La, W.-J. Kim

Gangnam Severance Hospital, Seoul, Korea, Republic of

**Background and aims:** Restless legs syndrome (RLS) can change sympathetic activation and blood pressure. But the association between RLS and hypertension (HTN), diabetes mellitus (DM) and ischemic vascular disease (IVD) remains contradictory results.

We investigated the prevalence of RLS and its association with HTN, DM and IVD in a cross-sectional nationwide sample of adult population.

**Methods:** This was a cross-sectional questionnaire-based study including 2,836 nationwide Korean adults aged 19 years or more.

We identified subjects who met the four essential International RLS study group (IRLSSG) criteria were defined as the RLS group.

The presence of HTN, DM, and IVD was defined as a self-reported history of physician-diagnosed diseases.

**Results:** Among the 2,836 subjects, 157 (5.5%) were found to have RLS symptoms.

The prevalence of self-reported HTN was 38 (24.2%), DM was 15 (9.6%) and IVD was 14 (10.4%) respectively.

The RLS group was associated with old age (Odds ratio [OR], 2.306; 95% CI, 1.703-3.271), the women gender (OR, 1.431; 95% CI, 1.033-1.984), HTN (OR, 2.273; 95% CI, 1.550-3.334), DM (OR, 2.140; 95% CI, 1.221-3.752) and IVD (OR 2.088; 95% CI, 1.171-3.724).

In multiple logistic regression analysis adjusted with age, it showed that odds ratio for self-reported HTN in the RLS group was 2.104 (95% CI, 1.428-3.099), DM was 1.783 (95% CI, 1.009-3.150) and IVD was 1.399 (95% CI, 0.764-2.562) compared to controls.

**Conclusion:** RLS symptoms is age independently associated with a high prevalence of HTN, DM and IVD in the adult population.

**Disclosure:** Nothing to disclose

## EPO3347

**Sleep alteration and anxiety behavior in a modified post-traumatic stress disorder (PTSD) rodents model**Y. Lo<sup>1</sup>, P.-L. Yi<sup>2</sup>, F.-C. Chang<sup>1</sup><sup>1</sup>National Taiwan University, Taipei, Taiwan, Chinese Taipei,<sup>2</sup>Department of Sport Management, Aletheia University, Taipei, Taiwan, Chinese Taipei

**Background and aims:** Post-traumatic stress disorder (PTSD), a typical syndrome of chronic stress induced by high intensive and emotional stimulation, causes the persist hyper-arousal, anxiety, poor sleep quality, and nightmares for over 1 month. Although several PTSD-like models can successfully simulate the decreased sleep efficiency and elevated anxious behavior on rodents, the limited time of these exhibiting symptoms causes question about the animal model. Therefore, in this study, we modified and extended fear behavior to establish an ideal PTSD-like animal model.

**Methods:** In order to extend stress behavior, the model of single-prolong stress (SPS) was modified by elevating the intensity and the uncontrollability of the containing stressors. The male Sprague-Dawley rats were randomly receiving seven days in a series of stressors. Then the bodyweight alteration, fear memory retrieval ability, sleep-wake activity, and anxious behavior were assessed in the short-term (3 weeks) and long-term (7 weeks) periods.

**Results:** Our results showed a significant stress expression during the SPS procedure and that the fear memory could be retrieved after 7 weeks of giving the modified SPS. The declined bodyweight, increased corticosterone secretion, and freezing behavior, which occurred during the SPS and fear memory recalling process, have successfully been prolonged. In addition, the high anxiety level evaluated by the theta oscillation power and behavior tasks after the memory recall were also obtained. Furthermore, REM sleep was suppressed, which reflects the phenomenon of chronic stress-induced sleep alteration.

**Conclusion:** In sum, increasing the intensity and the uncontrollability of the stimulations can prolong the psychological and physiological symptoms to simulate the PTSD.

**Disclosure:** Nothing to disclose

## EPO3348

**Factors associated with excessive sleepiness in patients with Parkinson's disease**M.A. Nikitina<sup>1</sup>, N.G. Zhukova<sup>1</sup>, V.M. Alifirova<sup>1</sup>, E.Y. Bragina<sup>2</sup>, K.F. Nurzhanova<sup>1</sup>, E.S. Kolupaeva<sup>1</sup>, I.A. Zhukova<sup>1</sup><sup>1</sup>Department of Neurology and Neurosurgery, Siberian State Medical University, Tomsk, Russian Federation, <sup>2</sup>Population Genetics Laboratory, Research Institute of Medical Genetics, Tomsk, Russian Federation

**Background and aims:** Excessive daytime sleepiness (EDS) is a common non-motor symptom in Parkinson's disease (PD) and affects up to 55% of people with PD [Chahine LM,2017]. The aim is to identify the factors associated with the presence of EDS in PwPD in Tomsk region.

**Methods:** A cross-sectional study was performed involving 296 PwPD (women:men=169:127, average age – 63.9±18.3, PD average duration – 12.7±11.3, average stage – 3.86±3.73). The research consisted of demographic details, disease related parameters (PD duration, PD type, H&Y Scale, LEDD, sleep disturbance duration, influence of sleep disturbance on life quality, MDS-UPDRS (III part), HADS, Beck depression inventory II, Epworth Sleepiness Scale, Parkinson's disease sleep score (PDSS), SAQ (Sleep attack scale), Apathy Scale, Montreal Cognitive Assessment (MoCA-test), Questionnaire for Impulsive-Compulsive Disorders (QUIP-RS), PDQ-39, Columbia-Suicide Severity Rating Scale(C-SSRS). The study protocol was approved by Ethics Committee.

**Results:** EDS was observed in 59.4% of PwPD (176). Main related factors were the presence of cognitive impairment ( $r=0.489$ ,  $p<0.0001$ ), depressive disorders ( $r=0.476$ ,  $p<0.0001$ ), apathy ( $r=0.429$ ,  $p<0.0001$ ), anxiety ( $r=0.375$ ,  $p<0.0001$ ), dysphoria ( $r=0.381$ ,  $p<0.0001$ ), MDS-UPDRS – motor score ( $r=0.336$ ,  $p<0.0001$ ), suicidal thoughts/actions ( $r=0.332$ ,  $p<0.0001$ ), impulsive-compulsive disorders ( $r=0.315$ ,  $p<0.0001$ ), life quality ( $r=-0.401$ ,  $p<0.001$ ), compared with patients without sleepiness in following indexes of the PDQ-39: mobility ( $p<0.01$ ), activity ( $p<0.001$ ), cognitive ( $p<0.001$ ), advanced disease ( $p<0.001$ ).

**Conclusion:** EDS is a common symptom in PwPD, and other factors, different from general population observed, seem to have a greater importance in this patients group.

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## EPO3349

**The study of psychophysiological indicators in short sleep states for during monotonous cognitive load**

R. Parsamyan<sup>1</sup>, A. Runnova<sup>2</sup>, M. Zhuravlev<sup>3</sup>, A. Kiselev<sup>2</sup>, E. Salina<sup>2</sup>

<sup>1</sup>Pain Clinic, Saratov, Russian Federation, <sup>2</sup>Saratov State Medical University, Saratov, Russian Federation, <sup>3</sup>Saratov State University, Saratov, Russian Federation

**Background and aims:** The state of sleep and capabilities are still of considerable interest. It is already reliably known that sleep periods of slow wave activity are especially important, the presence of which correlates with the subjective feeling of “sleepiness”, as well as restoration to the cognitive functions maximum level. We evaluate the dynamics of the cognitive attention function during the occurrence of short periods of drowsiness, including episodes of slow wave activity, in subjects, caused by evening time and an artificial uniform monotonous load.

**Methods:** We studied electroencephalography for a group of participants (5F, 10M; 33.6±7.3 years old years; 32 EEG channels). All experiments took place in the evening in a darkened room. For 60 minutes, subjects observed cognitive stimuli (bistable images) to which they responded by pressing a button.

**Results:** Based on wavelet time-frequency analysis we demonstrate a pronounced predominance of slow-wave activity in the occurring short sleep periods. Before going to bed, the subject shows a sharp increase in reaction time. After the spontaneous end of the sleep period, the subject’s cognitive ability is restored to its maximum level. The cognitive functions of subjects not experiencing sleep episodes experience a trend of gradual decline during the entire experiment.

**Conclusion:** We describe a period of sleep that is abnormal in the level of observed slow activity with prolonged monotonous cognitive load. After these sleep states, subjects demonstrate a significant increase in cognitive attention function indicators. Subjects without short-term drowsiness experience a trend of slow decline in attention rates throughout the experiment.

**Disclosure:** The reported study was funded by RFBR according to the research project No 19-32-80036.

## EPO3350

**Sleep disorder symptoms improvement after the 12-week mindfulness therapy sessions in myofascial facial pain syndrome patients**

G. Shevtsova<sup>1</sup>, L. Medvedeva<sup>2</sup>, O. Zagorulko<sup>2</sup>, N. Vashchenko<sup>1</sup>

<sup>1</sup>Moscow, Russian Federation, <sup>2</sup>Petrovsky Russian Research Center of Surgery, Moscow, Russian Federation

**Background and aims:** Sleep disorders impair the body’s functioning, resulting in more severe pain, longer pain duration, greater levels of anxiety, depression, and worse impairment in physical and psychosocial functioning. The study aims to assess the effectiveness of mindfulness therapy in myofascial facial pain syndrome (MFPS) patients according to sleep disorder symptoms.

**Methods:** The prospective randomized study included 64 patients with MFPS, who attended the Pain clinic in Sept. 2018–Aug. 2019 and were divided into 2 groups (32 patients each) by the sealed envelope method. All patients received venlafaxine 75mg/day and tizanidine 4mg/day during 12 and 4 weeks respectively. The study group was additionally educated with mindfulness meditation techniques (weekly 2-hour group sessions with following daily outside preparation during 12 weeks and individual session for every participant). Treatment effectiveness was evaluated at admission, 6 and 12 weeks after treatment by measuring pain intensity using a subjective visual analogue scale (VAS) and sleep disorders characteristics—total wake time (TWT) and Insomnia Severity Index (ISI).

**Results:** At admission the VAS score was 4.8±1.5 and 5.4±1.6 points, TWT – 57.6±18.4 and 54.2±19.8 minutes and ISI total score – 17.1±2.2 and 16.8±1.4 points in the study and control groups, respectively. 6 weeks after treatment measurements showed significant VAS score (2.1±0.9 vs. 3.4±1.1), TWT (31.5±16.1 vs. 48.2±15.7) and ISI (10.9±1.8 vs. 15.5±1.7) score reductions in the study group compared to controls. 12 weeks follow-up show tendency to upcoming VAS score decreasing (1.7±0.5 vs. 3.2±0.7), TWT (21.7±11.4 vs. 45.6±14.3) and ISI score (5.2±2.6 vs. 16.4±1.9) in the study group compared to the controls.

**Conclusion:** Mindfulness therapy can significantly improve sleep disorders in MFPS patients.

**Disclosure:** Nothing to disclose

## EPO3351

**LMOD3 gene mutation in a patient with familial periodic hypersomnia**E. Wenz<sup>1</sup>, M. Tafti<sup>2</sup>, C. Bassetti<sup>1</sup><sup>1</sup>Department of Neurology, University Hospital Bern, University Bern, Berne, Switzerland, <sup>2</sup>Department of Biomedical Sciences, University of Lausanne, Lausanne, Switzerland

**Background and aims:** Kleine-Levin syndrome (KLS) is a debilitating disorder with a prevalence of 1-2 per million characterized by episodes of hypersomnolence associated with cognitive, psychiatric and behavioral disturbances. The diagnosis of KLS is based on clinical findings. Recently, LMOD3 mutations were described in a family with KLS in Saudi Arabia and in 7 sporadic cases.

**Methods:** Review of a patient's clinical record and the relevant literature.

**Results:** We report a case of a 35-year old female patient, who over 17 years received different sleep diagnoses including those of idiopathic hypersomnia, non organic hypersomnia and periodic Hypersomnia. Her history is also positive for psychiatric/psychological disturbances (depressive symptoms, worsening of hypersomnia going along with psychosocial stress). A positive family history for periodic hypersomnia and psychiatric symptoms was noted. Current diagnostic criteria for KLS were not satisfied. We were recently able to prove a mutation in the LMOD3-gene in this patient, a Proline for Histidine substitution at codon 552. The p.P552H mutation was previously reported in 2 sporadic KLS patients.

**Conclusion:** This report illustrates the current difficulty in differentiating different forms of non narcolepsy central disorders of hypersomnolence. In addition, it documents the association of a LMOD3 gene mutation with a familial, incomplete form of KLS.

**Disclosure:** Nothing to disclose

## EPO3352

**A possible link between current restless legs syndrome and surgical interventions in the past**G. Yeganyan<sup>1</sup>, Z. Tavadyan<sup>2</sup>, S. Khachatryan<sup>2</sup><sup>1</sup>Sleep and Movement Disorders Center, Somnus Neurology Clinic, Yerevan, Armenia, <sup>2</sup>Department of Neurology and Neurosurgery, National Institution of Health, Yerevan, Armenia

**Background and aims:** We had shown before, that patients with restless legs syndrome (RLS) report significantly more surgical interventions (SI) in their medical history compared with health population. It was hypothesized that specific types of SI could be risk factors for RLS. Our aim was to investigate the prevalence of appendectomy and tonsillectomy in medical history of RLS patients who had surgery in the past.

**Methods:** Patients from a sleep clinic population were involved. Based on international diagnostic criteria participants were divided into RLS (+) and RLS (-) groups. Detailed SI history was obtained. Appendectomy and tonsillectomy were identified as most common types of SI. Chi-square test was utilized for statistical analysis.

**Results:** We included 161 adult patients (F=51.5%, mean age=41.0) who had previous surgical anamnesis. RLS was diagnosed in 37.0% (52) of them. We divided them into subgroups: RLS (+) (mean age=49.5) and RLS (-) (mean age=35.7). Prevalence of appendectomy and tonsillectomy in total group was 29.2% (47) and 33.5% (54) respectively. Prevalence of appendectomy in RLS (+) was 38.5% (20), while in RLS (-) was 24.8% (27) (p=0.07). In RLS (+) prevalence of tonsillectomy was 32.7% (17) versus 33.9% (37) in RLS (-) (p=0.87).

**Conclusion:** There is no significant difference in prevalence of appendectomy and tonsillectomy between patients with RLS and non-RLS population. However, we found a trend towards more appendectomies done in RLS population. This hypothesis needs further investigation for a possible link.

**Disclosure:** Nothing to disclose