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Child and developmental neurology 2

**EP3101**

**Multiple sclerosis in Tunisian children**

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**Introduction:** Multiple sclerosis (MS) is an inflammatory disorder of the central nervous system commonly diagnosed in adults. It is being recognized increasingly in children. The objective of this study was to report epidemiological, clinical features and effect of disease modifying therapies (DMT) in a series of Tunisian patients with pediatric MS.

**Methods:** Retrospective study (2005-2014) was conducted in 10 children with relapsing-remitting MS (according to 2010 Mc Donald criteria) followed up in our department. Epidemiological, clinical data and DMT effects were analyzed.

**Results:** There were 3 males and 7 females (Mean age was 15.9 years (5-20 years)). Mean age at onset was 11.9 years (3-17 years). Mean follow-up period was 3.8 years. Three patients were followed up for type 1 diabetes that preceded the first demyelinating event. Optic neuritis and motor dysfunction were the most common presenting features. ADEM-like presentations were noted in 2 patients. Interferon (INF) β 1a and INF β 1b were respectively prescribed in 7 and 3 cases. All patients received INF after their second demyelinating attack. They showed a decrease of their annualized relapse rate without any intolerance symptoms. However, a disease progression was noted in 1 patient in spite of a full medication adherence.

**Conclusions:** Our findings, although based on a small case series of patients, suggest that diagnosis of MS is still challenging in children younger than 12 years who usually have ADEM-like presentations. Early treatment with IFNβ-1 has been found to be safe and beneficial for Tunisian children with MS.

**Disclosure:** Nothing to disclose

**EP3102**

**Obstructive sleep apnea syndrome in children – importance of polysomnography**

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**Introduction:** The syndrome of obstructive sleep apnea (OSA) is a frequent, albeit under-diagnosed condition in children, which may lead to substantial morbidity if left untreated. The purpose of the present study was to investigate the night sleep structure in children with OSA using polysomnography (PSG) method.

**Methods:** 18 male children (mean age 10.0 years) with clinical manifestation of OSA were investigated. All children appeared to have tonsillar hypertrophy found by laryngological examination. All of them underwent a PSG and the main sleep parameters were calculated in all cases.

**Results:** According to the PSG report, the main criteria of the sleep study were the following: sleep latency-10 min, REM-22%, II stage-42%, III stage-11%, respiratory arousal-11%, saturation-96%, desaturation index-1, snoring index-38, apnea index-1.2. In particular, the episodes of central (Central Apnea - CA) and obstructive apnea (OA) were observed with low indexes (CA Index 1.5-2.5; OA Index 0.2-0.6) in all cases, mainly plagued with EEG-arousals, snore-arousals and LM-arousals.

**Conclusions:**

1. Investigation of night sleep by using PSG can help researchers to reveal variability of sleep architecture during the different clinical presentation of OSA in children.
2. PSG study in those children did not establish a clear relationship between tonsillar hypertrophy and frequency of apnea episodes.
3. PSG can help sleep specialists in distinguishing OSA from benign snoring.

**Disclosure:** Nothing to disclose
EP3103

Hypomelanisis of Ito: diagnostic based clinical criteria

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Introduction: Hypomelanosis of Ito is a rare neurocutaneous disorder characterised by hypopigmented skin lesions appearing in linear distribution on any body part. Chromosomal mosaicism and sporadic mutations are the causes of Hypomelanosis of Ito, but the identity of a specific gene has not been confirmed.

Case study: We present a child 2.5 years old with sharply marked hypomelanosis on the back and diffuse in a few other areas. On the front left side towards axillary region there is a linear depigmentation. The child has atopic dermatitis and poor development of teeth, with a palatal abscess and dental indication for extraction of all teeth. His fundus is pale and gray. He has mental retardation, pharmacoresistant epilepsy, cortical malformation and delayed myelinization as seen on MR. His speech is delayed and his behaviour is in the autistic spectrum. He has an extremely low value of sodium which we cannot attribute to SIADH, renal loss, or increased intake of fluids. He has been evaluated metabolically (organic and amino acids, biotinidase) and all tests are within normal ranges. The skin biopsy is unremarkable, most likely a mosaicism.

Conclusion: Although there are 40 or 100 or more different states of mosaicism, diagnosis is based on clinical criteria, especially unique distribution of hypopigmented lesions coupled with pharmacoresistant epilepsy and cortical dysplasia with delayed myelination. Our patient is most likely a “pigmentary mosaic of the Ito type.” In the near future, exome sequencing may help elucidate the molecular basis of many cases of so-called Hypomelanosis of Ito.

Disclosure: Nothing to disclose

EP3104

A health technology assessment protocol in children: pediatric neuromuscular ultrasound normative data

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Introduction: Neuromuscular diseases, mainly the pediatric ones, are clinically heterogeneous, progressive and disabling, often requiring invasive, uncomfortable and expensive investigations. The ultrasonographic evaluation of neuromuscular diseases is a highly specific and sensitive first level screening-tool. It is: non-invasive, painless, safe, inexpensive, easy and quickly to perform, characterized by high spatial and temporal resolution. The knowledge of physiological maturative ultrasound neuromuscular modifications is essential to correctly interpret pathological changes, to direct the differential diagnosis and guide focused II level diagnostic choices. We collected both quantitative and qualitative pediatric normative data, by a neuromuscular ultrasound (NMUS) Health-Technology-Assessment (HTA) study.

Methods: In 120 healthy children shared in 5 age-groups I) 2-5; II) 6-8; III) 9-11; IV)12-14; V)15-16 years; M65-F55).

We have performed a NMUS wide protocol for the first time including bilaterally distal and proximal muscles of upper (Forearm Flexors, Biceps brachii, Flexor carpi radialis) and lower limbs (Anterior Tibial, Long Toe Extensor, Soleus, Medial and Lateral Gastrocnemius, Rectus Femoris, Vastus Intermedius) and nerves (Median, Ulnar, Sural) evaluating muscular thickness, echogenicity and pennation and nerves’ perimeter and area.

Results: The muscular echogenicity of I-II groups was lower than III-IV-V ones. Muscular thickness increased with age and BMI, especially between IV and V groups. No significative differences were found between males and females.

Conclusions: In clinically heterogeneous pediatric neuromuscular diseases, neuromuscular ultrasound (NMUS) is an informative, easy, non invasive screening tool that, predicting presence-absence of neuromuscular disease, can help prioritise subsequent invasive investigations, guide the therapeutic rehabilitation path with restrained cost and with a minor management-duty for the care-giver.

Disclosure: Nothing to disclose
EP3105
Patterns of ankle dorsiflexion through gait cycle in children with idiopathic toe walking

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Introduction: Idiopathic toe walking (ITW) encompasses a wide range of gait variations with abnormal foot contact. Instrumented gait analysis is used to define how far these patterns are from normal gait. We aimed to outline ankle dorsiflexion patterns in ITW children.

Methods: Ankle dorsiflexion curves through 100% of gait cycle were extracted from 4-5 left/right gait cycles in 10 ITW clinically diagnosed school-aged children. 97 (48 left/49 right) curves were treated for hierarchical clustering analysis using dynamic time warping unnormalized distance as dissimilarity measure and average as grouping criterium. ITW curves were then compared with ankle dorsiflexion curves from 30 non ITW school-aged controls.

Results: 3 patterns of ITW curves are defined. Ankle dorsiflexion through gait cycle in pattern A is similar to the one shown in the non ITW group. Pattern B gathers curves in which ankle dorsiflexion curve is parallel to normal but overall ankle plantar flexion values are increased throughout the gait cycle (particularly in mid- and terminal stance). Pattern C groups curves with toe strikes at initial contact and decreased values in dorsiflexion through stance, leading to earlier foot clearance. ITW children use one (11/20 limbs), two (7/20 limbs) or even three (2/20 limbs) of these patterns to walk. Left and right gait cycles of a single patient may differ in ankle flexion pattern.

Conclusions: ITW children use different ankle dorsiflexion patterns to walk. Usually two different patterns can be used by one child. With-in patient variability should be carefully controlled in treatment studies.

Disclosure: Nothing to disclose

EP3106
Heterozygote mutation in POLR3A and AIMP1 genes in a patient with hypomyelinating leukodystrophy

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Introduction: Leukodystrophies are a heterogeneous group of inherited neurodegenerative disorders, mutations in POLR3A and AIMP1 genes were recently reported to cause clinically overlapping hypomyelinating leukodystrophy phenotypes.

Case description: We describe a 3 y.o. girl with hypomyelination leukodystrophy. She was born from non-consanguineous parents; the pregnancy and delivery were uneventful. She presented severe static psychomotor developmental delay and growth failure from the birth, spastic tetraparesis, axial hypotonia, late teeth eruption and hypodontia. Work-up of inborn errors of metabolism was normal. MRI at the age of 10 months showed diffuse hypomyelination, reduction of NAA and elevation of choline peak on spectroscopy. VEP and SEVP were normal, EEG showed focal left occipital epileptiform activity. Heterozygous missense mutation c.4112A>G (p.Asn1371Ser) was found in exon 31 of gen POLR3A, which related with hypomyelinating leucodystrophy type 7. Also c.592C>T (p.Pro198Ser) mutation in exon 5 of gene AIMP1 in heterozygote was found, which related with hypomyelinating leukodystrophy type 3.

Conclusions: Mutation p.Asn1371Ser of gen POLR3A has not been described before in the database of the project of 1000 genomes. We did not find any other mutation in the same gene. Mutation p.Pro198Ser of gene AIMP1 has not been described before. As we found only a unique mutation in 2 different genes in recessive condition we could not identify the molecular origin of the patient’s clinical phenotype. However mutation located in the intronic part of the gene could perhaps explain the clinical phenotype of the patient. Further studies are needed to characterize the nature of these mutations.

Disclosure: Nothing to disclose
EP3107

Long-term outcome in patients with West syndrome: an out-patient clinical study

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Introduction: West syndrome (WS) is an epileptic encephalopathy consisting of infantile spasms, developmental involvement and hypsarrhythmia. This study analyses the long-term development of our patients with WS.

Method: The patients were followed in the neurology clinic of Cerrahapaşa Medical Faculty for at least 3 years. Demographic features, clinical and laboratory data were registered. Three groups were formed depending on the severity of the neurological picture and as; A: Independent, mentally active; B: Supported, socially active; C: Severely handicapped. Three other groups were determined according to the state of epilepsy: I: Epilepsy +/-treatment +; II: Epilepsy controlled/ treatment +; III: No epilepsy/ no treatment.

Results: A total of 109 patients were enrolled in the study. Etiological groups were as symptomatic (99), cryptogenic (9) and idiopathic (1). Parental consanguinity was present in 30, positive family history for febrile seizures or epilepsy in 17 patients. According to the latest evaluation 7 patients were deceased, 9 patients were in group A, 63 patients in group B and 30 patients were in group C. Six patients were in group III, 50 patients in group II and 46 patients in group I. Main parameters with significant negative impact on the course of WS in our patients were presence of symptomatic etiology, partial seizures before the onset of spasms and the younger age at onset of epileptic seizures other than spasms.

Conclusion: Although WS is a condition with severe detrimental consequences, approximately half of the patient population may achieve decent standards of social living.

Disclosure: Nothing to disclose

EP3108

Juvenile migraine and cutaneous cephalic allodynia: a clinical study

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Introduction: In the past years, several studies have underlined the importance of Alldynia during cephalalgic attacks for the comprehension of migraine physiopathological mechanisms, as for its treatment. Nevertheless, there are only two studies about allodynia in the pediatric population, both undertaken in small groups. The aim of this study was to evaluate the prevalence of Allodynia during cephalalgic attacks in a juvenile population with primary headaches and to study the correlation between allodynia and other main symptoms of migraine.

Methods: A short questionnaire on allodynia was administered to all children seen in a two years period and diagnosed with primary headache. Chi-square and t-tests were used to compare nominal and continuous variables. Odds Ratio, calculated by means of a logistic regression analysis, has been used as measure of association of CAS and migraine characteristics.

Results: 230 children suffering from primary headache (105 males, 125 females, age 4-17 years) have been enrolled: 202 children were affected by migraine, 28 (12.2%) by other primary headaches; migraineurs significantly complained allodynia (37% versus 0%). Pain increased by physical activity (OR 2.0, 95% CI 1.0, 3.8), patient showed phonophobia (OR 2.3, 95% CI 1.0, 5.1) and nausea (OR 1.9, 95% CI 1.0, 3.7).

Conclusions: According to our data Alldynia is common during pediatric migraine attacks. The associations between allodynia and physical activity, nausea and phonophobia, even if not described in any precedent studies on pediatric population, are supported by several studies on adult population and they imply specific physiopathological mechanisms.

Disclosure: I would like to partecipate at the tournament of young neurologists.
EP3109

Screening for psychopathological comorbidity with Strengths and Difficulties Questionnaire (SDQ) assessment in adolescent migraine and tension-type headache

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Introduction: The SDQ is a brief psychopathological screening tool that has been recommended for the detection and classification of psychosocial problems in adolescents. Data regarding the SDQ assessment in adolescent headache are limited.

Methods: 326 adolescents aged 12-18 years were examined by trained neurologist to diagnose the headache types. Based on ICHD-II criteria, a classification of migraine and clinical relevant tension-type headache (TTH, including the subtypes “frequent episodic TTH, chronic TTH”), and mixed type of headache (in subjects fulfilling the diagnostic criteria for both probable migraine and probable TTH) were given. Clinically irrelevant “infrequent episodic TTH” was assessed as “no headache” for the main analysis. Adolescents were tested with self report version of SDQ questionnaires. Kruskal-Wallis test was used.

Results: We have found a strong positive association between TTH presence and SDQ emotional symptoms score (Kruskal-Wallis test p<0.021, fig. 1). No differences have been found in conduct problems, peer problem, and prosocial behaviour scores, as well as, SDQ total difficulties score. Additional analysis has shown that only “frequent episodic TTH” and “chronic TTH”, but not “infrequent episodic TTH”, were associated with SDQ emotional symptoms score (Kruskal-Wallis test p<0.023). No differences have been found between TTH subtypes and other SDQ scores.

Conclusions: Thus, frequent episodic and chronic TTH, but not infrequent episodic TTH or migraine, are strongly associated with psychopathological comorbidity such as emotional problems. We suggest that such subtypes of headache diagnostics and treatment in adolescents should include estimation and treatment of their mental health status.

Disclosure: Nothing to disclose

EP3110

Gender differences in the association between iron deficiency markers (ferritin, soluble transferrin receptor) and adolescent recurrent headache

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Introduction: Several psychological and neurological conditions have been described as connected to iron deficiency, such as fatigue, weakness, irritability, pica, and restless legs syndrome. However, adolescent recurrent headache has not been studied well in this relation, although the iron deficiency prevalence is high in this age.

Methods: Two adolescents groups (aged 12-18 years, otherwise healthy with normal hemoglobin level) were selected: with recurrent headache (1 or more headache episodes per week over the past 3 months) and without headache (no more than one headache episodes per month over the past 3 months). Serum concentrations of ferritin and soluble transferrin receptor (sTfR) were estimated with ELISA kits. Two-tailed exact Fisher test was used.

Results: We have found the strong positive association between recurrent headache and low serum ferritin concentration (<12µg/l) in adolescent boys only, but not in girls. This tendency was the same when had used the other cutoff point for the ferritin lowering estimation - <20µg/l, but it disappeared when we had used the cutoff point as 30µg/l. We have found no distinctions in sTfR level in accordance of presence/absence of headache and gender.

Conclusions: Low serum ferritin level is associated with recurrent headache in adolescent boys but not in girls. We suppose that the different iron deficiency pathophysiology can mask such tendency in adolescent girls. Probably, due the low erythropoietic activity in headache boys and/or low diagnostic accuracy we have found no distinctions in sTfR levels.

Disclosure: Nothing to disclose
EP3111

Intellectual ability in Duchenne muscular dystrophy and dystrophin gene mutation location

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Introduction: Duchenne muscular dystrophy (DMD) is the most common form of muscular dystrophy during childhood. Frequently observed non-progressive cognitive disability in DMD patients is caused by mutation in dystrophin gene (DMD) gene. In this study, we aim to determine association between intelligence level and DMD mutation location among our patients with DMD.

Methods: 41 male DMD patients, aged 3 to 16 years, were recruited at the Clinic for Neurology and Psychiatry for Children and Youth in Belgrade. All patients had defined DMD mutation (MLPA or PCR) and cognitive status assessment (Brunet-Lezine scale, Vineland-Doll scale, Wechsler Intelligence Scale for Children or Wechsler Adult Intelligence Scale).

Results: Between 37 patients with estimated intelligence quotient (FSIQ), six patients (16.22%) had borderline intelligence, while seven patients (18.92%) were intellectually impaired. The FSIQ was not statistically significantly associated with structural site of mutation within DMD. However, intellectual ability was statistically significantly associated with groups of DMD isoforms. Mutations affecting expression of Dp140, Dp71 and Dp40 have been associated with higher frequency and severe cognitive impairment in DMD.

Conclusions: Classification of mutation based on the altered DMD isoforms explained variation in intellectual ability with effect of cumulative loss of DMD isoforms and important role of Dp140, Dp71 and Dp40 on FSIQ.

Disclosure: Nothing to disclose

EP3112

Chemical exposure and nutritional deficiency induced pregnancy outcomes and neuropsychiatry development of children in India

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Introduction: Developing fetuses and infants are exquisitely sensitive to environmental chemicals which may disrupt the specific developmental processes and cause neurodevelopmental disabilities. At any stage during brain development alteration or disruption in the process imposed by environmental toxins & deficiency of iodine may affect its functioning leading to behavioral and functional abnormalities. The present study considers the environmental as well as nutritional factors to associate the changes, if any, in the developing children and fetus.

Methods: 1. Detailed history about any antecedent medical facts was collected from all women, the necessary clinical examination was done in them. To understand the intendependence of neuropsychiatric development and life style factors on human development.
2. Determination of maternal thyroid function at the end of each trimester by estimation of total T3 (TT3), total T4 (TT4), free T3 (FT3), FT4, and TSH levels.

Results: Exposure to a number of chemicals may adversely affect child development through altered endocrine function. Variations in the urinary iodine excretion during pregnancy were recorded demonstrating physiological adaptation allowing energy conservation.

Conclusions: Iodine is an important requirement during pregnancy as it effects the formation of thyroid & thus affects neurodevelopment of foetus directly. Environmental factors & life style plays a very significant role in the neuropsychiatric behavior of children. The study is in progress to relate the effect of toxicants & pesticides with neurodevelopment of children in tribal areas.

Disclosure: Nothing to disclose