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Mild cognitive impairment
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The increasing prevalence of old age dementia is alarming and needs to be addressed. So far, attempts to treat this threatening epidemic have failed. One reason given for this failure is that treatment might have started too late. It is thus speculated that earlier intervention could be more successful.

Since senile dementia develops insidiously, attention has shifted to people at the earliest stages. Mild cognitive impairment (MCI) is a term used for the state of subjects whose cognition is below the expectations for their age and premorbid functional level. However, the entity of MCI is heterogeneous in terms of its pathogenesis, underlying pathology, clinical manifestations and prognosis. Therefore clinical management of these cases should start with accurate diagnosis, but this is not possible in many cases.

There is little chance that therapies directed against beta amyloid or tau would prevent future cognitive decline. The best approach should be to use data coming from epidemiological studies in which risk factors for cognitive decline are identified, and use targeted measures against those affecting the specific individual.

ALS and FTD neuropathology and phenotype
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It has been convincingly shown that ALS and FTD are neuropathologically and clinically related.

Neuropathologically, it has been shown, that the behavioural form of FTD and ALS show a pattern which exhibits initiation and propagation in defined stages. However, initiation of bvFTD and ALS is completely different; showing that both entities are rather distinct then a continuum. The clinical translation of the neuropathological findings have revealed that both diseases are a multisystem degeneration. In the case of ALS the changes show a corticoefferent pattern in which subcortical nuclei are affected in stages; in the first stage anterior horn cells and bulbar motoneurons, in a second stage the precerebellar nuclei, in a third stage striatal neurons and in a fourth state the hippocampus are affected. All this can be translated, as in FTD, by neuroradiological examinations, into the clinic.

In summary, these findings show that FTD and ALS are related, but phenotypically and neuropathologically distinct; both diseases show a pattern of initiation and propagation. It will be the challenge of the future to translate these features into effective therapies.
E 03  Issues of Global Stroke Prevention
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The 70ties and 80ties in the last century showed a decline in stroke mortality. Today, we see an increase of stroke mortality which is most dramatic in low and middle income countries. If instead of mortality alone we also look at prevalence and burden of the disease, dementia and stroke are both by far the most burdening diseases globally. In countries with aging populations the increase is also seen due to demographic changes.

More recently, it has been shown that a decrease of incidence is possible by improving modifiable risk factors, mostly of lifestyle. For example, The Global Burden of Disease Study reports that the burden of stroke can be reduced by up to 90% if risk factors, esp. behavioral and metabolic risk factors are managed appropriately. Recently, environmental factors (air pollution and lead exposure) have been recognized as a major risks. Air pollution alone causes 30% of the stroke risk burden globally.

Prevention on a population scale can only be effective if large programs are established that target not only high-risk persons but aim also at medium risk and even low risk persons. The WHO led initiative of reducing the NCDs (noncommunicating diseases such as heart disease, cancer, diabetes, stroke and cardiopulmonary disease) can only become effective if the prevention issues are carried across diseases and are not only focused on one specific illness. This NCD Alliance has published a WHO Global Action Plan 2013-2020 which aims at reducing the NCD burden by 30% in 2030 (30 by 30). Regional assessments of the effectiveness of such initiatives show that in some world regions this may be reached but in others the targets will be missed if additional efforts are not made.

E 04  Progressive supranuclear palsy
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Sixty years ago, Steele, Richardson and Olszewski designated progressive supranuclear palsy (PSP) as a new clinicopathological entity defined by early postural instability with falls, supranuclear vertical gaze palsy, symmetric akinesia and rigidity, frontal dementia, and pseudobulbar palsy. Neuropathological confirmation (neurofibrillary tangles, neutrophil threads, tau-positive astrocytes and their processes in basal ganglia and brainstem, and the accumulation of 4 repeat tau protein) is necessary for definite PSP. However, phenotypic heterogeneity of PSP has been increasingly reported in the literature and can be the source of incorrect clinical diagnosis particularly in the early stages of the disease when the classically associated symptoms of early falls and supranuclear gaze palsy may not be apparent. The spectrum of PSP variants includes PSP-parkinsonism, pure akinesia and gait failure, PSP presenting with focal cortical syndromes, such as frontotemporal dementia, corticobasal syndrome and apraxia of speech, as well as, PSP presenting as cerebellar syndrome, primary lateral sclerosis, pallido-nigro-luysian degeneration, axonal dystrophy, and multiple system atrophy.
The clinical heterogeneity is associated with variability of regional distribution and severity of abnormal tau accumulation and neuronal loss. Midbrain atrophy on conventional MRI correlates with the clinical phenotype of RS but is not predictive of PSP pathology. Cerebrospinal fluid biomarkers and tau ligand positron emission tomography are promising biomarkers of PSP. The H1 haplotype (particularly a sub-haplotype H1c) of MAPT is a risk haplotype for PSP. A recent genome-wide association study on autopsy-proven PSP revealed additional PSP risk alleles in STX6 and EIF2AK3.

E 05 Botulinum Toxin Therapy in Movement Disorders
Maja Relja

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Botulinum toxin (BTX), produced by Clostridium botulinum is a potent toxin with therapeutic effects based on its specific synaptic physiology. Justinius Kerner (1786-1862), a German physician, is credited as being the first to recognize the potential of BTX for the treatment of hyperkinetic movement disorders. Since its development for clinical use in 1980s BTX, the most potent biological toxin known to man, has become a useful drug in a range of clinical conditions, especially in the management of muscle over-activity. One of the most notable contributions of BTX therapy in is in the field of movement disorders. BTX has proved to be remarkably effective local therapy for numerous movement disorders associated with muscle over-activity such as dystonia. According to evidence-based review of the safety and efficacy of BTX in the treatment of movement disorders and classified literature based on AAN criteria (Class I-IV) BTX should be offered as a treatment option for the treatment of cervical dystonia, blapharospasm, hemifacial spasm, adductor laryngeal dystonia, focal upper and lower limb dystonia. BTX is used as therapy in oromandibular dystonia, task-specific dystonia, tremor, ticks, as well as in some uncommon movement disorders as spinal myoclonus, painful/painless legs moving toes and hands. Further research is needed to address evidence gaps and to evaluate different BTX formulations where currently there is insufficient and/or conflicting clinical data. In addition, central effects of BTX should be assessed as potential site of therapeutic action.

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E 06 Progressive Supranuclear Palsy-Variability in Clinical Presentation
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Introduction
Progressive Supranuclear Palsy (PSP) may present in various subtypes, such as the „classical” Richardson-, the Parkinson -, Pure Akinesia and Gait Freezing (PAGF) Subtypes, and others [Williams and Lees, 2009, Respondek et al. 2014].

Objectives: Review of the literature on the clinical variability of PSP and data of an own longitudinal series of 40 patients
Patients and Methods
Patients were seen at 6 months intervals until drop out. Data set comprised history, UPDRS III, Tinetti Mobility Test, Barthel Index, De Renzi idiomotor apraxia test, autonomic nervous system data, Neuropsychiatric Interview, Frontal Behavioral Inventory, Instrumental Activities of Daily Living, Caregiver Burden, neuropsychological testing, and MRI

Results
Patients were mean 73 years old. Male and the female sex were balanced. Most, not all patients had falls in the 1st year of manifestation. UPDRS III sum score was mean 39, Tinetti 13.3. MMSE z scores was mean -2.1. Behavioral abnormalities were frequent. Barthel Index was mean 71. Most patients developed urinary incontinence. There was considerable caregiver burden (Zarit Caregiver Burden Scale sum score >= 26) in one third of the patients.

Conclusions
Most patients presented with the Richardson type, with variable symptom progression, single patients with PAGF und Parkinson subtype.

E 07 Brain resting-state neuronal networks modifications in Parkinson's disease - an fMRI study
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The recently developed fMRI studies, allowed the possibility to better identify the resting state neuronal networks activity in the human brain in normal and pathologic conditions. This method is particulary useful in studying and understanding the the dynamics of the functional pathophysiology in neurodegenerative diseases and neurocognitive disorders. We have analyzed resting-state functional magnetic resonance imaging (rs-fMRI) data in 27 PD patients and 16 healthy subjects. Differences for intra- and inter-network connectivity between healthy subjects and patients were investigated. Intra-network connectivity changes, eight components showed a significant connectivity increase in patients (p<0.05); these were correlated with clinicalscores and were largest for (sensori)motor networks. For inter-network connectivity changes, we found higher connectivity between the sensorimotor network and the spatial attention network (p=0.0098) and lower connectivity between anterior and posterior default mode networks (DMN) (p=0.024), anterior DMN and visual recognition networks (p=0.026), as well as between visual attention and main dorsal attention networks (p=0.03), for patients as compared to healthy subjects. The area under the Receiver Operating Characteristics (ROC) curve for the best predictor (partial correlation between sensorimotor and spatial attention networks) was 0.772. These functional alterations were not associated with any gray or white matter structural changes.

Conclusion
Our results show higher connectivity between sensorimotor and spatial attention areas in patients, which in our view probably represents a biologic functional compensatory mechanism as a consequence to the chronic neurodegenerative process.
E 08 Neural correlates of cognitive impairment in PD as assessed by resting-state fMRI
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Resting state fMRI studies have provided evidence of functional connectivity (FC) changes both within and between individual resting state networks (RSNs), including particularly the default mode network (DMN), frontoparietal, salience, and associate visual networks, which seem to be crucial for cognitive performance success in PD. DMN connectivity or its coupling with other networks was disrupted in PD with normal cognition although not in all studies, as well as in PD with mild cognitive impairment (PD-MCI) and PD with mild dementia. In contrast, the occurrence of cognitive deficits in PD was associated with abnormal FC within the frontoparietal network or between this network and other RSNs even after controlling for dopaminergic medication in PD with MCI and dementia.

The normally existing anti-correlation between the attentional fronto-parietal networks and the DMN was decreased in PD-MCI. In PD-MCI, impaired memory and visuo-spatial functions were related to abnormal FC in parietal and temporal regions. Moreover, FC changes in more posterior regions may be associated with the evolution to dementia as shown in a three-year longitudinal study. Altogether, these results are consistent with the concept of two distinct cognitive syndromes in PD, which include a dopaminergically mediated fronto-striatal executive impairments and a “posterior cortical syndrome” more frequently associated with later development of dementia. Longitudinal studies will have to demonstrate whether these changes may predict cognitive impairment and dementia in early PD.

E 09 When hoofbeats are zebras: late onset niemann-pick disease type C overlapping with frontotemporal dementia
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Introduction: Niemann–Pick disease type C (NPC) is a rare genetic disorder belonging to the lysosomal storage diseases. It is mainly diagnosed by pediatricians, while the manifestation of the disease in young adults is even rarer. Diagnosis of late onset NPC is complicated by the heterogeneous symptomatology of the disease, especially in adults, where its neuropsychiatric manifestations (mainly psychosis and dementia) are frequent symptoms in degenerative disorders and the red flag sign of NPC, the vertical supranuclear gaze palsy, is usually seen in patients with progressive supranuclear palsy (PSP).
Patients and methods: We diagnosed a patient with NPC at the age of 59 after a history of parkinsonism and dementia, fulfilling the criteria of PSP and corticobasal syndrome too in different stages of the disease.

Conclusion: Neurological manifestations in combination with frequently asymptomatic visceral symptoms should raise the suspicion of NPC. Score systems aid clinicians to estimate the probability of NPC (such as www.npc-si.com). In case of high likelihood of NPC there are available biochemical and genetic tests to prove the diagnosis. NPC is probably under-diagnosed due to its highly heterogeneous clinical presentation. The neurological manifestations of NPC can mimic FTD syndromes leading to significant delays in the diagnosis especially in dementia and movement disorders units. In case of familial aggregation of the phenotype and presence of otherwise inexplicable visceral symptoms, clinicians should think about late onset NPC, where treatment with miglustat is able to slow or stop the progression of the disease.

E 10; E 11 The concept of Deep Brain Stimulation. Conventional treatment or surgery
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We have not received the abstract until the deadline.

E 12 Enzyme levels of indoleamine-2,3-dioxygenase and kynurenine monooxygenase in the nitroglycerin model of migraine
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Migraine is a debilitating neurological disorder, which can be modelled by the administration of the nitrogen-monoxide donor nitroglycerin (NTG). In animals, NTG is able to activate and sensitize the trigeminal system, where glutamatergic mechanisms are suggested to play an important role. During the metabolism of tryptophan kynurenines are produced which modulate the glutamatergic neurotransmission. Previously, one of the kynurenines, kynurenic acid and its analogues were effective mitigating the activation and sensitization phenomena in animal models of migraine, suggesting the involvement of the kynurenine system in trigeminal pain processing. Our aim in the present study was to examine the possible changes in the kynurenine pathway (KP) after NTG administration.

Ten animals were divided into two groups, the first group received intraperitoneal physiological saline injection, while the second group received NTG (10 mg/kg). Four hours later the animals were processed for Western blotting to determine the levels of indoleamine 2,3 dioxygenase (IDO1) and kynurenine monooxygenase (KMO) enzymes. IDO1 is the rate limiting enzyme of tryptophan metabolism, converting L-tryptophan to N-formylkynurenine, while KMO converts L-kynurenine to 3-hydroxykynurenine.
The relative optical density of both enzymes were decreased after NTG treatment. Previously we found that the levels of kynurenine aminotransferase II were also decreased after NTG, suggesting that a down regulation of the KP occurs due to the NO released from NTG. Alterations in the KP may contribute to the modulation in glutamatergic neurotransmission, possibly promoting the activation and sensitization of the trigeminal system.

E 13  
**Cognitive impairment among Hungarian patients with multiple sclerosis**  
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**Background:** Cognitive impairment (CIm) is a frequent symptom of multiple sclerosis (MS); its prevalence is reported to be 43-70% [1]. It has a serious impact on the patients’ quality of life and it is one of the most important factors in MS patients becoming unemployed [2]. Yet it is still underdiagnosed and not screened routinely.

**Objectives:** We aimed to determine the prevalence of CIm among Hungarian MS patients and to assess the differences between genders and patients with different educational levels.  
**Patients and methods:** Five-hundred and fifty-four patients were enrolled to our study from three Hungarian MS centers. We utilized the BICAMS battery for the assessment of CIm, and used the BDI-II questionnaire to determine depression [3, 4]. For statistical analysis, we used Fisher-exact test and one-way ANOVA.

**Results and conclusion:** Three-hundred and eighteen (57.2%) patients had some level of CIm. CIm was significantly (p<0.001) more frequent among men (70.1%) than women (51.6%). There was no difference between patients among man with different educational levels. The prevalence of CIm among women with higher education was significantly (p<0.001) less common (41.9%) than women with lower education (63.9%). There was no difference between the rate of depression among any of the groups (p>0.05).  
Our prevalence data is well within the range of previously reported rates (43-70%) [1]. We found that men are more vulnerable to CIm than women in MS, similarly to a recent assessment [5]. We are the first to report, that higher education, thus higher cognitive reserve, is only a protective factor among women.

**References**

**E 14 Impaired functional and structural networks in migraine**

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**Introduction/Objectives**

Our Research Group aimed to explore functional and structural alterations in homogeneous (Szabó et al, 2012.) and separated groups of migraine patients with or without aura (Faragó et al, 2016.; Szabó et al, submitted).

**Materials/patients & methods:** Episodic migraineurs and healthy controls were scanned on a 1.5T MRI scanner. Resting state networks were identified and diffusivity parameters of the white matter were estimated and compared between patients’ groups and controls.

**Results and conclusion**

1. **Functional networks:** The amplitude of resting state blood-oxigenisation-level-dependent fluctuation is higher in migraine with aura in the superior parietal lobule, cingulate cortex, cerebellum and bilateral frontal regions compared to migraine with aura (p<0.05). We found no significant differences between migraine with aura and controls. The amplitude of resting activity was lower in patients without aura in the default mode network (p < 0.05) compared to controls. 2. **White matter paths:** In the mixed group of patients we found microstructural alteration in the right prefrontal white matter (p < 0.01), which is the part of the pain-network. In further analysis, we found no alteration between controls and migraineurs without aura. Widespread white matter difference was detected between controls and migraine with aura and between patients’ groups (p < 0.05).

We have provided evidence for interictal functional and microstructural white matter changes in patients with migraine. Our findings in separated group of migraineurs call the attention to the differences between these two subgroups of migraine and might be handled separately.

**E 15 Cortical hand knob stroke: report of 25 cases**

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**Introduction**

Cortical representation of hand movements is located in the precentral gyrus, known as 'hand knob' area. Hand weakness due to vascular damage of this territory is a rare entity, also called 'pseudoperipheral palsy', as hand knob stroke patients can mimic peripheral palsies of the hand. Herewith we report 25 cases of cortical hand knob stroke.
Objectives
To evaluate clinical and etiological characteristics of this particular subgroup of stroke.

Patients and methods
Thirteen female and 12 male patients were admitted in our ward between 2006 and 2016 with pure distal arm palsy. Ischaemic lesions in the precentral gyrus were detected with either CT or MR imaging, while atherosclerotic changes in the supraaortic arteries with carotid Doppler, CT or MR angiography.

Results and conclusion
Isolated infarction in the hand knob region was found in 18 of the 25 cases, while 7 had multiple acute infarctions. Supraaortic atherosclerosis was detected in 22 patients, 8 of them had >50% ipsilateral stenosis of the internal carotid artery. Most of our patients had proven signs of cerebral microangiopathy. Hypertension was found to be an important risk factor (n=20, 80%). Most of the patients demonstrated good clinical outcome. Using the TOAST classification system, the vast majority of our cases was defined as a stroke of undetermined etiology (n=23, 92%). In conclusion, cortical infarction has to be considered in the differential diagnosis of distal arm palsies especially in patients with the mentioned risk factors. The high frequency of undetermined etiology highlights the importance of multifactorial approach in hand knob territory stroke cases.

E 16 Quality of life in medication overuse headache
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Introduction
Medication overuse headache (MOH) affects at least 1% of the population, and 30% of the patients in tertiary headache centers. It is defined as a frequent headache (>14 days per month) that occurs in patients with a primary headache disorder who overuse acute medications; this overuse results in the chronicification of the primary headache, causing further disability and decreased quality of life. MOH represents a therapeutic challenge and even after successful treatment recurrence rates can be as high as 40% [1]. We studied generic and headache-specific quality of life (QOL) in MOH patients.

Methods: Twenty-seven MOH patients (20 females and 7 males; mean age: 44±8.6 years) completed the SF-36 generic QOL questionnaire [2] and the headache-specific Comprehensive Headache-related Quality of life Questionnaire [3] during their first visit at our Headache Centre. We compared MOH patients’ QOL to the QOL of normal controls. Furthermore, we studied the clinical data and QOL of 18 MOH patients undergoing comprehensive treatment, consisting of acute medication withdrawal, preventive pharmacological treatment and lifestyle intervention.

Results
MOH patients had significantly worse generic and headache-specific QOL than normal controls except for SF-36’s Role Emotional domain. The treatment program resulted in a
significant reduction of the number of headache days, headache severity and analgesic consumption, that was paralleled by a significant increase in QOL scores.

Conclusions: MOH has a deleterious effect on QOL that can be significantly improved with adequate therapeutic measures.

References

E 17 Characteristics of Parkinson’s disease and the prevalence of neuropsychiatric symptoms in the NEUROHUN 2004-2017 database
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Introduction
Parkinson’s disease (PD) is the second most common neurodegenerative disorder. Neuropsychiatric and cognitive symptoms are frequent in PD and may precede and exceed motor symptoms as major factors impacting disease course and quality of life.

Objectives: to assess PD epidemiological characteristics in Hungary and the prevalence of neuropsychiatric comorbidities.

Materials/patients & methods
In Hungary, a country with 10 million inhabitants and a single payer health insurance system we have set off the NEUROHUN 2004 – 2017 project. 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 (NHIF) from all hospitals and outpatient services throughout the country in a ten-year period of time, between 2004–2013. For the current analysis, ICD-10 code for PD was used (G20) from the database for patient selection.

Results and conclusion
96 874 patients were reported to the NHIF with G20 code between 2004-2013. Most of the new cases (94%) appeared after the age 60. Significant regional differences exist regarding PD occurrence. The first medical attendance of PD was made by neurology departments in 74% of the cases. Following the G20 diagnosis, certain neuropsychiatric symptoms appeared within 2 years on average. The most common neuropsychiatric comorbidities were dementia, behavioral and mood disorders. Similarly to international data, major hospital and
E 18  **Differential diagnosis of motor neuropathies**

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**Introduction**

Peripheral neuropathy rarely presents in the form of pure motor fiber loss, leaving the sensory and autonomic functions intact. Patients usually complain of progressive, painless wasting of the muscles in either the upper and/or lower extremities, posing significant diagnostic challenge even for the experienced clinician.

**Objectives**

We would like to give a brief overview of the broad differential diagnosis of pure motor neuropathies, emphasizing the role of nerve conduction studies and electromyography in this group of diseases.

**Methods**

Careful physical examination and detailed patient history are essential, whereas electrophysiology studies help the most in specifying the disease.

**Results & Conclusion**

Without correct diagnosis (and adequate treatment), patients often wander from department to department for years, while the underlying disease is deteriorating irreversibly. One prominent and frequently missed example is multifocal motor neuropathy with conduction block which – in most cases – is a treatable condition (unlike its mimic, progressive muscular atrophy), therefore it is crucially important to recognize it in time and treat it accordingly.

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E 19  **Ictal asystole**

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**Intradaction**

Ictal asystole (IA) is defined by seizure-related lack of electrical heart activity for ≥3 s. Despite its rare occurrence, it can cause differential diagnostic difficulties.

**Objective**

To analyze IA on a large number of patients.

**PATIENTS & METHODS:** A systematic review of IA-describing case reports was performed (1983–2016). Data regarding patient history, seizure characteristics, diagnostic workup, and therapy were collected. IA was deemed „new onset” if the delay between epilepsy onset and IA onset was < 1 year, and “late-onset” if ≥ 1 year. Asystole duration was labeled “very prolonged” if lasted > 30 s.

**Results**

157 cases were included. All patients had focal epilepsy. The seizure-onset zone and the focal seizure activity at asystole beginning were usually temporal (p<0.001 and p=0.001,
respectively) and were lateralized to the left hemisphere in 62% (p=0.005 and p=0.05, respectively). Asystole duration was 18±14s (3–96 s); 73% had late-onset, 27% had new-onset IA. Compared to late-onset IA, new-onset IA was associated with female gender (p=0.023), preexisting heart condition (p=0.014), focal seizure activity at asystole beginning (p=0.012), normal neuroimaging (p=0.013), normal interictal EEG (p<0.001), auditory aura (p=0.012), and drug-responsive epilepsy (p<0.001). “Very prolonged” asystole was associated with secondary generalized tonic–clonic seizures (p=0.003) and extratemporal seizures (p=0.074). No IA-related death was reported.

**Conclusion**

We hypothesize that in new-onset IA, female gender and a preexisting heart condition may serve as predispositions in an otherwise benign epilepsy; whereas neuronal network changes in a chronic, therapy resistant epilepsy may contribute to the ictal manifestation of late-onset IA.

**E 20 Importance of sleep examination in stroke**

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Obstructive sleep apnea syndrome (OSAS) is characterized by recurrent partial or complete pharyngeal collapses during sleep. Obstructive events incorporate range of stressors that active mechanisms contributing to the initiation and progression cardiac, vascular and metabolic diseases. Severe OSAS is associated with a high cardiometabolic risk, but initially there are many questions of role OSAS in cardiovascular events, especially stroke. The exponentially published articles in last decades shown that the importance of sleep examination in stroke.

Objectives: The aim of our investigations to reveal to significant relationship between OSAS and stroke.

Methods: Initially we analysed the occurrence of OSAS in 50 stroke-diagnosed patients with questionnaire, in positive cases polygraphic records. Further on we investigated 27 ischemic stroke patients with polysomnographic recordings following 3 and 12 months. In other follow-up case study we elucidated the involvement and characteristics of sleep-related breathing abnormalities of bilateral paramedian thalamic and mesencephalic stroke with polysomnographic records.

Results and conclusion: Our results demonstrated the high prevalence of OSAS in stroke patient. Polysomnographic examinations revealed characteristic sleep architectural changes and different types of sleep related breathing abnormalities. In a stroke with special localisation (paramedian thalamus and mesencephalon bilaterally) dynamical changes of the breathing abnormalities were found. These data underline the importance of examination and treatment of OSAS in stroke patients.
E 21 Predictive immunohistochemical markers in meningiomas

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Meningiomas are one of the most frequent intracranial tumours. Although tumour recurrence is an important and not infrequent event in meningiomas, predictive immunohistochemical markers that could support the routine pathologic work-up have not been identified yet. Reviewing the literature has revealed potentially predictive markers in meningiomas: p53, Ki-67 (Mib-1) and progesterone receptor (PR).

The aim of this study was to address a prognostic immunohistochemical panel by systematic retrospective analysis of surgically completely resected meningiomas with and without recurrence, including tumour samples from patients who underwent repeat surgeries.

114 surgical specimens of 70 meningioma patients (16 male and 54 female) in a 16 years interval have been studied. On Mib1, PR and p53 immunostained sections, the percentage of labelled tumour cells, the staining intensity and the multiplied values of these parameters (the histoscore) was calculated. Results were investigated by Kruskal-Wallis H-test, Mann-Whitney U-test and Wilcoxon signed ranks tests.

Our results confirmed previous findings that the WHO grade is directly proportional to Mib1 and p53 and is inversely proportional to the PR immunostain. We have demonstrated that Mib1 and p53 have a significant correlation with and predictive value of relapse/recurrence irrespective of the histological subtype of the same WHO grade. Mib1 showed a significant correlation with the rate of progression (based on the propagation of WHO grades). The immunohistochemical panel of PR, p53, Mib1 in parallel with applying standard diagnostic criteria based on Haematoxylin & Eosin stained sections is sufficient and reliable to predict meningioma recurrence in surgically completely resected tumours.

E 22 Frequency of peripheral neuropathy and myogen lesion in antineutrophil cytoplasmic antibody associated (ANCA) small vessel vasculitis

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Introduction
In systemic vasculitis the peripheral nerves are affected in 60-70%, but myogen involvement is less known.

Objectives
We tested the frequency of neuropathy and muscle damage in a homogenous ANCA small vessel vasculitis patient group. Neurological and neurophysiological examination (electroneurography, electromyography) were performed. Currently we present the preliminary data and results of our long-term prospective study.
**Results**

Twenty two patients were recruited. Time since verifying ANCA positivity in average was 4 years. The peripheral nerves were affected in the majority of the examined patients. The detailed electroneurography results were the following: 2 patients had mononeuropathy multiplex affecting the lower limbs, 1 of them the sensory and motor nerves and in the other patient only the sensory part have been affected. Eight patients had neuropathy in the lower limbs, in 2 patients only the sensory nerves were affected and the other 6 patients suffered from sensorno-motor neuropathy. Polyneuropathy was detected in 6 patients. The electroneurography were normal in 6 cases, who were examined in the first month period after the diagnosis of ANCA positivity. Interestingly high percent of the patients had myogen lesion (50%). But electromyography revealed abnormality in all patients (11 had neurogen lesion, 9 had myogen, 2 had both).

**Conclusion**

We found that in most of the ANCA positive patients not only the peripheral nerve lesion is characteristic but the myogenic lesion as well. Follow up of the patients is necessary to detect the progression of the clinical neurophysiological conditions.

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**E 23 The effect of reading with direct or indirect light on the visually evoked flow velocity increase in the posterior cerebral artery**

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**Introduction**

It is widely experienced that reading with direct light (i.e. from an iPad) makes most people more tired than reading with indirect light (i.e. from a book).

**Objectives:** Our aim was to investigate whether vascular effects are in the background of the more pronounced tiredness when reading with direct light. Therefore, flow increase in the posterior cerebral artery (PCA) induced by reading with direct light was compared to that of reading with indirect light.

**Patients & Methods**

By using a visual cortex stimulation paradigm, visually evoked flow velocity response was measured by transcranial Doppler sonography in both PCAs of twenty young healthy right-handed adults, before and after fifteen minutes reading from an iPad and from a printed text. To allow comparisons between volunteers, relative flow velocity was calculated in relation to baseline.

**Results and conclusion:** The maximum flow velocity increase during visual stimulation was similar after reading from an iPad to that after reading a printed text. On the left side, there was a tendency for longer time interval to reach the maximum flow velocity after reading from an iPad than after reading a printed text. The flow velocity increase in the PCA induced by reading was significantly higher on the left than on the right side. Our results suggest that vascular effects are probably not responsible for being more tired after reading with direct light. Further measurements are planned to clarify the cause of the side difference in the visually evoked PCA flow velocity increase.
E 24 Hereditary neuropathy or something else? – Case Report

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The diagnostic procedure of peripheral neuropathies can be challenging. In the adulthood, several accompanying disease can modify the clinical picture, while in childhood, wide spectra of hereditary disorders have to be taken into consideration during the diagnostic process.

Besides careful history taking including the family history, physical examination, laboratory testing, electrophysiological studies, nerve ultrasound examination and sometimes histological analysis can help the physician to reach the proper diagnosis and thus the appropriate treatment for the patient. Occasionally, in spite of thoroughgoing examinations, the differential diagnosis can be quite difficult.

With our case report, we would like to raise the attention to atypical features of a possible hereditary demyelinating polyneuropathy detected in a 12-year-old male patient.

The 12-year old boy with a history of pyelectasia and orthopedic follow up because of genu valgum and talipes equinovarus was referred to the neurologist, because the patient experienced moderate pain in the heels and soles on long walking, and for 6 months, he started ‘toe walking’. Neurologic examination revealed slightly weakened dorsiflexion of both feet and severely reduced tendon reflexes throughout the body. No other motor, neither any sensory symptom were detected. Vibration sense was also normal. Nerve conduction studies revealed marked slowing of both motor and sensory conduction velocities (17-29 m/sec) and length dependent seconder axonal loss. In the upper limbs, conduction blocks and signs of temporal dispersion were detected. Cerebrospinal fluid analysis showed slightly elevated protein level (0,79 g/l). Other laboratory results were normal.

According to the clinical course and the electrodiagnostic results, the background disease is probably an inherited neuropathy, however in this case, the inhomogeneous demyelination of the peripheral nerves are not typical.

Conclusion: Further genetic, ultrasound and histological examinations should be performed to confirm the preliminary diagnosis.
How does the brainstem contribute to tremor genesis?

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Introduction
The role of the cerebellum in tremor genesis is poorly understood. Our previous work suggests that cerebellar tremor is likely to be generated by a network instead of a specific structure. However, we could distinguish two groups, which were associated with consistent tremor characteristics.

Objectives: The aim of this work was to present quantitative tremor characteristics of these two groups: 6 patients with concomitant cerebellar and medulla oblongata lesions (group1) and 5 patients with mesencephalon lesions (group2).

Methods
Tremor recording has been performed with a biaxial accelerometer in resting, postural and intentional position. A set of frequency parameters have been determined. MRI images have been evaluated by a radiologist. Lesions in the following structures have been marked: inferior olive, inferior, middle and superior cerebellar peduncle, dentate nuclei, cerebellar cortex, red nuclei, substantia nigra.

Results and conclusion
We have found pathologic tremor in all patients of group1. Tremor frequency was around 2 Hz, frequency dispersion around 1 Hz, whereas tremor intensity was normal. The inferior olive was damaged in only 1 patient. We have found enhanced tremor intensity but normal frequency characteristics in all tumorous patients of group2. One patient with mesencephalic aneurysm had physiologic tremor.

If focal cerebellar lesions are associated with lesions in the medulla oblongata, they frequently cause pathologic tremor with low intensity. Objective tremor recording is necessary for its detection. Mesencephalon lesions often cause enhanced tremor intensity with normal frequency parameters. However, the pathomechanism of the lesion might influence the outcome.
E 26 Levodopa/carbidopa intestinal gel can improve both motor and non-motor experiences of daily living in Parkinson’s disease: an open-label study

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Introduction
Levodopa/carbidopa intestinal gel therapy (LCIG) can efficiently improve several motor and non-motor symptoms of advanced Parkinson’s disease (PD). The recently developed Movement Disorder Society-sponsored Unified Parkinson’s Disease Rating Scale (MDS-UPDRS) improved the original UPDRS making it a more robust tool to evaluate therapeutic changes. However, previous studies have not used the MDS-UPDRS and the Unified Dyskinesia Rating Scale (UDysRS) to assess the efficacy of LCIG.

Objectives
Our aim was to determine if the MDS-UPDRS and UDysRS could detect improvement in the experiences of daily living following 1-year LCIG treatment.

Methods
In this prospective, multicenter, open-label study, 34 consecutive patients undergoing LCIG treatment were enrolled. Patients were examined twice: prior to LCIG initiation and 12 months later. Impact of PD-related symptoms and dyskinesia was assessed by the MDS-UPDRS and UDysRS.

E 27 Pain sensitivity and potency of opioid ligands in a new complex schizophrenia rat model (WISKET)

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Introduction:
Several data suggest altered pain sensitivity in schizophrenia. A new substrain of Wistar rats (WISKET) was developed by selective breeding after social isolation and subchronic ketamine treatment with decreased acute heat pain sensitivity. The aim of the present study
was to determine the degree of mechanical allodynia during chronic inflammation, and the potency of opioid ligands applied systemically or spinally.

Methods:
Monosodium iodoacetate (MIA) was injected into one of the ankle joints of the adult, male WISKET and control Wistar rats to induce an experimental chronic osteoarthritis. One week after MIA injection, the degree of edema and the mechanical pain threshold were detected at both hind paws, and the antinociceptive effects of morphine (1mg/kg subcutaneously), or endomorphin-1 (5 µg intrathecally) were assessed.

Results:
MIA caused significant degree of edema, but none of the treatments influenced it. The MIA-induced allodynia was blunted in the WISKET rats, while the mechanical sensitivity did not change on the non-inflamed side in any groups. Morphine produced significant antinociceptive effect that appeared earlier and was more prolonged in the WISKET compared to the control rats. In contrast, the intrathecally administered endomorphin-1 caused similar degree of antinociception in both groups.

Conclusion:
Our study proved that decreased level of inflammatory pain was developed in WISKET rats with enhanced sensitivity to systemically administered morphine. In contrast, endomorphin-1 resulted in equivalent efficacy in both groups, suggesting that primarily the supraspinal processes altered in this schizophrenia animal model.

E 28 Migraineurs show increased anterior cingulate cortex activation during serotonergic challenge: an fMRI study

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The anterior cingulate cortex (ACC) has important role in migraine by influencing pain anticipation, pain perception and salience, and also by modulating top-down control of brainstem areas with central role in migraine attacks. However, the role of the serotonergic system in this process is poorly understood. In this study we investigated whether migraine without aura patients show altered ACC activation pattern during serotonergic challenge.

Changes in brain activation following 7.5 mg i.v. citalopram, an SSRI, were measured in 27 healthy and 6 migraine volunteers using within-subject, placebo-controlled, double-blind, randomized design with a 30 minutes-long challenge pharmacological fMRI (phfMRI). The two scanning sessions, placebo and citalopram respectively, were separated by at least two weeks. Imaging data were analysed using factorial ANOVA as implemented in Statistical Parametric Mapping (SPM 12, Friston, The Welcome Department of Cognitive
Neurology, London, UK). The activation changes over time in ACC during and after citalopram infusion were obtained by time x drug interaction F-test. Our results demonstrated significant differences in activation between migraine and control subjects in two clusters in the right ACC (p(FWE)=0.006 and p(FWE)=0.022). The extracted time-series showed that the activation of ACC in migraine patients was significantly increased compared to controls in the first 8 minutes of the citalopram challenge. These findings clearly demonstrated that migraine patients are more sensitive to the increase of serotonergic tone, suggesting that maladaptive brain response to pain and pain elicited stress in migraine patients is partially mediated by impaired serotonergic control on the ACC function.

Keywords: migraine, serotonin, pharmacological fMRI, anterior cingulate cortex

Disclosure
The study was supported by the Hungarian Academy of Sciences (MTA-SE Neuropsychopharmacology and Neurochemistry Research Group) and by the Hungarian Academy of Sciences and the Hungarian Brain Research Program – Grant No. KTIA_NAP_13-2-2015-0001 (MTA-SE-NAP B Genetic Brain Imaging Migraine Research Group). The sponsors funded the work, but had no further role in the design of the study, in data collection or analysis, in the decision to publish, or in the preparation, review, or approval of the manuscript. The authors report no conflict of interest.

E 29 “Cortical afferent inhibition reflects cognitive impairment in obstructive sleep apnea syndrome: a TMS study.”
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Objectives:
Patients with obstructive sleep apnea syndrome (OSAS) show neurocognitive impairment, but the exact mechanisms that cause cognitive dysfunctions remain unknown. The cholinergic system is known to play a key role in all attentional processes and cognitive functions. A transcranial magnetic stimulation (TMS) protocol may give direct information about the function of some cholinergic circuits in the human brain; this technique relies on short latency afferent inhibition (SAI) of the motor cortex. The objective of this exploratory study was to test the hypothesis that impaired cognitive performances in OSAS patients are associated with a dysfunction of the cholinergic system, as assessed by SAI.

Materials/patients & methods:
We applied SAI technique in a group of 13 patients with OSAS and compared the data with those from a group of 13 age-matched healthy subjects. All the patients underwent a sleep study, an extensive neuropsychological evaluation, and TMS examination.

Results and conclusion:
Mean SAI was significantly reduced in our OSAS patients when compared with controls. The neuropsychological evaluation showed impairments in most cognitive areas in the OSAS patients. SAI values were strongly correlated with the neuropsychological test scores. These findings suggest that the cognitive deficits in OSAS may be, at least in part, secondary to alterations in cholinergic neurotransmission, presumably caused by nocturnal hypoxemia. TMS studies may shed light on the pathophysiological mechanisms of the cognitive disturbances in OSAS patients.

E 30  Neurostimulation in epilepsy
Prof. Dr. Ivan Rektor
The Neurology Department of the University Hospital in Brno

We have not received the abstract until the deadline.

E 31  The role of functional MRI in the diagnosis and prognosis of patients with severe brain damage
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Background and aims
Exact diagnosis of patients following severe brain damage is essential for clinical and rehabilitative care as well as decision-making and a rate of 43% of misdiagnosis is evident. Neurobehavioral tests relying on the patients’ intellectual and motor ability to communicate are the most widely used diagnostic tools, since their advantage over clinical assessment has been validated. However, with the emergence of modern neuroimaging methods, especially fMRI, objective physiological markers for assessing the state of consciousness are available but the benefits still have to be determined.

Methods
21 patients clinically and neurobehaviorally diagnosed as “Apallic-Syndrome (AS)” and 6 patients as “Minimally Conscious State (MCS)” after severe brain damage of different etiologies were examined with different fMRI paradigms testing fundamental functional networks of the brain (propiroceptive, pain, motor, emotion, self-awareness, language, resting state). The findings were compared with the clinical and neurobehavioral diagnosis and it was analyzed whether additional information from fMRI confirmed or questioned the clinical and neurobehavioral diagnosis.

Results
16 of the 21 AS- and 5 of the 6 MCS-patients show specific brain activation in a special diagnostic battery of fMRI-paradigms suggesting that the AS-patients are in MCS or even better.

Conclusion
Misdiagnosis in patients following severe brain damage is still a big problem even with well-established diagnostic assessment scales. As long as internationally accepted guidelines for assessing these patients do not exist, we propose a special diagnostic battery of fMRI-
paradigms to minimize diagnostic errors in these patients and to find systematically perceptive channels to approach the patients in neurorehabilitation programs.

E 32 Behavioral side effects of antiepileptic drugs: Is brivaracetam a solution?
Jozsef Janszky
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University of Pécs, Hungarian Academy of Sciences, Pécs, Hungary

Levetiracetam is one of the first-line broad-spectrum antiepileptic drugs. Both brivaracetam and levetiracetam act on the SV2A protein influencing the vesicular neurotransmitter transport. Conversely, brivaracetam shows no significant effect on the AMPA receptors (unlike levetiracetam). Antiepileptic drugs acting on the AMPA receptors may show severe behavioral side effects including aggression and suicidality. The most frequent causes for discontinuation of levetiracetam are the psychiatric side effects thought to be related to the AMPA receptor binding. Due to its different mechanism of action and first clinical experiences, in this review, we argue that brivaracetam might have the same efficacy, but show less severe behavioral side effects than levetiracetam.

E 33 Treatment with Botulinum Toxin: Less usual indications
Zvezdan Pirtošek,
Department of Neurology, UMC Ljubljana, Ljubljana, Slovenia

Using rich video cases a journey through various, also less usual indications for the use of Botulinum Toxin will be presented & discussed.

E 34 XEOMIN: New opportunities for Botulinum Toxin Therapy
Dirk Dressler
Hannover, Germany

We have not received the abstract until the deadline.

E 35 Stroke and neurology – Let us link with Reveal LinQ
Péter Klivényi ; László Sághy
Szeged

We have not received the abstract until the deadline.
E 36  Advances in brain protection and recovery after stroke – integrating neurobiology into evidence-based treatment

Dafin F. Muresanu
Chairman Department of Clinical Neurosciences,
University of Medicine and Pharmacy “Iuliu Hatieganu”,
Cluj-Napoca, Romania

Nowadays, it is still difficult to find the correct therapeutic approach for brain protection and recovery in stroke, especially because we do not fully understand all of the endogenous neurobiological processes, the complete nature of the pathophysiological mechanisms and the links between these two categories.

Endogenous neurobiological processes, such as neurotrophicity, neuroprotection, neuroplasticity and neurogenesis, are central to protection and recovery and represent the background of endogenous defense activity (EDA).

Stroke pathological cascades contain a limited number of pathophysiological processes. It is characterized mainly by excitotoxicity, oxidative stress, inflammation, apoptotic-like processes and important metabolic disturbances.

Pathophysiological processes share some common mechanisms with EDA (e.g. excitotoxicity and neurotrophicity together with neuroplasticity have, as a common important driver, the NMDAR activity; inflammation has an important contribution for neuroregeneration, stimulating neuroplasticity, via trophic factors).

Postlesional brain regulation is currently better understood. Every lesion in the nervous system triggers in the first minute an endogenous neuroprotective reaction. An endogenous repair process, combining neuroplasticity and neurogenesis follow this as a second answer. All these processes are initiated and regulated by endogenous biological molecules.

The biological reality of the nervous system is far more complex. In fact, there is an endogenous holistic process of neuroprotection and neurorecovery that should be approached therapeutically in an integrated way.

The current tendency to exclusively frame drug activity in terms of single mechanisms and single focus effect might distract from other paradigms with greater explanatory power and hinder the development of more effective treatment strategies.

A change of concept is required in pharmacological brain protection and recovery in stroke therapy.

This presentation briefly reviews the current and future considerations in this therapeutic strategy, including an integrated pharmacological approach, focusing on drugs with multimodal activity rather than single mechanism drugs, which usually are chemical drugs.

In line with this strategy the current presentation will also highlight the result of CARS Trial, one of the latest double blind placebo randomized controlled trial in the field.
Cognitive Decline Following Stroke: a New Research Agenda
Michael Brainin MD PhD FESO FAHA
Danube University Krems, Austria

The close relationship between stroke and dementia is an important health issue. Ischemic stroke can facilitate the onset of vascular dementia as well as aggravate preexisting cognitive decline. The onset of cognitive decline may become manifest immediately following the onset of ischemic stroke, but often there is a delay in the development of cognitive decline after a stroke. This delay can be seen as a therapeutic time window allowing to apply interventions to preserve cognition following stroke. Both neurodegenerative and vascular mechanisms are activated and probably result in overlapping processes within the neurovascular unit.

This review focuses on incidence and prevalence of cognitive decline following stroke, predisposing stroke etiologies, pre-stroke decline, imaging factors and biomarkers. Outcomes are discussed in relation to timing of assessment and neuropsychological tests used for evaluation of cognitive decline in ischemic stroke patients. Including such tests in routine evaluations of stroke patients after some weeks or months is recommended. Finally, an outlook on ongoing and planned intervention trials is added and some recommendations for future research are proposed.
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P 01  An MRI volumetric study of healthy young smokers
Gergely Darnai\textsuperscript{1,2}, Beatrix Lábadi\textsuperscript{2}, András Zsidó\textsuperscript{2}, Orsolya Inhóf\textsuperscript{2}, Gábor Perlaki\textsuperscript{3}, Gergely Orsi\textsuperscript{3}, Norbert Kovács\textsuperscript{1}, József Janszky\textsuperscript{1}
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Growing evidence human neuroimaging studies indicates functional and structural brain-altering effects of smoking.

Investigations in humans found wide range of effects but studies focusing on young healthy population are sparse.

We used structural magnetic resonance imaging technique for assessing volumetric differences between 30 smokers (15 males) and 30 age- and gender-matched controls.

Significantly smaller grey matter volumes (p = 0.05, corrected for intracranial volume) were found in anterior and posterior cingulate, and parahippocampal cortex in smokers, although greater insular and orbitofrontal volumes were found also in people with moderate and severe nicotine addiction. Group differences were also found in corpus callosum, bilateral pallidum, bilateral cerebellum and right accumbens - non-smokers showed greater volumes in every subcortical region.

These findings provide evidence for cognitive dysfunctions and alterations in cognitive control function in earlier stages of life.

P 02  How efficient is subthalamic deep brain stimulation in reducing dyskinesia in Parkinson’s disease?
Annamária Juhász\textsuperscript{1,2}, Gabriella Deli\textsuperscript{2}, Zsuzsanna Aschermann\textsuperscript{2}, József Janszky\textsuperscript{2,3}, Márk Harmat\textsuperscript{1,2}, Attila Makkos\textsuperscript{1}, Márton Kovács\textsuperscript{1}, Sámuel Komoly\textsuperscript{2}, István Balás\textsuperscript{4}, Tamás Dóczi\textsuperscript{3,4}, András Büki\textsuperscript{3,4}, Norbert Kovács\textsuperscript{2,3}
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Introduction
Dyskinesias are among the most troublesome symptoms of advanced Parkinson’s disease (PD). The recently developed Unified Dyskinesia Rating Scale (UDysRS) can measure simultaneously several subjective and objective aspects of dyskinesia irrespectively of other motor symptoms of PD. Despite of its advantages, previous studies on deep brain stimulation (DBS) have not used the UDysRS yet.

Objective
Our aim was to to determine if UDysRS could detect improvement in dyskinesia after bilateral subthalamic nucleus DBS for PD.

Methods: In this prospective study, 71 consecutive patients undergoing DBS implantation were enrolled. Patients were examined twice: 1 week prior to the DBS implantation (baseline) and 12 months postoperatively. Severity of PD-related symptoms were assessed
by the Movement Disorders Society Unified PD Rating Scale (MDS-UPDRS). Presence and severity of dyskinesia were specifically measured by UDysRS and patient diaries.

Results: At baseline all the 71 patients had dyskinesia, but 1 year after DBS implantation 25 patients were dyskinesia-free and additional 19 had only mild dyskinesia. The total score of UDysRS decreased from 38.0±17.8 to 10.8±13.0 (p<0.001). Besides, all parts of UDysRS showed significant improvement after STN DBS treatment and the magnitude of these changes had large effect size. Total score of MDS-UPDRS improved from 76.5±24.3 to 60.4±21.4 points (p<0.001). Health-related quality of life, measured by PDQ-39, also improved from 27.6±12.8 to 21.4±14.7 (<0.001).

Conclusions
Based on our results, UDysRS can reliably detect improvements in dyskinesia after DBS implantation.

**P 03** Examination of factors that influence the outcome of stroke and factors that influence ambulance notification among stroke patients

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**Introduction**
The immediate emergency calls improve the chances of effective management of stroke, for example systemic thrombolysis or thrombectomy. We examined consecutively admitted stroke patients on admission and performed their follow-up.

**Objective**
We assessed if the patients called the National Ambulance Service when they detected their symptoms and the consequences of this for their future status.

**Patients and methods**
The primary data assessment of 253 patients was conducted between 2013 and 2014 in Neurology of Nyírő Gyula Hospital–OPAI in Hungary with a follow up period of 11.6 months on average. We analyzed the relationship between the National Ambulance Service notification, severity of residual symptoms and survival. Data analysis was conducted using descriptive statistics, linear and logistic regressions and Cox proportional hazard models.

**Results**
Admission stroke severity (NIHSS) (OR=1.19, CI 95%: [1.12-1.27], p<0.001) and atrial fibrillation (OR=2.25, CI95%: [1.15-4.41], p=0.019) significantly increased the odds of ambulance call.

The analysis of functional damage (mRankin) and survival concluded that higher NIHSS leads to worse prognosis, whereas ambulance call had no significant independent effect. Higher NIHSS significantly increased the odds of death (OR=1.22, CI95%: [1.12-1.32], p<0.001 and the mRankin score both on leaving the hospital (coefficient=0.26, CI95%:
[0.23-0.3], p<0.001) and during follow-up (coefficient=0.22, CI95%: [0.17-0.27], p<0.001). The Cox models gave similar results.

Conclusions

According to the results, patients who had more severe sings were more likely to call for ambulance and also had worse prognosis. Calling the ambulance itself had no statistically significant effect on the prognosis in this small number of cases.

P 04 Pharyngeal-cervical-brachial variant of Guillain Barré syndrome in a patient with Hashimoto thyroiditis

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Pharyngeal-cervical-brachial variant of Guillain Barré (PCB) syndrome it is believed to be a focal form of acute motor axonal neuropathy [1]. Several studies shown that the clinical outcome in the PCB cases was more severe if they had anti-ganglioside complex antibodies [2,3].

Our aim was to evaluate if an underlying autoimmune disorder could influence the clinical outcome of the PCB patients without anti-ganglioside antibodies.

We report a case of a 47-year-old Caucasian female with Hashimoto thyroiditis, who developed rapidly progressive oropharyngeal and upper limb dominant muscle weakness a week after a digestive infection. She developed acute respiratory insufficiency due bulbar palsy two days after the admission. The cerebrospinal fluid examination revealed albuminocytologic dissociation. Repeted electrophysiological examination was consistent with pure motor axonal neuropathy. In the serum were not detected antibodies against GM1, GD1a, GD1b, GT1b, GQ1B. She showed slowly recovery after intravenous immunoglobulin therapy.

We suggest that even in the absence of IgG antiganglioside antibodies the evolution of the patient can be devastating, if the patient has an underlying autoimmune dysfunction.

References

P 05 Clinicopathological correlates of PARP1 and p21 immunohistochemical patterns in glioblastoma  
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Introduction  
Glioblastoma (GBM) is the most frequent and aggressive primary malignancy of the central nervous system. Despite the progress in surgical resection, irradiation- and chemotherapy, the prognosis of patients with GBM remains very poor. DNA repair mechanisms are likely a key to understanding the failure of treatment and biological nature of GBM.

Objectives  
The aim of this study was to characterize the immunohistochemical (IHC) expression pattern of poly (ADP-ribose) polymerase-I (PARP1), and to determine its association with p21 and p53 levels. The prognostic role of PARP1 protein levels was also investigated in our cohort.

Material and methods: We retrospectively analysed the medical reports of 56 GBM patients (27 males and 29 females) who were diagnosed at the University of Debrecen, Institute of Pathology, between 2006 and 2014. According to the median age of patients, the cases were further subdivided in two groups (over 58 and below 58 years old). Using formalin-fixed, paraffin-embedded (FFPE) tissue sections, immunohistochemistry was carried out to detect p21, p53 and PARP1 proteins.

Results and Conclusion  
All the three proteins were expressed in the examined samples. The IHC expression of PARP1 showed strong correlations with p21 (p=0.003), p53 (p=0.028). No significant differences were observed between PARP1 expression and the age at diagnosis. Our analyses demonstrated that IHC the expression level of PARP1 is increased in GBM. Furthermore, our results revealed a possible connection between PARP1 and the downstream signalling of p53 pathway in glioblastoma.

P 06 Molecular subtyping dependent expression of PARP1 in glioblastoma – a bioinformatic analysis of the TCGA dataset  
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Introduction  
Increased of PARP1 expression exists in various cancers, including glioblastoma (GBM). Although PARP1 inhibition is a promising therapeutic target, no comprehensive analysis has addressed PARP1’s expression characteristics regarding molecular heterogeneity in GBM.
Objectives
Our aim was to evaluate PARP1’s associations with GBM lineage specific markers, and its transcriptomic subtypes.

Materials and methods
PARP1’s somatic mutations, copy number alterations (CNAs), and mRNA expression, and clinical data were collected from the ‘Glioblastoma Multiforme’ TCGA dataset. An integrated bioinformatic analysis was performed to evaluate PARP1’s genetic signature, and prognostic role in GBM.

Results and conclusion
Our analysis demonstrated that PARP1 CNA gain and increased mRNA expression level is a characteristic of glioblastoma, particularly of its Proneural (PN) and Classical (CL) subtypes. Additionally, higher PARP1 levels exhibited an inverse correlation with patient survival (p<0.005) in the CL subgroup. ATRX (p=0.006), and TP53 (p=0.015) mutations were associated with increased PARP1 mRNA expression. Our results support the therapeutic role of PARP inhibitors in GBM with the caveat that molecular heterogeneity needs to be taken into account.

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P 07 Immunohistochemical correlates of TP53 somatic mutations in brain tumours
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Introduction
Alterations in the TP53 gene can be observed in nearly half of the human cancers and are common in brain tumours. Despite controversy on the correlation between p53 accumulation and TP53 mutational status, immunohistochemical (IHC) detection of over expressed protein is used as a surrogate tool of mutation analysis.

Objectives
The aim of our study was to characterise IHC expression features of TP53 somatic mutations and define their frequency in human cancers, particularly in brain tumours.

Materials & methods
A large-scale database analysis was conducted in the IARC TP53 Database (R17). Altogether, 7878 mutations with IHC features were retrieved representing 60 distinct tumour sites.
Results and conclusion
Our study demonstrates that p53 immunopositivity largely correlates with TP53 mutational status in cancer. We observed, that all brain tumour specific TP53 mutations showed detectable levels of p53 immunore activity. However, an increased likelihood of false negative IHC associated with rare nonsense mutations was observed in other tumour sites (breast, colorectum, head&neck, lung, bladder and skin). Our bioinformatics findings indicate that p53 IHC – a routinely used methodology in diagnostic (neuro) pathology – has good sensitivity and specificity regarding the presence or absence of TP53 mutations in brain tumours.

Grant supports
This study was supported by the New National Excellence Program of the Ministry of Human Capacities (BM) and the Hungarian Brain Research Program (NAP) – Grants No. KTIA_13_NAP-A-II/7 and KTIA_13_NAP-A-V/3, and AGR_PIAC_13-1-2013-0008 (TH & ÁK)

P 08 Predictive immunohistochemical markers in meningiomas
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Meningiomas are one of the most frequent intracranial tumours. Although tumour recurrence is an important and not infrequent event in meningiomas, predictive immunohistochemical markers that could support the routine pathologic work-up have not been identified yet. Reviewing the literature has revealed potentially predictive makers in meningiomas: p53, Ki-67 (Mib-1) and progesterone receptor (PR).

The aim of this study was to address a prognostic immunohistochemical panel by systematic retrospective analysis of surgically completely resected meningiomas with and without recurrence, including tumour samples from patients who underwent repeat surgeries.

114 surgical specimens of 70 meningioma patients (16 male and 54 female) in a 16 years interval have been studied. On Mib1, PR and p53 immunostained sections, the percentage of labelled tumour cells, the staining intensity and the multiplied values of these parameters (the histoscore) was calculated. Results were investigated by Kruskal-Wallis H-test, Mann-Whitney U-test and Wilcoxon signed ranks tests.

Our results confirmed previous findings that the WHO grade is directly proportional to Mib1 and p53 and is inversely proportional to the PR immunostain. We have demonstrated that Mib1 and p53 have a significant correlation with and predictive value of relapse/recurrence irrespective of the histological subtype of the same WHO grade. Mib1 showed a significant correlation with the rate of progression (based on the propagation of WHO grades). The immunohistochemical panel of PR, p53, Mib1 in parallel with applying standard diagnostic
criteria based on Haematoxylin & Eosin stained sections is sufficient and reliable to predict meningioma recurrence in surgically completely resected tumours.

P 09  Sleep disorders in patients with Parkinson's disease underwent neurological care at Clinical Hospital Centre Osijek during 2015, Croatia

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Introduction
Parkinson's disease (PD) patients can experience a number of sleep disorders, including insomnia, parasomnias and daytime somnolence. Sleep disorders in the PD patients represent a public health problem, and epidemiological data in our locality have been incomplete.

Objectives
The purpose of this study was to investigate the sleep disorders in the PD patients and determine whether there are differences in sleep disorders considering to gender, age, level of education and self-care.

Patients and methods
In current study was analyzed data on 80 participants (average age was 72±7 years) which included 40 PD patients (14 women and 26 man) and 40 examinees (14 women and 26 man) in the control group. A Parkinson’s disease sleep scale was used for assessing the sleep disorders. Differences between variables were tested with Mann-Whitney U test. The level of significance was set to P<0.05.

Results
The PD patients are significantly more dissatisfied with sleeping than participants in control group (P<0.001). Significantly dissatisfied with the quality of sleeping are in the PD patients who are dependent on the help of others (P=0.046). In the PD patients there are no significant difference in the evaluation of sleep disorders by gender, age and level of education.

Conclusion
Results suggest a higher incidence of sleep disorders in the PD patients. There are significantly more dissatisfied with the quality of sleep in the PD patients which largely or completely dependent on the help of others. Results could help in defining sleeping problems in the PD patients and suggest that we need an interdisciplinary approach to working with them.

Key words: Parkinson’s disease, Parkinson’s disease sleep scale, sleep disorders
Who seeks help? A cross-sectional study of psychological symptoms and probable migraine status as potential predictors of helpseeking

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Previous studies suggested that chronic somatic disorders increase helpseeking behaviour for psychiatric problems but much less is known whether migraine type headaches promote this behaviour. Our goal was to identify psychological symptoms as potential predictors for helpseeking among probable migraineurs (PM) and non-migraineurs (NM) with the history of psychiatric problems.

PM measured by the ID-Migraine Questionnaire was investigated in 1331 subjects from Manchester and Budapest (aged 18-60), who all reported a history of psychiatric problems on the background questionnaire (BGR). We collected data about reported migraine as illness and the use of professional helpseeking for mental problems. Four groups were made on the basis of PM-status (PM or NM) and helpseeking (seeking or not). We compared their psychological symptoms using the Brief Symptom Inventory (BSI) with one-way ANOVAs; binary logistic regression models were used to test their effects on the membership of the produced groups.

Only 26% of PM subjects reported migraine as illness. The helpseeker PM showed significantly higher psychological symptom scores. The proportion of helpseekers was significantly higher among PM, although the probable migraine status wasn’t a predictor of helpseeking. Only anxiety predicted helpseeking (OR=1.83, p=0.005) in the total population. This association remained significant only among NM (OR=2.04, p=0.009) but not in PM.

Probable migraineurs with the history of psychiatric problems show more severe psychological symptom profile explaining significantly more helpseeking. However, probable migraine status is not a predictor for this behaviour which suggest that migraine may be underdiagnosed even in psychiatric patients.

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P 11 Application of autologous transplantation of mesenchymal stem cells for relapsing-remitting multiple sclerosis
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Introduction
The therapeutic potential of mesenchymal stem cells (MSCs) in multiple sclerosis (MS) has immunomodulation, remyelination and neuroprotection effects.

Objectives
To study the results of the re-transplantation of autologous MSCs in patients with relapsing-remitting MS.

Materials/patients&methods
Autologous transplantation of mesenchymal stem cells (ATMSCs) conducted in 19 patients with relapsing-remitting MS, 7 of them underwent ATMSCs twice after 9 month of first ATMSCs. Autologous MSCs were injected intravenously in a dose 1,0×10^6 cells per kg bodyweight. Monitoring of patients was performed before ATMSCs, after 9 and 18 months of ATMSCs.

Results and conclusion
When assessing the neurological status of all MS patients who underwent ATMSCs at screening and after 9 months after a single (n=12) or repeated (n=7) transplantation, a significant difference was not determined (Wilcoxon =1.7, p = 0.09). Neurological evaluation in next 9 month after re-transplantation in re-AMSC transplantation group showed statistically significant decreasing of EDSS-score (Wilcoxon=2.02, p=0.04). Also in these group, marked reduction in the number of active foci of demyelination in 9 months and 18 month was found. Analysis the dynamics of the thickness of the retinal nerve fiber layer (RNFL) in patients with single and repeated transplantation of autologous MSCs showed that a greater increase in RNFL thickness was observed in the group of patients who ATMSCs performed twice. These findings suggest that the stabilization of neurological status after re-transplantation MSCs in MS patients is more evident. The optimal period for re-ATMSCs appears to be 9 months after first injection.
Watershed infarcts in the brain caused by cardiologic diseases- Clinical and pathologic features
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Background
Watershed infarcts are ischemic lesions situated along the border zones between the territories of two major arteries, e.g. the anterior and middle or the middle and the posterior cerebral arteries.

Methods
Clinical and pathologic findings were reported in 75 patients. Three types of watershed infarcts were considered: 1) those between the superficial territories of the middle and anterior cerebral arteries, 2) those in the border zone between the superficial territories of the middle and posterior cerebral arteries, 3) those in the border zone between the superficial and deep territories of the middle cerebral artery.

Results
There were 48 men and 27 women. Watershed infarct was the first event in 55 % of the patients. Clinical symptoms differed according to the site of infarct. Anterior infarcts (44%) caused mainly lower limb hemiparesis sparing the face, associated with impaired sensation in a part of the cases; in dominant hemispheres there often occurred transcortical aphasia, preceded by mutism in a few cases. In posterior infarcts (39%) hemianopia was the most common symptom; hemihypaesthesia was also common, but limb paresis was rare. In dominant hemisphere lesions, transcortical sensory aphasia or Wernicke-type aphasia was present. In subcortical infarcts (17%) hemiparesis was seen in all cases, hemisensory loss was present in about one-half of the cases, aphasia was common in dominant hemispheric lesions. 41 patients were diagnosed with high risk for cardial embolism.

Conclusions
In our patients with watershed infarction cardiac disease were more prevalent compared with the stroke population as a whole.

Synthesis and pharmacological characterization of opioid- cannabinoid hybrid ligands
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The 1-alkyl-3-naphthoyl substituted indole JWH-018 is a potent, non-selective full agonist of the CB₁ and CB₂ cannabinoid receptors. In order to obtain novel analgesic compounds and useful pharmacological tools to investigate the cannabinoid-opioid receptor interactions, heterodimeric ligands were prepared by covalent coupling of JWH-018 and oxycodone or enkephalin. The opioid and cannabinoid pharmacophores were coupled via linkers of different length and structure (ethylenediamine, 1,6-diaminohexane, di(ethylene glycol), Gly, β-Ala, GABA).

The resulting heterodimerized ligands were characterized in in vitro radioligand binding experiments. In order to obtain adequate cannabinoid receptor binding data the radioactive labeling and characterization of JWH-018 as a radioligand were also performed. The functionality and ability of the bivalent ligands to activate the CB₁/CB₂ and/or µ opioid receptors were tested in [³⁵S]-GTPγS binding assays. It was found that the 1,6-diaminohexane-linked oxycodone – JWH-018, and the Gly-linked enkephalin – JWH-018 bivalent ligands exhibited the highest binding affinity and efficacy to both receptors. Finally, for some new compounds in vivo experiments were performed in order to evaluate their effects in acute and inflammatory models of pain. The parent ligands and JWH-018 derivatives showed strong antinociceptive effects, interestingly the two in vitro most potent bivalent ligands did not exhibited synergism.

Our study may give a beneficial starting point to the development and optimization of a useful tool to explore receptor heteromerisation and better understanding the new bivalent therapeutic approach for reducing chronic pain.

P 14 Epileptic seizure or not? Proportion of correct judgement among medical doctors, medical students and parents based only on a video recording of a paroxysmal event
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Introduction
Early recognition of epileptic seizures among infants is essential for proper treatment. Although, distinguishing between epileptic and non-epileptic seizures or harmless movements in this age seems to be challenging without any additional data.

Objective
Our study intended to measure the proportion of correct seizure recognition among different medical and non-medical groups based on only a video recording.
**Patients & methods**

Video-EEG recordings were taken about paroxysmal movements of 15 very young infants at the EEG lab of our University Hospital. Only the video recordings (without EEG) were displayed for six groups: (1) 159 1st-year medical students, (2) 65 4-5th-year medical students, (3) 52 paediatric residents, (4) 18 paediatric neurologists, (5) 43 adult neurologists and (6) 37 parents. All participants were asked to decide which recording they considered of epileptic origin or a non-epileptic event. Correct answer rate (CAR) was calculated in every group for every video.

**Results and conclusion**

The average CAR was the lowest in the group of 1st-year medical students (36.6%), the best results were reached by paediatric neurologists (67.4%). The CAR was significantly different between the groups of 1st-year medical students and paediatric neurologists (p=0.02), and between the groups of 1st-year medical students and residents (p=0.045). The CAR of the most deceptive epileptic seizure was only 18.2%.

Recognising epileptic seizures in very young infants without EEG is extremely inaccurate. The role of education and experience is clearly indicated by the increase in CAR from 1st-year medical students through to well-trained paediatric neurologists.

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**P 15 Wenn die bildgebenden Verfahren nicht richtungsweisend sind- Ein interessanter Fall einer Neuroborreliose**

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**Einführung**

Mit der Vorstellung unseren Falles möchten wir auf die Vielfalt der Initialsymptomatik einer Neuroborreliose aufmerksam machen.

**Fallvorstellung**

Konsequenz
Mit unserem Fall möchten wir den Stellenwert einer Liquoruntersuchung in der Diagnostik akuter Paresen betonen, wenn die modernen bildgebenden Verfahren nicht richtungsweisend sind.

P 16 Thyroid – Associated Orbithopathy – case report
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Introduction
Various manifestations of an autoimmune disease include neurological symptoms as well. The clinical picture may provide suggestions for differential diagnosis and evaluation.

Case report
We report a case of a 46-year-old male patient who presented with recent onset double vision. At admission during routine physical examination a previously undetected cervical mass and bilateral proptosis was discovered. His neurological status revealed restriction of abduction in both eyes predominantly on the left side with horizontal diplopia, mild difficulty in swallowing and visual impairment. Routine investigations were normal. Thyroid function tests revealed decrease in serum free thyroxine estimate and a raised level of serum thyrotropin. Computer tomography of the orbit showed bilateral thickening of extraocular muscles. The muscular enlargement particularly involved the medial rectus, resulting in optic nerve compression on the right side. Thyroid ultrasonography showed diffuse hypoechogenicity with a solitary nodule on the right side with secunder trachea dislocation.

Based on the above mentioned findings a diagnosis of thyroid-associated orbitopathy was made. The patient started hormone replacement therapy. After the management of the thyroid condition the symptoms significantly improved.

Conclusion
We reported a case with neurological symptoms due to an endocrinological disorder. Our aim was to highlight the importance of prompt recognition and management of the background condition. An unique feature of the case is that thyroid-associated orbitopathy most commonly is seen in thyrotoxicosis, but in our case is related to primary hypothyroidism.