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Movement Disorders

834
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Movement Disorders
Effects of zonisamide for overall non-motor symptoms with Parkinson's disease patients

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Background: Non-motor symptoms in Parkinson's disease (PD) are considered as an important factor related to the quality of life in PD patients. However, treatment strategies for these symptoms have yet been established. Zonisamide was reported to improve motor functions of PD and have various effects on nervous systems. The present study investigated the efficacy of zonisamide in non-motor symptoms of PD.
Methods: 20 patients with PD participated in this study and were treated with zonisamide (25 mg/day) for 12 weeks. When subjects entered in this study, written informed consent was acquired from each subject. General symptoms were evaluated using the Unified PD Rating Scale (UPDRS). Non-motor symptoms were measured by Non Motor Symptom Scale (NMSS), which consists of 9 subdomains. The study protocol got the approval of the Institutional Review Board.
Results: Median UPDRS part III score significantly decreased from 25.5 points at baseline to 20.6 points at 12 weeks ($p = 0.004$). In addition, NMSS total score showed significant improvement from 55.9 +/- 51.6 to 44.3 +/- 50.4 ($p = 0.044$). Within each NMSS subdomain, significant amelioration was observed in mood/cognition (from 11.9 +/- 18.0 to 7.3 +/- 12.8, $p = 0.020$) and attention/memory (from 7.3 +/- 8.9 to 4.8 +/- 7.6, $p = 0.021$) domains.
Conclusions: This study suggests that zonisamide improves non-motor symptoms, especially psychical and cognitive symptoms in PD patients.

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836
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Movement Disorders
Intrafamilial phenotypic variability in Spinocerebellar ataxia type 8

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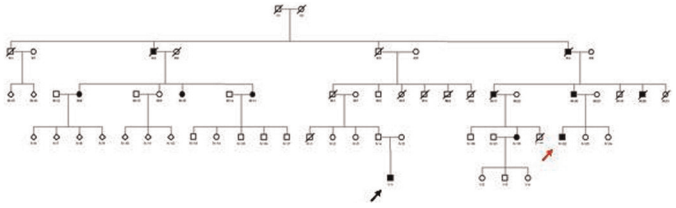
Background: Spinocerebellar ataxia type 8 (SCA8) is an autosomal dominant ataxia related to expanded CTA/CTG triplet repeats on chromosome 13q21. The pathological role of these expansions is currently debated because of the genetic and clinical heterogeneity of the disease, the absence of segregation in many families so far described, and the evidence of expansions also in healthy subjects.
Objective: Here we describe two members of a large Italian family (Fig. 1), second cousins once removed, with a peculiar disease phenotype.
Patients: The first patient (red arrow) was a 55-years-old man whose father suffered from a late-onset very mild ataxia. He went to our attention because of a 20-year-history of slowly progressive cerebellar ataxia, L-dopa-responsive parkinsonism, and orthostatic hypotension. The second patient (black arrow) had speech difficulties and gait disturbance from the age of 17 years, and disabling paroxysmal myoclonic tremor of the head at the age of 19 years. Neurophysiological evaluation excluded a cortical origin of the tremor. Cerebellar atrophy was present on MRI in both patients. Further ten members of the family have been reported to be affected with cerebellar ataxia.
Results: Molecular genetic analysis excluded SCA1-2-3-6-7-10-12-17-36 and DRPLA and demonstrated a SCA8 pathological expansion.
Conclusion: The segregation between the disorder and the CTA/CTG expansion in so distant relatives supports the pathological role of SCA8 mutation. Our description confirms intrafamilial heterogeneity of clinical features.



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839
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Movement Disorders
Polineuropathy and B12 deficiency in levodopa/carbidopa intestinal gel – etiology and management -our experience

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Background: Duodenal infusion of levodopa/carbidopa intestinal gel(LCIG) is an effective treatment option for advanced Parkinson's disease(PD).

We found polyneuropathy in a number of patients treated with LCIG (DUODOPA).

0022-510X/$ – see front matter.

Is this a side effect of therapy or is independent from neurologic disease?

We have 28 patients treated with Duodopa since January2012;an important percent of them developed polyneuropathy after initiating this therapy.

Objective: To determine the etiologic factors and the correct management in order to prevent this affection.

Material and methods: We studied 28 patients with advanced PD in treatment with LCIG;They were examined by EMG(Electromyography) serum level of B12 before treatment and 6 and 12 months after Duodopa treatment. The objectives of this study were to evaluate the risk of neuropathy in patients with Parkinson's disease and to evaluate the role of levodopa exposure as a potential risk factor.

Results: We found some cases of severe sensorimotor polyneuropathy with both subacute and chronic onsets, rarely associated with vitamin B12 imbalance. We did not observed severe changes in vitamin B12 level. This may reflect a rare complication or a severe side effect.

Conclusion: We describe 28 PD patientswho developed axonal polyneuropathy and vitamin B(12) deficiency. Wereview the potential etiologic factors, and discuss about the algorithm for themanagement and prevention of this simptomatology. Our research suggest a relationshipbetween levodopa/carbidopa intestinal gel and PN.

Keywords: Parkinson disease,neuropathy ,B12 deficiency

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840
WFN15-0371
Movement Disorders
Complications related to levodopa/carbidopa intestinal gel treatment –colentina hospital experience

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Background: Enterally administered levodopa/carbidopa gel (Duodopa)(LCIG) is used for the treatment of advanced Parkinson's disease (PD) in patients with motor fluctuations and dyskinesias. However, it is not free of complications.

Our clinic started to use LCIG in December 2012.So far we have treated 28 patients.

Although generally considered safe, PEG (percutaneous endoscopic gastrostomy) tube placement can be associated with many potential complications. This paper describes a variety of PEG tube related complications and strategies for complication avoidance.

Objective: - to report complications that we observed in our patients with advanced Parkinson's disease treated with continuous infusion of intraduodenal levodopa/carbidopa(LCIG) andalso their management.

Methods -:we report our experience in 28 patients treated since December 2012 and also the advantages and limitations of the procedure.

Results: The adverse-event profile of LCIG is likely similar to that of oral levodopa, although technical problems with the infusion device have occurred in up to 30 % of patients. The most likely problems were related to intestinal tube placement, including dislocation to the stomach which not occurred very frequent due to experts techniques.

Conclusions: Duodopa has symptom-relieving and stabilizing effects without severe side effects from our observations.

The majority of adverse events were related to the infusion system or surgical procedure rather than the drug.

Keywords: -Duodopa ,Parkinson disease,complications

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841
WFN15-0807
Movement Disorders
Hemodynamics in patients with idiopathic Parkinson's disease

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Background: Arterial stiffness is an independent predictor of all-cause and cardiovascular mortality, fatal and nonfatal coronary events, and symptomatic strokes. The aim of the present study was to explore the arterial stiffness by measurement of the augmentation index (AIx) in subjects with Parkinson's disease and to evaluate the relationship between these indexes and other clinical and laboratory variables.

Methods: AIx was measured by applanation tonometry (SphygmoCor, Atcor, Australia). Applanation tonometry was used to record the radial artery pressure waveform continuously, and mean values of the 2 screens of pulse waves of good quality were used for analysis.

Results: Forty patients with Parkinson's disease and 90 control subjects were enrolled for the study. The mean age was 66.4 years. The baseline characteristics were well balanced among the groups. While there were no significant differences among the groups for hemodynamic indices, peripheral PP and aortic PP were significantly lower in IPD group than control group. ($P = 0.031$, $P = 0.001$). According to the univariate analysis, AIx was significantly correlated with aortic pulse pressure ($r = 0.324$; $P < 0.001$) and peripheral pulse pressure ($r = 0.193$; $P = 0.025$).

Conclusion: In this study we asked whether there is a difference in terms of hemodynamic indexes between subjects with Parkinson's disease and control. From this evidence of lower peripheral and aortic PP in IPD group, we conclude that subjects with Parkinson's disease could have a lower risk of developing cardiovascular event.

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842
WFN15-1496
Movement Disorders
Post ischemic stroke status dystonicus, a case report

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Introduction: Status Dystonicus (SD) is a life-threatening rare movement disorder characterized by episodes of frequent or continuous severe generalized dystonic spasms. It's considered a underdiagnosed entity and it treatment remains a challenge.

Case report: A 44-years old woman was admitted with a 6-hour history of loss of consciousness and generalized stiffness. She had a previous hospitalization 7 months ago due a stroke in the left MCA site. At neurological examination, she was in GCS 10, with generalized dystonia affecting neck and the four limbs and global hyperreflexia, with no clonus. A MRI showed hyperintense lesions in T2, FLAIR and DWI sequences compatible with acute ischemic stroke affecting cortex and white matter in both frontal lobes, right parietal and temporal lobes, and bilateral striatal nuclei involvement. On arteriography, intracranial stenosis of the right carotid bifurcation was observed. Also, there was a previous pencil-like occlusion of the left internal carotid and a partial filling of left A2 site by anterior communicating artery. She evolved with significant improvement of SD after sedation with Midazolam. Levodopa-Benzerazide and Baclofen were added and intermittent midazolam dosege mantained for 3 days. After 7 days from ictus, dystonia began to improve, followed by normalization of creatine kinase levels.

Discussion: Post-stroke dystonia is the second most frequent movement disorder related with ischemia and rarely are presented as generalized dystonia. The main lesion site is Lenticular Nucleus, especially Putamen.

There is no agreement in literature about specific SD first line therapy, however, Levodopa-Benzerazide, Baclofen and Midazolan can be used.

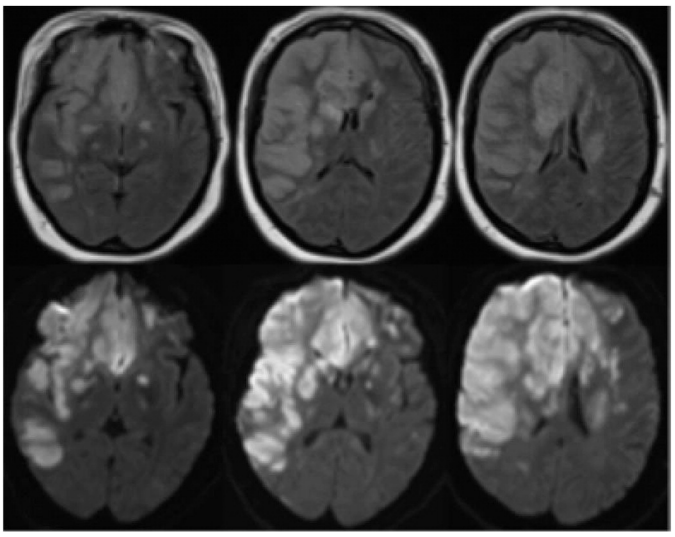

Figure: hyperintense lesions in FLAIR and DWI sequences compatible with acute ischemic stroke, affecting cortex and white matter in both frontal lobes, right insula, parietal and temporal lobes. Also, there is a bilateral striatal nuclei involvement, notably on the right side.

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844
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Movement Disorders
Factors altering the quality of life in Parkinson's disease: study retrospective of 100 cases

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Background: individuals with Parkinson's Disease (PD) are confronted with physical, psychological and psychosocial issues that impact quality of life(QOL).
Objective: To identify the factors that determinate quality of life in patients with idiopathic PD in a population based sample.
Material and methods: : All patients with idiopathic PD were asked to complete a disease- specific QOL questionnaire (PDQ-39) , SF-36 and MDRS to evaluate the depression. The patients were followed for consultation or contacted by telephone to complete the self-evaluation of dependent dopamine behavior questionnaires (ACDD).A part from demographic and treatment details parkinsonian disability and stage was assessed by Hoehn et Yahr, Schawb and England scale and UPDRS scores.
Results: The alteration of QOL was found in all patients and all interested items assessed, particularly physical activity, mental health, general health and vitality energy. The early onset of age, degree of disability, the presence of motor complications and related disorders correlated to poor QOL. Behavioural changes assessed by ACDD the questionnaire were found in 60% of cases, marked by a tendency to isolation (20 cases), depression in 40% of cases. We conclude that presence of depression, low degree of independence, higher levodopa dose and higher UPDRS activity of daily living score have have the most detrimental impact on QOL in patients with Parkinson's disease.
Conclusion: Depression, disability, postural instability and cognitive impairment have the greatest influence on QOL in Parkinson's disease. The improvement of these features should therefor become an important target in the treatment of the disease.

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845
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Movement Disorders
Rotigotine: a treatment option for parkinsonism

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Background: Multiple System Atrophy (MSA), Progressive Supranuclear Palsy (PSP) and Cortico Ganglio Basal Degeneration (CGBD) are listed within the atypical parkinsonisms due to common symptoms; however the response to levodopa and dopamine agonists is poor and there are no additional options. Rotigotine is a non-ergot agonist dopa commonly used in Parkinson Disease that primarily stimulates D3 receptors and by its mechanism of action simulates a continuous dopaminergic stimulation.
Objective: Evaluate the response and safety to rotigotine of atypical parkinsonism such as MSA, PSP and CGBD.
Patients and methods: In total twelve patients; five women and seven men, four patients with MSA parkinsonian subtype, six with PSP and two with CGBD were treated with rotigotine. MSA patients were evaluated before and after the start of medication with the Unified Multiple System Atrophy Rating Scale (UMSARS), patients with PSP with the Progressive Supranuclear Palsy Rating Scale (PSPRS) and CGBD patients with the UPDRS III.
Results: All patients showed improvement in motor and related non-motor symptoms. According to the UMSARS the benefit was of 37%, according to the PSPRS the benefit was of 35% and the UPDRS showed a benefit of 26% in patients with CGBD. One patient with PSP did not tolerate the medication due to onset of hallucinations and agitation.
Conclusion: patients with MSA-P, PSP and CGBD showed improvement of motor and non- motor symptoms with rotigotine confirmed by appropriate scales. The medication was well tolerated but one patient quit the medication due to side effects.

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846
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Movement Disorders
Receptor mediated delivery system bearing dopamine for effective management of parkinsonism

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Delivery of drug and sustaining it in effective concentration in brain is challenging due to blood brain barrier. In present investigation, amino acid coupled liposomes bearing dopamine-HCl were prepared to deliver drug to the brain utilizing receptor-mediated transcytosis for effective management of parkinsonism.

L-lysine stearylamine conjugate (LSC) was synthesized & LSC coupled liposomes bearing dopamine HCl was prepared by lipid cast film method. Formulations were analyzed for average vesicle size, drug entrapment, *in-vitro* drug release and *in-vivo* efficacy of the formulations was assessed by measuring the reduction in the degree of drug induced catatonia in albino rats.

Average particle size was found in the range of 1.92-0.80 mm. There was increase in the size for coupled liposomes due to the inclusion of LSC

in liposomal bilayers. The percent encapsulation efficiency decreased from 46.82 ± 2.17% in uncoupled to 38.13 ±1.18% in coupled liposomes. The *in-vitro* drug release after 24 hrs was 58.9 ± 2.94% with uncoupled while the coupled liposomes showed 43.7 ± 2.18% drug release. The lower value for coupled formulation could be due to the retardation of drug release caused due to the incorporation of LSC in the liposomal bilayers, which enhanced the structural integrity of the bilayer. *In-vivo* study reveals that the animals receiving uncoupled liposomes showed partial reduction and animals that received coupled liposomes showed almost complete reduction in catatonia.

Fluoresence study clearly indicates the uptake of 6-CF in blood vessels and accumulated in brain. This could be due to enhanced uptake of Lysine coupled liposomes through amino acid transporters present at BBB surface.

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847
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Movement Disorders
Stiff person syndrome in a 64 year old male Filipino: a case report

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A 64-year-old Filipino man presented with a one-month history of progressive left thigh rigidity and involuntary muscle contraction observed during knee extension, ankle plantarflexion and inversion. Volitional movement and noise aggravated the condition, and prolonged episodes of spasms were associated with pain. This affected ambulation and eventually necessitating the use of crutches.

There was increased tone of the rectus femoris, vastus lateralis and vastus medialis muscles of the left leg. All affected muscles were hard on palpation. Marked rigidity was more prominent when patient is observed during ambulation. Neurologic examination was unremarkable. Deep tendon reflexes were normal.

Electromyographic and nerve conduction studies (EMG NCV) studies showed sustained interference patterns consisting of normal motor unit action potentials which is consistent with Stiff Person Syndrome. Anti-glutamic acid antibody (anti-GAD Ab) determination was negative. Oral benzodiazepine and baclofen afforded relief of spasms and stiffness and resulted in improvement of functional status.

SPS is an important diagnosis to consider in patients presenting with muscle stiffness, spasms and cramps. It may present as a paraneoplastic condition usually associated with lung and breast cancer and may indicate the presence of autoimmune disease.

This condition causes significant morbidity and mortality. When properly diagnosed, most cases respond to appropriate treatment resulting to improvement of symptoms. Further investigation for the presence of paraneoplastic conditions especially in seropositive cases is highly recommended.

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849
WFN15-1378
Movement Disorders
Differentiating apathy and depression in patients with dementia in Parkinson's disease

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Background: There is a consensus in that apathy should be considered a separate syndrome in dementia. Another important feature regarding apathy evaluation pertains to its distinction from depression.
Objective: The aim of this study was differentiate depression and apathy in patients with dementia in Parkinson's disease (PDD).
Methods: A total of 29 patients with diagnosis of idiopathic Parkinson's disease (PD) and dementia (SCOPA-Cog) were recruited. The patients were assessed for level of motor impairment (UPDRS-III), depressive features (MADRS) and apathy (AES).
Results: All of the patients presented apathy and 17 (68,52%) had depression. Apathy [r = -0.3613, 95%CI (-0,013-0,647)] had a direct correlation, and the depression [r = -0364, 95%CI (-0,01-0,648)] had an inverse with PDD severity levels. In SCOPA-Cog, there was a direct correlation with apathy and reverse with depression in the digit span backward (r = 0.4256 and r = - 0.3254). The delayed recall was correlated only with depression (r = -0.5279). There was no relationship between apathy and UPDRS [r = -0,0982, 95%CI (-0,278-0,448)], but a strong inverse correlation with depression [r = -0,98, 95%CI (0,958-0,99)].
Conclusions: This study suggests that apathy is more common that depression in PDD. Depression may be more serious in lighter levels of PDD and when the motor symptoms are not in the advanced stages. Apathy can be more severe in later levels, without relationship with the motor symptoms. The age onset of PDD possibly has influence on the development of the patient's apathy and depression. Perhaps stages of SCOPA-cog could be useful in differentiation between apathy and depression in PDD.

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850
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Movement Disorders
Clinical, electromyographic and accelerometry findings in patients with psychogenic tremor

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Background: Psychogenic tremor makes up 40-60% of the psychogenic movement disorder and occupies 5% of the specialized appointment. It has clinical and neurophysiological features which may distinguish with organic tremors.
Objective: To describe clinical and neurophysiological features of the patient with psychogenic tremor of the Department of movement disorder at *institute neurológico de Colombia.*
Patients and methods: A descriptive study of patient with suspected psychogenic tremor of department of movement disorder at institute neurologico de Colombia with clinical and neurophysiological (electromyography and accelerometry**):** evaluation between may/2014 and march/2015. Demographic, clinical and neurophysiological (amplitude and frequency of rest tremor with and without distraction, postural tremor with and without weight and electromyographic pattern) characteristics were evaluated. The study was approved by the Ethics Committee of the institute.

Results: Eleven patients were included, 81% female, mean age 48 +/- 11 years and with duration of symptoms 8.8 years; 36.4% had a history of previous injury. The insidious presentation, involving dominant limb and postural component were the most frequent finding. The tremor was inconsistent and observer dependent on all patients. The multiple peaks with frequently between 5-10Hz and varying amplitudes were the most common finding in accelerometry. The electromyographic pattern was alternating with bursts between 50-150 milliseconds.

Conclusion: Clinical and neurophysiological features are important to characterize this entity and able to offer a more precise and objective diagnosis.

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851
WFN15-0870
Movement Disorders
Transcranial sonography utility in the study of parkinsonian syndromes: our experience

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Background: The differential diagnosis of the parkinsonian syndromes is clinical, and in sometimes is difficult. Transcranial sonography is a valuable method as a complementary exploration and it has a low cost and easy to perform.
Objetive: To describe what was found in the sonographic of patient with parkinsonian syndrome evaluated on the Department of movement disorder at the institute neurológico de Colombia; and correlating its clinical and sonographic diagnosis.
Patients and methods: A descriptive study of 109 patients with parkinsonian syndrome with a transcranial sonography performed between June 2014 and March 2015. The clinical diagnosis was compared with the sonographic. In Parkinson´s disease with clinical and sonographic diagnosis, we calculated the average of the midbrain area, and the echogenicity of the substantia nigra, the diameter of the third ventricle and lateral ventricles. The study was approved by the Ethics Committee of the institute.
Results: Sixty-eight patients was included, mean age 66 +/-12 years, 64,7% male. Thirty-one (45,6%) had clinical diagnosis of Parkinson´s disease and 23(33,8%) of atypical parkinsonian syndrome with compatible sonography in 80,6% and 37,5% respectively. Ten (14,2%) had secondary parkinsonian (drugs and vascular), 60% with normal sonography. Twenty-five patient had Parkinson´s disease (clinical and sonographic diagnosis), had an average of the midbrain area of 5,04 +/-0.06 cm2, echogenicity of the substantia nigra of 0,23 +/-0,07 cm2, diameter of the third ventricle of 5,32 +/-1,77 mm and lateral ventricles of 16,82 +/-1,42 mm.
Conclusion: Transcranial sonography in our department, has proved useful to differentiate parkinsonian syndromes, especially to support the diagnosis of Parkinson's disease.

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852
WFN15-0682
Movement Disorders
Simple and low-cost mucuna pruriens preparation for Parkinson's disease patients in low-income countries

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Background: In low-income areas, about 80% of Parkinson's disease (PD) patients cannot afford medications, such as pharmaceutical levodopa/DDCI preparations. *Mucuna pruriens* (MP) seeds have high levodopa content and may offer an alternative.
Objectives: To develop a safe, easy, low-cost method for MP seed preparation. To quantify the dose of MP required to treat PD patients.
Material and methods: The seeds were toasted in a pan at low heat, without adding fat or seasoning, for 15 min. As soon as the husks burst open they were removed, and the seeds were ground and passed through a sieve, in order to obtain a powder.

We collected 29 different kinds of MP seeds from Africa and Latin America and measured the levodopa content of their dried seeds, both raw and after roasting.

One patient with advanced PD was administered levodopa/carbidopa 100 + 25 mg and the corresponding dose of MP roasted powder (7 g dispersed in water), containing about 400 mg of DDCI-free levodopa. Plasma levodopa levels were measured after both administrations.
Results: The mean levodopa content of the dried MP seeds collected worldwide was 5.1%.

Roasting does not reduce the content in levodopa (still 5%).

In the treated patient, MP roasted powder provided similar clinical benefit and no significant side effects. AUCs were 55.3 and 95.5 (μg/ ml)*min, respectively.
Conclusions: MP is safe, effective, easy to prepare and very cheap (total annual cost per patient: 10-15 US $). MP may be a sustainable alternative treatment for PD patients in low-income countries.

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853
WFN15-0317
Movement Disorders
Endothelial progenitor cells: a cardiovascular protective factor in Parkinson's disease?

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Background: Parkinson's disease (PD) patients have a favourable cardiovascular risk profile. Cardiovascular risk factors are inversely associated with circulating endothelial progenitor cells (EPCs). These cells are involved in the recovery of endothelial integrity, and their function and mobilization from the bone marrow are negatively affected by dopamine.
Objective: To investigate EPC counts in PD and establish whether their count is affected by dopamine-replacement therapy.
Patients and methods: We studied de novo (DPD; N = 27) and levodopa-treated (LTPD; N = 27) PD patients and control subjects (N = 54) free of comorbidities and matched (1:1:2) by age, gender and body mass index.

Results: Both DPD and LTPD patients had higher EPC counts than controls ($P < 0.001$). No difference was detected between groups of PD patients. After adjusting for age, gender, total serum cholesterol andprotein intake the difference between patients and controls remained significant (DPD, $P = 0.020$; LTPD, $P = 0.045$). High serum cholesterol and protein intake were also significant independent predictors of a reduced number of EPCs. In LTPD patients levodopa dosage (mg/kg/day) was directly associated with circulating EPC counts ($P = 0.014$).
Conclusion.: PD patients have higher EPC counts than controls, independently of cardiovascular risk profile and dopamine-replacement therapy. A major contributing factor is likely the peripheral sympathetic denervation characterizing these patients. The determinants of circulating EPC counts in PD deserve further investigation. Future studies should address also the functional properties of EPCs in PD. Prospective studies controlling for relevant confounders are required to clarify the role of EPCs as a new marker of cardiovascular disease and risk in PD.

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854
WFN15-0318
Movement Disorders
Double blind, placebo-controlled trial of a fermented milk containing multiple probiotics strains and prebiotic fiber for constipation associated with parkinson's disease

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Background: Constipation is the most frequent (prevalence, about 60%) dysautonomic non motor symptom affecting Parkinson's disease (PD) patients. Unfortunately, limited treatment options have been investigated and are now available for the management of constipation in PD. Preliminary data have suggested that probiotics could be help improving bowel habits but high-quality randomized trials are required in this area.
Objective: To evaluate whether the use of a fermented milk containing multiple probiotics strains and prebiotic fiber have a beneficial effect on constipation in PD.
Patients and methods: We designed a double-blind randomized, controlled trial. After a 2-week run-in phase to confirm diagnosis of constipation according to Rome III criteria, PD patients will be randomized (2:1) to receive daily (at breakfast) a fermented milk (125 grams), containing multiple probiotics strains and prebiotic fiber, or placebo (pasteurized fermented milk without prebiotics) for 4 weeks. Patients will be allowed continuing the use of anticonstipation medications but also advised to limit it as much as possible. The primary efficacy end point will be the increase in the number of complete spontaneous bowel movements (CSBMs) per week.
Results: Using internal unpublished data, we calculated that for a p value of 0.05 and for a power of 0.9, 120 total patients ($80 + 40$) would be required to show a difference in the frequency of CSBMs between case patients (3.4 ± 2.2 per week) and control subjects (2.2 ± 1.7 per week) based on stool diaries.
Conclusion: Positive data from this trial would offer an effective adjuvant treatment options for constipation in PD.

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855
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Movement Disorders
Case study of pathologically proven progressive supranuclear palsy (PSP) presenting with prominent chorea

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Progressive supranuclear palsy (PSP) is a neurodegenerative disease associated with cortical and subcortical tauopathy. Neuropathology provides a gold standard for diagnosis (NINDS-SPSP "definite PSP") but in practice the diagnosis remains essentially clinical,

73 year old right handed man 12 year history of "twitching". The frequent brief movements were unpredictable, involuntary, progressive and bilateral. Over the last five years his wife noticed a change in personality. On examination there were widespread choreoathetoid movements in all limbs and face. There was intermittent gegenhalten in the limbs. No bradykinesia or apraxia. Power, tendon reflexes, plantar responses, coordination and sensation were normal. Horizontal and vertical gaze were restricted. On cognitive examination, MMSE 30/30 and Addenbrookes Cognitive Examination (revised) 98/100. Seven months after presentation he was admitted for investigation of swallowing difficulties and died several days after a nocturnal cardiac arrest.

Radiology: Chest radiograph, MRI Brain (T1, T2, FLAIR, PD, DWI) and DAT scan all normal.

Pathology: Widespread evidence of a neurodegenerative Tauopathy, with distribution and morphology typical of PSP.
Conclusion: Despite the PSP pathology, this patient did not meet criteria probable PSP (NINDS-SPSP criteria) He presented atypically, with widespread choreiform movements over 12 years, personality change without dementia. This is the first case presenting with chorea and neuropathological confirmation and in which the syndrome remained atypical of PSP throughout the 12 years. Highlighting the diagnostic difficulty posed by PSP, and widening of the clinical phenotype.
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856
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Movement Disorders
Low dose tetrabenazine as monotherapy for treatment of hemichorea in non-ketotic hyperglycemia

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Background: Non ketotic hyperglycemia (NKH) has been recognized as the second cause of hemichorea, only after vascular disease. Treatment of hemichorea associated with NKH includes neuroleptics, dopamine depleting agents, and GABAergic drugs. Tetrabenazine (TBZ) has been used as treatment of choreic movements Due to its high cost, the use of neuroleptics is preferred over tetrabenazine. No specific treatment for hemichorea associated to NKH has been established.

Objective: Determine the optimal dose of tetrabenazine for hemichorea treatment as monotherapy in NKH.
Patients and methods: Four patients with hemichorea associated to NKH were included from 2013 to 2014. Other causes of hemichorea were ruled out with proper clinical evaluation and confirmed with MRI findings. Titration of TBZ was started with a 12.5 mg dose with weekly 12.5 mg increases together with appropriate clinical assessment.
Results: We achieved satisfactory control of hemicorea with tetrabenazine 37.5 mg total dose up to six-month follow up.
Conclusions: Tetrabenazine may be used as first line drug for NKH, it represents a reliable option as a short-term treatment for hemichorea related to NKH.

I have obtained patient and/or Institutional Review Board (IRB) approval, as necessary.

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857
WFN15-1203
Movement Disorders
Incobotulinumtoxina improves dystonic signs and modulates cortical plasticity in focal hand dystonia

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Background: Botulinum toxin (BoNT) is an accepted treatment for focal hand dystonia (FHD) but the effects of incobotulinumtoxinA have not been reported. The central mechanisms of action of BoNT are not fully understood. Animal models have shown deficient depotentiation in corticostriatal networks but this has not been explored in FHD.

Objective: To study depotentiation in FHD patients and correlate with the clinical effects of BoNT treatment.

Methods: We studied 7 FHD (5 writer's cramp and 2 musician's dystonia) patients (age: 57 ± 3 years, 2 women) with established response to BoNT. They were studied at baseline (four months after last BoNT injection), one and three months after treatment with incobotulinumtoxinA with FHD scores and a potentiation-depotentiation protocol. Motor-evoked potential (MEP) amplitude was measured at baseline and after five different time intervals up to 30 min after the potentiation-depotentiation protocol.

Results: FHD patients had baseline writer's/musician cramp rating scale scores of 14.3 ± 2.1, which decreased to 12.6 ± 2.3 ($p = 0.02$) at one month post-injection and to 12.7 ± 2.5 ($p = 0.03$) at three months post-injection assessed by a blinded rater. Potentiation was decreased in patients at baseline and inhibition was observed at one month after BoNT injection, when peak effect is found. There was depotentiation in patients at baseline and at 3 months post incobotulinumA injection, but potentiation at 1 month after injection.

Conclusions: Our preliminary findings suggest that incobotulinumtoxinA treatment improves dystonia scores and modulates cortical plasticity in FHD. Depotentiation may be related to its therapeutic effect. This is ongoing study with more patients being recruited.

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858
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Movement Disorders
Activation of neurotensin receptor type 1 decreases hyperlocomotion and glycogen synthase kinase-3 activity

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Background: Despite the unmet needs for better medications for hyperlocomotion and mania, drug development has been sluggish largely owing to a lack of understanding of the molecular mechanisms underlying manic behavior. Increasing evidence suggests that neurotensin receptor type 1 (NTS1) is a promising therapeutic target for mania or motor disorders. Activating neurotensin receptor type 1 (NTS1) is known to suppress hyperactivity and some mania-like behaviors.
Objective: We aimed to investigate the molecular mechanism underlying the anti-manic effects of NTS1 agonists.
Material and methods: Using a NTS1 selective agonist, PD149163, we examined if NTS1 activation inhibits amphetamine-mediated hyperactivity in C57BL/6 J mice. To examine the effect of NTS1 activation on hyperlocomtion and mania-like behavior, we used amphetamine treatment. NTS1 activation inhibits dopamine D2 receptor (D2R) function. Therefore, we used acute amphetamine treatment to investigate the effect of PD149163 on hyperlocomtion and mania-like behavior. In addition, we assessed glycogen synthase kinase-3 (GSK-3) activity, a molecular target of mood stabilizers, using phospho-specific antibodies. PD149163 (0.1 and 0.5 mg/kg) inhibited amphetamine-induced hyperactivity and amphetamine-mediated deficits in prepulse inhibition in C57BL/6 J mice. We found that PD149163 decreased GSK-3 activity in a dose- and time-dependent manner in the nucleus accumbens and medial prefrontal cortex of the mice.
Conclusion: Together, our findings indicate that activation of NTS1 could be a novel pharmacological method to treat hyperactivity-related movement or psychiatric disorders.

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859
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Movement Disorders
The association of musculoskeletal pain with bone mineral density in patients with Parkinson's disease

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Background: Pain and osteoporosis are common in Parkinson's disease (PD) and their prevalence in PD patients is higher than in the general population. Additionally, pain is associated with a high incidence of osteoporosis in the general population. The aim of this study was to determine whether there is an association between the pain subtypes and the bone mineral density (BMD) in patients with PD.
Methods: We examined 169 PD patients, and 7 were excluded from subsequent analyses because their pain duration was 3 months. Pain was assessed using the patients' descriptions, a structured interview, a detailed neurologic examination, and the visual analogue scale. BMD was measured using dual energy x-ray absorptiometry scans.
Results: Of the 162 PD patients, 120 had chronic pain, while 42 reported no pain. The most prevalent type of pain was musculoskeletal, followed by radicular/neuropathic, dystonic, and central. PD patients with musculoskeletal pain had a lower BMD than PD patients without

pain. Univariate regression analysis showed that old age, female sex, a high body mass index (BMI), and the presence of pain or musculoskeletal pain significantly correlated with BMD of the lumbar spine, hip, and femoral neck. After adjusting for age, sex, BMI, and the 25-OH-vitamin D concentration, the presence of musculoskeletal pain was significantly associated with the BMD of the lumbar spine, hip, and femoral neck.
Conclusions: PD patients with musculoskeletal pain have low BMD and are at risk for developing osteoporosis. Therefore, if a PD patient has musculoskeletal pain, clinicians should consider screening for osteoporosis.

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860
WFN15-0431
Movement Disorders
Efficacy of rasagiline in patients with Parkinson's disease and mild cognitive impairment: results from moderato, a 24-week randomized, double-blind, placebo-controlled trial

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Objectives: To evaluate the effects of rasagiline 1 mg/day vs. placebo on cognition in Parkinson's disease patients with mild cognitive impairment (PD-MCI).
Background: MCI is reported to affect 25-30% of non-demented PD patients.
Methods: MODERATO was a 24-week, double-blind, study in PD-MCI patients (MoCA rating scale score 20–25 required at screening). Patients on stable dopaminergic therapy were randomized (1:1) to adjunct rasagiline 1 mg/day or placebo. Primary endpoint was mean change from baseline to Week-24 in the SCOPA-COG total score. Key secondary efficacy measures included: MoCA, PDAQ, ADCS-CGIC and UPDRS motor and ADL scores.
Results: Of the 170 patients randomized, 151 (88.8%) completed the study, and 162 (rasagiline n = 82, placebo n = 80) were included in the modified-ITT analyses. SCOPA-COG scores improved in both groups, however the treatment difference of 0.8 between placebo and rasagiline was not significant ($p = 0.22$). There were no significant differences in MoCA ($p = 0.84$) or PDAQ scores ($p = 0.48$). The ADCS-CGIC distribution was (rasagiline vs. placebo): improvement 43% vs. 27%, no change 42% vs. 54%, and worsening 15% vs. 19% ($p = 0.1$). At Week-24, both UPDRS motor and ADL scores improved in the rasagiline group (treatment differences vs. placebo: -2.5 points $p = 0.02$ and -2.3 points $p < 0.001$, respectively). Rasagiline was well-tolerated; most common AEs were falls (rasagiline n = 7, placebo n = 9) and dizziness (rasagiline n = 7, placebo n = 4).
Conclusion: Rasagiline in PD-MCI patients was not associated with cognitive improvement vs. placebo. Rasagiline did not worsen cognition, improved UPDRS motor function and ADLs compared with baseline, and was safe and well-tolerated in a PD-MCI population.

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861
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Movement Disorders
Efficacy of rasagiline in early Parkinson's disease (PD): a meta-analysis of data from the tempo and adagio studies

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Objective: Evaluate the efficacy of rasagiline 1 mg/day versus placebo in a pooled population of patients with early PD.
Background: Individual TEMPO and ADAGIO studies confirmed rasagiline 1 mg/day efficacy in early-PD untreated patients.
Methods: TEMPO and ADAGIO were randomized, controlled Phase-III studies of rasagiline in untreated patients with early PD. The placebo-controlled phase was 26-weeks in TEMPO and 36-weeks in ADAGIO. This meta-analysis included UPDRS efficacy observations from weeks 12, 24 and 36 in ADAGIO and from weeks 14 and 26 in TEMPO; TEMPO visits were recoded to weeks 12 and 24 respectively to allow integration with ADAGIO. The analysis includes 1134 patients who had ≥1 post baseline efficacy observations at the selected weeks and a subgroup of 276 patients whose baseline UPDRS scores were ≥27 (upper quartile analysis). Change from baseline in UPDRS Total, and UPDRS Parts I, II and III subscales were evaluated using mixed models repeated measures analyses.

Variable	Pooled population 1mg/day – placebo Estimate; mean ±SE (p value)	Upper Quartile 1mg/day – placebo Estimate; mean ±SE (p value)
UPDRS Total		
Week 12/14	-2.18 ±0.33 (<0.0001)	-3.74 ± 0.66 (<0.0001)
Week 24/26	-3.57 ±0.40 (<0.0001)	-5.57 ± 0.81 (<0.0001)
Week 36	-3.01 ±0.48 (<0.0001)	-5.30 ± 1.03 (<0.0001)
UPDRS Part I (Mentation)		
Week 12/14	-0.16 ± 0.06 (<0.01)	-0.39 ± 0.11 (<0.001)
Week 24/26	-0.23 ± 0.06 (<0.001)	-0.42 ± 0.13 (≤0.001)
Week 36	-0.21 ± 0.08 (<0.01)	-0.36 ± 0.17 (<0.05)
UPDRS Part II (ADL)		
Week 12/14	-0.70 ±0.12 (<0.0001)	-1.48 ± 0.25 (<0.0001)
Week 24/26	-0.97 ±0.15 (<0.0001)	-1.69 ± 0.29 (<0.0001)
Week 36	-0.85 ±0.18 (<0.0001)	-1.83 ± 0.38 (<0.0001)
UPDRS Part III (Motor)		
Week 12/14	-1.30 ±0.25 (<0.0001)	-1.81 ± 0.50 (<0.001)
Week 24/26	-2.35 ±0.30 (<0.0001)	-3.38 ± 0.61 (<0.0001)
Week 36	-1.90 ±0.36 (<0.0001)	-3.09 ± 0.77 (<0.0001)

Results: Effects on UPDRS total, motor and ADL scores were significantly better for rasagiline 1 mg/day (both populations) compared with placebo at all time periods (table).
Conclusions: This meta-analysis confirms the symptomatic efficacy of rasagiline in early PD over 36 weeks. Over periods of 6-9 months, rasagiline 1 mg/day showed improvements versus placebo of about 5 UPDRS units in patients with a baseline UPDRS Total score of ≥27.

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863
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Movement Disorders
Mucuna pruriens in parkinson's disease: a double-blind, randomized, placebo-controlled, crossover study

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Background: *Mucuna pruriens* (MP) is a legominous plant whose seed contain high-concentrations of levodopa (LD).
Objective: To investigate safety and efficacy of MP challenge in comparison to standard LD + DDCI.
Patients and methods: This study was performed in Santa Cruz (Bolivia) where the local neurologist (J.L.) has long-term experience on MP therapy in PD. The LD content in MP was 5.7% (roasted&grinded).

Eigtheen patients with advanced PD (N = 8 on chronic MP therapy since a median of 3.5 years) underwent six treatment arms: (1) Dispersible LD + Benserazide (BZ) at 3.5 ± 0.2 mg/kg; (2) MP at 3.5-fold higher dose than LD + BZ; (3) MP at 5-fold higher dose than LD + BZ; (4) LD without DDCI at similar dose of high-dose MP; (5) MP + BZ at similar dose of LD + BZ; (6) Placebo.

UPDRS III scores were collected in OFF, at 90' and 180'. Dyskinesias were rated using the AIMS at 90'and 180'. We recorded all AEs, supine/standing blood pressure and heart rate.

Results: Compared to LD + BZ, MP induced larger improvement of UPDRSIII at 90' and 180' ($p = 0.001$) than LD-BZ; latency to ON was shorter ($p = 0.008$), full ON was longer ($p < 0.001$) and dyskinesias milder ($p = 0.021$). Overall, adverse events after MP was significantly lower after the same dose of LD without DDCI ($p = 0.002$). No differences were found in cardiovascular response.

Conclusion: MP is a safe and effective treatment in PD with motor fluctuations and dyskinesias. If proven to be safe and effective also in the long-term, MP could be a sustainable alternative to standard medical therapy for PD in low-income countries.

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864
WFN15-0543
Movement Disorders
Prevalence of movement disorders in Cameroon. A rural and urban-based in/outpatient population study

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Background: Due to rapid demographic changes, evidence suggests the prevalence of Parkinson´s disease (PD) and other movement disorders (MDs) is increasing in sub-Saharan countries.

Objective: To create a registry and surveillance of neurological diseases and MDs in urban and rural health care centers in Cameroon from 2012-to 2014.

Methods: The records of out-and impatients from urban and rural health care centers were reviewed. In the urban areas, the diagnosis was made by a neurologist but this was not the case in the rural areas. The following variables were analyzed: demographics, medical center characteristics, presenting neurological complaint, medical history, neurological diagnoses, and disability. Neurological diseases were classified according to ICD-10.

Results: Out of 20131 medical charts reviewed (13% from the rural area), 4187 cases with neurological complaints were identified (20.79%). MDs were present in 134 patients (3% of neurological cases), mean age 48.67 ± 18.62, females 54.7%. No MDs were reported in the rural area. Among MDs patients Parkinson´s disease (G20) was reported in 46 (34%), tremor/myoclonus (G25) in 41 (30%), secondary parkinsonism (G21) in 24 (18%), dystonia (G24) in 18 (14%), ataxia (R29) in 3 (2%), Huntington´s disease (G10) in 2 (1%).

Conclusion: There is limited data on movement disorders in the rural areas suggesting that most patients with movement disorders are underdiagnosed and untreated. This underscores the need for more neurologists with training in movement disorders, to better care for these patients, especially in rural areas in Africa.

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865
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Movement Disorders
The effects of fluvoxamine maleate in a post-natal stress model of neurodegeneration

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Parkinson's disease (PD) is the most common movement disorder characterized by loss of dopamine neurons in the substantia nigra. Treatment strategies focus mainly on retarding the progression of the disease since the serological evaluation of new treatments is difficult. Motor symptoms of PD appear late as opposed to non-motor symptoms (i.e. depression, anxiety) frequently preceding motor symptoms. Fluvoxamine maleate (FM) is an antidepressant widely used to treat depression and anxiety disorders. In patients with both depression and Parkinsonism, treatment with FM may delay motor symptoms and protect dopamine neurons. We aimed to use an animal model of depression to investigate the neuroprotective effects of FM on a postnatal stressed model of neurodegeneration. The ethics clearance was 061/14/Animal.

Sprague-Dawley rats (N = 80) were divided into eight groups. Maternal separation was used to create an animal model of depression. Behavioural tests (open field, elevated plus-maze, step and cylinder test) were conducted prior and after the injection of 6-OHDA into the medial forebrain bundle to mimic Parkinsonism. Animals received FM (25 mg/kg, i.p/day) pre and post-lesion and were sacrificed on postnatal day 76. Blood and brain tissues were collected for corticosterone, lipid peroxidation, dopamine and serotonin analyses.

Maternal separation caused depressive-like symptoms prior to the 6-OHDA lesion and motor impairment after the lesion. Plasma corticosterone levels and lipid peroxidation were increased in the striatum and the prefrontal cortex while dopamine and serotonin levels decreased. Treatment with FM reversed these effects in maternally separated animals and showed neuroprotection to dopamine neurons in our parkinsonian rat model.

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868
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Movement Disorders
The relationship between clinical severity and olfactory bulb volume in idiopathic Parkinson's disease

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Idiopathic Parkinson's disease (IPD) is a clinical condition in which derangement of motor function occurs due to degeneration of the basal ganglia (BG), as part of a neurodegenerative process. The sense of smell is lost years before the occurrence of motor symptoms of IPD. The presence of atrophy of the olfactory bulb was shown in patients with loss of the sense of smell in many studies. Magnetic resonance imaging (MRI) is a reliable modality in measurement of the volume of olfactory bulb (OBV). We aimed to investigate a correlation between the clinical severity of IPD and OBV in this study.

Thirty six patients admitted at the Department of Neurology of Gaziantep University and diagnosed as having IPD, and 23 age-matched control group. The right, left and total OBV values of these two groups were compared. The patient group was divided in 3 subgroups according to Hoehn – Yahr stages, and the Unified Parkinson's Disease Rating Scale (UPDRS) scores of the patient group were also calculated. The right, left and total OBV values of the

patient group were lower than the controls. There were no significant differences between patient subgroups according to Hoehn-Yahr staging, in terms of right, left and total OBV values of the IPD group. A significant negative association was detected in the IPD group, between the total OBV values and UPDRS scores.

In conclusion, the loss of sense of smell that occurs in the early phases of IPD and the ensuing OB atrophy increase in correlation with the UPDRS score.

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869
WFN15-0759
Movement Disorders
Does stressful life events precede the onset of hemifacial spasm?

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Background: Studies show that stress compromises the immune system, and is linked to heart disease, fibromyalgia and cancer.
Objective: To study the demographics of hemifacial spasm patients in Penang General Hospital, and to analyze the role of stress as a possible pathogenesis of hemifacial spasm.
Patients and Methods: This is a retrospective analysis of patients with hemifacial spasm and control (public individuals). Social Readjustment Rating Questionnaire (SRRQ) and Perceived Stress Scale (PSS) were used to assess patients' stress level. Subjects answer the questionnaires based on recall of events prior to the onset of hemifacial spasm. Higher PSS score suggests a higher stress level and a higher SRRQ predicts a higher probability of disease manifestation.

Results: 28 hemifacial spasm patients and 21 controls were included. Age of patients ranged from 41-78 years with Chinese female preponderance. Majority of subjects (60.7%) within the ages of 55-65 years (n = 17). 61% had right-sided hemifacial spasm, 39% had left-sided hemifacial spasm. 46.4% received combination of Botulinum toxin injection and oral medication (clonazepam, baclofen or carbamazepine). Majority of the subjects (50%) scored 150-300 points in SRRQ, 7% scored more than 300 points, 43% scored less than 150 points. PSS of patients with hemifacial spasm have a higher mean score (17.11), compared to public individuals (13.14), which is statistically significant ($p = 0.025$). Prior to the onset of hemifacial spasm, majority of the patients admitted that there were some live events that significantly hurt the patient's ego.
Conclusion: Our findings support the findings of Johnson et al that subjects with closely spaced stressful life events may be at increased risk of developing hemifacial spasm. The result supports the impact of psychological stress on the manifestation of physical illness.

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870
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Movement Disorders
Cerebral vasoreactivity in Parkinson's disease

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Background: Cerebral vasoreactivity (CVR) alteration in Parkinson's disease (PD) patients hasn't been well determined; nonetheless, it suggests that a vascular mechanism may be involved in its pathophysiology.
Objective: To compare CVR between PD patients and healthy individuals.
Methods: A cross-sectional study was conducted including one group of PD patients and one control group of healthy individuals. Transcranial Doppler Ultrasonography (TCD) was applied to both groups using 7% CO_2 inhalation technique. The local ethics committee reviewed and approved the study design. Written informed consent was obtained from all patients.
Results: 27 PD patients were evaluated and matched with 27 healthy individuals. CVR was estimated finding a statistical significant difference between groups ($p = 0.044$). 70% of patients from the PD group had diminished CVR.
Conclusions: Findings suggest that Parkinson's disease patients are prone to exhibit diminished CVR in comparison with healthy individuals.
Keywords: Cerebral Vasoreactivity; Parkinson's Disease; Transcranial Doppler Ultrasonography.

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6 Vascular Neurologist ascribed to the Centro Medico Zambrano Hellion, Mexico.

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872
WFN15-0882
Movement Disorders
Clinical and neuropsychological characteristics in patients with parkinsonims

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Background: Parkinson's disease (PD) carriers have a high prevalence of cognitive symptoms. There are also many other diseases known as Parkinson plus that share some motor and non-motor PD features, so it is important to look for clinical and neuropsychological profiles that may help differentiate between these conditions.
Methods: 30 PD subjects, 20 Parkinson plus and 20 control subjects were recruited. A set of clinical and neuropsychological tests was applied including UPDRS, MMSE, FAB and other specific cognitive function tests. Mean scores for each group were analysed with ANOVA or unpaired T test.
Results: Most important differences between controls and PD include TMT-B and Wisconsin sorting card test ($P = 0.03$ and 0.014) while PD and Parkinson plus have differences in TMT-A and verbal fluency tests ($P = 0.017$ and 0.023).
Conclusion: Here we describe differences on clinical evaluation and neuropsychological tests that help differentiate between control subjects, PD and other parkinsonisms.
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873
WFN15-0313
Movement Disorders
Efficiency of deep brain stimulation of the subthalamic nucleus in patients with advanced Parkinson's disease on mood and cognition

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The aim of this study is to evaluate the efficacy of DBS STN patients with advanced Parkinson's disease on cognitive and affective disorders. Three-year prospective non-randomized trial was organized. The study involved 22 patients treated with STN-DBS; 28 patients with PD receiving conservative treatment formed the control group (mean age 54,2 years, mean disease duration 9,6 years). Patients were evaluated under "OFF" and "ON"- medication conditions at 3, 6, 9, 12, 24 and 36 months from the start of the study. Mini-Mental State Examination – MMSE; Frontal Assessment Battery; Montreal Cognitive Assesement MoCA; Hamilton Rating Scale for Depression; The Hamilton Anxiety Rating Scale; Columbia Suicide Severity Rating Scale; The SAD PERSONS Scale; Obsessive–compulsive disorder Self-Test; Questionnaire for Impulsive-Compulsive Disorders in Parkinson's Disease – Anytime During Full and short, were used.

Improvement of neurodynamic criteria in the first year with insignificant deterioration (for 4%) by three years of supervision was noted in all patients. Logical and visual memory become noticeably better within the first year, with borderline deterioration by the third year of observation. Improvement of mentation remained stable within three years. An insignificant decrease in verbal activity on the direct (7,2%) and controlled association (8,5%) was noted. Additionally, a reduction the severity of a depressive syndrome (for 46%), trait (for 22%) and state anxiety (for 26%) had place.

No apparent transient situational personality disorders, such as hypomania, maniacal states, psychoses and aggressive behavior for all the time of supervision were observed.

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874
WFN15-1564
Movement Disorders
Two atypical cases of stiff-person syndrome

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Background: Stiff-person syndrome (SPS) is a rare autoimune movement disorder, characterized by muscular rigidity, painful muscle spasms predominantly affecting paraspinal muscles.
Objective: Report two cases of SPS with atypical manifestations.
Patients and Methods: Collect data from medical records and compare to medical literature.
Results: 60-year-old woman started presenting shakings in her right lower limb associated to cramps and instability three years ago. She also manifested dystonia-like postures of the limb extremity, but without pattern of repetition. Support was indispensable to walk. She developed panic disorder and severe startle reflex. Serology for anti-GAD was positive. Immunoglobulin therapy provided decrease in falls and dystonic movements; stiffness was sustained.

47-year-old woman, with type 2 diabetes, started presenting painful spasms and rigidity of lower limbs 16 years ago. The symptoms intensified and ascended to upper limbs. She used to fall, developed fear of walking and became bedridden. She also showed startle reflexes. Moreover, it was detectable scanning speech *dysmetria* and movement *decomposition*. Anti-GAD was positive. ENMG evinced continuous firing of paravertebral and limb muscles. MRI displayed cerebellar atrophy. High doses of benzodiazepines and muscle relaxers attenuated the painful spasms.
Conclusion: Stiff-Person Syndrome is a rare disorder described by muscle rigidity and spasms. Limb dystonia is an atypical manifestation and may be explained by decreased GABA-inhibition which could lead to excessive plasticity and functional impairment. Cerebellar ataxia in SPS has been documented in few cases; our second case endorses the possible association between GAD-Abs and cerebellar ataxia.

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875
WFN15-1278
Movement Disorders
Collecting pieces in a possible case of adrenoleukodystrophy

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Background: Leukodystrophies compass a wide range of progressive degenerative diseases that affect white matter.
Objective: Register a possible case of leukodystrophy showing intriguing particularities
Patients and methods: Collect data from prompt-book and compare to the literature from Pubmed® database.
Results: A 28-year-old man started at the age of 16 with spastic paresis of his left leg. At 23 years old he was paraparetic. Two years later he presented sphincter dysfunction. Brain MRI only displayed discrete sulci; CSF analysis was normal and negative for HTLV-1. One year later, he presented with urinary infection besides cognitive decline. The neurological deterioration developed fast. He kept spastic paraparesis with catatonia, including mutism. T2-weighted MRI showed diffuse atrophy with symmetrical hyperintesity in parieto-occipital regions including posterior limb of internal capsule and U fibers but sparing brainstem and cerebellum. These data are suggestive of cerebral adrenoleukodystrophy despite adrenal functioning and normal plasma concentration of very-long-chain fatty acids (VLCFA). Adrenoleukodistrophy is an X-linked disorder that compromises VLCFA oxidation. Therefore, VLCFA gets accumulated in adrenal, spinal cord and brain. This case could represent an adrenomyeloneuropathy form (AMN) which evolves into cerebral form only in 20% after 10 years. However the patient didn't pass through adrenal failure (present in 70% of the AMN cases). These particularities characterize an even lesser common presentation of a rare disease.
Conclusion: Leukodystrophies involve numerous classifications with different phenotypes. Image patterns are a useful tool to complement diagnosis since molecular test is expensive and may cause false negative.

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876
WFN15-1305
Movement Disorders
Postural balance in Machado-Joseph disease

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Introduction: Patients with spinocerebellar ataxia have important balance impairment and risk of falls; the more severe the ataxia, the greater the impairment of postural balance.
Objective: Describe the postural balance of patients with MJD using force platform stabilometry under different combinations of visual and biomechanical demands.
Methods: Twelve patients with MJD were invited to participate in this study. The inclusion criteria: clinical manifestations of cerebellar ataxia with axial predominance. Exclusion criteria: musculoskeletal or cardio-respiratory affections that could compromise gait performance, pain or utilization of auxiliary equipment for gait or medications that interfere in postural control. Five patients were included in the quantitative study. Participants performed four postural tasks on the undisturbed upright stance: 'feet apart eyes open' (FAEO), 'feet apart eyes closed' (FAEC), 'feet together eyes open' (FTEO) and 'feet together eyes closed' (FTEC). Parameters computed comprised: standard deviation (SDX; SDY), maximum velocity (Vmax X; Vmax Y), elliptical area (Area PCA) and the average velocity (Vavg).
Results: A significant increase ($P < 0.001$) in all parameters was observed among postural tasks (FAEC, FTEO, FTEC) as compared to the reference task (FAEO).
Discussion: Dysfunction in generation or control of anticipatory postural adjustments is associated with postural deficits in some subjects with cerebellar damage. The role of cortico-subcortical pathways underlying this has been identified in animal studies.
Conclusion: Despite the presence of cerebellar damage in MJD patients, the observed motor behavior under demanding postural tasks suggests that these patients reweight their sensory system to perform postural adjustments to avoid falling in undisturbed stance.

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877
WFN15-0274
Movement Disorders
Dendritic spines of medium spiny neurons in nucleus accumbens in 6-OHDA-lesioned rats chronically treated with levodopa

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Background: Dendritic spines of medium spiny neurons (MSN) in nucleus accumbens (NAc) in cocaine-treated rats increased in density and become enlarged. Although levodopa is most efficacious to ameliorate motor dysfunction in Parkinson's disease (PD), its chronic use to PD patients often induces dopamine dysregulation syndrome (DDS), a compulsive use of levodopa like addiction. The mechanisms of DDS have been suggested to be similar to those of cocaine addiction. We hypothesized that the morphological changes of dendritic spines, observed in cocaine-treated rats, also occur in NAc neurons in rats repeatedly treated with levodopa.
Objective: To examine morphological changes of dendritic spines in MSN in core and shell of NAc in 6-OHDA-lesioned rats repeatedly treated with levodopa.
Methods: We used control rats, 6-OHDA-lesioned rats (PD) and 6-OHDA-lesioned rats chronically treated with levodopa (levodopa-PD). After fixation, sections through NAc were prepared. Lucifer yellow was injected into soma of NAc MSN labeled by DAPI to visualize dendritic spines. We measured density and volume of spines using confocal laser scanning microscope and Neurolucida in MSN in the shell and core of NAc.
Results: Dopamine denervation decreased the density of spines in core and shell MSN, but levodopa treatment restored the decrement. Although spine volume was unchanged by dopamine denervation, levodopa treatment to the PD rats enlarged the dendritic spines.
Conclusions: The morphologic changes of dendritic spines in the levodopa-PD rats are like those observed in cocaine treated rats.

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878
WFN15-1390
Movement Disorders
Parkinson's disease in Senegal: epidemiologic, clinical and therapeutic aspects

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Background: Parkinson's disease (PD) is the first cause of parkinsonian syndrome. It is also the second disease that leads to neurological disability after stroke.
Objective: The aim of this study was to determine the epidemiologic, clinical and therapeutic aspects of patients treated for PD.
Patients and methods: This was a prospective and transversal study conducted over 13 months on 19 patients aged between 52 and 79 years and treated for Parkinson's disease at the Neurology department of Fann teaching hospital, Dakar.
Results: Sex ratio was 1.71 and the mean age was 65.26 years. Notion of consanguinity was found in 42.12 % cases and the use of pesticides was noted in 15.78% of our patients. The average age of onset was around 60.52 years. Tremor was the first functional sign (68.42%) and this sign was present in 84.21% of patients. However, rigidity was found in 94.73% of them. The other signs were represented by motor fluctuations (78.94%), painful syndrome (73.68%), mood disorder (52.63%), hallucinations (42.10%), insomnia (31.57%), falls (10.52%) and orthostatic hypotension (5.26%). Brain CT was available in five patients and was normal in four of them. 36.84% of the patients were receiving (Levodopa + benserazide), (Levodopa + carbidopa) or piribedil and 52.63% in association with Trihexyphenidyl. 42.10% received physiotherapy.
Conclusion: PD diagnosis is clinical. Frequency of PD signs in our setting is not different from those in western countries. It is important to educate general practitioners and people for early recognition of PD signs for a better management.

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879
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Movement Disorders
Holmes' and palatal tremor following a ponto-mesencephalic hemorrhage

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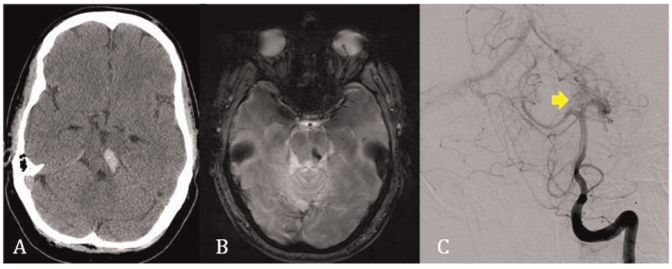
Background: The co-existence of Holmes' and palatal tremor is rare. We present a patient with a midbrain tegmentum/superior cerebellar peduncle arteriovenous malformation (AVM) causing a Wernekink commissure syndrome (WCS), symptomatic palatal tremor (SPT), and Holmes tremor (HT).
Objective: Case report and literature review.
Results: A 50-year-old man had acute onset right facial and hemibody numbness, binocular vertical diplopia, slurred speech, and gait imbalance. CT showed an acute caudal midbrain tegmental hemorrhage. MRI suggested an underlying vascular malformation. Two months later, he developed right upper extremity tremor followed by tremor of the left



upper extremity. The tremor abated during sleep. Neurologic examination demonstrated ataxic dysarthria, head titubation, palato-laryngeal tremor and synchronous horizontal-rotary nystagmus. He also had bilateral dysdiadochokinesis more pronounced on the right, a high-amplitude postural and kinetic tremor worse on the right with a mild resting tremor, and marked dysmetria more pronounced on the right arm. Gait was ataxic. Catheter cerebral angiogram showed an 11 mm x 5.4 mm Spetzler-Martin grade III AVM.
Conclusion: WCS is a rare midbrain syndrome in patients with caudal mesencephalic lesions who may exhibit bilateral cerebellar ataxia due to interruption of dentato–rubro–thalamic pathways, associated with ocular movement abnormalities and palatal tremor. Our patient exhibited SPT resulting from a disruption of the Guillain-Mollaret triangle, as well HT. Although the temporal evolution of the two clinical syndromes could not be established in our case, the clinico-radiological profile illustrates the role of the dentato–rubro–olivary circuitry in the generation of two distinct tremor syndromes.

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880
WFN15-1334
Movement Disorders
Huntington's disease two cases

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Huntington's disease is a rare condition in our country, in which we do not have the means for genetic study in order to confirm the disease. We are going to describe two cases with the genetic, clinic and radiologic studies confirming the diagnosis.

Huntington's disease is a hyperkinetic disorder with a low prevalence in Bolivia. Due to the lack of genetic studies that would allow us to detect the number of Huntingtin's repeats , the semiology and family backgrounds becomes extremely important in order to make the diagnosis.

Huntington's chorea is a neurodegenerative and autosomal dominant disease which tends to appear in middle age patients with an average survival of 15 to 20 years.

The semiology characterized itself by involuntary movements on the extremities, facial muscles, gait abnormalities, akinesia, hypokinesia, rigidity, language abnormalities, tic, dystonia and sometimes also cerebellar associations. The most meaningful symptoms are often psychiatric, which sometimes leads to admission into psychiatric institution.

I one of our cases the symptoms present in an average median age with psychiatric alterations treated for seven years until the choreic movements appeared and the genetic studies were done confirming the diagnosis. The mother has had the symptoms and, the brother and grandfather were also positive for genetic testing.

The second patient became symptomatic also at an average median age. The symptoms were hyperkinetic movements and psychiatric alterations with early cognitive deterioration. The genetic testing confirmed the diagnosis and with him five more relatives were positive for Huntington's disease.

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881
WFN15-0207
Movement Disorders
Catatonia-like syndrome due to hypoxic ischemic encephalopathy: a case report

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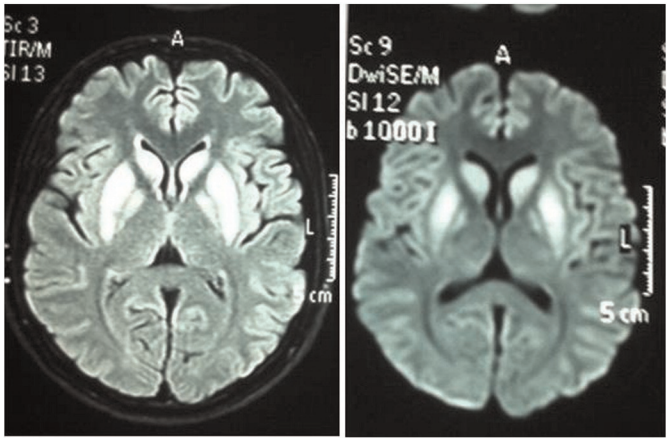
Pulmonary thromboembolectomy is an important procedure for the management of pulmonary embolism. During the procedure, cardiopulmonary arrest and bypass are performed, then there is a risk for hypoxic and embolic complications. Here we present a 28 YOM with a medical history of idiopathic pulmonary thromboembolism and pulmonary hypertension, who was admitted for pulmonary endarterectomy. After the procedure the patient gradually decrease verbal fluency, blink rate and movements, developed fixed gaze; at the third postsurgical day, mutism and fixed posture were present. Neurology consultation was required for a suspected stroke as complication. The patient was alert, with poor eye contact and marked decrease in verbal fluency, but with insistence emitted some words and low tone; opposed to be evaluated and crying episodes with a tendency to keep fixed posture, a mild bilateral cogwheel rigidity was found.

A catatonia-like syndrome diagnosis was done, and paraclinical tests were requested to rule out organic etiology. AngioMRI ruled out a vessel lesion; however, hyperintense bilateral lesions in the basal ganglia suggestive of hypoxic ischemic encephalopathy were seen. Psychiatric evaluation showed abnormality in abstraction categories, tendency to



concrete thinking, impaired in phonological and semantic verbal fluency, difficulty in tracking sequences TMT-A. With Lorazepam 2 mg t.i.d. a dramatic clinical improvement was achieved, increased in verbal fluency and voluntary movements with ambulation. It was concluded that the patient had a secondary catatonia-like syndrome due to hypoxic ischemic encephalopathy with bilateral basal ganglia lesions, that explained the motor and neuropsychiatric components with impaired motor speech phase and executive dysfunction.

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882
WFN15-1088
Movement Disorders
Parkinson-plus syndromes: epidemiological findings from a Tunisian cohort of 210 patients

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Background: here has been no prior systematic review of epidemiological aspects of all types of Parkinson-plus syndromes (PPS) in North African population.
Objective: To determine the epidemiological aspects of PPS in a Tunisian monocentric cohort.
Methods: A 12 years retrospective study, including all the patients diagnosed with PPS with parkinsonian syndrome (PS) (Dementia with Lewy bodies (DLB), corticobasal degeneration (CBD), progressive supranuclear palsy (PSP), multiple system atrophy (MSA), frontotemporal lobar degeneration with PS (FTLD-Park), PPS of undetermined origin (PPS-UO). Frequencies, age, sex, consanguinity rate, family and personal history were analyzed.
Results: We included 210 patients with PPS (18.2% of all patients with PS followed in the department in the same period; DLB:53%, CBD: 15%, MSA: 9%, PSP:11%, FTLD-Park:4%,PPS-UO:8%). Sex-ratio: 1.3 (mainly males in DLB, CBDand PSP; mainly females in MSA, no sex differences in FTLD-Park). Mean age:73,5 years; mean age of onset: 66,9 years; mean age of onset of PS: 67 years[38-94]. Consanguinity rate was 33.3%. Family history of neurological pathologies was found in 60,4% (38.6 % with dementia, 18,6% with PS and 8.1% of similar cases).
Conclusion: The frequency of PPS found in the present study was comparable to that reported for European population. DLB, the most common PPS in our series, has been recently included in epidemiological studies of Parkinsonism. Male predominance is established in PS. The high consanguinity rate in our series may explain the high percentage of similar cases. Further studies are needed to determine the suggested implication of genetic factors.

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883
WFN15-0723
Movement Disorders
Olfaction testing in Parkinson's disease and controls: a comparison of two techniques

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Background: Hyposmia is common in early Parkinson's disease (PD) and often precedes motor symptoms. Commonly applied validated tests use different methods, making comparison across studies challenging.
Objective: To compare two methods of testing olfaction by performing both tests in the same individuals.
Methods: Healthy controls and PD cases underwent olfactory assessment using the University of Pennsylvania Smell Identification Test (UPSIT) 40-item British version, and Sniffin' Sticks (SS) 16-item version. Hyposmia was defined as UPSIT score <30 and SS score <12 respectively. Results are mean and standard deviation (SD). Categories were compared using the kappa statistic, and provisional conversions defined by the equipercentile method.
Results: 128 subjects, 67 controls (54% female, mean age 61.0 years SD 13.2, 16.7% cigarette smokers) and 61 PD cases (39% female, mean age 66.8 years SD 8.9, 3.3% cigarette smokers) participated. Olfaction was better in females than males, in younger than older subjects, and in controls (UPSIT 28.0, SD 6.9; SS 11.6, SD 2.8) compared to PD cases (UPSIT 16.7, SD 6.0; SS 6.6, SD 3.3). By UPSIT definitions 49.3% of controls and 98.4% of PD cases were hyposmic, while by SS 41.8% of controls and 93.4% of PD cases were hyposmic (between test kappa 0.67, 95% confidence interval 0.53 to 0.81, $p < 0.001$). Equipercentile results showed approximate linearity for results.
Conclusions: Agreement between the UPSIT and SS tests was good, suggesting that interconversion between the tests is feasible. Further analysis in the Tracking Parkinson's (PRoBaND study) cohort will be used to refine the technique.

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887
WFN15-0101
Movement Disorders
Blood pressure variations are not predictive for survival length in multiple systems atrophy

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Background: Multiple Systems Atrophy (MSA) is a severe rapidly progressive neurodegenerative disease. Autonomic Failure (AF) is one of the main manifestations of MSA. Orthostatic Hypotension (OH) – one of the main manifestations of AF in MSA. Whether OH correlates to the length of survival in probable MSA patients remains to be determined.
Objective: To describe the epidemiological and cardiovascular profile of MSA patients in correlation to their survival.
Methods: The files of 146 MSA patients (72 females) were retrospectively analyzed, to 130 patients tilt test was performed. Patients were divided into groups with short (15 years) survival.
Results: Two, 101 and 43 patients had definite, probable and possible MSA, respectively. 104 were MSA-parkinsonian type (MSA-P) and 42 were MSA-cerebellar type (MSA-C). The Tilt test revealed no between survival group differences in the supine systolic and diastolic BP. MSA-P prolonged survivors trended towards a greater BP decline leading to syncope. MSA-P males had a significantly longer median survival than all other groups (7 years [1-28], $HR = 0.503$, $p = 0.036$).
Conclusion: No characteristic epidemiological pattern or profile of BP changes emerged between survival groups. Cardio-sympathetic function was not predictive of survival in this MSA cohort. The lack of a statistically significant relationship may be clinically relevant as pharmacological management of OH in MSA patients may not improve survival rates while increase the risk of side effects and drug-interactions. The relation between cardiovascular autonomic failure and length of survival in MSA requires further investigation.

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888
WFN15-1485
Movement Disorders
Epidemiology of Huntington's disease in Japan

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Background: Huntington's disease is very rare in Asian country compared with European and American country. This discrepancy is reported by different frequency of haplotypes.
Objective: To clarify the prevalence of Huntington's disease in Japan, and to investigate their medical condition.
Material and methods: We collected patients' data from Japan Intractable Disease Information Center and department of the specific disease control, Japanese Ministry of Health, Labor and Welfare. Then, we analyzed these data with statistical methods.
Results:

1. Prevalence rate of Huntington's disease in Japan is estimated 0.7/100,000 population. Number of patients are estimated less than 1000 people in Japan.
2. Range of age at onset is among all age groups, peak age at onset is forties.
3. Mean duration of illness is estimated 15 ~ 20 years same as Caucasians.
4. Most of Huntington's disease cases are under home care or long term hospitalization. Only a few patients are at work. Disturbed factors to work are both of psychiatric and movement disorders, especially disturbance of discrete movement.
5. Most patients are isolated from social network even their family and friends because of their psychiatric symptoms and their heredity.
6. Most patients are under the medical treatment. They are prescribed tetrabenazine, typical and atypical antipsychotics, SSRI and so on.

Conclusion: Prevalence of Huntington's disease of Japan is tenth compared with Caucasian. It is important to social support avoid being closed off both patients and family.

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889
WFN15-0744
Movement Disorders
Empathy in Huntington's disease families: study in the colombian caribbean

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Background: Huntington's disease (HD)patients are typically impaired in their social functioning, partly due to emotional disturbances and lack of empathy. Only one study had assessed empathy in these individuals and none had assessed this domain in first-degree relatives.
Objective: The present study assessed the performance of manifest HD patients as well as first-degree asymptomatic relatives on empathy task.
Methods: 18 symptomatic patients genetically and clinically diagnosed with HD, 19 asymptomatic first- degree relatives, and 36 healthy control participants were assessed with an empathy task that involves the perception of intentional and accidental harm.
Results: HD patients exhibited deficits in distinguishing accidental and neutral from intentional pain situations. The fundamental aspects of empathy, such as empathic concern, are preserved in both patients and relatives. However, some aspects of empathy related with intentionality detection are affected in the HD patients. No differences between relatives and controls were observed in empathy.
Conclusions: HD patients showed subtle impairments in aspects of empathy related with the inference of the intentionality of others' actions. Our results highlight the importance of identifying changes that occur before the appearance of motor symptoms in order to develop early intervention strategies.

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890
WFN15-0470
Movement Disorders
Leucine-rich repeat kinase-2 (LRRK2) R1441G knockin mice are prone to rotenone-induced mitochondrial dysfunction and dopaminergic cell death

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Introduction: Pathogenesis of Parkinson's disease (PD) is multifactorial. LRRK2 mutation is the commonest genetic risk. Interaction between genetic susceptibility, environmental toxin and aging is crucial to the development of PD.
Objective: To elucidate the interaction between LRRK2^{R1441G} knock-in mutation and mitochondrial stress on synaptosomal dopamine uptake, mitochondrial function and dopaminergic neuronal survival using rotenone (mitochondrial Complex-I inhibitor) toxicity over time.
Methodology: ATP level and survival of primary neurons from LRRK2^{R1441G} knock-in mice and their wild-type littermates were compared after rotenone exposure. Longitudinal assessments of locomotor activity were performed in mice from age 8 to 18 months which were exposed to low doses of rotenone (5 mg/kg, twice/week given by oral gavage). Total dopamine uptake in isolated striatal synaptosomes was also assessed.
Results: LRRK2^{R1441G} mutant mice were more hyperactive than their wild-type littermates. After 50 weeks of low dose rotenone, mutant mice had significantly lower accumulative movement duration compared with wild-type littermates. Mutant striatal synaptosomes also showed lower dopamine uptake after rotenone toxicity. ATP levels in mutant primary cortical neurons were significantly lower after rotenone exposure, associated with more cell death in mutant cortical and dopaminergic neurons.
Conclusion: LRRK2^{R1441G} mutant neurons were more susceptible to rotenone-induced ATP deficiency and cell death. LRRK2^{R1441G} mutation also potentiated dopamine uptake deficit induced by rotenone. We previously found that LRRK2^{R1441G} knockin mice are more liable to reserpine-induced dopamine depletion (Liu H.F., et al, 2014). These findings suggested that LRRK2^{R1441G} knock-in mouse is a useful experimental model to explore genetic-environmental-aging interactions in the pathogenesis of PD.

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891
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Movement Disorders
Differing demographic and clinical profiles in men and women with Parkinson's disease

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Research on sex differences in Parkinson's disease (PD) often focuses on clinical differences, rather than socioeconomic differences. We studied a population of patients with idiopathic PD at an urban safety net hospital in Boston, Massachusetts to examine differences in demographic characteristics and disease features between affected men and women.

Our study included 445 idiopathic PD patients (41.3% female, aged 30-100 years, M = 68.3 years, SD = 11). Compared to men, a greater proportion of women were non-white, ($p = 0.03$) and a trend was observed in which women were older at diagnosis ($p = 0.08$), and more likely to be on public insurance than men ($p = 0.067$). After adjusting for age at diagnosis, insurance type, and race, women were found to experience motor fluctuations (Odds Ratio, OR = 2.07, $p = 0.004$) and dyskinesias (OR = 2.92, $p < 0.0001$) more frequently than men, but were less likely to be diagnosed with dementia (OR = 0.436), and to experience autonomic dysfunctions (OR = 0.513, $p = 0.038$) than men. An uncontrolled analysis demonstrated women to have more severe disease off medication than men, on the Hoehn and Yahr scale ($p = 0.0024$).

Our results further characterize how clinical features cluster differently in men and women with PD. In addition, we provide evidence that socioeconomic factors, such as race and insurance type, may modify clinical differences, such as disease severity.

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892
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Movement Disorders
Parkinsonism after climbing high amplitude mountain: a case report

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Acute mountain sickness (AMS) is caused by climbing to a high altitude above 2,500 meters without acclimatization. Various clinical symptoms of AMS include headache, nausea, malaise, dizziness, and insomnia within 6 to 12 hours after reaching the high altitude. Neurological consequences like Parkinsonism following AMS without lesion of brain MRI have been reported rarely. A healthy 64-year-old man presented with gait disturbance. Neurological examination showed tremor of hands, limb rigidity, and bradykinesia. He had never climbed above 1,500 m before. Symptoms developed about 20 days after he had been climbing in the Baekdu Mountain up to 2,700 meters. Neurologic examination showed mental alertness and Unified Parkinson's Disease Rating Scale (UPDRS) part III(Motor examination) was checked 10 points by rating resting tremor of his hands(2), limb rigidity(4), gait(2) and bradykinesia(finger tapping 1, toe tapping 1). Routine laboratory examinations were normal in blood tests. His electrocardiogram and echocardiography were normal, and there were no lesions detected in the brain MRI including T2-weighed and FLAIR image. He was almost improved after parkinsonism persisted for about five months. We presume that Parkinsonism occurred by transient regional hypometabolism due to hypoxia in both globus pallidus although we did not perform functional imaging. We suggest that Parkinsonism can develop after climbing to a high altitude but they can be transient symptoms in case of no abnormalities on brain MRI. Additionally, people who plan to climb high altitudes above 2,500 m need sufficient acclimatization before climbing and must pay attention to speed of ascent.

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893
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Movement Disorders
Clinical pattern of morbidity among Pakistani patients of Parkinson's disease

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Introduction: Parkinson's disease is one of the disorders of extrapyramidal system characterized by rigidity, akinesia and tremors. The aim of this study was to describe the clinical spectrum of the disease from Pakistan,a developing country in south-east Asia.
Methods: This phase 2 study was conducted at Rawalpindi Medical College teaching hospital, Rawalpindi,Pakistan over a period of 1 year from Sept 2013 till July 2014.Patients with Parkinson's disease,were identified by ICD-9 coding system of the hospital medical records. An informed consent was obtained from all the participants. Neurology, radiology and the department of internal medicine coordinated simultaneously.
Results: A total of 53 patients were identified.41 were males and 12 were females. Mean age of onset of the disease was 49 ± 2 years.25 patients had onset of illness during the sixth or seventh decade of life. Mean duration of illness at the time of presentation was 5 ± 2 years. Rigidity, bradykinesia, tremors, primitive reflexes, difficulty in performing fine work and walking difficulty were the most common clinical features. 33 patients had predominantly unilateral symptoms. 10 patients had cognitive impairment. Cognitive decline was more common in the elderly and in patients with disease duration of longer than 6 years.
Conclusion: Our study results highly matched our findings in our phase 1 trial. Parkinson's disease is more common in males. Tremor, rigidity, walking difficulty, bradykinesia and difficulty in performing fine work are the commonest clinical features. Disease severity increases with duration of the disease. Cognitive impairment is not uncommon in these patients and is associated with disease duration and age of onset of the illness.

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894
WFN15-0438
Movement Disorders
Syntax, action verbs, and nouns in Parkinson's disease: dissociability, progression and executive influences

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In recent years, several studies have shown that deterioration of the basal ganglia leads to selective language impairments in the domains of syntax and action-verb processing. In particular, such disruptions have been repeatedly observed in Parkinson's disease (PD) patients. However, it remains unclear whether these deficits are language-specific and whether they are equally dissociable from other language disturbances – viz., processing of noun semantics. To address these issues, we administered linguistic and executive function (EF) tasks to two groups of non-demented PD patients, with and without mild cognitive impairment (PD-MCI and PD-nMCI, respectively). We compared these two groups with each other and with matched samples of healthy controls. Our results showed that PD patients exhibited linguistic

processing deficits even in the absence of MCI. However, not all language domains were equally related to EFs and MCI across samples. Whereas EFs predicted disturbances of syntax and noun semantics in both PD-nMCI and PD-MCI, they had no impact on action-verb processing impairments in either group. Critically, action-verb semantics and action-verb production were disrupted in patients in the absence of MCI and without any influence of EFs, suggesting a *sui generis* deficit present since the early stages of PD. These findings indicate that varied language domains are differentially related to the basal ganglia networks, contradicting popular approaches to neurolinguistics (This work was partially supported by grants from CONICET, CONICYT/FONDECYT Regular 1130920, COLCIENCIAS 1115-545-31374, contract: 392, FONCyT-PICT 2012-0412, FONCyT-PICT 2012-1309, and the INECO Foundation).

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895
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Movement Disorders
Intrathecal baclofen therapy for rigospasticity in patients with corticobasal syndrome

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Background: Rigospasticity is a major factor that disturbs ADL in patients with corticobasal syndrome (CBS). Muscle relaxant agencies by oral administration with adequate dose induce sleepness, however effect is not sufficient.
Objective: Intrathecal baclofen (ITB) therapy is effective to increased muscular tone conditions. We studied ITB effects on rigospasticity in patients with CBS.
Patients and methods: Three patients (two males, one female, averaged disease period 5.7 years) were studied. CBS was diagnosed by clinical course and symptoms, brain MRI, brain blood flow scintigraphy. MIBG scintigraphy was studied to exclude Parkinson's disease. ITB therapy was apllied in two steps, first was screening traial with bolus injection by lumbar puncture, and second continuous therapy with pomp implantation. Ashoworth scale is used for evaluation of rigospasticity for major joints in each extremities. We evaluated rigospasticity at pre-screening, post screening traial, and post inplantation of pomp system.
Results: One patient was received only screening traial, and not received pomp implantation operation. Two patient were performed pomp implantation operation to continue ITB therapy. Ashworth scales in most severe extremity were decreased in all patients at screening trial (case1; 3.83 to 2.50 in left lower, case2; 3.33 to 1.00 in left lower, case3; 3.67 to 2.5 in right upper extremity). After pomp implantation, decreased Ashworth scales stayed lower than pre ITB therapy.
Conclusion: ITB therapy has effect on rigospasticity in patients with CBS, and should be considered to improve ADL.

I have obtained patients' and our Institutional Review Board (IRB) approval for this paper.

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896
WFN15-1398
Movement Disorders
Primary restless legs syndrome in patients with type 2 diabetes mellitus : efficacy of magnesium & co enzyme q10 therapy

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Objective: Primary Restless Legs Syndrome (RLS) is frequently undiagnosed and poorly treated sleep disorder with prevalence 7-10% in general population and 20-30 % in diabetic population, we investigated the prevalence of RLS in type 2 DM and assessed the efficacy of Magnesium therapy.
Methods: One hundred patients with diagnosis of type 2 DM without other secondary causes of RLS were screened from data base of regional Narayana diabetic centre of excellence and research institute south India, were screened by essential diagnostic criteria developed by international Restless Legs Study group & severity of RLS and sleep quality were assessed by international Restless Legs Rating scale (IRLS) and Pittsburgh sleeo quality index (PSQI) and patients with moderate – severe neuropathy based on nerve conduction study were excluded from our study. Magnesium dicitrate (600 mg) Co enzyme Q10 (100 mg) & was administered for 12 weeks.
Results: RLS was diagnosed in 17 of 100 with mean age 51.6 +/- 11.9, mean duration of diabetes 7.2 +/- 4.1 & mean BMI 27 +/- 4.21. The IRLS score was improved from 12.71 +/- 3.6 to 6.4 +/- 2.1 ($p < 0.001$) and noticeable change in quality of sleep with change in PSQI dropping from -4.5 (95% CI) to 2.0: $P < 0.03$) after 12 weeks, however no change in HBA1c parameter or in BMI was noted.
Conclusion: We find prevalence of primary RLS in type 2 diabetic patients higher than general population. High BMI is a possible risk factor. Magnesium & Co enzyme Q10 treatment can improve symptoms of RLS and quality of sleep, however long term efficacy in wider diabetic population needs to be to investigated.

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897
WFN15-1399
Movement Disorders
Predictors of the placebo effect in clinical trials in Parkinson's disease: a meta-analysis

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Objective: To examine the predictors of the placebo effect in double-blind randomized controlled trials (RCTs) in Parkinson's disease (PD) using a meta-analysis with meta-regression models.
Methods: The PubMed, EMBASE, and Cochrane Central Register of Controlled Trials databases (up to December 2014) were searched. We selected and extracted data from double-blind RCTs in PD which reported the mean change in the Unified Parkinson's Disease Rating Scale (UPDRS) part III score. The impacts of the predictors were assessed with linear meta-regression analyses using a random effects model. Significant predictors were used in a multivariable meta-regression analysis.
Results: Forty two studies (comprising 5,239 participants on placebo) were included. The pooled effect size was -1.47 (95% confidence interval [CI] -2.22, -0.72; $p < 0.001$, $I^2 = 93.1\%$). The duration of treatment, use of concomitant levodopa, and the baseline UPDRS part III score were significant predictors in linear meta-regression analyses. A short duration of treatment ($\beta = 0.07$, 95% CI 0.02, 0.12; $p = 0.008$) and high baseline UPDRS part III score ($\beta = -0.30$, 95% CI -0.43, -0.16; $p < 0.001$) significantly increased the placebo effect size in the multivariable meta-regression analysis.
Conclusions: The duration of treatment and the baseline UPDRS part III score were the independent predictors of the magnitude of the placebo

effect in RCTs in PD. The findings of our study suggest that researchers should consider the presence of the placebo effect when they interpret or design RCTs in PD, especially in short-term studies and in advanced PD.

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898
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Movement Disorders
Prevalence of polyneuropathy in advanced PD patients from Crete: relation to disease characteristics or mode of levodopa delivery

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Background: Polyneuropathy (PN) in not uncommon among both treated and untreated Parkinson Disease (PD) patients. Its relation to the underlying neurodegeneration, levodopa dose or mode of levodopa delivery remains to be clarified.
Objective: To investigate the frequency of polyneuropathy in a hospital-based cohort of advanced PD patients treated with levodopa, either continuously or intermittently, to identify its electrophysiological features as well as any association to specific patients' and/or disease characteristics.
Patients and methods: Thirty-six patients with advanced PD were included in the study. Eleven PD patients were on continuous intestinal levodopa infusion (CLI) and 25 were on intermittent oral levodopa treatment (IOL). Sensory and motor nerve conduction studies were performed. Epidemiological, clinical and laboratory data were compared between the two groups (CLI v/s IOL) and between PD patients with and without polyneuropathy
Results: Polyneuropathy of no evident cause was identified in 5 out of 11 CLI-patients and in 14 out of 25 IOL-patients (45.5% and 56% respectively) ($p = 0.721$). Autonomic dysfunction was found in 70% in CLI-group and in 57% of patients in the IOL-group ($p = 0.697$). All, but one, patients presented a chronic sensory or motor-sensory axonal polyneuropathy. Body mass index, present age, disease duration and severity, daily levodopa dose, vitamin B12 and folic acid levels were not significantly different between neuropathic and non-neuropathic PD patients.
Conclusion: Sensory or sensory-motor axonal polyneuropathy is similarly frequent in advanced PD patients treated either continuously or intermittently with levodopa. No patient- or disease-related predisposing factors to polyneuropathy were identified.

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901
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Movement Disorders
UHPLC-MS/MS quantitative profiling of tryptophane-related neuroactive substances in cerebrospinal fluid in Parkinson's disease patients

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Objective: The aim of this study was to develop method for the analysis of tryptophane (Trp) and its metabolites in human serum and cerebrospinal fluid (CSF).
Background: Many of the Trp related compounds possess biological or pharmacological properties and their abnormal neurotransmission seems to be linked to a wide range of neurodegenerative and psychiatric diseases. Nevertheless, their dynamic state of metabolism still remains unclear.
Methods: An efficient analytical approach employing off-line coupling of the centrifugation filter with a sensitive, selective, and comprehensive ultra-high performance liquid chromatography - electrospray ionization tandem mass spectrometry (UHPLC-ESI-MS/MS) method for the simultaneous quantitative determination of Trp and its major and minor metabolites was developed. The method was applied for the analyses of Trp and its metabolites in human serum and CSF. Trp and its metabolites in cerebrospinal fluid were assessed in patients with Parkinson's disease (PD) and in control group (CG). The levels of these metabolites were then compared between study groups. In the pilot study with this new method were 16 PD patients and 18 subjects as controls included.
Results: New method for the simultaneous quantitative determination of Trp and its major and minor metabolites was developed. In this small sample size no significant differences between PD patients and control subjects were found.
Conclusion: Further studies with larger sample size are needed before using method in routine clinical practice.

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902
WFN15-0962
Movement Disorders
Impulse control disorders in young-onset patients with Parkinson's disease: cross-sectional study seeking associated factors with regard of personal characteristics

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Background: Several studies indicate that Parkinson's disease (PD) patients with younger age at onset of the disease are especially at risk of developing Impulse control disorder (ICD) symptoms.
Objective: The aim of this cross-sectional study was to investigate the frequency and factors associated with ICD symptoms in Czech young-onset PD patients, including personality characteristics.
Methods and materials: We have examined 49 young-onset PD patients and 38 age-matched control subjects. ICD symptoms were identified using South Oaks Gambling Screen and modified Minnesota Impulse Disorders Interview. Current cognitive status was evaluated using Montreal Cognitive Assessment General psychopathology was assessed with The Symptom Checklist 90 (SCL-90). Depressive and anxiety symptoms were evaluated using MADRS and

HAMA scales. Personality characteristics were evaluated using Personality Style and Disorder Inventory (PSSI).

Results: Higher prevalence of pathological gambling and hypersexuality was found in PD group in comparison to control subject. Symptoms of any ICD were more frequent in PD group (13 patients (26.5%) / 4 controls (10.5%); n.s.).

Higher incidence of pathological gambling was found in young-onset PD group using dopamine agonists and also in patients with dyskinesias lasting 5 years or more. Incidence of any ICD symptoms was associated with coffee consumption, higher reported anxiety and somatization. ICD symptoms were also related to personality characteristics (using PSSI) in PD patients; there was a higher score on Self–assertive/Antisocial and Reserved/Schizoid personality styles.

Conclusions: Knowledge about factors associated with ICD symptoms could be helpful in proactive search for these pathological types of behaviour in young onset PD.

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903
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Movement Disorders
Chronic capillary leak syndrome in a patient with primary amyloidosis and plasma cell dyscrasia presenting as a movement disorder resembling stiff-person syndrome

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We present a 46 year old woman who develop, over a course of 4 years, skin hyperpigmentation and a progressive movement disorder resembling stiff-person syndrome. Physical and neurological examination revealed peri-orbital bruising, generalized edema, hard "body builder"-like muscles, difficulty in talking, chewing and swallowing, generalized stiffness, marked bradykinesia and hypokinesia, and severe burning muscle pain aggravated by exercise. Brain and Spinal Cord MRIs, CSF studies, DATSCAN, antibodies for Stiff-Person's Syndrome were normal. Electrophysiological studies revealed a mild axonal polyneuropathy. Hematological studies revealed a light chain amyloidosis due to an underlying clonal plasma cell dyscrasia. Amyloid fibrils were detected in the skin, bone marrow, gastrointestinal tract and blood vessels. Heart, kidneys, liver and lungs were not affected. A secondary chronic form of systemic capillary leak syndrome and a chronic compartment syndrome was diagnosed as muscle biopsy reveal no amyloid myopathy. Increasing awareness of primary amyloidosis is needed, as the presenting symptom can mimic many medical conditions including a movement disorder syndrome and may result in a significant and often critical delay in diagnosis.

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904
WFN15-0480
Movement Disorders
Long-term effects of STN-DBS on patients with Parkinson's disease suffering from impulse control disorders

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Purpose: Patients with Parkinson's disease (PD) may develop impulse control disorders (ICDs) such as pathological gambling, hypersexuality and compulsive drug use or dopamine dysregulation syndrome (DDS). Decrease in medication may resolve ICDs, but aggravate motor symptoms. Deep brain stimulation of the subthalamic nuclei (STN-DBS) may improve motor symptoms and allow to decrease dopaminergic drugs. We investigated the longitudinal effects of STN-DBS on behavioral disorders in patients with PD accompanied by ICDs.

Patients and methods: We evaluated the motor, cognitive, and behavioral conditions and LEDD in 5 patients with PD and ICDs who had undergone STN-DBS bilaterally, before, 3 months, 3, and 5 years after the surgery.

Results: All the patients were men whose mean age ± SD was 56.6 ±6.1 years old with disease duration 8.8 ± 4.0 years, and MMSE score 28.8 ± 1.8 at the time of surgery. Before surgery, all the patients showed wearing-off and ICDs. Two patients had had DDS, two had ICDs, and one had both. Three months after the surgery, motor symptoms improved in all the patients and ICDs disappeared in 4 out of 5 patients. LEDD was reduced in 2 patients. Five years after the surgery, wearing-off re-emerged in 4 out of 5 patients and impulsivity exacerbated in one patient. No patients showed DDS. LEDD remained below pre-DBS level in two patients. MMSE score was decreased to below 23 in one patient.

Conclusion: STN-DBS may improve ICDs and DDS of PD patients for more than 5 years after surgery.

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905
WFN15-0338
Movement Disorders
Psychometric evaluation of the Oxford participation & activities questionnaire (Ox-PAQ)

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Background: There is growing interest in the management of long term conditions and keeping people active and participating in the community. Testing the effectiveness of interventions which aim to impact upon activities and participation, however, can be challenging without the availability of a well-developed, valid and reliable instrument.

Objective: To develop a fully FDA compliant patient reported outcome measure, the Oxford Participation and Activities Questionnaire (Ox-PAQ), theoretically grounded in the World Health Organisation International Classification of Functioning, Disability and Health (ICF).

Material and methods: Questionnaire items generated from patient interviews and based on the nine chapters of the ICF were administered by postal survey to 386 people with three neurological conditions; Parkinson's disease, amyotrophic lateral sclerosis, and multiple sclerosis. Participants also completed the MOS 36-Item Short Form Survey (SF-36) and EQ-5D-5 L.

Results: 334 participants completed the survey, a response rate of 86.5%. Factor analytic techniques identified 3 Ox-PAQ domains, consisting of 23 items, accounting for 72.8% of variance. Internal reliability for the 3 domains was high (Cronbach's α .84-.96), as was test-retest reliability (intra-class correlation .81-.96). Concurrent validity was demonstrated through highly significant relationships with relevant domains of the SF-36 and the EQ-5D-5 L.

Conclusion: Preliminary results suggest that the Ox-PAQ is a short, valid and reliable measure of participation and activity. The measure will now be validated in a range of further conditions. Additional properties, such as sensitivity to change and predictive validity, will also be assessed in the next phase of the instrument's development.

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906
WFN15-0335
Movement Disorders
A patient with Niemann-Pick type C presenting with dopaminergic deficit

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Background: Niemann-Pick type C (NPC) is a rare, autosomal recessive disease with visceral, psychiatric and neurological symptoms. It has rarely been reported whether parkinsonism accompanies NPC.
Objective: We report a patient with NPC who presented with mild parkinsonism which was supported by ^{18}F FP-CIT PET imaging.
Patient and Method: A 25-year-old male patient started to develop delusions and limb clumsiness at the age of eighteen years. Hallucination, cognitive impairment and gait disturbance followed within a few years. On examination, He showed severe ataxic gait, limb dystonia, dysarthria, vertical gaze limitation, hyperreflexia, and severe cognitive deficits. He also showed slowness of movement, but not tremor or rigidity. These progressive symptoms were refractory to symptomatic medical treatment.
Results: The abdominal CT scan revealed hepatosplenomegaly which was not detected on routine physical examination. Brain MRI revealed moderate atrophy in the posterior cortical area and severe hypoperfusion was found in the brain perfusion SPECT. ^{18}F FP-CIT PET imaging showed decreased uptake in the caudate and anterior putamen different from that of Parkinson's disease (PD). NPC1 gene sequencing revealed compound heterozygote for p.R518W and p.A927V mutations, already known as a genetic cause of NPC.
Conclusion: This is a first case report of adolescent/adult form of NPC in Korea. It was suggested that although clinical features of PD were not prominent, dopaminergic deficit be one of characteristics of NPC. Further studies using ^{18}F FP-CIT PET imaging will be needed to confirm that.

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907
WFN15-0354
Movement Disorders
HMPAO spect study of cerebral perfusion in Parkinson's disease with depression and major depression disorder

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Depression, the most common psychiatric complication in Parkinson's disease (PD), affects 40–50% of PD patients. Diagnosis of depression in PD is complicated by overlapping symptoms of the two disorders. We performed SPECT in Major depression (MD) disorder and PD patients with and without depression. The aim of this work was to investigate regional cerebral blood flow (rCBF) in patients with PD with depression and without depression, and compare it to healthy controls, and patients with MD. 103 patients were studied, 38 PD with depression (PDMD), 46 PD patients without depression, 19 MD patients, and 32 age-matched healthy control subjects. SPECT images were analyzed using Statistic Parametric Mapping 2. Brain perfusion SPECT analysis revealed that PD and PDMD groups showed significant hypoperfusion in the bilateral frontoparietal cortex compared to control group. Also, in the MD group, hypoperfusion was significantly observed in the paracingulate gyrus compared to control group. More interestingly, PDMD group showed more significant hypoperfusion in the subcallosal cortex compared to PD group. Hypoperfusion was also observed in PDMD in the intracalcarine cortex, superior temporal gyrus and central opecular cortex compared to MD group. In the present study, we suggested that dysfunction of frontal cortex, especially in paracingulate gyrus, might be involved in the pathogenesis of depression in PD. Importantly, we found that hypoperfusion of the frontal cortex in PDMD group was less than in the MD group.

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908
WFN15-0538
Movement Disorders
Beneficial role of brain neurotransmitters in Parkinson's induced rats

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Objectives: Neurotransmitters play a vital role in the functioning of brain. Our study aimed to investigate the changes in brain Neurotransmitters in Wistar rat models of Parkinson's disease

Parkinson's disease (PD) is a neurodegenerative disease and a movement disorder characterized by loss of dopaminergic neurons in the substantia nigra causing dopamine depletion in the striatum. Neurodegeneration in PD occurs due to multiple pathways including oxidative stress, mitochondrial damage, protein aggregation.
Methods: Determination of brain norepinephrine, dopamine and serotonin was carried out using high performance liquid chromatography (HPLC) system, Agilent technologies 1100 series.
Results: The mean values of brain norepinephrine, dopamine and serotonin levels in Parkinsons induced rat brain were significantly increased compared to control group.
Conclusion: Neurotransmitters play a vital role in brain functioning and also have important function in Parkinson's disease status.

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910
WFN15-0159
Movement Disorders
CAG repeat length and suicidality in Huntington's disease

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CAG repeat length and suicidality in Huntington's disease

The purpose of this study was to determine if a correlation exists between suicide and CAG repeat length in Huntington's disease.
Methodology: A case-control study using the COHORT Study de-identified database was conducted. Responses were collected from 163 participants. Depression, substance abuse history and use of benzodiazepines were covariates. Responses to the UHDRS behavioral section pertaining to the frequency and severity of suicidal ideation ('feels life is not worth living", 'has suicidal thoughts") were analyzed.
Results: Despite taking depression, benzodiazepine use, and history of substance abuse into account, there is still a predictive relationship between CAG repeat length and **frequency** of suicidal ideation. CAG repeat length was a significant predictor of **frequency** of suicidal ideation, $p = .010$, suggesting that as CAG repeat length

increased, the likelihood of being in a higher category of **frequency** of suicidal ideation also tended to increase. For every CAG length increase, there is a 0.09 increase in suicidal ideation **frequency**.
The results of the ordinal logistic regression did show significance, $p = .019$, suggesting that CAG repeat length predicted **severity** of suicidal ideation. When the effect of depression was taken into account, there was no significant relationship between CAG repeat length and the **severity** of suicidal ideation.
Recommendations: The findings from this quantitative analysis supported using CAG length in a clinician's risk factor assessment to determine the frequency of suicidality.

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911
WFN15-0828
Movement Disorders
Efficacy of botulinum toxin injection in treatment of hemifacial spasm: quality of life, anxiety, depression and somatic symptoms

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Backgroud & objectives: Hemifacial spasm (HFS) is considered as a benign condition, it can cause significant cosmetic and functional disability to the affected patients. A number of studies have been reported that botulinum toxin is an effective treatment. However few studies have investigated effectiveness of botulinum toxin injection in term of health-related quality of life(HrQoL), emotional and somatic symptoms. We performed this study to evaluate the relationship between the degree of HFS symptoms and HrQoL, anxiety, depression and somatic symptoms scores and further to know these scales improved after tailored botulinum toxin treatment.
Methods: Assessment of scales, were performed at week 0 and week 3 of botulinum toxin injection treatment: clinical severity scales, HrQoL scales for HFS and affective symptom scales.
Results: Baseline severity of HFS eyelid symptoms were found to have a greater association with HFS cheek symptom, HrQoL and anxiety, but no association with depression and somatic symptoms. Baseline severity and frequency of HFS cheek symptoms showed no correlation with HrQoL and emotional status. Self-reporting numeric global disability rating scale for HFS have a greater association with eyelid symptoms, especially HrQoL and anxiety, but no association with cheek symptoms. Social stigma and shame is an major detrimental factors affecting subjective disability and anxiety state rather than actual discomfort of activity of their daily living.
Conclusion: Active treatment with botulinum toxin improved all of emotional and somatic scores compared to their baseline scores. This suggest that appropriate treatment of HFS could improve mood and QoL of HFS pateints. Improvement of anxiety status and eyelid symptoms is the key factors affecting patient's satisfaction through treatment.

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912
WFN15-0277
Movement Disorders
Head injury exposure in PSP: a case-control study

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Progressive Supranuclear Palsy (PSP) is an atypical parkinsonian disorder and a primary tauopathy. Head injury has been reported to be associated to other related neurodegenerative disorders, and repetitive head injury (HI) is associated to chronic traumatic encephalopathy (CTE), which is also a tauopathy. We investigated the relationship between PSP and HI.

300 PSP cases meeting the NINDS-SPSP clinical criteria and 300 age- and gender-matched healthy controls were recruited as part of the ENGENE-PSP case-control study to determine environmental risk factors for PSP. We evaluated whether head injury or head injury with loss of consciousness is associated with PSP.

Conditional logistic regression analysis controlling for risk factors previously reported to be associated with PSP: obtaining a college diploma, ever living within one mile of a farm, and smoking pack-years, was performed to assess the association between PSP and HI and HI with loss of consciousness.

103 cases and 90 controls reported history of HI (odds ratio 1.22 (95% CI 0.86 - 1.71; p: 0.26). Of those who suffered HI, 40 cases and 48 controls also reported loss of consciousness (odds ratio 0.80 (95% CI 0.50 - 1.27; p: 0.35). After controlling for possible confounders, neither HI (odds ratio 1.25 (95% CI 0.87 - 1.81; p: 0.23) nor HI with loss of consciousness (odds ratio 0.94 (95% CI 0.57 - 1.54) p: 0.79) was associated with PSP.

This study didn't find an association between HI and PSP. Small sample size may have limited our ability to detect an association. Further studies will be necessary.

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913
WFN15-0925
Movement Disorders
Botulinum a toxin injection in two Filipino brothers with X-Linked dystonia parkinsonism (XDP) in Cebu City, Philippines: a case report

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Background: Sex-linked dystonia parkinsonism (XDP) is a movement disorder unique to adult Filipino men whose ancestries can be traced to Panay Island, Philippines, characterized by severe, progression torsion dystonia, dominating the first 10 to 15 years of the illness associated with parkinsonism features in the later years of life.
Objectives: To present a case of two Filipino male siblings initially seen with parkinsonism and eventually with dystonia and to present botulinum A toxin as part of the treatment for X-linked dystonia parkinsonism in Cebu City.
Discussion: A 54 year old man presented initially with parkinsonian symptoms and later developed oromandibular and truncal dystonia. Further history revealed that he had an older brother who also presented with the same symptoms. Family history revealed that their mother was originally from Panay and a diagnosis of XDP was made. Botulinum A toxin injections done in the lateral pterygoids and the anterior belly of the digastric muscles in both patients plus in the trapezius and right sternocleidomastoid muscles for the second case which afforded significant relief of muscle spasms, involuntary jaw opening, drooling and pain for approximately 3 months.
Conclusion: XDP was considered in 2 Filipino male siblings who presented with oromandibular dystonia, truncal dystonia, shuffling gait, resting tremors with ancestry from Panay on the maternal side. There is no cure for XDP, only symptomatic treatment. Until recently, only oral chemotherapy was available in Cebu. Botulinum A toxin injection done in both patients afforded temporary resolution of symptoms.

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914
WFN15-1597
Movement Disorders
Long-term efficacy of safinamide as add-on to levodopa in Parkinson's disease fluctuating patients: results from a 2-year placebo-controlled trial

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Background: Safinamide (Xadago®, Zambon SpA, Italy) add-on to levodopa in fluctuating patients demonstrated significant superiority over standard-of-care in the 24-week study 016 on ON without troublesome dyskinesia, OFF, UPDRSIII.
Objective: To compare pattern of benefit of safinamide at 6 months (Study 016) and 2 years (Study 018), to evaluate its persistence of efficacy.
Methods: Data from 016 and 018 were combined and analysed using a modified Intent-to-Treat Population (mITT; groups: placebo; safinamide 50 mg/day, 100 mg/day; All safinamide), for ON (without troublesome dyskinesia), OFF, and the percentage of patients with improvement of ≥60 min in ON and OFF, ≥30% on UPDRSIII, and those meeting all 3 criteria ("responders", chi square test). The same analyses were run for the Completer population (who completed 24 months).
Results: The mITT Population included 645 patients (safinamide: 50 mg/day = 217; 100 mg/day = 216; placebo = 212). Statistically significant improvement ($p < 0.05$) at 2 years was observed for ON and OFF (mITT) for the 50, 100 mg/day and the All safinamide vs. placebo. Results for the Completer were similar. The Responder analyses (mITT) showed a statistically significantly ($p < 0.05$) greater proportion of patients in the 50 mg/day and All safinamide with improvement of ≥60 min in ON vs. placebo. The proportion of patients with improvement ≥30% UPDRSIII was significantly greater for 100 mg/day vs. placebo. The proportion of "responders" was significantly higher for All safinamide vs. placebo. Results for the Completer showed a significantly higher proportion of patients improved in ON, OFF, and UPDRSIII in the 100 mg/day vs. placebo.
Conclusions: Safinamide's benefits persisted for 2 years, and were comparable to those observed at 6 months.

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915
WFN15-0838
Movement Disorders
Unilateral subthalamotomy for Parkinson disease using gamma knife radiorurgery: the first preliminary Chilean experience

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Background: Nowadays the subthalamic nucleus (STN) is considered the best target for Parkinson disease (PD) treatment using mainly deep brain stimulation (DBS). Radiofrequency subthalamotomy has also been used. There is scarce experience using gamma knife radiosurgery (GKRS).
Objective: The purpose of the present study is to present the preliminary experience in Chile with GKRS for the treatment of PD using the STN as target.
Patients and methods / material and methods: Seven PD patients underwent unilateral Gamma Knife Subthalamotomy (GKST). High Resolution Magnetic resonance imaging guidance was used for STN targeting contralateral to the most affected side. A single 4-mm isocenter was used to target a maximum dose of 120 Gray (Gy) to the STN. Pre and post treatment clinical evaluation was performed using part III of the Unified Parkinson Disease Rating Scale (UPDRS).
Results: The mean patient age was 60.5 years (56-71) with a mean follow-up of 11.3 months (4-18). In all cases there was clinical improvement; the mean pre-treatment affectation score part III UPDRS was 43% and 17.9% at the last follow up. There were no complications, in particular no chorea-hemibalismus.
Conclusion: GKST could be considered an effective neurosurgical treatment for PD and may be an alternative to open procedures. Further follow up and larger series are necessary to confirm these results in the long term.

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916
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Movement Disorders
Cognitive dysfunction in drug-induced parkinsonism caused by prokinetics and antiemetics

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Background and objective: The use of prokinetics/antiemetics is one of the leading causes of drug-induced parkinsonism (DIP). Cognitive dysfunction in DIP has recently been recognized, but whether such dysfunction is secondary to underlying pathological processes or to blockade of dopaminergic neurotransmission is unknown.
Patients and methods: Among our retrospective cohort of 385 consecutive parkinsonian patients enrolled in our parkinsonism registry, 14 patients were identified who satisfied our inclusion criteria: parkinsonism caused by prokinetics/antiemetics, existing T1 3D volumetric MR images, and normal [^{18}F]- FP-CIT PET images. For the comparison, 30 age-sex-matched healthy individuals were included. Among 14 patients with DIP, 4 patients were diagnosed with dementia, and all other patients had mild cognitive impairment (MCI).
Results: Comparisons of MR data between DIP patients with MCI and controls showed, cortical gray matter volumes were reduced bilaterally in DIP ($p < 0.05$) without changes in either total white matter volume or total intracranial volume. Among subcortical structures, the volume of the right hippocampus was reduced in DIP patients compared with controls ($p < 0.05$). In DIP, cortical thickness was reduced in the bilateral lingual, right fusiform and part of the left lateral occipital gyri ($p < 0.05$).
Conclusion: Our results suggest that cognitive dysfunction in DIP caused by prokinetics/antiemetics is common. Structural changes in the brain may be associated with cognitive decline in DIP.

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917
WFN15-0798
Movement Disorders
Cerebral glucose metabolism in Parkinson's disease with cognitive decline

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Background: In Parkinson's disease (PD), cognitive decline is recognized as a deteriorating factor of quality of life. Mild cognitive impairment in PD (PD-MCI) is noticed as a preclinical stage of cognitive decline of PD dementia (PDD). Early detection of PD-MCI is expected for the early diagnosis.
Objective: To clarify cerebral glucose metabolism in PD, PD-MCI, and PDD.
Patients and methods: Patients with PD and healthy control were recruited and written informed consents were obtained. Neurological and neuropsychological examinations were performed in patients with PD. The cerebral glucose metabolism was measured using with 18 F-fluoroglucose positron emission tomography. This study is approved by the local ethical committee of our institute.
Results: We could recruit 5 healthy controls, 10 PD, 9 PD-MCI, and 8 PDD. PDD group showed significantly higher age ($p = 0.02$) and UPDRS ($p < 0.01$). Statistical parametric mapping analysis showed a positive correlation between regional cerebral glucose metabolism and the minimental state examination (MMSE), the frontal assessment battery (FAB), and the Montreal cognitive assessment (MoCA). Hypometabolism was observed in parieto-occipital region in MMSE, frontal region in FAB, and frontal and parieto-occipital region in MoCA in the brain of PD-MCI and PDD. There was no difference of hypometabolic region between PD-MCI and PDD.
Conclusion: This study revealed that cerebral glucose metabolism was decreased in the MCI stage. It was suggested that cerebral metabolic dysfunction could already begin before the stage of cognitive decline as mild as PD-MCI in patients developing PDD. More sensitive diagnostic tools to cognitive function in PD is expected.

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919
WFN15-0788
Movement Disorders
Evaluation of the quality of sleep in 35 Parkinson's disease patients at the teaching hospital of Fann, Dakar, Senegal

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Introduction: Sleep disorders are twice as frequent in Parkinson's patients as compared to the same age and gender controls.
The objective: Assessing the quality of sleep in patients with Parkinson's disease followed at the neurology clinic CHNU Fann.
Patients and methods: We conducted a cross-sectional study from April to June 2014 on 35 patients fulfilling the criteria UKPDSBB. They filled out following rating scales and questionnaires: PDSS the PSQI and ESS to analyze their sleep qualities. Hoehn and Yahr's scale assessed the disease stage of evolution. A PDSS score <82 or a sub score <5 and a PSQI score <5 were considered disorder sleep. A ESS score > 10 meant excessive daytime sleepiness.

We used the Pearson correlation test for correlation.
Result: Our patients were men in 60%(21/35) and women in 40% (14/35). On average, they were 65.71 ± 7.42 years old with the extremes of 48 and 79 years; the disease duration was 33.3 ± 22.8 months and the evolutionary stage of 2.42 ± 0.90. In total, 94.3% (33/35) and 22.9% (8/35) of the patients had respectively a score <5 on one of the PDSS items and a score <82 on the PDSS questionnaire reflecting severe sleep disorder. In addition, 22.9% (8/35) and 74.3% (26/35) of patients had a ESS score > 10 and a PSQI score > 5 respectively. No correlation was observed between age, duration of disease progression and overall score of PDSS.
Conclusion: After this study, we could highlight serious disruption of sleep quality in Parkinson patients.

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920
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Movement Disorders
Complex surgical treatment of generalized dystonia

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Objective: Evaluation of effectiveness and safety of multimodal stereotactic procedures (lesioning and deep brain stimulation (DBS)) and multifocal (globus pallidus pars interna (GPi) and subthalamic nucleus (STN)) treatment of generalized dystonia (GD).
Background: Thalamotomy and pallidotomy are the primary stereotactic methods of GD treatment. DBS is a surgical method of choice for various movement disorders treatment that include GD. Multimodal and multifocal DBS was involved in the movement disorders treatment to achieve better results, but no analysis has been conducted yet.
Methods: Seven GD patients with history of bilateral GPi DBS or thalamotomy or pallidotomy were qualified for further surgical treatment. All of them demonstrated significant improvement that vanished few years after surgery. Five of them, who underwent lesioning in the past were qualified for DBS: GPi (3 patients) and STN (2 patient). Two patients, who underwent GPi stimulation in past were qualified for multifocal stimulation- additional STN DBS.
Results: Multimodal and multifocal DBS have caused sustained improvement in dystonic movement (measured with GDS) that lasted in two to five years follow-up. No surgical or stimulation related complications were reported.
Conclusions: Multimodal: lesioning and DBS and combined, multifocal GPi and STN DBS might and should be considered when dystonic symptoms aggravate over time.

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921
WFN15-0675
Movement Disorders
Improving dystonia among NBIA patients with subthalamic or pallidal nucleus deep brain stimulation

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Conservative and surgical treatment of Neurodegeneration with Brain Iron Accumulation (NBIA) is difficult and frequently ineffective. The authors present a group of patients with clinically and radiologically diagnosed NBIA with genetically confirmed PANK2 mutation, treated with deep brain stimulation.

Materials and methods: Twelve patients with confirmed PANK2 mutation (NBIA-PKAN) were treated with deep brain stimulation between 2008 and 2015. Age of the patients varied from 8 to 24 years. The clinical condition of the patients was evaluated with scales and video recorded. At all cases the permanent electrodes were implanted to the subthalamic nuclei or globus pallidus. The surgical procedure was undertaken under general anesthesia. The target was identified with direct and indirect method. Intrasurgical macrostimulation and micro-recording were used for neurophysiological evaluation of the target. Postsurgical local field potentials were recorded in all cases.

Results: Neither neurological deterioration nor surgical complication were noted among the group. Caregivers of the patients noted subjective improvement of the clinical state of the subjects that was confirmed with tailored scales. More significant improvement was noted among STN group compared to GPi group.

Conclusions: Subthalamic or pallidal deep brain stimulation reduces dystonic movements among NBIA patients. The technique carries minimal surgical risk, and improves quality of life of the patients.

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922
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Movement Disorders
Biateral pallidal deep brain stimulation for secondary generalized dystonia. Ten years follow-up

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The role of pallidal (GPi) Deep Brain Stimulation (DBS) in the treatment of primary dystonia is well established. The results of the GPi DBS treatment among patients with diagnosed secondary generalized dystonia (SGD) are not that promising. The authors present group of three patients diagnosed with SGD treated with GPi DBS.

Materials and methods: Between 2005 and 2007 three SGD patients were treated by the same team with GPi DBS. Mean age during implantation was 31 ± 4. Global Dystonia Scale, Fahn-Marsden Movement Scale and Unified Dystonia Rating Scale and Activity of Daily Living scale were used for evaluation. Using MRI guided frame based stereotactic system GPi was identified using indirect and direct method. The stimulation was initialized on the first day following surgery.

Results: Clinical improvement was noted among whole group of patients measured with previously mentioned scales and varied from 36 to 85% (mean 56%). One patient with severe neck dystonia reported with displaced connector (from retromastoid region to supraclavicular region) four months after surgery. The connector was surgically replaced.

Conclusions: GPi DBS might be considered as a safe and effective tool of treatment of SGD in selected group of patients.

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923
WFN15-1470
Movement Disorders
Usefullness of transcranial substantia nigra echography for vascular parkinsonism differentation

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Background: In the last several years, trasncranial echography (TE) assessment of the substantia nigra (SN) echogenicity area has been proven as an easy and feasible technique for idiopatic Parkinson disease (iPD), as well for several atypical parkinsonisms.

Objective: The aim of the study was to determine, by means of echography, whether probands in whom clinical doubts of diagnosis were present, have an iPD or a vascular parkinsonism (vP).

Patients and methods: Patients with Parkinson disease symptoms evaluated in our movement disorders unit in whom clinical diagnostic doubts existed underwent TE. The echographist was blinded for the clinical diagnostic. Based in previous studies, a cut off of SN values $>0.25\ cm^2$ were considered pathological. Brain atrophy was assessed by means of III ventricle measurement, considering values > 10 mm pathological.

Results: 54 patients. Mean age: 73.76 ± 8.04 years old. 76% with clinical diagnosis of iPD and 24% vP. Pathological values of SN area where found in 92% of clinical iPD for only 8,3% with vP ($p < 0.0001$). SN echogenicity was higher among iPD compared to vP (91.7% vs 58.3%, $p = 0.007$). Brain atrophy was higher in vP than in iPD (3% vs 27.3%, $p = 0.040$). According to our data, a cut of value of SN area $0.26\ cm^2$ showed with a 76% sensitivity and 73% specificity for iPD.

Conclusions: TE assesses with high sensitivity and specificity, the clinical suspected diagnosis of both iPD and vP, in patients in whom clinical diagnostic remains unclear.

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924
WFN15-1254
Movement Disorders
Use of botulinum neurotoxin in spastic cerebral palsy: a literature review

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Background: The spastic type affects 60-80% of children with cerebral palsy. Its characteristics are: hypertonia, abnormal posture/movements, pathological reflexes, signs of pyramidal release. Botulinum toxin therapy inhibits generation of strong spastic muscle contraction.

Objectives: Review key aspects related to use of botulinum toxin as spastic cerebral palsy treatment.

Materials and methods: A search was performed in Pubmed with "botulinum toxin" AND "treatment of cerebral palsy spastic", filtering: free full text / 5 years / English / Humans, resulting in 30 articles, from which 18 were selected.

Result: Studies used BoNT-A and BoNT-B. The incidence of adverse events with BoNT-A was 6,2-10%, and BoNT-B was 28.6%, which were correlated to presence of epilepsy and level of Gross Motor Function Classification System. They occurred mainly in first application, decreasing in the subsequent ones. Numbers suggested to be more

effective in children between 2-6 years, but there were also satisfactory results in adults. The botulinum toxin effects remained for 3 months, gradually returning to original state. Better results are achieved when botulinum toxin treatment is associated with other tone recovery programs. The re-treatment must be carried out after 3-4 months, avoiding production of neutralizing antibodies.
Conclusion: Treatment is safe, and achieves the aims for improvement of function, comfort, care, prevention or correction if deformities, reducing pain, physical and functional limitations. Most reported adverse reactions were mild, even in patients severely affected by cerebral palsy. The reduction of spasticity, improvement in motor coordination and trunk stability negatively influence production of strength and muscle volume.

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925
WFN15-0931
Movement Disorders
Onset age of Parkinson's disease is delayed by a common dysfunctional variant of ABCG2, a major causative gene for early-onset gout

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Background: Oxidative stress is well known to be one of the major causes of Parkinson's disease (PD) development. Uric acid (urate), which has an antioxidant effect, has been suggested to play a protective role in PD onset. Dysfunction of ABCG2, a high-capacity urate transporter, is a major cause for early-onset gout based on hyperuricemia. The common variant (Q141K, rs2231142) of *ABCG2* is proven to be a dysfunctional variant by *in vitro* functional studies.
Objective: This study was performed to evaluate the effects of Q141K variant on onset ages of gout or PD.
Patients and methods: A total of 1015 PD patients and 507 gout patients was recruited and then genetically analyzed for Q141K variant of *ABCG2*. We have obtained patient and Institutional Review Board (IRB) approval.
Results: Q141K variant hastened the gout onset ($p = 0.0027$), while this variant significantly delayed the PD onset ($p = 0.025$). The ages at onset of gout patients with Q141K homozygous mutation were 4.6 years younger than those without Q141K mutation, while the ages at onset of PD patients with Q141K homozygous mutation were 1.6 years older than those without Q141K mutation.
Conclusion: The Q141K variant of *ABCG2* hastened the onset of gout. On the contrary, this variant delayed the PD onset, which could be due to the antioxidant effect of uric acid increased by ABCG2 dysfunction.

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926
WFN15-1327
Movement Disorders
Secondary normal pressure hydrocephalus post gamma knife radiosurgery for treatment of vestibular schwannoma

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Background: Secondary normal pressure hydrocephalus (sNPH) has been described as one of the possible complications following Gamma knife radiosurgery (GKRS) for vestibular schwannomas (VS).
Objective: We report here a case of sNPH post GKRS for VS treatment.
Patients and methods: A 71 year old male patient presented with tinnitus and left-sided high-frequency hearing loss in 2008. His neuro-imaging revealed left VS for which he eventually underwent GKRS in 2010 due to gradual tumor growth revealed by serial follow-up scans. His past medical history included Type-2 diabetes and he was not affected by Type-2 neurofibromatosis.

His 6-weeks neurosurgical follow-up showed good control of the size of the known VS without any post-operative complications. Within 6 months however he started to decline with quickly deteriorating gait and lower limb mobility, occasional urinary incontinence and worsening memory.
Results: On examination he showed apraxic, broad-based gait without co-existent tremor or limb rigidity. His neuropsychology assessment suggested subcortical/frontal picture of cerebral dysfunction. His new MRI head scan did not show any significant changes in the size of the VS but revealed prominence of the lateral and third ventricles raising the possibility of NPH.

He was admitted electively for a large-volume lumbar puncture with an opening pressure of 23 cm H_2O. Since subsequent placement of a ventriculo-peritoneal shunt he made definite progress with improved gait, cognitive function and reduced urgency of micturition.
Conclusion: Clinical awareness of sNPH as possible complication following GKRS for VS is important to avoid delays in diagnostic intervention and appropriate treatment.

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927
WFN15-0268
Movement Disorders
A study of dysosmia in Parkinson's disease: a simple method using an incense stick

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Purpose: Recently, olfactory disorders have received attention as non-motor symptoms associated with Parkinson's disease (PD) and may contribute to the early detection of PD. We evaluated dysosmia in PD by a simple method using an incense stick.
Methods: The subjects were 83 healthy controls (mean age, 72.3 years) and 60 outpatients with PD (72.2 years; disease duration, 6.1 years; Yahr severity 1.9). First, the subjects closed their eyes and were asked what was the smell of an unlit incense stick. If the subject immediately replied "incense," the response was considered normal and classified as no dysosmia (-). If the response was "no smell," the subject was considered to have dysosmia (+). If the response was unclear, the subject was assigned to the borderline

group (±). The prevalences of dysosmia were compared between the healthy controls and patients with PD.
Results: Among the 83 healthy controls, 39 (47.0%; mean age, 70.6 years) were dysosmia (-), 31 (37.3%; 72.6 years) were dysosmia (±), and 13 (15.7%; 77.0 years) were dysosmia (+). Among the 60 patients with PD, 10 (16.7%; mean age, 69.0 years) were dysosmia (-), 17 (28.3%; 71.9 years) were dysosmia (±), and 33 (55.0%; 73.3 years) were dysosmia (+).
Conclusion: Dysosmia including borderline dysosmia was found in 83.3% of patients with PD.

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928
WFN15-0390
Movement Disorders
Effects of dopaminergic medication on executive function in drug-naive patients with Parkinson's disease: using behavioral assessment of the dysexecutive syndrome

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Background: There is a correlation between executive and motor functions in Parkinson's disease (PD). However, the effect of dopaminergic medication on executive function in PD patients is uncertain, especially in drug-naive *de novo* PD patients. The Behavioral Assessment of the Dysexecutive Syndrome (BADS) is a sensitive executive assessment tool.
Objective: We examined the effect of dopaminergic medication on executive function in drug-naive PD patients with approval by the Showa University ethics committee.
Methods: Dopaminergic drugs (levodopa, dopamine agonists, selegiline) were given to 17 (9 males, 8 females) drug-naive PD patients without dementia (Mini-Mental State Examination score above 25) and increased to the optimal dose to obtain improvement in motor symptoms. Patients were tested prior to and at 4 to 7 months after drug initiation. Motor function was assessed using the Unified Parkinson's Disease Rating Scale (UPDRS: total score and subscores of tremor, rigidity, bradykinesia and gait). Executive function was assessed using the Japanese version of the BADS. Improvements from baseline for both motor and executive assessments were compared with the levodopa equivalent dose (LED).
Results: Dopaminergic drugs significantly ameliorated all motor problems. The improvement did not correlate with the LED. The mean BADS score showed no significant improvement. However, improvement in the BADS score showed a significant positive correlation with the LED.
Conclusions: The effects of dopaminergic medication on executive function in drug-naïve PD patients are dose dependent.

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929
WFN15-0456
Movement Disorders
Dropped head syndrome caused by various diagnoses – effect of physiotherapy (The 2nd report)

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Background: Dropped head syndrome is seen in various diseases. Its pathophysiological mechanisms are unknown, but the possibility of dystonia of neck flexors or weakness of neck extensors was suggested. We reported the existence of tonic activities of extensor muscles as a common finding of surface EMG and the effect of physiotherapy to relieve their complaints in WCN 2013.
Objections: We used physiotherapy for more patients to make sure its effect on dropped head syndrome.
Patients and methods: Since 2010, we treated 25 cases: 18 cases of Parkinson disease and related disorders (PA), 3 cases of cervical spondylosis (CS) and 3 cases without known causes (UK) and 1 dystonia (DY). By the physiotherapy, the improvement of the alignment of the pelvis and whole vertebral column and the enhancement of activity of extensor muscles were aimed. Some of PA were received the injection of local aesthesia. We have obtained patient approval, as necessary.
Results: 15 of 25 cases (60%) of which included 9 PA, 2CS, 3UK and 1DY, showed remarkable improvement. 10 cases were no improvement, which included 9 PA and 1 CS.
Conclusion: We conclude that the primary reason of dropped head syndrome is unknown in PA and CS, but also that many of the patients with dropped head syndrome have secondary effects in alignment and activity of the skeletomuscular system, which could be treated with physiotherapy. The effect of local anesthesia will be discussed.

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931
WFN15-0635
Movement Disorders
Opsoclonus-myoclonus syndrome in adults: a report of two cases

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Background: Opsoclonus-myoclonus syndrome (OMS) is a rare movement disorder characterized by chaotic multidirectional eye movements, myoclonus and less frequently cerebellar ataxia. OMS affects as few as 1 in 10,000,000 people per year.
Case reports: We present two cases of female Caucasian patients aged 19 and 60 years respectively who developed OMS following a febrile illness. In both cases OMS starts with an acute flare-up of physical symptoms within days. The neurologic examination revealed opsoclonus, myoclonus and ataxia. Both women had normal magnetic resonance imaging of the brain. The results of routine laboratory tests were normal. In both cases, cerebrospinal fluid examinations was consistent with aseptic meningoencephalitis and showed cell-protein association (lymphocytic pleocytosis and protein elevation). The oligoclonal IgG band was negative. Cytomegalovirus, Epstein-Bar virus, Varicella-zoster virus, borrelia, coxsackie, enterovirus, streptococcal infection, syphilis, herpes simplex virus-1 and -2, human immunodeficiency virus or hepatitis were negative in the serological tests. The thyroid function tests, the tests for antinuclear and anti-neuronal antibodies were within normal limits. Malignancy was not detected on positron-emission tomography-CT. After therapies including a combination of intravenous methylprednisonolon, intravenous ceftriaxon, acyclovir and clonazepam, both patients gradually improved and had recovered. After a 12-month follow-up, both women had no neurological sequelae. We have obtained approval of both patients.
Conclusion: OMS is associated with multiple etiologies. The most common etiologies are idiopathic, paraneoplastic and infectious disorders. OMS may occur in patients with aseptic brainstem encephalitis. The exact immunopathogenesis and pathophysiology of OMS are uncertain.

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932
WFN15-1275
Movement Disorders
Brain SPECT imaging in the differential diagnosis of essential tremor and Parkinson's disease - case report

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Introduction: Parkinson's disease (PD) is still wrongly diagnosed in 10 to 25% of cases, in Movement Disorders Units and general clinics, respectively (Hughes et al. 2001). Studies have shown that molecular imaging (SPECT or PET) using radio-ligands with high affinity for dopaminergic system can be used as auxiliary markers on PD allowing the detection of preclinical risk individuals, estimating the loss of dopaminergic cells in initial and advanced PD and classifying individuals with parkinsonism syndromes. (Scherfler et al., 2007; Catafau & Tolosa, 2004).
Case report: MRSR, 66 years, with a history of hands tremor when holding objects (cutlery, glasses) or write. Familiar history positive for Essential Tremor. Neurologic examination normal, but postural tremor, with approximately 8 c/sec.HD: Essential Tremor (ET). Treatment there was no improvement with Primidona until 200 mg, Propranolol to 80 mg (discontinued after bronco spasm crisis), and Topiramate up to 300 mg/d, with little improvement. Evolved worsening. In March 2015 was given the diagnosis of PD by another colleague, no improvement with treatment. Requested SPECT with Trodat: right striatum 0.70 (0.52-1.0), left striatum 0.57 (0.52 to 1.0).
Discussion: The prevalence of resting tremor in Essential Tremor is 18% (Cohen et al., 2003). Images of the dopaminergic system are important for the identification of patients with and without Parkinsonism. The sensitivity of the SPECT with TRODAT -1 was 100% and 70% specificity in the studies (Felicio et al. 2010).
Conclusion: This is a powerful tool in the differential diagnosis between DP and other tremors in difficult cases.

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933
WFN15-0454
Movement Disorders
Detection and quantification of freezing of gait and falls in Parkinson's disease patients using a body-worn sensor

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Objective: The aim of the present study is to objectively detect and quantify freezing of gait (FOG) and falls in Parkinson's disease (PD) patients during everyday activities.
Methods: Patients were selected from among 36 patients who participated in our previous prospective study on falls. We developed a motion recorder (body-fixed 3D accelerometer) with a long-lasting battery. First, healthy volunteers simulated FOG and falls, and acceleration signals were analyzed. Then movements of recurrent PD fallers with severe FOG were recorded during their everyday activities and in the outpatient clinic. A newly developed freezing index (cross correlation calculation based on pattern matching) was also calculated and compared with the previous index (ratio of power spectrum).
Results: Characteristic patterns of acceleration signals were recorded for simulated falls. Falls were associated with abrupt changes in trunk angle. Knee trembling was recorded as a rapid oscillation of acceleration, and the freezing index increased during knee trembling. In PD patients, actual falls in everyday life were also detected as abrupt trunk angle changes, and knee trembling was recorded when patients reported FOG-induced falls. The freezing index increased during the start and turning hesitations, similarly to the index calculated using methods proposed by Moore et al.
Conclusions: Motion recording using our wearable sensor is useful for detecting FOG and falls in everyday life in PD fallers, and calculating the freezing index may improve the quantification of FOG. I have obtained patient and Institutional Review Board (IRB) approval.

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934
WFN15-0664
Movement Disorders
The degree of cardiac MIBG uptake is correlated with that of cardiac sympathetic denervation in pathologically-verified Lewy body disease

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Objective: The aim of this study is to quantify the degree of cardiac sympathetic denervation in pathologically-veirfied Lewy body disease (LBD) and to examine the relationship between the degree of cardiac sympathetic denervation and cardiac MIBG uptake.
Methods: Twenty-three subjects with pathologically-verified LBD (17 men and six women, mean age at death: 77.5 ± 6.9 years) who were performed MIBG cardiac scintigraphy in life, were enrolled in this study. One subject with multiple system atrophy and one Alzheimer's disease were served as controls. The sections of the left ventricular anterior wall from the specimens were immunostained with anti-thyrosine hydroxylase (TH) and anti-neurofilament (NF) antibodies. We quantified the immunoreactive areas of the residual cardiac nerve axons and examined the relationship between the degree of cardiac nerve axons and H/M ratios on MIBG cardiac scintigraphy.
Results: 1) Cardiac MIBG uptake in the early and delayed phases were reduced in 90.9% and 95.7% of the subjects with LBD, respectively. 2) The area of TH-immunoreactive axons was correlated with the degree of cardiac MIBG uptake both in early (correlation coefficient (r) = 0.57, $p < 0.01$) and delayed ($r = 0.54$, $p < 0.01$) phases. The area of NF-immunoreactive axons was correlated with the degree of cardiac MIBG uptake both in early ($r = 0.65$, $p < 0.01$) and delayed ($r = 0.58$, $p < 0.01$) phases.
Conclusions: This study confirms that MIBG cardiac scintigraphy is a useful imaging tool to make a clinical diagnosis of LBD and can assess the degree of cardiac sympathetic denervation.

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935
WFN15-1312
Movement Disorders
Debilitating ataxia and tremor in a 39 year old man: neurologic sequalae of chronic toluene abuse

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Objective:

- To describe the clinical and radiological features, and treatment outcomes of a case of toluene induced ataxia, tremor and oscillopsia

Background:

- Intoxication via inhalation, sniffing or huffing, is infrequently reported.
- Inhalation of toluene-based products is popular because of the euphoric effect, easy and legal availability.
- Toluene abuse is a cause of slowly progressive multifocal CNS dysfunction.

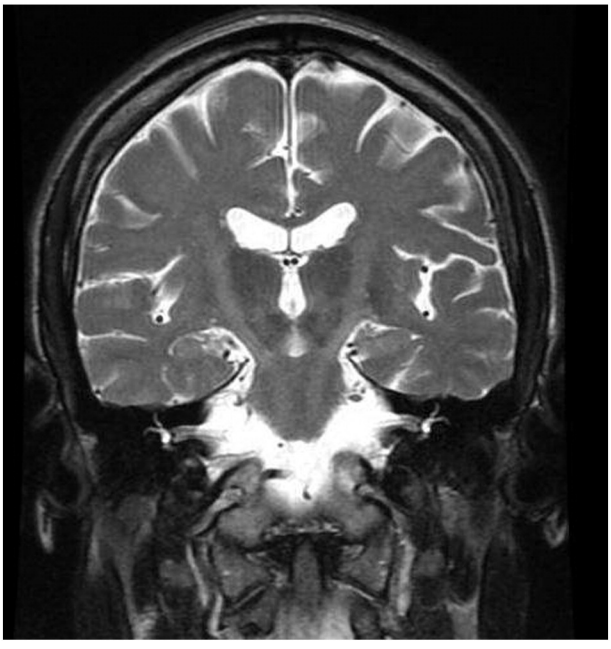
Design/method:

- Case Report

Results:

- 39-years-old man with history of huffing carburetor cleaner, for 9 years presented with 6 month history of progressive oscillopsia, continuous bilateral limb tremor and progressive truncal ataxia that render the patient wheelchair bound. At exam patient was disheveled, with vocal tremor and obvious primary gaze nystagmus. Head titubation and truncal tremor at rest, limb tremor with movement. Reflexes were pathologically brisk. There were patchy sensory abnormalities. Bilateral finger-nose-finger and heel-knee-shin dysmetria marked.
- Brain MRI showed thinned corpus callosum, diffuse cerebellar atrophy, symmetric hyperintense flair signal change along bilateral cerebrospinal tract from cortex through pons without enhancement.

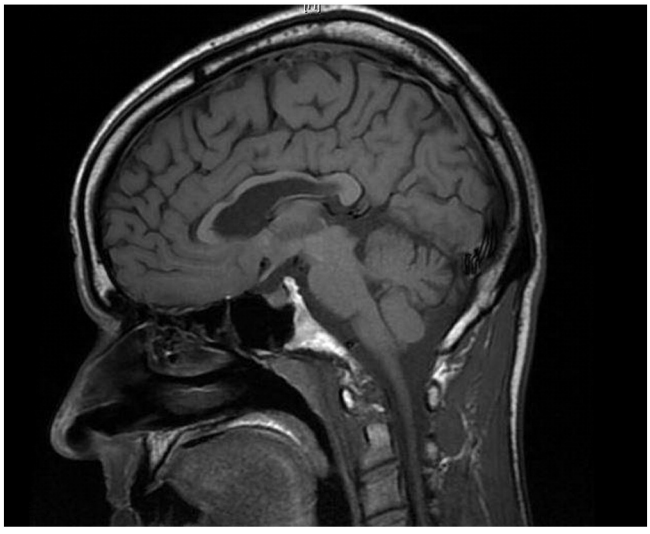
Laboratory: TSH, T4, CMP, CBC, B12, Ceruloplasmin, copper 24 hrs, manganese levels, folate normal. Anti-GAD ab: negative. Ethyl alcohol, acetone: not detected. Toluene quantitative levels: 14 mcg/ml (limit: 0.3 mcg/ml)



- Patient had good response to benzodiazepines, was able to walk for short distances with reduced oscillopsia.

Conclusions:

- Toluene broadly affects the cerebellum causing gait ataxia, limb ataxia and vocal cord tremor in chronic abusers. Myelin injury is demonstrated histopathologically.
- Previous MRI findings include cerebellar, diffuse white matter and corpus callosum involvement. Our case showed severe corticospinal involvement which is a novel observation.



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937
WFN15-0481
Movement Disorders
Gabapentin-induced myoclonus: a case report

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Objective: To present a case of myoclonus secondary to gabapentin use in a patient with no epilepsy or renal disease.
Background: Myoclonus may be linked to a variety of causes, including epilepsy, postanoxic brain injury, metabolic encephalopathies and focal central nervous system lesions. Various drugs also have been reported to induce myoclonus. Gabapentin-induced myoclonus has been reported previously, especially in cases with impaired renal function or epilepsy.
Method: Case report
Results: A 68-year-old male presented with hand tremors starting 2 weeks after the initiation of 1800 mg daily gabapentin recommended for distal neuropathic pain. Examination revealed bilateral action-induced clonus in the hands. His mental status was normal, and there was no weakness. Ankle reflexes were normal, and plantar reflexes were flexor. There was mild hypesthesia of the distal lower extremities. Routine blood tests including urea, creatinine, electrolytes and thyroid function tests were normal. Gabapentin levels were not determined. Gabapentin was discontinued, and his symptoms spontaneously resolved 2 days after discontinuation of gabapentin.

Conclusions: The close time relationship between gabapentin initiation and onset of myoclonus, and the rapid resolution of symptoms after withdrawal of the drug suggested that gabapentin played a causative role in our patient. Pathophysiological mechanisms of gabapentin-induced myoclonus remain poorly understood. It has been suggested that the serotonin neurotransmitter system may be involved in the pathogenesis. Administration and dose escalation of gabapentin should be performed with caution, and gabapentin should be always considered as a potential etiology for myoclonus.

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938
WFN15-0737
Movement Disorders
Humoral response against small heat shock proteins in Parkinson's disease

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Background: HSPs are functionally and immunologically highly conserved molecules present in almost all living organisms. Anti-HSP antibodies are present in different disorders with involvement of inflammatory process. In the light of evidence for the increased heat shock proteins expression in neurodegenerative disorders, the presence of the adaptive humoral response of the immune system can be expected.
Aim: The aim of the study was to check whether Parkinson's disease (PD) has the ability to elicit immune response against small heat shock proteins (sHSP). Antibodies titers against HSP60 and alpha B-crystallin were assessed.
Materials and methods: IgG and IgM autoantibodies against alpha B-crystallin were assessed in 26 PD patients 26 healthy subjects. Serum samples from PD patients were collected twice, at baseline and after mean of 13 months follow up. For the assessment of anti-HSP IgG autoantibodies serum samples from 31 parkinsonian patients and 31 healthy control subjects were collected.
Results: Both IgM and IgG autoantibodies against alpha B-crystallin in PD patients were significantly higher compared to healthy controls ($p < 0.05$). Additionally, PD patients presented higher levels of anti-HSP 60 IgG autoantibodies than healthy controls ($p = 0.02$).
Conclusions: Anti-HSP 60 IgG autoantibodies belong probably to the natural auto-antibodies, as they are present in healthy people, nevertheless chronic neurodegenerative process may have additional inducing effect on humoral response involving anti-HSP autoantibodies. Increase in IgG and IgM antibodies titers against alpha B-crystallin over the investigated period of time reflects activation of the immune response, probably secondary to widespread neurodegenerative process and may suggest the involvement of the immune system in the disease progression.

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939
WFN15-1104
Movement Disorders
Cerebellar evaluation in Parkinson's disease: gray matter analysis and its association with disease severity

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Background: The cerebellum has emerged as a structure potentially involved in Parkinson's Disease (PD), however where within the cerebellum and when it is affected remains unclear.
Objective: To evaluate the cerebellar gray matter (GM) of patients with tremor-predominant (PDT) and akinetic/rigidity-predominant PD (PDAR), and also to assess whether any identified GM change is associated with the severity of motor impairment.
Methods: MRI scans of 66 patients were acquired. In the first analysis we compared 45 PDT to 45 healthy controls (HC) and 21 PDAR to 21 HC. We divided the PDT group into three groups according to the Hoehn and Yahr scale (HY) and compared each group with a matched HC group. Analysis I: 9 patients (HY:1 - 1.5); analysis II: 21 patients (HY: 2 - 2.5); analysis III: 15 patients ($HY \geq 3$). For a specific evaluation of the cerebellum, we used the SUIT tool for voxel-based morphometry (*Puncorrected* < 0.001).
Results: In PDT we observed GM atrophy in the lobule VI, lobule Crus I, and in the vermis. In the PDT subgroups analysis the groups I and II had no atrophy. Group III however, demonstrated a large GM decrease in the anterior lobe, in the crus I and in the lobules V, VI (including the vermis) and VIIIa. There were no significant changes in the cerebellar GM in PDAR.
Conclusions: We demonstrated that cerebellar GM is affected in PDT patients only; they showed atrophy particularly in the anterior lobe and motor-related lobules and these changes seemed to parallel disease severity.

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940
WFN15-1394
Movement Disorders
Eye Movement (EM) measurements as objective and precise biomarker for symptoms development in patients with Parkinson's disease

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Background: Parkinson's disease (PD) is the second after Alzheimer most common neurodegenerative disease with risk factor increasing in our aging society. We still do not understand how brain processes are affected by nerve cell deaths in PD, therefore there is a need for sensitive biomarkers monitoring PD beginning and progression.
Objectives: We propose to measure EMs in order to find how they correlate with UPDRS and if they can predict effects of different treatments?
Methods: By means of infrared saccadometer (Ober-Consulting, Poland) we've measured horizontal reflexive saccades (**RS:**) and pursuit ocular movements (**POM:**) in response to light spot moving sinusoidally with different frequencies (*slow:0.125Hz, medium: 0.25Hz, fast:0.5Hz*) under treatments combinations of L-DOPA and DBS (deep brain stimulation). Changes of motor performance, behavioral dysfunction, cognitive impairment and functional disability were also evaluated in 13 patients according to UPDRS in four sessions: *S1:MedOffDBSOff*, *S2:MedOnDBSOff*, *S3:MedOffDBSOn*, *S4: MedOnDBSOn*. This study was approved by IRB of Dept. Neurology, Warsaw Medical University.
Results: The mean age was $58.3 \pm 9.3(SD)$ years, mean disease duration was 10.9 ± 1.6 years, mean UPDRS/ UPDRS III: *S1:* $56.7 \pm$

16.2/43.6 ± 12.7; S2: 48.1 ± 14.4/35.0 ± 11.1; S3: 27.8 ± 13.3/20.2 ± 7.9; S4: 16.8 ± 11.4/9.9 ± 5.9; differences:S1-S3, S1-S4 were stat-sig. ($p < 0.001$) and S1-S2:not stat-sig.; mean **RS latencies:** *S1:291.2 ± 93.1 ms, S2:199.6 ± 39.5 ms, S3:232.9 ± 82.7 ms; S4:183.2 ± 30 ms.* Differences between latencies: S1-S2, S1-S4:stat-sig ($p < 0.01$), S1-S3:not stat-sig.

POM: gain:*slow/medium/fast sinusoids*: *S1:1.06 ± 0.1/0.94 ± 0.2/0.81 ± 0.16; S2: 1.02 ± 0.1/0.96 ± 0.14/0.84 ± 0.2; S3:1.04 ± 0.06/0.98 ± 0.07/0.93 ± 0.1; S4:1.01 ± 0.05/0.97 ± 0.07/0.87 ± 0.1;* **accuracy:** (sum of normalized differences between stimulus and eye position):*slow/medium/fast sinusoids*: *S1:0.71 ± 0.11/0.63 ± 0.16/0.55 ± 0.16; S2:0.71 ± 0.16/0.70 ± 0.18/0.61 ± 0.2; S3:0.75 ± 0.14/0.73 ± 0.18/0.65 ± 0.16; S4:0.8 ± 0.11/0.77 ± 0.07/0.65 ± 0.16.*

Stat-significant ($p < 0.05$) correlations: UPDRSIII/II with: RS-latency (0.64/0.8), POM-accuracy:*slow/medium/fast (-0.44/-0.45/-0.4)*

Conclusions: Doctor-independent eye movement measurements may help/replace classical neurological diagnosis.

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941
WFN15-0716
Movement Disorders
Modulation of feedback-related negativity during trial-and-error task in Parkinson's disease: assessing the role of apathy and depression in cognitive impairments

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Parkinson's disease (PD) is accompanied by a variety of neuropsychiatric symptoms, like apathy and depression, and cognitive deficits. The feedback-related negativity (fERN) is a mid-frontal event-related potential recorded in various cognitive tasks and has been proposed to reflect neural response to prediction errors during reinforcement learning. There are still some aspects of apathy and depression that remain unknown. Notably, whether they are associated independently with cognitive deficits, and how is modulated the fERN within apathetic and depressive groups. Especially its sensitivity to positive and negative reward prediction error.

55 PD patients were recruited from the Department of Neurology at Carlos Van Buren Hospital of Valparaiso and completed a comprehensive clinical and neuropsychological evaluation. We recorded EEG activity during a problem solving task (PST) where each subject had to search by trial and error which of four visual targets was associated with a correct feedback.

Apathy was diagnosed in 24/55 participants (43%). In 39.9% of patients apathy coexisted with depression, whereas only 12.7% were apathetic without depression. Apathy was significantly associated with higher depression scores, lower cognitive functioning, more severe motor symptoms, longer reaction times and errors in the PST, and decreased fERN. Our results suggest that apathy but not depression is associated with impaired cognition in PD.

Analyses showed that the fERN was modulated by both negative and positive prediction error. From a clinical point of view the clearly attenuated fERN in apathetic PD patients may prove a useful additional tool for the early diagnosis of dopamine dysfunction in PD.

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942
WFN15-1531
Movement Disorders
Prospecive study of motor cortex excitability and conduction of pyramidal tracts in the presymptomatic spinocerebellar ataxia type 1 gene carriers

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Background: Spinocerebellar ataxia type 1 (SCA1) is a neurodegenerative, dominantly inherited disease caused by CAG repeat expansion. It manifests mainly as trunk and limb ataxia, dysarthria, gaze palsy and axonal neuropathy.

Aim: Evaluation of functional alterations in pyramidal tracts in the presymptomatic SCA1 gene carriers with 3-year-long follow-up.

Patients and methods: Transcranial magnetic stimulation (TMS), MRI volumetry of cerebellum, brainstem and cervical spinal cord were carried out on 26 SCA1 gene carries and 26 healthy volunteers. Presence of ataxia was assessed by the Scale for Assessment and Rating of Ataxia. All the examinations were repeated after 3 years.

Results: Age at study entry of SCA1 subjects was 25.6 ± 4.7 and healthy volunteers 26.2 ± 5.3. Baseline SARA score was 0.6 ± 0.7, during follow-up 3.9 ± 5.2. In 43% SCA1 cases cortical excitability was elevated for lower limbs, accompanied by motor evoked potentials amplitude decrease in 35% of cases. Silence period was significantly longer ($p < 0.01$) from upper and lower limbs. Central motor conduction time was prolonged in 56% of subjects to the lumbar spinal cord segments. MRI revealed decreased normalized volume of cerebellum 7.9% vs. control 9.1% and brainstem 1.65% vs. 2.1%. The volume of cervical spinal cord at follow-up visit (7125.4 mm^3) was significantly lower than at baseline (7735 mm^3) vs. control 9433 mm^3.

Conclusions: In the presymptomatic SCA1 gene carriers before the onset of overt clinical signs the atrophy of cerebellum, brainstem and cervical spinal cord was observed. TMS revealed functional alterations of motor cortex and corticospinal pathways. TMS could serve as an objective measure of disease progression of SCA1 patients.

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943
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Movement Disorders
Opicapone's efficacy in Parkinson's disease patients with motor fluctuations: a phase III, randomized, double-blind, placebo and active-controlled study – bipark I study

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Objective: Investigate the efficacy, safety and tolerability of 3 different doses (5, 25 and 50 mg) of opicapone (OPC) administered once-daily,

compared with entacapone (ENT) and placebo, in levodopa-treated patients with Parkinson's disease (PD) and motor-fluctuations.
Methods: Multinational, multicentre, double-blind, 14-15-week, placebo- and active-controlled study. The primary efficacy variable was the change from baseline in absolute OFF-time based on patient's diaries. Superiority vs. placebo and non-inferiority vs. ENT were tested under a gatekeeping procedure. Key secondary efficacy endpoint was the proportion of OFF- and ON-responders (≥1-h improvement). Other measures included the global assessment of change, symptoms and quality-of-life scales (IGAC, SGAC, UPDRS, PDQ-39, NMSS, PDSS).
Results: 600 patients were randomized to placebo (n = 121), 5 mg-OPC (n = 122), 25 mg-OPC (n = 119), 50 mg-OPC (n = 116) or ENT (n = 122). Both 50 mg-OPC and ENT significantly reduced mean daily OFF-time (-1.95-h [p = 0.0015] 50 mg-OPC and -1.61-h [p = 0.0141] ENT vs. -0.93-h placebo) and increased the ON-time without troublesome dyskinesia (1.82-h [p = 0.0016] 50 mg-OPC and 1.57-h [p = 0.0150] ENT vs. 0.78-h placebo). Non-inferiority was met for 50 mg-OPC (p = 0.00518). Significantly more patients receiving 25 mg- or 50 mg-OPC achieved the OFF-time responder endpoint (60.3% [p = 0.0464] 25 mg-OPC and 69.6% [p = 0.0011] 50 mg-OPC vs. 47.5% placebo). Either 5 mg-OPC and ENT missed statistical significance. A significant proportion of ON-responders was also found for 50 mg-OPC (65.2% [p = 0.0028]). Significant improvements in IGAC and SGAC scores were observed for 25 mg- and 50 mg-OPC, but not for ENT. OPC and ENT were generally safe and well tolerated.
Conclusion: OPC, particularly 50 mg-OPC, was effective in reducing OFF-time in PD patients with a favourable profile compared to ENT.

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944
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Movement Disorders
Efficacy and safety of opicapone in patients with Parkinson's disease and motor fluctuations: 1-year follow-up (bipark I)

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Objective: To evaluate the safety profile of opicapone (OPC) as add-on to levodopa over 1-year of treatment in patients with Parkinson's disease (PD) and motor-fluctuations.
Methods: After completion of the placebo- and active-controlled double-blind (DB) part, 495 (82.5%) patients continued to a 1-year OL-part, in which all were treated with OPC (5, 25 or 50-mg OPC). All subjects began with 25-mg OPC once-daily for 1-week, then investigator freely adjusted the levodopa therapy and/or OPC based on the dopaminergic response and/or associated adverse events (AEs). Efficacy was assessed as the change in absolute OFF-time, based on patient diaries. Secondary endpoints include proportion of responders, UPDRS, PDQ-39, NMSS, PDSS. Safety was assessed by AEs, laboratory, vital-signs, ECG, physical and neurological examination, modified Minnesota Impulsive Disorders Interview (mMIDI) and Columbia Suicide Severity Rating Scale (C-SSRS).
Results: After 1-year treatment with OPC, reduction in absolute OFF-time in relation to the DB-baseline was consistent with that observed at DB-part (~2.0-h). For subjects that were under placebo in the DB-part, a decrease of ~1.2-h in relation to OL-baseline and a relevant decrease of ~2.2-h in relation to the DB-baseline, were observed. For subjects that were under entacapone in the DB-part, a decrease of ~0.7-h in relation to OL-baseline and a relevant decrease of ~2.2-h in relation to the DB-baseline, were observed. OPC was safe and well tolerated.
Conclusion: Long-term use of OPC was safe, well tolerated, presented a sustained efficacy in reducing the OFF-time in PD patients on levodopa-therapy and with motor-fluctuations and offered an additional 0.7-h reduction in OFF-time in patients switched from ENT.

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945
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Movement Disorders
Adaptive deep brain stimulation in patients with Parkinson's disease: phase II clinical trial preliminary results

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Background: Emerging evidence now suggests that conventional deep brain stimulation (cDBS) for the treatment of Parkinson's disease (PD) could be optimized using adaptive deep brain stimulation (aDBS) continuously supplies the stimulator with new settings obtained by analyzing control variable related to the patient's current clinical state. A reliable control variable is subthalamic local field potential (LFP) activity recorded from the stimulating electrode itself.
Objective: We designed a randomized, double-blind, cross-over clinical trial to compare the efficacy, the safety and the amount of charge delivered (TEED) of aDBS versus cDBS using an external dual (cDBS or aDBS) mode portable device controlled by LFPs.
Patients and methods: Seven patients were randomly assigned to aDBS or cDBS as first treatment and blinded to the treatment. Both aDBS and cDBS were administered for 2 hours consecutively, during which the patient was assessed every 30 minutes, by a blinded investigator, through the UPDRS III and the Rush dyskinesia scales. The experimental sessions were also video-recorded in order to analyze any treatment related Adverse Events (AE).
Results: Over the 2 hour of stimulation the patients exhibited a reduction of dyskinesias during aDBS compared to cDBS maintaining the same UPDRS III score. There were no treatment related AE (severe, moderate and mild) both during aDBS and cDBS. The TEED during aDBS was 70% less than cDBS ($p < 0.03$).
Conclusions: Preliminary data showed that aDBS is safe and well tolerated in PD patients and decrease the amount of TEED, thus obtaining a reduction of dyskinesias. Our work should help understand how aDBS therapy works in PD and indicate future technical and clinical advances.

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946
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Movement Disorders
TRIM28 regulates the stability and toxicity of alpha-synuclein and tau through a common mechanism

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It is increasingly clear that the pathogenesis of a number of neurodegenerative diseases involves elevated steady-state levels of specific protein(s). In Parkinson's disease (PD) and Alzheimer's disease

(AD), for example, elevated levels of alpha-Synuclein and tau drive pathogenesis, and tissues from AD and PD patients sometimes display accumulations of both proteins. Some studies have shown that these two proteins can seed each other's formation of toxic moieties, but it remains unclear what increases the levels of both proteins. To uncover common pathogenic pathways and identify molecules that might reduce toxicity in these two diseases, we screened for modifiers affecting the steady-state levels of both alpha-Synuclein and tau. We found that TRIM28 regulates both alpha-Synuclein and tau stability in human cells, Drosophila and mouse brain and that reduction of TRIM28 rescues toxicity in Drosophila and mouse models of alpha-Synuclein- and tau-mediated degeneration. We further discovered that TRIM28 promotes alpha-Synuclein and tau stability and toxicity through SUMOylation and subsequent nuclear translocation and that this accelerates pathology in mouse models of synucleinopathy and tauopathy. This study underscores the importance for intersecting screens across comorbid proteinopathies to reveal shared mechanisms.

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947
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Movement Disorders
Cerad battery can be used for the diagnosis of dementia in Parkinson's disease?

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Background: The neuropsychological battery developed by the Consortium to Establish a Registry for Alzheimer's disease (CERAD) is widely used as an instrument for cognitive assessment in patients with Alzheimer's disease (AD), but not for Parkinson's disease (PD). The Scales for Outcomes in Parkinson's disease-Cognition (SCOPA-Cog) has been shown to be a clinimetrically rigorous and valid instrument for a disease-oriented neuropsychological assessment of PD patients.
Objective: The aim of this study was to evaluate the possibility of using CERAD battery as dementia diagnostic tool in patients with PD.
Methods: A total of 33 patients with diagnosis of idiopathic PD were recruited and assessed for cognitive state with SCOPA-Cog (gold-standard – cutoff for dementia = 22 points) and CERAD Battery.
Results: A total of 28 patients had some degree of dementia (dementia in PD – PDD) and 5 had a normal cognition for SCOPA-Cog. The results of CERAD Battery ranged between 10 and 80 points. The AUC (Az) was 0.1015 ± 0.078. The accuracy for CERAD battery was 51.5%, the sensitivity was 42,9% and the specificity was 100%.
Conclusions: Despite the fact that CERAD has demonstrated high specificity, this study suggests that SCOPA-Cog should be preferred in the evaluation of PDD due to low sensitivity and accuracy found with the CERAD battery.

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948
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Movement Disorders
Screening for cognitive impairment in patients with Parkinson's disease

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Background: The MoCA (Montreal Cognitive Assessment) and MMSE (Mini Metal State Exam) have been used as screening tool to cognitive impairment in Parkinson's disease (PD). The Scales for Outcomes in Parkinson's disease-Cognition (SCOPA-Cog) has been shown to be a clinimetrically rigorous and valid instrument for a disease-oriented neuropsychological assessment of PD patients.
Objective: The aim of this study was to evaluate the possibility of using MoCa and MMSE as cognitive impairment screening tool in patients with PD.
Methods: A total of 33 patients with diagnosis of idiopathic PD were recruited and assessed for cognitive state with SCOPA-Cog (gold-standard – cutoff for dementia = 22 points). The results with SCOPA-Cog were compared with MoCa and MMSE scores.
Results: A total of 28 patients had some degree of dementia (dementia in PD – PDD) and 5 had a normal cognition for SCOPA-Cog. MoCa had 100% for specificity, 51,5% for accuracy and 42,9% for sensitivity. MMSE had 100% for specificity, 39,4% for accuracy and 28,6% for sensitivity. The AUC - Az (ROC) was 0.0491 for MoCA and 0.1022 for MMSE.
Conclusions: This study suggests that MoCa should be preferred in screening for PDD due greater sensitivity and accuracy than MMSE.

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949
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Movement Disorders
Improvement of cognitive function after the endpoint of Dash-PD study (Donepezil Application for Severe Hyposmic Parkinson Disease), a case report

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Objective: To report a case who showed improvement of cognitive function after end point with administration of donepezil.
Patients and methods: A 72 years old PD patient with ten years disease duration was screened as a candidate for DASH-PD. The examination revealed severe hyposmia and normal cognitive function. She was judged as competent for DASH-PD, and participated the study after informed consent.
Results: Six month after participation, she developed visual hallucination and delusion. The examination revealed emergence of cognitive decline. She was judged as reached to end point of DASH-PD. Her investigational drug was stopped, donepezil (3 mg/day for initial two weeks, then 5 mg/day) and low dose risperidone was prescribed. Six months after end point, neuropsychological examination showed recovery of cognitive function to baseline. The examination at twelve months after end point revealed further improvement.
Conclusion: Although the content of her investigational drug is unknown, this case may suggest a strategy of early detection of cognitive decline by structured neuropsychological evaluation and active intervention is useful to prevent progression of dementia in advanced PD patients.

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950
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Movement Disorders
Mutations in the AMPA receptor complex protein FRRS1L cause an inherited Huntington-like chorea-dementia syndrome

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Background: Although most patients with progressive chorea and dementia harbor CAG expansions in Huntington disease (HTT), a proportion of patients are HTT-negative.
Objective: To unravel the cause of a novel Huntington-like phenotype in humans.
Patients and methods: In a multiplex, consanguineous Saudi family with four siblings with juvenile onset chorea, dementia and seizures with normal HTT alleles, we applied a combined homozygosity mapping and exome sequencing approach to identify novel genes.
Results: Our studies uncovered a homozygous premature truncation mutation in FRRS1L, an AMPA receptor complex constituent, that segregated with affected status within the family. We detected an additional unrelated patient with biallelic mutations and a similar phenotype. Validation studies revealed markedly decreased protein abundance and evidence of protein mislocalization, consistent with loss of the membrane-interacting domain. Electrophysiologic investigations showed that loss of FRRS1L markedly impairs AMPA receptor-mediated currents in cultured neurons.
Conclusion: These results indicate that mutations in FRRS1L cause a novel Huntington-like phenotype in humans and implicate AMPA receptor dysfunction in hereditary chorea, dementia and seizures.

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951
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Movement Disorders
Deep brain stimulation in Parkinson's disease: first report of 18 patients treated in Ecuador

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Background: Deep brain stimulation (DBS) has been approved since 2002 for the symptomatic management of Parkinson's disease (PD). In Ecuador, DBS started in 2010 with isolated cases in different cities across the country. In 2013, a multidisciplinary group was formed and 18 patients have been implanted since.
Objective: To report our experience with DBS in Ecuador.
Materials and methods: All patients who had DBS for PD between December 2013 and January 2015 were included. All patients had neuropsychiatric testing and signed informed consent prior to the surgery. The variables obtained were sex, age, adverse events, duration of disease, UPDRS III scores and medication changes.
Results: A total of 18 patients had bilateral DBS to the subthalamic nucleus between December 2013 and January 2015. 12 were men and 6 were women. The average age was 57.61 (43-75) and the average duration of the disease was 11.66 years (6-21). One patient died suddenly 3 days after surgery. Of the remaining 17 patients, the mean pre surgical UPDRS score was 51.23 (30-89) and the mean UPDRS score three months after surgery was 14.58 (5-27). The most common adverse events were paresthesias and dysarthria, which improved as the stimulation parameters were modified. In eight patients the medications were decreased by 25% three months after surgery.
Conclusion: Although there is worldwide experience with DBS, this is the first report of patients treated in Ecuador. Our outcomes are similar to the expected outcomes reported in the literature.

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952
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Movement Disorders
Effect of deep brain stimulation the subthalamic nucleus on the acoustic parameters of speech in Parkinson's disease

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Background: Speech disorders are common symptoms in the course of Parkinson's disease (PD). Dysarthria with slowing and microphonia concerns nearly 90% of individuals suffering from PD. The effects of dopaminergic medication as well as deep brain stimulation (DBS) on speech intelligibility are variable and difficult in clinical evaluation.
Material and method: Material consisted of 5 right-handed (DBS) patients (3 males, 2 females) with PD and dysarthia. In all cases acoustic analysis of speech sounds was performed with the use of computer programmes called "Iris" and "Diagnoscope Specjalista" before and during high-frequency DBS of the subthalamic nucleus (STN). Acoustic analysis of verbal tests, recorded on hard disc of the personal computer (PC), included speech rate, selectivity and stability of sounds.
Results: After implementation of electrode into subthalamic nucleus and beginning stimulation, we noticed shortening of speech rate, reduction of speech fluctuations and voice tremor with evident stability of vocal effort in patients with PD.
Conclusions: High frequency DBS in PD stabilizes acoustic parameters inducing improvement of speech intelligibility. Acoustic analysis may be used for objective assessment of physical speech alterations before and after implementation of stimulating electrodes into STN in PD. This preliminary report suggests the important role of basal ganglia on the performing speech sounds.

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953
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Movement Disorders
Meaning of malnutrition factors in Parkinson's disease

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Background: Malnutrition usually occurs in advanced Parkinson's disease (PD), and is related to dysphagia, other motor and cognitive disturbances.
Objective: The aim of the study was to define the grade of malnutrition in PD patients, and the dependency on medical history, clinical symptoms, biochemical, and bioelectrical impedance analysis (BIA) parameters.
Material and methods: We analyzed 40 PD patients (21 women and 19 men), with a mean age of 67 years. In the study group we performed interview of diet with SGA scale, coexisting diseases and concomitant treatment, also the use of stimulants, we performed clinical examination (UPDRS and Hoehn-Yahr scales), screening

blood test, assessed the thickness of skin folds, hand force in dynamometer test, and body composition by means of bioelectrical impedance analysis. Body mass index (BMI), quality of life in PDQ-39 scale and depression in Beck depression scale were also done.
Results: The mean severity of PD was 2.5 points in the Hoehn-Yahr scale. The mean motor impairment in the UPDRS part III was 23 points in "on" phase. Malnutrition was observed in 7% of patients, the risk of malnutrition in 12%. The incidence of malnutrition correlated with the presence of depressive disorders, bradykinesia, and choreic dyskinesia. None of the patients suffered from dyphagia. The body composition analysis revealed the reduction of body fat.
Conclusion: Nutrition disorders appear to be an important consequence of advanced PD. Malnutrition prevention, early recognition, and insufficiency replacement are basic for efficacious PD treatment.

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954
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Movement Disorders
High DJ-1 level in urine exosome of Koreans with Parkinson's disease

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Parkinson's disease (PD) is a difficult disease to diagnose although it is the second most common neurodegenerative disease. Recent studies show that exosome isolated from urine contains LRRK2 or DJ-1, proteins whose mutations cause PD. To investigate a potential use for urine exosomes as a tool for PD diagnosis, we compared levels of LRRK2, -synuclein and DJ-1 in urine exosomes isolated from Korean PD patients and non-PD controls. LRRK2 and DJ-1, but not -synuclein, were detected in the urine exosome samples, as reported previously. We initially could not detect any significant difference in these protein levels between the patient and control groups. However, when age, disease duration, L-dopa daily dose and gender were considered as analytical parameters, LRRK2 and DJ-1 protein levels showed clear gender-dependent differences. In addition, DJ-1 level was significantly higher (1.7-fold) in male patients with PD than that in male non-PD controls and increased in an age-dependent manner in male patients with PD. Our observation might provide a clue to lead to a novel biomarker for PD diagnosis, at least in males.

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955
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Movement Disorders
Phenotype-genotype correlations of GBA mutations in Parkinson disease patients from the Island of Crete

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Introduction: Glucocerebrosidase (GBA) gene mutations are a major risk factor for the development of Parkinson's disease (PD). The phenotypic-genotypic correlations of such mutations remain to be clarified.
Objective: In the present study we aimed to investigate the prevalence of GBA mutations in PD patients and controls from the island of Crete and to study their phenotypic expression.
Methods: A cohort of 226 patients with PD and 128 elderly controls were screened for two GBA mutations associated with mild (N370S) and severe (L444P) Gaucher disease. Available first degree relatives of GBA carriers were also genotyped. Clinical and demographic data of GBA-mutation carriers and non-carriers patients were compared.
Results: We identified 7 GBA mutation-carriers among PD patients and 2 in the controls, (3.1% versus 1.5% ($p > 0.05$). Six PD patients were found to be L444P positive whereas only one carried the common benign N370S mutation (2.65% and 0.45% respectively). GBA-carriers displayed an earlier onset of PD and were more likely to develop dementia, psychosis, depression and hyperkinesias as compared to GBA-non carriers. The clinical expression of the GBA-related parkinsonism involved the typical idiopathic form of the disease. However, two patients developed late in their disease course, atypical features, such as Pisa syndrome, pyramidal signs and vertical ophthalmoplegia.
Conclusions: GBA mutations represent a significant risk factor for PD on the island of Crete. Cretan PD patients that are GBA-carriers present the typical idiopathic late onset PD but can also develop atypical features.

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956
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Movement Disorders
A new classification of cervical dystonia for botulinum toxin therapy: the col cap concept

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Botulinum neurotoxin A is the treatment of choice for cervical dystonia (CD). Treatment outcome is significantly dependent on the correct assessment of the muscle involved. In a study with imaging (MRI, CT) in patients with CD, it was noted that the previous phenomenological classification of CD in four groups (torti-, latero-, ante- and retrocollis) is inadequate (Reichel 2009). We conducted a large study using clinical examination, CT and MRI, with the overall aim of elucidating a more precise method of differentiating forms of head and neck postures in patients with CD (Reichel 2011). Patients and methods**:** 78 patients with diagnosed primary CD were examined. The soft tissues of the neck were examined using MRI tilted towards the deep neck muscles. Characterization of different forms of the abnormal head (-caput) and neck (-collis) postures in patients with CD was conducted by clinical evaluation and radiological examination.
Results: It was shown that in lateral flexion and in rotation, in 1/5 of patients the disorder affected only muscles which work on atlanto-occipital joints (latero- or torticaput), and in a further 1/5 it affected only muscles which work on the cervical spine (latero- or torticollis). 3/5 showed both disorders.
Recommendations: In the case of rotation, the position of the larynx may be helpful. In torticaput, it tends to remain in the middle, whereas in torticollis it tends to be turned to the side. In lateral shift laterocollis occurs on one side and laterocaput on the other side. An analysis of forward or backward flexion can be performed by lateral examination of the angles between the cervical spine and the thoracic spine and/or between the cervical spine and the skull.

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958
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Movement Disorders
Variation in recent onset Parkinson's disease: implications for pre-motor detection

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Background: The premotor detection of Parkinson's disease (PD) is desirable in order to test treatments with neuroprotective potential. The ability to achieve this will be affected by the known substantial variations in PD.
Objective: To examine the presence and correlates of 4 key non-motor features of PD thought to predate motor presentation.
Methods: Hyposmia (University of Pennsylvania smell identification test < 16th centile), rapid-eye movement sleep disturbance (RBD screening questionnaire >4), depression (Leeds > 6) and constipation (<1 motion daily/laxative use) were recorded in recent onset PD cases in the Tracking Parkinson's (PRoBaND) study.
Results: In 858 PD cases, mean age 67.7 years (SD 9.1), 34.1% female, mean disease duration 1.4 years (SD 0.9), hyposmia was present in 71.3%, RBD in 42.5%, constipation in 33.8% and depression in 20.9%. 0 of 4 features were present in 10.1% of cases, 1/4 in 35.6%, 2/4 in 33.2%, 3/4 in 16.6%, and 4/4 in 4.5%. Motor severity (unified Parkinson's disease rating scale) increased according to the number of non-motor features, from mean 19.8 (SD 9.8) with 0/4, to 28.4 (SD 10.0) for 4/4 features (Kruskal-Wallis $p = 0.001$). There was no change in Montreal cognitive assessment according to the number of non-motor features ($p = 0.445$).
Conclusions: The frequency of non-motor features in early PD varies, and correlates with motor severity, but not with cognition. A substantial proportion (45.7%) of recent onset PD cases have only one, or none, of the 4 key non-motor features. Using the presence of multiple non-motor features to screen for very early PD will lack sensitivity.

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959
WFN15-1030
Movement Disorders
Cardiovascular risk and statin use in recent onset Parkinson's disease

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Background: Vascular disease is common in patients with Parkinson's disease (PD). Statins are effective treatments and are recommended in established vascular disease, or when the calculated vascular risk is high (recent UK guidance suggests ≥10% 10 year risk), but implementation of this in PD may be suboptimal.
Objective: To determine the frequency of vascular disease, 10 year cardiovascular risk, and prescription of statin therapy in patients with recent onset PD.
Methods: Vascular disease, risk factors and statin use were recorded in recent onset PD cases recruited to the Tracking Parkinson's (PRoBaND) study. 10 year cardiovascular risk was quantified using the QRISK2 calculator (http://www.qrisk.org/) and statin use considered against the new 10% and previous 20% risk thresholds.
Results: The cohort had 1,989 cases, mean age 67.6 years (SD 9.3) and 65.5% male. Cardiac disease was present in 12.6%, stroke/TIA 5.0%, high cholesterol 32.4%, hypertension 34.2%, and diabetes 9.0% of cases. 300 (15.1%) of 1,989 patients had established vascular disease, of whom 227 (75.7% of 300) were prescribed statins. QRISK2 was calculable in 1646 cases. 1020 (62.0%) had a QRISK2 score >10%, of whom 273 (26.8% of 1020) were prescribed statins. 568 (34.5%) had a QRISK2 score >20%, of whom 196 (34.5% of 568) were prescribed statins.
Conclusion: A high proportion of recent onset PD patients have an indication for statin therapy, but are not prescribed it. Further research should explore the reasons for this, and whether there are differences from patients without PD.

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960
WFN15-1371
Movement Disorders
Lentiform fork sign and multisegmental dystonia syndrome in a patient with diabetes mellitus and uremia on regular hemodialysis

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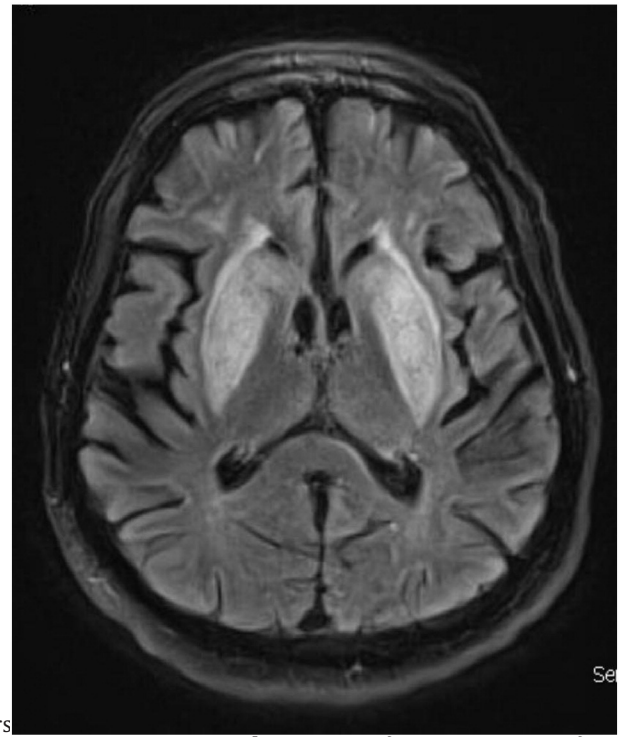
Background: Lentiform fork sign is a rare neuroimaging sign, reported in patients with diabetes, uremic encephalopathy on hemodialysis (HD) with or without metabolic acidosis.
Objectives: To report unusual case of dystonic syndrome associated with the presence of bilateral symmetrical basal ganglia lesions known as the lenticular fork sign.
Method: We are reporting a video-recorded case of a 56 year-old male with CRF on regular HD who had sub-acute development of oro-mandibular dystonia, speech disturbance and gait apraxia associated with lentiform fork sign.
Results: A 56 year old male who had a history of HTN, DM, IHD, peripheral vascular disease and CRF on regular HD was admitted due to progressive articulation and speech disturbance, oro-mandibular and upper limbs dystonia as well as gait apraxia.

One week before his symptoms began he had endovascular repair for his right iliac and SFA stenosis. The patient had his regular HD on next day.

His clinical neurological symptoms appeared as an involuntary lip smacking which were associated with articulation difficulties. Symptoms progressed over few weeks to extent that the patient became unable to communicate due to severe articulation and expression difficulties and he also developed gait apraxia. Symptoms did not improved even after we intensifies his HD sessions (daily).

Conclusion: Majority of published cases with lentiform fork sign were associated with depressed level of consciousness, parkinsonian symptoms or choreoatetosis. To the best of our knowledge this is the



firs nia associated with lentiform fork neuroimaging sign.

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961
WFN15-1547
Movement Disorders
Reduced dorsolateral putaminal connectivity in resting state FMRI in Parkinson's disease

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Objective: Here, we propose a novel framework to parcellate functional subregions of the putamen into the dorsolateral striatum (DLS) and dorsomedial striatum (DMS) connectivities. These have been postulated to be instrumental in some of the deficits seen in PD. Changes in the DLS in PD may result in loss of habitual control, while the DMS, associated with goal-oriented control, tend to remain intact.

Methods: Twenty-one subjects (12 PD, 9 controls) were scanned at rest, with eyes closed. Anatomically-defined ROIs were segmented using the open source program, Freesurfer (Harvard). Utilising prior structural and functional knowledge of the striatum from animal studies, we employed 1) a sparse spatially regularized fused lasso regression model, 2) an iterative voxels (groups) merging and adaptive parameter tuning process and 3) a Graph-Cut optimization algorithm on our data.

Results: In all subjects, spatially continuous and functionally consistent subdivisions of the putamen into the DLS and DMS were seen. (see Fig. 1). However, in the PD group, the ratio of number of voxels in the DLS/DMS was significantly smaller (t-test, p-value = 0.0186) (see Fig. 2).

Conclusion: This pilot study confirms that the DMS and DLS connectivities in the putamen may be reliably parcellated out to distinguish between PD and controls. As PD patients lose control of habitual movements associated with impaired DLS network, the ratio of voxels number in the DLS/DMS is lowered. Further work is needed to determine if effective interventions to restore automatic movements (e.g. walking) result in normalization of these abnormal striatal connectivity patterns.

Figure 1: This bar graph illustrates the total number of voxels in the dorsolateral striatum (DLS) and dorsomedial striatum (DMS) of the putamen in both healthy controls and PD subjects.

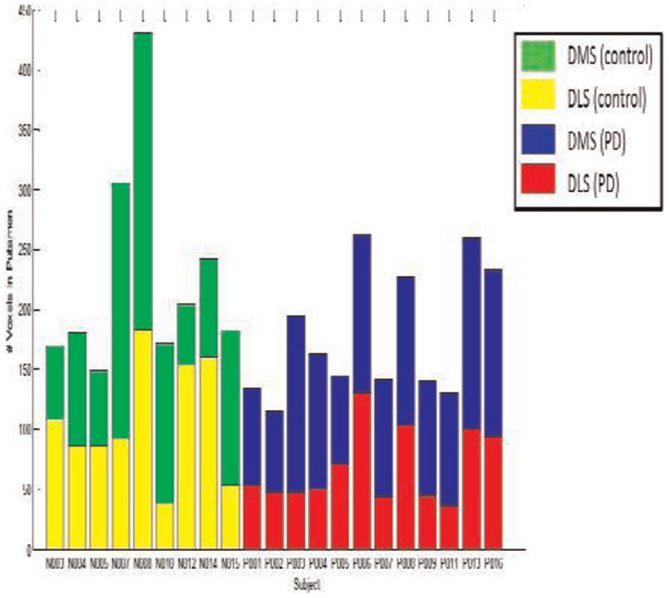
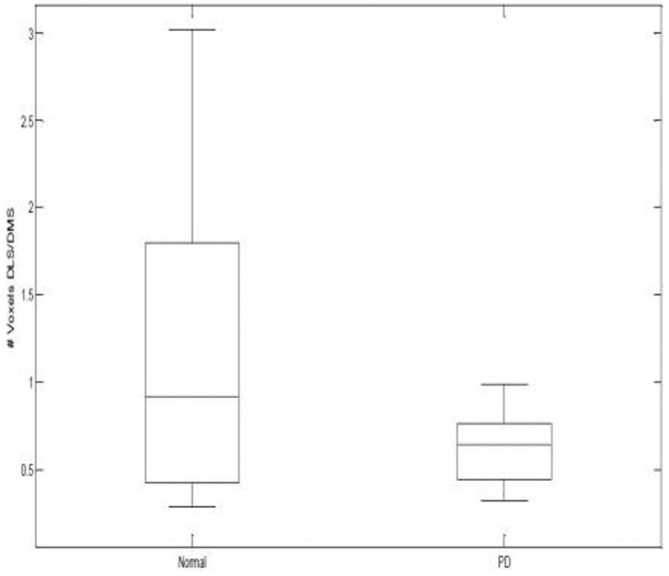


Figure 2: The ratio of number of voxels in the dorsolateral straitum (DLS) over dorsomedial straitum (DMS) is significantly lower in Parkinson's subjects versus healthy controls (Student's t-test, *p value = 0.0186).



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962
WFN15-0229
Movement Disorders
Malnutrition and Parkinson disease

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Backgronud: Patients with Parkinson`s disease are under higher risk for weight loss and malnutrition. Some of them suffer from weight loss even before diagnose of Parkinson disease was made. Malnutrition is connected with worse quality of life, shorter lifespan, poorer response to therapy, osteoporosis, susceptibility to infections and bedsores and deterioration in motor, mental and autonomic functions.
Objective: to investigate frequency of the malnutrition in Parkinson's disease patients and to find correlation with age and disease duration.
Patients and methods: We had analysed patients with idiopathic Parkinson`s disease. Study was approved from Ethics Committee. As a research instrument, a specially designed questionnaire was used that contained general questions and the Mini Nutritional Assessment (MNA) tool to assess the presence of risk for malnutrition. Data were evaluated using χ^2-test with the significance of $p < 0,05$.
Results: We had analysed 68 patients, 42 (61,8%) male and 26 (38,2) female. They were in range from 41 to 86 years old with average age $70,4 \pm 8,9$ years. The average duration of the disease was $5,7 \pm 4,4$ years. According to the MNA results, 38 (55,9%) patients were at risk of malnutrition and 9 (13,2%) patiens were malnourished. We find no statistical significant difference between MNA and patients age ($p = 0,071$) neither the MNA and disease duration ($p = 0,137$).
Conclusion: More than half patients were at risk for malnutrition and 13,2% were already malnourished. We have found no correlation with age and disease duration and malnutrition. Nutritional status should be integrated in routine patient follow-ups even from early stage of disease.

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963
WFN15-0373
Movement Disorders
Serotonin and noradrenaline reuptake inhibitor duloxetine reduces daily off time in Parkinson's disease

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Backgrounds: Duloxetine is an antidepressant that inhibits serotonin and noradrenaline reuptake. We have demonstrated that serotonin and noradrenaline transporters play a major role in uptake of L-dopa-derived dopamine in the rat striatum with massive dopaminergic denervation by 6-OHDA. Furthermore, we have shown that duloxetine enhances L-DOPA-induced motor behaviors in the rat model Parkinson Disease (PD).
Study aim: To examine efficacy of duloxetine in PD patients with wearing-off in an open label study.
Methods: Permission for the study was given by Ethical Committee of Aomori Prefectural Central Hospital. Written informed consents to participate in the clinical trial were obtained from 13 PD patients (eight women and five men) with depressive complaints and wearing-off at least for 2 hours a day. A stable regimen of all antiparkinsonian drugs had kept for at least 4 weeks prior to participation to the study. Duloxetine 20 mg/day was given during the first week then increased to 40 mg/day. Patients' diary and clinical evaluations were made at 0, 2, 4 and 8 weeks.
Results: Eleven patients completed the study. When compared to 0 week, UPDRS part II score during ON (-0.64, $P < 0.05$) and OFF (-2.8, $P < 0.05$) and UPDRS part III score during ON (-4.43, $P < 0.01$) significantly improved at 8 weeks. Daily OFF time became significantly shortened (-4.9 hours, $P < 0.01$) at 8 weeks. However, 4 patients complained of aggravation of troublesome dyskinesias.
Conclusions: Duloxetine enhances the effects of L-DOPA and shortens daily OFF time, but may worsen L-DOPA-induced dyskinesias.

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964
WFN15-1464
Movement disorders
Mc Leod neuroacanthocytosis syndrome: a case report

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Mc Leod Neuroacanthocytosis Syndrome is a X-Linked disorder presenting with multisystem involvement. The main features are: i) absence of expression of Kx erythrocyte antigen, ii) weak expression of Kell glyprotein antigens, iii) red blood cell acanthocytosis, iv) increased serum creatinkinase, V) neurological deficits. This case is a 48 yo, male, with a maniacal episode in 2003. Four year later presented with dysphagia and also bucolingual, axial and limb chorea. The neurological examamination showed temporal muscles atrophy, tonghe with multiple scars. Disarthria and vocal tics. Limbs with mild paresis (M4/5) and distal atrophy. Frequent choreic type movements in upper and lower limbs.

Laboratory tests showed acanthocytosis, creatine kinase in peripheral blood of 10.6%. Electromyography showed axonal sensory polyneuropathy and myopathic elements in upper limb muscles. No cardiomyopathy or arrhythmias. Brain magnetic resonance imaging showed atrophy of the caudate nuclei. The immunohaematological study confirmed the absence of expression of Kell antigens and KX.

The treatment with risperidone and valproate diminished clinically the choreic movements. Our case emphasizes the importance of the clinical elements that are associated with the choreic symptoms specify for a more precise diagnosis.

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965
WFN15-0415
Movement Disorders
Improvement of drug-resistant tremors with botulinum toxin treatment

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Objective: We report our experience with the use of botulinum toxin (BT) in 22 patients with drug-resistant tremor.
Background: BT is current treatment for dystonia and other movement disorder. Drugs are effective in 50-70% of patients affected by Essential tremor but they are generally inefficient in other tremors. BT has been shown to be effective in reducing tremor, but side effects could limit its use.
Methods: 22 patients affected by refractory tremors of limbs or head and treated with incobotulinumtoxinA, were retrospectively evaluated. The aetiology was idiopathic tremor (8), multiple sclerosis (6), posttraumatic

tremor (4), Parkinson Disease (2) and spino-cerebellar ataxia (2). Tremor involved upper limbs in 20 cases and head in 2 cases. Clinical and EMG assessment of each patient identified tremor-related muscular involvement. Muscles most active were teres major, infraspinatus, deltoideus posterior, biceps brachialis and pectoralis major. Thirteen patients were treated with EMG-guided BT injection.

Results: A significant clinical improvement was observed in 14 patients. Seven of the eight unsatisfied patients were treated without the use of EMG-guided procedures. Three patients affected by multiple sclerosis reported weakness managed by a toxin dose decrease. No major side effects were reported.

Conclusions: BT injections are an effective and safe treatment for drug-resistant tremors of different origin type, mainly affecting proximal muscles of the arm. Weakness seems a dose-dependent side effect, particularly in patients with previous strength impairment. We highlight the utility of clinical and electrophysiological evaluation of tremor, eventually followed by EMG-guided injection in complex cases.

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966
WFN15-0071
Movement Disorders
Balance training with augmented visual feedback in Parkinson's disease: a randomized clinical trial

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Postural instability and falls are a major problem in patients with Parkinson´s disease (PD). Balance training with explicit visual feedback in a virtual reality environment may improve postural stability. The objective was to investigate whether a balance training program using augmented visual feedback is feasible, safe, and more effective than conventional balance training in improving postural control in patients with PD.

Thirty-three patients with idiopathic PD participated in a balance training program consisting of ten group treatment sessions of 60 minutes. Participants were randomly allocated to (1) an experimental group receiving training using augmented visual feedback (VFT), or(2) a usual care group. Standing balance performance and health status were assessed at entry, at six weeks, and at twelve weeks follow-up.

Sixteen patients were allocated to the control group and 17 to the experimental group. Change scores for all balance measures favored VFT, although, the change in primary outcome measure Functional Reach test did not differ between groups ($t(28) = -.116$, $p = .908$). No other differences between groups were found to be statistically significant. VFT showed to be a feasible and safe approach to balance therapy for patients with PD. However, in this proof-of-concept study, VFT was not superior over conventional balance training.

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967
WFN15-1290
Movement Disorders
Cognitive impairment in Parkinson disease: clinical and neuropsychological features

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Background: PD includes both motor and non-motor symptoms, treatment of non-motor symptoms is often overlooked, especially cognitive impairment.

Objective: Evaluate witch clinical variables are related to cognitive impairment in PD and contrasts cognitive assessment of PD and controls.

Patients and methods: We performed a case-control demographic, neurological and neuropsychological analysis with several inclusion and exclusion diagnostic criteria.

Conclusion: This PD sample was characterized predominantly of amnestic multiple domain MCI. We did not find correlation between cognitive impairment and motor subtype or UPDRS III score. PD presented more severe impairment in all test with p value < 0.05 (Table 1).

	Patients		Control Group		*P*
	Mean	*sd*	Mean	*sd*	
Immediate Memory [(1)]	4.66	1.405	5.48	1.752	0.040
Episodic Declarative Memory[(1)]	5.88	3.280	8.97	3.779	0.001
Learning[(1)]	14.38	6.781	19.48	7.285	0.005
Memory Recognition[(1)]	6.50	4.990	9.48	5.245	0.022
Executive function (Speed Processing)[(2)] (seconds)	21.73	11.642	16.31	3.147	0.012
Speed Processing[(3)]	66.56	23.996	44.24	14.603	<0.000
Executive Functions[(4)] (Set-shifting/ switching/inhibition)	200.36	128.282	109.67	59.902	0.001

[(1)]Rey Auditory Verbal Learning Test (RAVLT), [(2)]Time 1 (seconds) - Stroop Test; [(3)]Time A (seconds) Trail Making Test; [(4)]Time B (seconds)Trail Making Test

	Patients	Control Group
	Mean (*sd*)	Mean (*sd*)
N	32	33
Gender (male %)	68,8	33,3
Age (years)	61.00 (7.269)	60.18 (6.673)
Education Level (years)	10.84 (4.120)	13.52 (3.429)
MMSE Score	26.41 (2.298)	27.39 (1.248)
MoCa Score	23.09 (3.658)	23.91 (2.638)
DP durantion (months)	83,25 (35.537)	
UPDRS III	18.5	-
H-Y	2.07	-

sd, standard deviation; MMSE, Mini Mental State Exam; MoCa, Montreal Cognitive Assessment —, not evaluated.

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969
WFN15-1582
Movement Disorders
The effect of deep brain stimulation of the subthalamic nucleus on sleep in advanced Parkinson's disease

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Parkinson's disease (PD) is a neurodegenerative disease with motor and nonmotor symptoms. Sleep problems are common symptom in PD patients. Our aim was to see influence of deep brain stimulation (DBS) of the subthalamic nucleus (STN) on sleep problems in PD patients using Parkinson's disease sleep scale (PDSS). We tested 20 patients with advance PD before and 1 year after DBS. Also, we used Unified Parkinson's Disease Rating Scale- motor part (III), Hospital Anxiety and Depression scale (HAD) and levodopa dosage. We found statistically significant improvement in motor symptoms (UPDRS III) and mean total PDSS score 1 year after DBS. Statistically significant improvement was

found in parts of PDSS considering quality of sleep, night-time motor symptoms and daytime sleepiness. In conclusion, we found that DBS, beside motor symptoms, improves sleep problems.

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971
WFN15-1536
Movement Disorders
Pain assessment in wearing off period of levodopa treatment for Parkinson's disease

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Background: Pain is a frequent feature reported in Parkinson's disease (PD). It can be an early symptom of the disease occurring before the motor symptoms. However, there still is little information about the pain during the wearing off (WO) period of levodopa treatment.
Objective: The aim of this study was to assess the pain in the WO period.
Methods: A total of 17 patients with diagnosis of idiopathic PD were assessed using the Wearing Off Questionnaire (WOQ-19). The UPDRS-III was applied at three different moments, 3 and 4 hours after levodopa administration and 1 hour after next administration of the drug to confirm the fluctuation o fmotor symptoms. There were included patients with pain at least three months before recruitment.
Results: A total of 12 (70.6%) patients had pain. 14 patients (82.4%) demonstrated WO symptoms, 6 had motor symptoms, 2 had nom-motor symptoms and 6 had motor and non-motor symptoms. In 8 patients (57.1%) with nom-motor symptoms pain was referred in 6. There was relief of pain after the next dose of levodopa in 5 of them. There was no difference between presence of pain in the groups with and without WO ($p = 1$). The pain during WO was not influenced by the presence of motor symptoms ($p = 1$). There were no difference between the groups with and without pain during WO when compared to levodopa therapy ($p = 0.5$), years of disease ($p = 0.56$), Hoehn and Yahr stage ($p = 0.43$) and the UPDRS-III score ($p = 0.77$).
Conclusion: Pain was a common feature in PD. The pain in the WO had improvement with the levodopa and did not have correlation with staging of PD. It may have different characteristics than other types of pain in PD.

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972
WFN15-0510
Movement Disorders
The spectrum of Neuropsychiatric Symptoms (NPS) in Patients with Parkinson's Disease (Pwpd)

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Objective: to investigate spectrum of NPS in PwPD according to the Hoehn&Yahr(H&Y) stage.
Background: NPS are common in PD with important consequences for life quality, daily functioning.
Patients and methods: 736 PwPD were registered in electronic movement disorders database of the Siberian region. We selected 119 PwPD with equivalent mean daily medications dose, without dementia. Patients were divided into four homogeneous groups: I–28(H&Y 2.0 stage), II–32(H&Y 2.5), III–33(H&Y 3.0), IV–28(H&Y 4.0). 34 healthy control subjects(HCs) were recruited. Clinical assessments were studied by UPDRS(III), MoCA-test, HADS, Beck depression inventory, Epworth Sleepiness Scale, Apathy Scale, Questionnaire for Impulsive-Compulsive Behavior(ICB)– QUIP-RS, SF-36.
Results: Significant differences of NPS' prevalence were in PwPD of I, II, III, IV and control groups. In IV depression was observed most often(76.92% including:46.15%–severe, 30.77%–mild), followed by delusion(30.77%), hallucination(19.23%), anxiety(61.54%:30.77%, 30.77%), apathy(69.23%), the sleep disorders(96.15%:19.23%,76.92%), cognitive impairment(84.6%) and ICB(30.7%); in III depression (66.66%:21.21%,45.45%), anxiety(60.6%:27.27%,33.33%), apathy (63.63%), sleep disorders(90.91%:24.24%,66.67%), cognitive impairment(75.75%), ICB(24.0%); in II depression(59.37%:43.75%,15.62%), anxiety(50.25%:31.25%,18.75%), apathy(53.125%), sleep disorders (81.26%:34.38%,46.88%), cognitive impairment(65.6%), ICB(19.0%). Depression(25.0%:43.75%,15.62%), anxiety(32.14%:14.28,17.86%), apathy(35.71%), DDS(10.7%) were also commonly observed in I, but delusion, hallucination, euphoria, aberrant motor behavior were seldom presented in I, II(less than 4%). Prevalence of NPS in I-II was similar to HCs than other groups.
Conclusions: The spectrum of NPS in PD was most prominent in patients in advanced disease ($p < 0.05$). Depression was most common NPS in PD. The presence of delusion, hallucination, or aberrant motor behavior could differentiate 2.5 stage from 3.0 stage, from 4.0 stage. The NPS were not prevalent in PD with 2.0 stage.

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973
WFN15-0429
Movement Disorders
Influence of non-motor symptoms on quality of life in parkinson's disease patients with different stages by the Hoehn&Yahr scale

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Background: The implications of non-motor symptoms (NMS) in quality of life (QoL) intensively studied last years.
Objective: to find out which of the NMS are better correlated with a low QoL in Parkinson's disease patients (PwPD) taking into consideration the Hoehn&Yahr (H&Y) Stage.
Methods: the study includes 169 PwPD without dementia (MOCA > 18); mean age: 68.8 ± 8.2; mean PD duration: 6.8 ± 4.6; women:men = 93:76; H&Y stages 1–4. Clinical assessments were studied using the UPDRS (III part), HADS, Beck depression inventory, Epworth Sleepiness Scale, Apathy Scale, Questionnaire for Impulsive-Compulsive Disorders (ICD), PDQ-39. Odors' identification studied using Sniffing Stix Test. Four groups of H&Y Stage were studied(homogeneous by gender, age): I– 12 PwPD (UPDRS 19.5 ± 8.6), II– 56 (UPDRS 28.5 ± 16.4), III– 72 (UPDRS 35.9 ± 18.9), IV– 29 (UPDRS 52.2 ± 33.6).
Results: the I group has a high correlation (Spearman coefficient q > 0,5) between PDQ-39 and such NMS as anxiety, depression, cardiovascular disorders, constipation, RLS and paraesthesia. The II

has a high correlation between PDQ-39 and such NMS as mood disorders, ICD, daytime sleepiness, smell dysfunction. The III group has a high correlation between PDQ-39 and such NMS as depression, apathy, ICD, psychosis, smell dysfunction, cognitive impairment. The IV group has a high correlation between PDQ-39 and apathy, smell dysfunction, cognitive impairment, psychosis, hallucination, urinary dysfunction and obstipation, nightmares, orthostatic hypotension, daytime sleepiness.

Conclusions: NMS influencesthe QoL in all stages of PD.

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