Friday, September 28, 2018, 09:00-10:00 h, Hall A
Platform Session 01: Miscellaneous Disorders

MiO1/40
Prevalence of Vitamin B12 deficiency and related neurological syndromes among subjects attending a tertiary care hospital in South India
Osman S, Murthy JMK
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Introduction: No recent studies to determine the prevalence of neurological disorders due to Vitamin B12 deficiency from India.

Materials and Methods: This was a prospective and observational outpatient-based study in a tertiary care hospital between July 2015 and November 2016. The study included patients ≥18 years of age presenting with acral paresthesias and other neurologic symptoms. Patients with: (1) neurological syndromes due to systemic, toxic, and neurodegenerative diseases; (2) neuropathy due to other causes; and (3) compressive neuropathies were excluded. All patients enrolled in the study underwent detailed clinical examination. Cognitive screening was done using Mini–Mental State Examination and neuropsychological testing when required. Neuropathy scores were assessed by Clinical Neurological Examination Score and Toronto Clinical Scoring system. Serum B12 testing was estimated by Automated Immunoassay Analyzer, deficiency defined as <250 pg/ml. Electrodiagnostic tests were done using conventional technique. Magnetic resonance imaging of the spine and brain was done whenever needed. Results: Of 7100 new outpatient visits, 92 (1.9%) had B12 deficiency. Acral paresthesia was presenting symptom in 910 (12.8%) patients and 61 of them had B12 (6.7%) deficiency. Among 92 patients with B12 deficiency, 31 (33.7%) had specific neurological syndromes and 61 (66.3%) had subjective acral paresthesias with no clinical or electrodiagnostic abnormalities. The prevalence of Vitamin B12 deficiency in this study population was 12.95/1000 and among patients with acral paresthesias, it was 67/1000. Prevalence-specific neurological syndromes were 4.36/1000. Conclusion: B12 deficiency is not uncommon among patients attending neurologic clinics. It is prudent to estimate B12 in patients with paresthesia.

MiO2/AWPN8
Transvenous aphasias
Jayakumar H, Ranganathan LN, Shanmugasundaram N, Venkatraman C, Kuppusamy K
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Objective: The main objective of this study is to analyze the clinical characteristics, evolution, and recovery pattern of language deficits in patients with cerebral venous thrombosis. Background: The most common presentations of cerebral vein thrombosis (CVT) include seizures, headache, or a focal neurological deficit. We present 16 cases of CVT with rare presentation of disturbances in language. The incidence of language disturbances in CVT is very rare. Design/Methods: A total of 16 CVT patients who presented with disturbances in language were included. Neurological examination with detailed language assessment, blood investigations, hypercoagulable workup, and magnetic resonance imaging with magnetic resonance angiography and magnetic resonance venography were done for all patients. The patients were periodically assessed and the evolution of aphasia was documented. All patients were treated with anticoagulation, antiepileptics, and provided speech therapy. Results: Out of 16 patients who presented with aphasia, 3 had global aphasia, 7 had Wernicke’s aphasia, 5 had Broca’s aphasia, and 1 had transcortical motor aphasia at the time of admission. Left transverse sinus thrombosis was observed in all 14 (100%) patients ± left sigmoid sinus thrombosis in 9 (64%) patients, respectively. The mean duration of hospital stay was 21 ± 4.5 days. It was observed that patients who presented with global aphasia had evolved mainly to Wernicke’s aphasia. Persistent anomia was the most common residual deficit noted on follow-up of patients who had Wernicke’s or Broca’s aphasia as the initial presentation. Conclusions: Venous aphasias are a rarity in contrast to arterial aphasias. They are observed in patients with transverse sinus involvement either alone or in combination. They have a good and early recovery with persistent anomia as a residual deficit. Hence, we propose this constellation of aphasia as transvenous aphasia.

MiO3/379
Prophylactic active tau immunization leads to sustained reduction in pathological hallmarks of Alzheimer’s disease
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Amyloid-β (Aβ) and tau pathologies are intertwined in Alzheimer’s disease and various immunotherapies targeting these hallmarks are in clinical trials. To determine if tau pathology influences Aβ burden and to assess prophylactic benefits, 3xTg-AD and wild-type mice received tau immunization from 2 to 6 months of age. The mice developed a high IgG antibody titer that was maintained at 22 months of age. Pronounced tau and Aβ pathologies were primarily detected in the subiculum/CA1 region, which was, therefore, the focus of analysis. The therapy reduced histopathological tau aggregates by 70%–74% overall (68% in males and 78%–86% in females), compared to 3xTg-AD controls. Likewise, biochemical characterization revealed a 41% clearance of soluble tau (38%–76% in males and 48% in females) and 42%–47% clearance of insoluble tau (47%–58% in males and 49% in females) in the immunized mice. Furthermore, Aβ burden was reduced by 84% overall (61% in males and 97% in females). These benefits were associated with reductions in microgliosis and microhemorrhages. In summary, prophylactic tau immunization prevents not only tau pathology but also Aβ deposition and related pathologies in a sustained manner, indicating that tau pathology can promote Aβ deposition and that a short immunization regimen can have a long-lasting beneficial effect.

MiO4/148
A comparative study of clinical radiological and anthropometric parameters in obstructive sleep apnea
Manickam V, Venkatraman C, Vellaichamy K, Ranganathan L.
Aim and Objectives: This study aims to identify obstructive sleep apnea (OSA) in patients with complaints of snoring and daytime sleepiness, to compare the clinical radiological and anthropometric parameters in OSA, and to study their prognostic significance. Methodology: Patients >13 years who had complaints of snoring and daytime sleepiness with Epworth sleepiness score >10 were included in the study. Those with coronary artery disease, chronic obstructive pulmonary disease, claustrophobia, and cancer were excluded from the study. This study was approved by the Institutional Ethics Committee. Overnight polysomnogram was conducted in 25 patients. A total of 10 had Apnea Hypopnea Index >5 and were considered to have OSA. They underwent clinical and anthropometric assessment and lateral cephalogram was done. Results: Seven were male and three were female. Gastroesophageal reflux disease, smoking, alcohol intake, and hypertension were seen in 6 males. All females had headache and hypertension. The mean age of 10 patients was 49. Mallampatti score was 2, 3, and 4 in 1, 7, and 2 patients, respectively. 1, 6, and 3 patients had mild, moderate, and severe OSA, respectively. Mean BMI was 33.3. Neck circumference (NC) was >43 cm in 6 males and >40 cm in females. Nine patients had a neck height ratio (NHR) >0.25, waist–hip ratio >0.9, and lateral neck length <12 cm. Lateral cephalogram of 8 patients showed decreased posterior airway space, midfacial and soft palate length, and inferiorly placed hyoid. Conclusion: Mallampatti score >3, increased NC and NHR, decreased LNL in anthropometric assessment, and decreased posterior airway space and midfacial and soft palate length was significantly associated with OSA. Therefore, anthropometric assessment and cephalogram can be used for screening OSA.

MiO6/280
To study clinical, histological, and radiological features of adult neurological mitochondrial disorders amongst Indian patients
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The clinical features in mitochondrial disorders are rarely pathognomonic and laboratory investigations are frequently required to confirm the diagnosis. This study was done to assess the clinical, histological, and radiological features in neurological mitochondrial disorders among Indian patients. This was an ambispective, observational, cross-sectional, single-center study done at Department at AIIMS, Delhi, from January 2012 to January 2017. The study population included adult patients suspected to have mitochondrial disorders (as per modified Walker’s criteria). One hundred and six patients (69 M, 37 F) of suspected mitochondrial disorders with mean age of presentation 25.76 years (range 13–56) were recruited in the study. 28 were CPEO, 11 CPEO plus, 13 MERRF, 20 MELAS, 6 KSS, 6 LHON, 6 Leigh’s disease, and remaining 20 patients had multisystemic features. Pitosis and frozen eye was the most common presenting complaint in 40.56%, followed by seizures in 25.47% and cognitive impairment in 21.69%. Family history was present in 26.42%. Blood lactate was elevated in 65.09%. 28.3% had B/L SNHL. Electromyography showed myopathic pattern in 25.58%. Magnetic resonance spectroscopy lactate peak was seen in 10.38%. Red-ragged and COX-negative fibers were seen in 72 of 97 biopsied patients. On comparison, biopsynegative patients had similar features despite having a negative biopsy, thus hinting toward the diagnosis of mitochondrial disorders. This is the largest study from India providing an insight into mitochondrial disorders in adults. This study also emphasizes the need of genetic testing, which may further confirm diagnosis, especially in those who are biopsy negative.

Friday, September 28, 2018, 09:00-10:00 h, Hall B
SO1/16
Intensive language action therapy in poststroke aphasia
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A set of 303 picture stimuli was developed with input from healthy individuals, following psychometric principles. Several variables of theoretical importance to memory and perception were included, namely, familiarity, appropriateness, image agreement, and visual complexity. The Intensive Language Action Therapy (ILAT) involved a card exchange game. The focus was on spoken language
production, shaping the requirements to suit the needs and level of performance, training in an intensive format, and practicing communication in a behaviorally relevant context of group communication with tasks that require turn-taking and communicative exchanges using the speech act of a verbal request. Eleven participants with different type and severity of aphasia having a chronic stroke of >3 months were included. The participants were stable and not improving any further in their speech and communication. Participant’s profiles were created on the basis of the standard language test battery (Western Aphasia Battery) and functional outcomes and quality of life-related questionnaire. ILAT was provided intensively for 10 days in recommended settings, and the treatment outcome was measured during 1st, 5th, and 10th sessions in terms of changes in reaction time of speech production and speech comprehension. It was an observational study with each subject providing its own multiple baselines. Long-term effect and generalization effect were evaluated on standard test batteries and Functional Outcome Questionnaires, at 6-month follow-up. There was the significant improvement in reaction times and error rates, which showed generalization to other aspects of communication and it lasted till 6 months.

**SO2/35**

**Study of clinical and epidemiological profile in patients of cerebral venous thrombosis in a tertiary care hospital in Central India**

Porwal M, Bagul K  
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**Background:** Cerebral vein thrombosis (CVT) affects all ages and has multifactorial etiology. Clinically, acute/subacute onset with intracranial hypertension, focal deficits, seizures, and altered consciousness. Early diagnosis and anticoagulation result good outcome. **Aim:** The aim is to study the clinical and etiological spectrum for early diagnosis and management of CVT and to evaluate the factors associated with poor outcome (mRS >2), prognosis and sequelae of CVT at 3-month follow-up. **Methodology:** A descriptive and prospective observational study performed during 2011–2017 on patients diagnosed of CVT (radiologically confirmed by computed tomography venography/magnetic resonance venography) were included. Clinical profile including detailed history, onset, progression, risk factors, etiological spectrum, systemic examination, and routine investigations were done. Neurostatus was assessed by mRS and NIHSS. Patients followed-up after 3 months personally/telephonically. Statistical software SPSS was used for data analysis. **Results:** MC (52.8%) in young (21–40 years) patients with male preponderance (59.7%) with subacute onset (56.9%). MC sites were deep sinuses 30 (41.7%) and/or superior sagittal sinus 29 (40.3%). Headache (79.2%) was MC presentation f/b seizures (51.4%). Hyperhomocysteinemia (37.5%) as MC risk factor, OCP use (34.5%) in females and alcohol (46.5%) in males. mRS was not dependent on clinical, etiological, and hematological profile. Significant decrease in mRS and NIHSS on discharge. Altered sensorium, papilledema, motor deficit, mRS >2, low Glasgow Coma Scale, high NIHSS, elderly and low calcium predicted poor outcome. Good outcome in (80.56%), poor outcome in (19.4%), and 1 expired. **Conclusions:** CVT is rare treatable cause of stroke with varied presentation and risk factors. MC presentation is headache and seizure; MC risk factor is hyperhomocysteinemia, oral contraceptive pill, and alcohol. CVT had good prognosis if diagnosed earlier and treated promptly.

**SO3/39**

**Eight years after decompressive hemicraniectomy in malignant dominant middle cerebral artery infarct**

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Life-threatening, space-occupying, infarction develops in 10%–15% of patients after middle cerebral artery (MCA) infarction. Decompressive hemicraniectomy is now standard of care in patients with malignant MCA infarction to save life. However, there is a paucity of follow-up data regarding the improvement of gait, speech, and quality of life after decompressive hemicraniectomy, especially for left MCA infarct. We are presenting a case of young stroke, 8 years after decompressive hemicraniectomy for left malignant MCA infarct with video presentation.

**SO4/63**

**Extent of cerebral venous thrombosis on magnetic resonance venography: correlation with clinical and magnetic resonance imaging findings**

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**Background:** The location and extent of cerebral venous thrombosis (CVT) and magnetic resonance venography (MRV) score may determine clinical severity, magnetic resonance imaging (MRI) changes, and outcome. **Aim:** This study aims to evaluate the role of the location of thrombosis and MRV score in determining clinical severity, MRI changes, and outcome of CVT. **Subjects and Methods:** Consecutive CVT patients in the last 10 years were included. Their clinical details, Glasgow Coma Scale (GCS) score, and MRI abnormalities were noted. MRV findings were classified as superficial, deep, or both. MRV score was obtained by giving one point to each thrombosed sinus except superior sagittal sinus was given 3 points. Death and disability at 6 months were assessed by modified Rankin Scale. **Results:** A total of 160 patients with CVT were included; their median age was 29.5 years and 76 were female. 131 patients had risk factors (prothrombotic 52, prothrombotic plus 65, infection 10, and female-specific 4). The MRV score ranged between 1 and 9 (median 3). The patients with papilledema have higher MRV score compared to those without (4.16 ± 2.16 vs. 3.14 ± 1.71; P = 0.002). The temporal profile, focal motor deficit, seizure, MRI, and GCS score were independent of MRV score. Death (3.41 ± 1.41 vs. 3.46 ± 1.98; P = 0.909) and good outcome (3.48 ± 1.97 vs. 3.16 ± 1.19; P = 0.582) were also not related to MRV score. **Conclusion:** In CVT, multiple sinus involvement is more common and MRV score is related to papilledema but not to severity and outcome.
SO5/76
Validation of basilar artery on computed tomography angiography score in posterior circulation stroke: a study from tertiary care hospital
Kumar SL, Reddy MY, Parida S, Jaiswal SK, Kumar SB, Lalitha P, Osman S, Murthy JMK
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Introduction: Basilar artery occlusion carries high risk of disability and mortality. Basilar Artery on Computed Tomography Angiography (BATMAN) score proposed by Alemseged et al. is a ten-point computed tomography (CT) angiography grading system based on collaterals and thrombus burden. The aim of the study was to validate BATMAN score in a cohort of patients with posterior circulation stroke.

Materials and Methods: Study design: prospective study of consecutive patients of posterior circulation stroke admitted to the hospital; Study site: tertiary care hospital, Hyderabad, South India; Study period: April 2017 to February 2018; Study cohort: 65 patients with posterior circulation stroke and all had CT or magnetic resonance angiography. Based on BATMAN score, patients were grouped into Group I score <7 and Group II score ≥7. Variables studied included: NIHSS at admission, modified Rankin Scale (mRS) at 3 months, proportion with good outcome (mRS 0–2), and proportion of patients with basilar artery disease. Results: Group I (<7) versus Group II (≥7): number of patients 37 versus 28; NIHSS at admission (mean ± SD): 5.08 ± 3.7 versus 8.8 ± 8.8 (P = 0.023); mRS at 3 months (mean ± SD): 1.67 ± 2 versus 2.5 ± 2 (P = 0.10); proportion of patients with mRS 0–2 at 3 months: 78% versus 50% (P < 0.0001); and proportion of patients with basilar artery disease: 51% versus 85% (P = 0.004). Conclusion: This study suggests that BATMAN scoring system may be a useful scale to determine the outcomes in prognostic in posterior circulation strokes.

SO6/104
Role of blood-based biomarkers for predicting outcome after spontaneous intracerebral hemorrhage: Preliminary findings from a multicentric prospective cohort study
Prasad K, Kumar A, Sagar R, Misra S, Kaul B, Gorthi SP, Dabla S, Anand KS, Agrawal CS, Garg A
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Background: Prediction of mortality after spontaneous intracerebral hemorrhage (sICH) is important for prognostication and shared clinical decision-making. Biomarkers may help in accurate prediction of mortality. Aim: The study aims to determine whether blood-based biomarkers within 48 h of onset of stroke are significant predictor of 90-day mortality in patients with sICH.

Method/Design: In a prospective multicentric cohort study, patients with “ICH” were recruited within 48 h of symptom onset. Blood samples (5 ml) were collected, serum levels of Troponin, Copeptin, C-reactive protein, Glial fibrillary acidic protein (GFAP), and S100B were determined using method of enzyme-linked immunosorbent assay. All the patients were telephonically followed using the modified Rankin Scale at 3 months. Univariable and multivariable analyses were done to determine “discrimination” of the predictive model using area under receiver operating curve (AUROC). Results: Data of 891 patients within 48 h of onset of sICH was analyzed. The mean age of patients was 56.43 ± 14.02. AUROC for 90-day mortality were 0.58 (troponin), 0.53 (GFAP), and 0.54 (S100B). In multivariable model with age, volume of sICH, intraventricular hemorrhage, and Glasgow Coma Scale, only troponin contributed significantly (OR 2.57; 95% CI: 1.36–4.85, P = 0.003) with improved AUROC (0.73). Conclusion: Our findings suggest that S100B, CRP, Co-peptin, and GFAP do not significantly contribute to discrimination of prediction model. We found evidence in favor of troponin measured within 48 h of onset as a significant contributor to discrimination of the model to predict 90-day mortality after sICH.

DO1/17
Storage, degradation, and new connectivity of face-related semantic memory in Alzheimer’s disease
Pal S
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Background: Excepting amnesia, impairment of other domains also hampers activity of daily living in Alzheimer’s disease (AD). Although prosopagnosia poses problem in interacting with other persons, it rarely causes problem during interaction with close relatives as voice acts as cue for recognition. Objective: In a cohort of AD, we planned to study errors in recognition, naming, and assigning relationship of close relatives; to assess type and frequency of errors; and to explain with current knowledge and hypothesis. Materials and Methods: This cross-sectional study was conducted in Memory clinic of Medical College Hospital, Kolkata, India, between July 2014 and June 2017. Patients were evaluated by history, general neurological examination, and neuropsychological tests. A structured questionnaire was used to assess recognition (use of honorifics) and naming defect of close relatives. Results: AD was diagnosed in 42 patients. Prosopagnosia was found in 14 and anoma in 6 patients. Four patients exhibited problem during conversation with close relatives. They assigned name and relation of one generation earlier to close relatives with proper recognitions. Discussion: We got predictive error of name and relation assignment of close relatives by one generation back with normal recognition. It can be explained by two memory traces in connection of face-visual and name (with/without relation) representation, earlier being hierarchically older and more resistant to wearing. Conclusion: We hypothesize that the name/relation store is orderly conserved. In AD, after the degradation of part of name/relation store, a new wiring might be built up between these two traces.

DO2/18
Neuropsychiatry of advanced idiopathic normal pressure hydrocephalus
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Introduction: Vascular Dementia (VaD) is the second leading cause of dementia worldwide, superseded only by Alzheimer’s disease. Its myriad of clinicopathological and cognitive profile which depends on the anatomical location of vessel involved along with its preventable and treatable nature makes it a distinct entity in itself.

Materials and Methods: Eighty patients of diagnosed VaD were recruited at Bangur Institute of Neurosciences, Kolkata, with respect to their clinicoepidemiological, cognitive, laboratory, and imaging parameters. The patients were then classified as small-vessel VaD and large-vessel VaD accordingly. Result: Among 80 patients of VaD, small-vessel VaD was identified in 50 (62.5%) cases and large-vessel VaD in 30 (37.5%) cases. Hypertension was the most prevalent risk factor in almost all the patients followed by smoking in 22 (27.5%) cases and type 2 diabetes in 14 (17.5%) cases. Other risk factors associated were hyperlipidemia in 10 (12.5%) and cardiac disease in 8 (10%) cases. The predominant domains impaired in small-vessel VaD were executive in 35 (70%) cases, attention in 40 (80%) cases, and behavior in 24 (48%) cases, while in large-vessel VaD, the predominant domains involved were memory in 10 (33.3%) cases, visuospatial in 9 (30%), language in 8 (26.6%) cases, and praxis in 7 (23.3%) cases. Conclusion: The above findings suggest that the diverse anatomical lesions and risk factors lead the heterogenous clinicocognitive profile in patients of VaD which if diagnosed at the earliest will help in treating and even prevention of this disease entity.
relationships, language, and motor impairment. Although deficits in social cognition are known in behavioral variant FTD, there is a paucity of literature of social cognition in language and motor variants. The present study investigates social cognitive profile and their neural correlates in patients with FTD spectrum disorders and usefulness of social cognition tests. **Methods:** 60 patients were recruited and 20 each with behavioral, language, and motor-variant FTD using clinical diagnostic criteria. Patients were subjected to emotion recognition test in form of pictures of facial affect (POFA) test in addition to tests of empathy, disinhibition, executive dysfunction, and semantic battery. Patients underwent voxel-based morphometry and resting-state functional magnetic resonance imaging to analyze its neural correlates. **Results:** Performance in all FTD groups including behavioral, language, and motor variants was significantly impaired on tasks of social cognition. Empathy was impaired in behavioral variant and also in progressive aphasia, progressive supranuclear palsy, and corticobasal degeneration. In emotion recognition test, most patients were able to identify happy emotions, but ability to identify emotions of fear and disgust was most affected. Individual social cognitive correlated with specific areas of the brain. **Conclusion:** FTD spectrum disorders including language and motor variant also have impaired social cognition comparable to behavioral variant. Recognition of this deficit will help in management of FTD patients.

**DO6/338**

**A pictorial essay of corpus callosum**

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**Background:** The commissural fibers contained in various parts such as rostrum, genu, body, and splenium of corpus callosum (CC) are affected by various disease process. **Aim:** The aim of this is to study the various parts of the corpus callosum and the etiological predilection to the corpus callosum. **Materials and Methods:** We analyzed various patients whose MRI imaging revealed corpus callosum lesions. The part of the corpus callosum involved, the etiological predilection to the parts of corpus callosum, the etiology based on the part involved, and the clinical presentation was noted. **Results:** 11 patients had involvement of corpus callosum. 7 patients were male and 4 were female. The rostrum was involved in 3, genu was involved in 4, body was involved in 5, and splenium was involved in 6. The various etiologies that contributed to the CC involvement was stroke (5), malignancy including glioblastoma and CNS lymphoma (2), systemic lupus erythematosus (SLE) (2), tumefactive demyelination (1), and infectious vasculitis (1). The most common site of involvement in stroke are splenium (4) followed by genu (2), rostrum (2), and body (2). SLE patients with neuropsychiatric lupus had involvement of the splenium. The etiology in splenial involvement was SLE (2) and ischemic (2) infarct. The etiology in involvement of body was infarct (2), tumefactive demyelination (1), infectious vasculitis (1), and malignancy (1). The associate areas that were involved included pericallosal area (2) and bifrontal lobar involvement (2). **Conclusion:** Splenium was the most common site of involvement in CC. The etiological predilection to various parts of CC is depicted with pictorial correlation.
The main objective of this study is to analyze test and patient’s beliefs toward usage of AEDs by utilizing adherence level was assessed using validated Morisky–Green. 

**Results:** On the Morisky–Green scale, 57% patients were reported nonadherent to treatment: 49.6% had moderate and 7.4% had low adherence levels. Nonadherence was considerably associated with lower socioeconomic status ($P < 0.001$) and duration of epilepsy ($P < 0.041$). Multiple regression analysis shows the independent factors affecting treatment adherence in PWE are socioeconomic Class V (odds ratio: 23; 95% confidence interval: 7.2–77.1; $P < 0.001$). The connection between seizures recurrence and nonadherence was measurably noteworthy ($P < 0.001$). Nonadherent patients had more concern about the potential adverse effects of AEDs ($P < 0.0013$). 

**Conclusions:** Beliefs about medicines are a contributing factor to adherence toward AEDs and more concern was common among nonadherent patients. The reinforcement of epilepsy services in rural and underserved areas can be done by providing a regular, uninterrupted, and free supply of AEDs. There is a need for awareness and educational programs by health-care professionals at different levels, to support and encourage positive beliefs, and discourage myths against AEDs in order to increase patient’s adherence.

**Results:** 

**Conclusions:**

Beliefs about Medicine Questionnaire (BMQ). 

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**Conclusions:** Beliefs about medicines are a contributing factor to adherence toward AEDs and more concern was common among nonadherent patients. The reinforcement of epilepsy services in rural and underserved areas can be done by providing a regular, uninterrupted, and free supply of AEDs. There is a need for awareness and educational programs by health-care professionals at different levels, to support and encourage positive beliefs, and discourage myths against AEDs in order to increase patient’s adherence.

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**Conclusions:** 

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**EO6/323**  
**Epilepsy surgery at or near eloquent cortex: Challenges, approaches, and outcomes**

**Kumar S**  
**Apollo Hospitals, Bengaluru, Karnataka, India**

**Objectives:** The main objective is to describe the tribulations associated with epilepsy surgery at eloquent cortex.  
**Methods:** Consecutive patients with medically refractory epilepsy who presented to tertiary care EMUs at Apollo hospitals, Seshadripuram; Fortis Malar Hospitals, Chennai; and Star Hospitals, Hyderabad, since the last 5 years, were included if the epileptogenic zone was at or near eloquent cortex. The same team of epileptologists and epilepsy surgeon was involved in all the three centers. **Results:** A total of 26 patients were included. Seven had temporal/temporinsular lesions, while the rest had extratemporal lesions. Thirteen patients (50%) underwent awake craniotomy with functional mapping using language protocols (auditory/visual naming) or motor mapping to identify eloquent cortex. A total of 2 patients underwent subdural grid placement, while 4 underwent stereotactic electroencephalogram implantation. The remaining underwent intraoperative motor mapping. A total of 2 patients underwent posterior quadrantotomy, 1 anterior quadrant disconnection, 6 motor/sensory sparing hemispherectomies, and the remaining lesionectomies. Postoperative deficits were seen in 8 patients (30.7%), of which all except 1, recovered in a week. One patient had aphasia and right hemiplegia and recovered in a month completely. The mean follow-up was 32.2 months. The seizure outcome was Engel Class 1a in 20 of 26 patients (76.9%). **Conclusions:** Epilepsy surgery at or near motor cortex is mired with numerous difficulties, but with optimization of approach, using a combination of intra- and extra-operative mapping, good outcomes can be attained.

**Friday, September 28, 2018, 17:00-18:00 h, Hall B**  
**Platform Session 05: Neuromuscular Disorders**

**NO1/101**  
**Evaluation of peripheral neuropathies with high-resolution ultrasonography and color Doppler**

**Sharma M, Sharma CM, Bagarhatta M, Kumawat BL**  
**Department of Neurology, Sawai Man Singh Medical College, Jaipur, Rajasthan, India**

**Objective:** Available diagnostic modalities for peripheral neuropathies, for example, clinical assessment, electrodiagnostics, and skin and nerve biopsy have certain limitations. The role of imaging is very limited. The purpose of this study is to assess the role of ultrasonography in diagnosis of peripheral neuropathies. **Materials and Methods:** Fifty adult patients of either sex with suspected peripheral neuropathies with either diffuse or focal involvement of nerves were evaluated with high-resolution ultrasound scan of the relevant peripheral nerves and were compared with age- and sex-matched fifty healthy adult controls. **Results:** The study included patients with both diffuse and focal peripheral neuropathies (diabetic peripheral neuropathy, idiopathic inflammatory polyradiculoneuropathy (AIDP), chronic inflammatory demyelinating polyneuropathy (CIDP), carpal tunnel syndrome, leprosy, peripheral nerve trauma, and compression). There was a significant increase in cross-sectional area ($P < 0.05$) of multiple nerves in diabetic peripheral neuropathy and leprosy patients as compared to age- and sex-matched controls. Sonography in peripheral nerve trauma showed significant hyperechogenicity and increased vascularity on Doppler at site of trauma with precise localization. Patients with AIDP and CIDP showed diffusely hyperechoic peripheral nerves. **Conclusion:** High-resolution ultrasonography with color Doppler showed greater extent of quantitative and qualitative alterations in the peripheral nerves in various peripheral neuropathies. USG can complement other diagnostic investigations such as the nerve conduction study and can objectively measure nerve damage in some focal neuropathies. It is easily available and has the potential to become the first modality for screening or evaluation of peripheral neuropathies.

**NO2/105**  
**Congenital myasthenic syndrome with predominant Limb–Girdle phenotype: GMPPB homozygous variant with likely founder mutation**

**Nalini A, Polavarapu K, Kumar VP, Vengalil S, Nashi N, Topf A, Balaraju S, Roos A, Horvath R, Mathur A, Niyak S, Ambawat S, Joshi A, Faruq M, Lochmüller H**  
**Department of Neurology, National Institute of Mental Health and Neurosciences, Bengaluru, Karnataka, India**

**Background:** Mutations in GMPPB encoding GDP-mannose pyrophosphorylase B are recently reported to cause congenital myasthenic syndromes. **Methodology:** Ten patients belonging to 4 South Indian families with late-onset Limb–Girdle syndrome had easy fatigability. Their clinical phenotypes, creatine kinase (CK) levels, RNS, and mutations are described. Six patients underwent genetic testing. **Results:** All were born to consanguineous parents. Nine patients were evaluated and all had progressive fatigable Limb–Girdle weakness, prominent truncal weakness with calf hypertrophy, and retained tendon reflexes. CK levels ranged between 650 and 4547 IU/L. Family 1: A 64-year-old male with onset at 42 years, two siblings and niece had onset between 2nd and 5th decades. Family 2: Proband was aged 35 is symptomatic for 5 years, similar illness in sister. Family 3: A female aged 32 had onset at 22 years of age. Family 4: A female aged 45 had onset at 28 years of age, jaw muscle fatigue for 7 years, her aged 46 had onset at 36 years of age, 1 st cousin aged 44 had onset at 18 years. RNS showed decrement in all. Genetic analysis revealed identical missense mutation c.1000G>A (p. Asp334Asn) in exon 9 of GMPPB gene in 6 patients tested from all families. Family 3 and 4 showed moderate/good response to pyridostigmine and salbutamol. **Conclusion:** Findings indicate the milder effect of the homozygous mutation. This variant is not reported from other geographical regions. We propose a possible founder effect for this mutation in South Asia which needs to be further explored.

**NO3/178**  
**Clinical profile and disease severity assessment in patients with myasthenia: A clinicoinmunological correlation study**

**Venmuri D, Garuda BR, Seepana G, Kumar ST, Kumari AL**  
**Department of Neurology, Andhra Medical College, King George Hospital, Visakhapatnam, Andhra Pradesh, India**
**Introduction:** Myasthenia is a potentially serious but treatable primary disorder affecting neuromuscular junction. **Aims and Objectives:** The aim is to study the clinical, laboratory, and electrophysiological profile in patients diagnosed with myasthenia and to study correlation between disease severity and AChR antibody titers. **Materials and Methods:** This study is conducted from April 2017 to May 2018 on 37 patients diagnosed with myasthenia in Department of Neurology, KGH, Visakhapatnam. Disease severity assessment was made with MGFA, QMG, and myasthenia Gravis Composite Score (MGC) and all patients underwent neostigmine test, RNS, AChR antibodies, and computed tomography (CT) chest. **Results:** In patients with myasthenia (n = 37), congenital myasthenia - 5 patients, acquired myasthenia gravis – 32 patients. Majority were male (59.5%) and the mean age of onset 31.6 years. Onset was ocular in 83.8%, limb girdle in 10.8%, generalized in 2.7%, and bulbar in 2.7%. MGFA I (21.6%), II A (16.2%), II B (10.8%), III A (37.8%), III B (8.1%), IV A (2.7%), and IV B (2.7%). QMG score showed a strong correlation with MGC score in assessing disease severity (r = 0.83, P < 0.001). RNS test-decremental response at 3 Hz in all patients. CT chest-thymic hyperplasia in 2 patients, thymoma in 3 patients. Out of acquired MG (n = 32 patients), AChR antibody positive in 14 patients (Mean titer=8.34). QMG score and MGC score showed a moderate correlation with AChR antibody titers (r = 0.40, P = -0.001 and r = 0.49, P = 0.001, respectively). **Conclusion:** QMG score for disease severity is positively associated with MGC score. QMG score and MGC score demonstrated good correlation with AChR antibody titers. AChR antibody titers can serve as a tool for assessing disease severity. Disease severity stratification aids in choosing appropriate treatment options.

**NO4/355**

**Medial and lateral plantar sensory nerve conduction studies in early prediction of diabetic neuropathy**

Vanukuri NK, Hazeena P, Shankar V, Sundar S
Department of Neurology, Sri Ramachandra Medical Centre, Chennai, Tamil Nadu, India

**Introduction:** Diabetic neuropathy causes a wide spectrum of abnormalities from autonomic and cardiovascular to diabetic foot with a prevalence of 10% in newly diagnosed diabetes, stressing the importance of early diagnosis. This study evaluates the utility of sensory nerve action potentials (SNAPs) of plantar nerves in patients with normal NCS for early detection of diabetic neuropathy. **Aim:** The aim of this study is to establish electrophysiological normative data for medial and lateral plantar nerve conduction and compare with diabetes. **Materials and Methods:** A total of 100 patients were included in the study; 50 (25 males and 25 females) control group and 50 (28 males and 22 females) with diabetes. NCS was performed for the evaluation of plantar nerves in patients with diabetes and healthy volunteers from December 2017 to March 2018 in Department of Neurology, Sri Ramachandra Medical Centre. **Results:** Among the 50 patients with diabetes, we investigated 10 individuals each aged 31–40 years (mean 35.2 ± 3.22), 41–50 years (45.6 ± 3.34), 51–60 years (56.3 ± 4.57), 61–70 years (66.2 ± 3.42), and 71–80 years (75.1 ± 3.28) with the duration of diabetes for >25 years (29.3 ± 3.46). 17 patients (34%) had normal NCS with prolonged SNAPs of plantar nerves and 23 patients (46%) had both abnormal, and NCS in diabetes shows statistically significant prolongation of latency and reduction in amplitude and drop out in conduction velocity in all age groups and diabetic duration increases. **Conclusion:** It may be possible to detect the neuropathy early in neuropathological manner in asymptomatic diabetic PNPs by studying plantar sensory nerve conduction properties in addition to the nerve conduction parameters studied in a standard PNP protocol.

**NO5/276**

**Transcranial Doppler diagnostic value in interictal phase of migraine**

Alashetty A, Jatkarah M, Lakshminarasimhan R, Jayakumar M
Department of Neurology, Institute of Neurology, Madras Medical College, Chennai, Tamil Nadu, India

**Objective:** The objective is to study the regional cerebral blood flow changes and the cerebrovascular reactivity (CVR) in patients with migraine. **Background:** Migraine is a neurovascular coupling disorder where the CVR is malfunctioning. Several transcranial Doppler studies including CVR assessment have been studied in migraineurs with varying outcomes. **Study Design:** This study was conducted over a period of 3 months at a tertiary hospital. We included 30 patients (12 with aura and 18 without aura) who satisfied criteria for migraine as per the IHS criteria and 30 age- and sex-matched controls. Transcranial Doppler was performed on all patients. CVR was assessed by breath-holding and photic stimulation. Mean velocity (MV) and peak systolic velocity (PSV) in middle cerebral artery (MCA) and posterior cerebral artery (PCA) were estimated. **Results:** The MV at baseline was 51 ± 13.93 in migraineurs and 48.80 ± 10.17 in controls. The MV after breath-holding (patients 62.27 ± 16.21 and controls 50.47 ± 9.63), increase in MV in patients was statistically significant (P < 0.001). The PSV in PCA before and after photic stimulation was 59.47 ± 10.34 and 63.13 ± 11.03, respectively, increase was statistically significant (P < 0.001). In patients with aura, the changes in PSV PCA changes postphotic stimulation was statistically significant (P < 0.002), whereas there was significant increase in MV after breath-holding in both groups to same extent. **Conclusion:** The study demonstrated an increased CVR in the interictal phase of migraineurs by both breath-holding and photic stimulation. The increased reactivity was noted in both groups of patients. This study demonstrates possible role of maladapted reactivity causing altered neurovascular homeostasis in causation of symptomatology of migraineurs.

**NO6/AWP6**

**Screening for Pompe disease in patients presenting with undiagnosed Limb–Girdle muscular weakness and unclassified Limb–Girdle muscular dystrophy in children and adult population**

Abraham DS, Ranganathan LN, Sarala G
Institute of Neurology, Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai, Tamil Nadu, India

**Background:** Pompe disease is a rare genetic metabolic disease caused by a deficiency of the lysosomal enzyme acid α-glucosidase (GAA). Pompe disease is a progressive, debilitating, and often fatal neuromuscular disorder that...
Tuberculous meningitis (TBM) is associated with a continuum of clinical phenotypes. The challenges of recognizing Pompe disease lead to prolonged delays between symptom onset and patient diagnosis. Despite an increasing awareness of Pompe disease, the average diagnostic delay remains high. Delays in diagnosis prevent the ability to intervene early and halt the progression of disease. There are several reasons explaining the diagnostic challenge in Pompe disease. The rarity of the disorder, the variable clinical presentation, and the similarity of the signs and symptoms with many other neuromuscular disorders and an insufficient awareness of Pompe disease and its clinical manifestations all contribute. **Aims and Objectives:** The aims are as follows: (1) At determining the occurrence of Pompe disease in a selected high-risk population of patients. The patients will be referred from various clinical specialties including pediatrics, genetics, internal medicine, neurology, and other relevant departments; (2) the high risk cases will be screened will include patients with a clinical history of unexplained Limb–Girdle muscular weakness (LGMW) and/or hyperCreatineKinaseasemia. All such high-risk cases from various departments will be referred to the Rajiv Gandhi General Hospital, Chennai-03 and Institute of Child Health and Hospital For Children, Egmore, Chennai-08, for screening for Pompe disease; and (3) the screening will be done by estimation of GAA enzyme activity on dried blood spot samples (DBS). **Materials and Methods:** Inclusion criteria: (1) Male and female patients (children and adult) of 1 month to 35 years of age and (2) patients with undiagnosed LGMW or axial muscular weakness or unclassified Limb–Girdle muscular dystrophy or asymptomatic or mildly symptomatic, idiopathic, persistent hyperCreatineKinaseasemia (sCK > 1.5 × ULN measured on at least 2 occasions within previous 6 months). Exclusion criteria: (1) patients in whom a GAA (acid alpha-glucosidase) enzyme activity assay has previously been performed and for which the result was normal and (2) patients with systemic diseases or conditions and/or medications potentially associated with hyperCreatineKinaseasemia. **Results:** Among 15 patients, five cases are <1 year of age, five cases are between 1 and 15 years of age, and five cases are between 15 and 35 years of age. In which five cases have low ratio of lysosomal to total acid alpha-glucosidase (B/A). Nine patients showed poor control, three patients had normal values and three patients are positive for GSD II. 60% are poor controls, 20% have GSD (glycogen storage disorder) II, and 20% had normal values.

**Department of Neurology, Government Medical College, Srinagar, Jammu and Kashmir, India**

**Objective:** The main objective of this study is to describe a case series of the central nervous system tuberculosis with acute encephalitic presentation. **Background:** Tubercular meningitis is classically described as subacute or chronic meningitis that evolves over a course of weeks to months. However, in some cases, the onset is acute or abrupt with features of encephalitis. **Design:** In a retrospective analysis of 104 adult patients of tubercular meningitis, 10 cases were found to have an acute presentation with features of encephalitis. Acute presentation was defined as symptom duration of 7 days or less. The definition of encephalitis included any person admitted to hospital with encephalopathy (altered consciousness of longer than 24 h) and two or more of the following: fever (≥38° C), seizures and/or focal neurological findings, and cerebrospinal fluid (CSF) pleocytosis. **Results:** The patients varied in age between 14 and 35 years. The average duration of symptoms before presentation was 5.2 days. Nine patients had fever, 6 had headache, 3 had vomiting, and 3 had seizures at presentation, while 9 had signs of meningeal irritation. Encephalopathy manifested in the form of worsening of sensorium in 6 patients, irritability in 2, and behavioral disturbance in 2 patients. All patients showed CSF pleocytosis with raised protein while glucose was low in 8 patients. The average delay before commencement of antitubercular treatment was 11.6 days. Nine patients improved while one died during hospital stay. **Conclusion:** Encephalitic presentation of the central nervous system tuberculosis is an underrecognized entity. Early recognition can be life-saving and prevent serious complications.

**IO2/59**

**Safety and efficacy of fludrocortisone in treatment of cerebral salt wasting in tuberculous meningitis: An open-label randomized clinical trial**

**Misra UK, Kalita J, Kumar M**

**Department of Neurology, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow, Uttar Pradesh, India**

**Introduction:** Tuberculous meningitis (TBM) is associated with high frequency of cerebral salt wasting (CSW). There is a paucity of objective information regarding best method of treatment of CSW. **Aim:** This study aims to evaluate efficacy and safety of fludrocortisone (FC) in management of CSW in TBM. **Methods:** This is an open-labeled, randomized controlled trial conducted during October 2015–April 2017. 93 patients with suspected TBM were recruited; 13 were excluded. 70 patients, who developed CSW, were eligible, one patient refused to participate. 36 patients were randomized to 0.9% IV saline with oral salt supplementation (5–12 g/day), only or additional FC (0.1–0.4 mg/day/PO). Patients were followed up for at least 6 months. All patients received four drugs antitubercular treatment. Primary end-point was time to correct serum sodium and secondary end-points were in-hospital deaths, disability at 3 and 6 months, frequency of stroke, and serious adverse reactions. **Results:** Two arms were matched for demographic, clinical, and MRI findings. FC normalized serum sodium earlier than saline (4 vs. 15 days, P < 0.01). In an intention to treat (ITT) analysis, hospital mortality and disability at 3 and 6 months were not different, but number
of infarcts in deep border zone were less in FC arm (6% vs. 35%; P = 0.04). FC was associated with severe hypokalemia and hypertension in two patients each and pulmonary edema in one necessitating discontinuation of FC in two patients. **Conclusion:** FC results in earlier normalization of serum sodium but did not affect 6-month outcome. FC had to be withdrawn in two patients because of adverse effects.

**IO3/201**

**Determinants of poor response to intensive phase of antituberculosis treatment in patients with tuberculous meningitis**

Shekhar R
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**Aims and Objectives:** To study the factors that determines the poor response to intensive phase of ATT in patients with tuberculous meningitis (TBM). **Background:** TBM is the most common cause of subacute or chronic meningitis in developing countries. It is associated with high morbidity and mortality. Predictors of poor response to intensive phase of ATT are not well described in literature. In this study, we plan to evaluate the role of presenting clinical parameters, cerebrospinal fluid (CSF) studies, and radiological findings in predicting the poor response to intensive phase of ATT in TBM. **Methodology:** A prospective, observational study being conducted in Department of Neurology in collaboration with Department of Microbiology, KGMU, Lucknow. Consecutive newly diagnosed patients of TBM according to consensus case definition proposed by Marais et al. are being included in the study. Detailed clinical examination, CSF examination, and neuroimaging are being done for every case. All patients are given standard ATT as per the WHO guidelines with adjunctive steroid. All patients are being followed up after 2 months. The primary outcome measure is death. The secondary outcome is disability assessment by modified Barthel index drop ≥2 or mBI <12 (whichever is worse). **Results:** Till date, 152 cases have been analyzed. 47.3% of them are males. Mean age being 35.2 years. Thirty-nine cases had poor outcome by end of 2 months. Stage 3 of disease, presence of hydrocephalus, vasculitic infarcts, and delay in diagnosis were associated with poor response to intensive phase of ATT.

**IO4/256**

**Clinicoradiological spectrum of spinal tuberculosis and its outcome with conservative management**

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**Aim:** Paucity of published information on spinal tuberculosis in the last 10 years prompted investigations into clinical and radiological spectrum and short-term outcome of spinal tuberculosis in tertiary care teaching hospital. **Methods:** Retrospective analysis of spinal TB diagnosed using clinical methods, radiology, and biopsy was included. Disability was graded by Nurick’s scale and outcome with modified Rankin scale (mRS). Outcome at 6 months was noted. **Results:** A total of 61 patients aged 11–73 years (median age 41) including 27 females were studied. 29 were ambulatory on presentation, 14 had paraparesis, and 18 had paraplegia. Median duration of symptoms was 8 months. 39 patients (63.93%) had weakness, 23 (37.7%) had sensory complaints, 10 (16.4%) had bladder involvement, 60 (98.4%) had pain, and 12 (19.67%) had extraspinal TB. Median Nurick’s grade on presentation was 4. On magnetic resonance imaging, the most common level was thoracolumbar (81.9% cases), multiple level involvement found in 29.5%, abscess in 31.1%, collapse in 49.2%, and cord changes in 39.3%. Biopsy confirmation was done in 13 patients (21.3%). After antitubercular treatment, subjective improvement seen in 12 patients (19.7%) by 3 months, 30 patients (49.2%) by 6 months, and 98.4% patients by 12 months. Nurick’s grade improved in 67.2% by 3 months, and 85.24% by 6 months. Paradoxical worsening occurred in 5 patients and drug-induced hepatits in 10 patients. Outcome at 6 months was good in 42 patients (68.9%). Bladder involvement and nonambulatory state on presentation were predictors of poor outcome. **Conclusion:** Conservative management of spinal tuberculosis leads to good outcome in majority of cases.

**IO5/301**

**Evaluation of GeneXpert MTB/RIF assay in patients with clinical suspicion of tuberculous meningitis**

Rathod M, Kulshreshtha D, Mittal V, Singh AK, Maurya PK, Thacker AK
Department of Neurology, Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, Uttar Pradesh, India

**Aim:** Evaluation of GeneXpert MTB/RIF assay in patients with clinical suspicion of tuberculous meningitis (TBM). **Introduction:** TBM is the most severe form of tuberculosis. Microbiological confirmation is rare, and treatment is often delayed, increasing mortality and morbidity. The GeneXpert MTB/RIF test was evaluated in patients with suspected TBM. **Methodology:** A total of 105 patients presenting with suspected TBM (clinical entry criteria as per the standard case definition for TBM by the working committee consensus 2010). To Dr. RMLIMS, Lucknow, between January 2017 and May 2018 were included in the study. They were divided into possible and probable tubercular meningitis according to consensus 2010. Cerebrospinal fluid samples were tested by Zielh–Neelsen smear, mycobacterial growth indicator tube (MGIT) culture, and XpertMTB/RIF. Rifampin (RIF) resistance results were also tasted. **Results:** A total of nine patients were excluded with other diagnosis. Of 28/96 included patients, 29.16% were diagnosed with TBM. Out of 36 patients with probable TBM, 16 had GeneXpert positive (44.4%) and 9 had MGIT positive (25%). Out of 60 possible TBM patients, 12 had GeneXpert positive (20%) and 8 had MGIT positive (13.3%). There was one false-positive XpertMTB/RIF test (99.5% speciﬁc) city. Two cases of RIF resistance were identified by Xpert. **Conclusion:** The Xpert MTB/RIF represents a significant advance in the early diagnosis of this devastating condition and identification of rifampin resistance also can be great value for further treatment plan.

**IO6/211**

**Migraine and ischemic vascular risk: A large case–control study from a tertiary care headache center**

Chowdhury D, Gupta A, Mahajan B, Puri S
Increasing evidence suggests that migraine is associated with ischemic vascular events. A potential association would have substantial impact on public health. **Aim:** This study aims to find out whether a battery of vascular risk factors occurs more commonly in migraine than in matched controls. **Materials and Methods:** Migraine patients (ICHD-3β) and matched controls without headaches above 18 years were assessed for three groups of vascular risk factors, namely, clinical (systolic BP [SBP], diastolic BP [DBP], ankle–brachial index [ABI], body mass index [BMI], waist–hip ratio [WHR]), biochemical (serum total cholesterol, high-density lipoprotein [HDL]), triglyceride [TG], fasting plasma glucose [FPG], serum hs-CRP, fasting serum insulin [ISI], and leptin [FSL]), and radiological (carotid intima-media thickness [IMT], computed tomography [CT] coronary calcium scoring). All 14 parameters were evaluated and compared. **Results:** A total of 230 patients (mean age 27.1 ± 10.19 years; F:M = 4.5:1) and 30 controls (mean age 32.9 ± 9.2; F:M = 4:1) were studied. Migraine patients had statistically significant (P < 0.05) higher DBP, BMI, total cholesterol, TG, HDL, FPG, ISI, FSL. 9/230 patients had PAD (none in controls). Both right and left IMT were statistically significantly higher in migraine patients (P < 0.5). CT coronary calcium scoring in first 100 patients was zero. Migraine patients had more clustering of abnormal vascular risk factors [3.7 vs. 1.9 (P = 0.00)]. About 49.1% migraine patients and 10% controls had metabolic syndrome (P = 0.0001). **Conclusion:** Migraine patients have strong and significant association with ischemic vascular risk factors than controls.

**Saturday, September 29, 2018, 09:00-10:00 h, Hall A**

**Platform Session 07: Headache**

**HO1/72**

**Bilateral greater occipital nerve block in treatment of chronic migraine**

Chopra R, Chowdhury D

Delhi Heart and Multispecialty Hospital, New Delhi, India

**Background:** There is no Indian data on use of greater occipital nerve (GON) block for treatment of chronic migraine (CM). **Aim:** This study aims to evaluate therapeutic efficacy and side effects of GON block in CM. **Methods:** Patients diagnosed as CM according to ICHD-3β underwent bilateral GON block using combination of 2% lignocaine and depomedrol, using standardized protocol. They were followed at 1 month for change in number of headache days and side effects. Response categorized as complete (100%), significant (76%–99%), moderate (50%–75%), and mild (<50%), estimated by reduction in headache days from baseline. **Results:** A total of 94 CM patients (female-to-male ratio 4:2; mean age 36.8 ± 10.30 years; range 13–65 years) were studied. Medication overuse headache (MOH) accompanied CM in 87% patients. 24 patients were taking prophylactic drugs; 70 were treatment naive. Mean change in number of headache days and side effects. Response standardized technique. Primary outcome was >50% responder rate at 1 month. Secondary outcome was percentage headache free days at 1, 2, and 4 weeks and changes in VAS and HIT. Side effects were initial injection site pain in 23 patients. One patient had self-limiting vertigo. **Conclusion:** GON block is an effective treatment option in CM with or without MOH. Side effects are mild and self-limiting.

**HO2/86**

**Occurrence of memory dysfunction and brain lesions in patients with chronic migraine**

Duggal AK, Khatwia GA, Gupta M, Chowdhury D

Department of Neurology, GB Pant Institute of Post Graduate Medical Education and Research, New Delhi, India

**Background:** Migraine is a common and disabling neurological disorder but the effect of chronic migraine (CM) on cognitive changes is largely unknown. **Aim:** To study the occurrence and pattern of memory dysfunction and brain lesions in patients with CM. **Methods:** Memory dysfunction in CM patients was assessed using Mini–Mental status examination (MMSE) and Post Graduate Institute, Chandigarh, Memory Scale (PGIMS) in one session, when the patients were not having an acute migrainous headache. All patients were subjected to magnetic resonance imaging (MRI) (brain) to look for the occurrence of any white matter lesions and/or infarcts. **Results:** A total of 100 consecutive CM with and without medication overuse headache were studied. Historically, 4 patients complained of poor memory, while 96 patients reported excellent (60) or good (36) memory. MMSE was abnormal in 15 patients and PGIMS was abnormal in 10 patients. CM patients performed poorly on tests for mental balance, attention, delayed recall, and verbal retention for dissimilar pairs. Among the variables tested, duration of CM (P = 0.04) and frequency of analgesic intake (P = 0.02) had a statistically significant negative correlation with memory scores. MRI abnormalities were seen in 10 patients (9 had WML and 1 had infarct), but they did not have any significant effect on either the MMSE or PGIMS scores. **Conclusion:** Patients with CM are more likely to have problems in attention, delayed recall, verbal retention for dissimilar pairs, and visual retention that may correlate with duration of disease and frequency of analgesic use.

**HO3/96**

**Greater occipital nerve block in headache disorders: Results of a pilot study from a tertiary care headache clinic**

Mundra A

Department of Neurology, GB Pant Institute of Postgraduate Medical Education and Research, New Delhi, India

**Background:** Greater occipital nerve block (GONB) can be a useful adjunct in preventive management of headache disorders. **Aims:** This study aims to determine the preventive efficacy of GONB in episodic migraine (EM), chronic migraine (CM), cluster headache (CH), hemiphoria continua (HC), chronic tension-type headache (CTTH), and cervicogenic headache (CGH). **Methods:** Patients unresponsive to at least two standard preventive drugs for 3 months received GONB (2 ml 2% lidocaine and 80 mg dexamethasone) using standardized technique. Primary outcome was >50% responder rate at 1 month. Secondary outcome was percentage headache free days at 1, 2, and 4 weeks and changes in VAS and HIT.
This study aims to compare the effectiveness of Amitriptyline in chronic migraine patients (CM) and chronic cluster headache (CH) patients. Aims and Objectives: A 12-week randomized, double-blind, double-dummy trial at the Department of Neurology, JIPMER, Pondicherry, from January 2017 to June 2018. We recruited 120 migraine patients who needed prophylactic measures. Patients were randomly assigned to either amitriptyline or gabapentin group. In each group, received placebo for medication events. Results: The mean age was 33.5 (SD ± 8.45) years, and 102 (85%) were women. Of 120 patients, 12 patients lost to follow-up, so finally, 108 patients were analyzed. Of total 108 patients, 55 received amitriptyline and 53 received gabapentin. At 3 months, percentage improvement in headache frequency was 87.3% in the amitriptyline group and 71.7% in the gabapentin group (P = 0.045). Percentage improvement in headache severity was 32.7% in the amitriptyline group and 35.8% in the gabapentin group (P = 0.73). The composite side effects were not different between the two groups 56.4% versus 58.5% (P = 0.826). Sedation and dry mouth were most common side effects in either group. Conclusions: Amitriptyline is more effective at 3 months than gabapentin. However, both drugs appear to be similar in side effect profile.

**HO6/192**

Comparison of efficacy and safety of amitriptyline with gabapentin in migraine prophylaxis: randomized, double-blinded, double-dummy trial

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Department of Neurology, Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry, India

Aims and Objectives: This study aims to compare the efficacy and safety of gabapentin with amitriptyline in the prophylaxis of migraine patients. Methods: We conducted a 12-week randomized, double-blinded, double-dummy trial at the Department of Neurology, JIPMER, Pondicherry, from January 2017 to June 2018. We recruited 120 migraine patients who needed prophylactic measures. Patients were randomly assigned to either amitriptyline or gabapentin group. In each group, received placebo for medication events. Results: The mean age was 33.5 (SD ± 8.45) years, and 102 (85%) were women. Of 120 patients, 12 patients lost to follow-up, so finally, 108 patients were analyzed. Of total 108 patients, 55 received amitriptyline and 53 received gabapentin. At 3 months, percentage improvement in headache frequency was 87.3% in the amitriptyline group and 71.7% in the gabapentin group (P = 0.045). Percentage improvement in headache severity was 32.7% in the amitriptyline group and 35.8% in the gabapentin group (P = 0.73). The composite side effects were not different between the two groups 56.4% versus 58.5% (P = 0.826). Sedation and dry mouth were most common side effects in either group. Conclusions: Amitriptyline is more effective at 3 months than gabapentin. However, both drugs appear to be similar in side effect profile.
Saturday, September 29, 2018, 09:00-10:00 h, Hall B
Platform Session 08: Autoimmune Disorders

AO1/21
N-methyl-D-aspartate encephalitis our experience with diagnostic Dilemmas, clinical features, and outcome
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Introduction: N-methyl-D-aspartate (NMDA) encephalitis is a neuropsychiatric syndrome characterized by a wide spectrum of clinical manifestations. It is seen in patients with antibodies against NR1–NR2 heteromers of the NMDA receptor. As the spectrum is mainly psychiatric most patients are treated as psychiatric disease resulting in huge diagnostic delay. Patients and Methods: A total of 29 patients who presented with NMDA encephalitis seen by the authors in the last 5 years are discussed here. Percentage of transfected cells showing granular cytoplasmic florescence was considered for positivity and severity both in cerebrospinal fluid (CSF) and serum. Investigated with history and clinical evaluation, magnetic resonance imaging (MRI), autoimmune workup, USS, electroencephalogram (EEG), and routine blood tests. Their presenting diagnosis, clinical features and the dilemmas, alarming gaps, laboratory data, response to treatment, and relapses are discussed. Observations: Females were 26/29. Maximum number found in 13–18 years. Referral diagnosis varied from Attention-deficit/hyperactivity disorder 2, autism 3, rabies 1, SSPE, rheumatic chorea 2, catatonia 6, viral encephalitis 5, etc. Autoimmune encephalitis was suspected in only 5 cases. Psychiatric symptoms varying from panic to severe aggression, seizures, chorea, hemiplegia, catatonia, mitzgenn, mutism, delirium, mania, schizophrenia, and memory problems. EGG is invariably abnormal. Conclusion: High degree of suspicion in all children and adolescent with refractory neuropsychiatric syndrome is needed. Both CSF and serum should be tested. EGG is very sensitive than magnetic resonance imaging in confirming organicity.

AO2/88
Clinical profile, etiology, and outcome in optic neuritis involving 78 eyes: A study from a tertiary care center in North India
Rai NK, Chowdhury D, Ghosh B
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Background: Data on short-term outcome in optic neuritis (ON) is sparse from India. Objective: The objective is to study clinical profile, etiology, and outcome in patients of ON at 1 year. Methods: ON was defined by standardized clinical criteria. All received intravenous methylprednisolone. Primary outcomes were changes in visual acuity, logMAR, and percentage of color vision card reading. Results: A total of 54 patients (mean age 30.9; sex ratio: M:F = 28:26) were studied. Visual loss was unilateral in 30, bilateral in 24 involving 78 eyes. Etiologies were typical ON 22, atypical ON 20, NMOSD 5, and RRMS and CRION 3. Pain on eye movement 36, papillitis 17, disc pallor 22, RFPD 39, abnormal VEP 54, abnormal OCT 10, and MR optic nerve abnormalities in 14 patients were seen. Visual acuity at baseline in 78 eyes were <6/60 in 29, 6/60–6/18 in 21, and 6/12–6/9 in 4 patients which improved to <6/60 in 9, 6/60–6/18 in 30, 6/12–6/9 in 31, and 6/6 in 8. Mean logMAR at 1 year significantly improved from baseline [0.63 vs. 1.7; P = 0.04]. Mean percentage of color vision card reading at 1yr also improved significantly [53.9 vs. 14.5; P = 0.026]. Conclusion: Isolated ON both typical and atypical was more common than MS, NMOSD, and CRION. Bilateral visual loss was more common than in the West. Visual acuity and color vision improved significantly at 1 year but only 10% regained full visual acuity.

AO3/100
Characteristics of movement disorders and experience with immunomodulation in pediatric anti-N-methyl-D-aspartate receptor encephalitis: A single-center experience
Sankhyan N, Suthar R, Saini A, Dhawan S, Saini L, Sahu J, Mahadevan A, Singh A
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Background: This study was aimed at describing the clinical characteristics of N-methyl-D-aspartate receptor encephalitis (NMDAR-E) in a cohort, with special emphasis on the movement disorder and the varied response to immunomodulation. Methods: Five-years of hospital/clinic records and videos of children with a confirmed diagnosis of Anti-NMDAR-E were reviewed by two pediatric neurologists and the nature of movement disorder was evaluated. Treatment details were noted and the outcome was assessed on the modified Rankin Scale. Results: Twenty-four patients (14 females and 10 males, median age of 70.5 months) were diagnosed with Anti-NMDAR encephalitis. The average duration of symptoms was 20 days. The clinical presentation of the disease was marked by neurological, behavioral changes, and movement disorder in all 24, sleep disturbances in 21, speech deficits in 17, seizures in 14, and dysautonomia in 7. Orofacial dyskinesia was seen in all but 4 children. dystonia in 11/23; chorea in 9/23; and stereotypies in 8/23 ([6 simple, 3 complex (perseveration)]). Twelve had definite MRI abnormalities. One child responded to only steroids; 4 to steroids and IVIG; 9 out of 13 gave rituximab as third agent responded, while 4 out 5 given cyclophosphamide responded. The mean last follow-up Modified Rankin score was 2.2. Conclusion: In children, hyperkinetic MDs dominate and orofacial dyskinesia is the most common movement in anti-NMDAR-E. Most children need immunomodulation with the third-line agents such as rituximab and/or cyclophosphamide to achieve remission.

AO4/167
Analysis of spectrum and functional outcomes of idiopathic inflammatory demyelinating disorders of central nervous system in adults
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Aims and Objectives: To study the clinical spectrum, etiological profile, and functional outcomes of inflammatory
Fourteen patients were in this study. Twelve patients were on first-line drugs and two were drug naive. Nata\lizumab was stopped in eight patients because of JC virus titer increase. Three patients are still continuing on natalizumab. One patient has developed relapse while on natalizumab. One patient died due to severe urosepsis. None of the patient’s had any drug or infusion related adverse effects. Conclusion: Natalizumab is very effective in active RRMS and has excellent clinical response in control of progression of disease under close supervision.

AO5/197
Five-year single-center experience of natalizumab in patient of relapsing remitting multiple sclerosis
Soni R, Gupta S, Manoj S
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Introduction: Natalizumab is used in treatment of relapsing remitting multiple sclerosis (RRMS). Methods: This study analyzed data of MS patient on natalizumab. Analysis included indication, EDSS, MRI lesion, JC Virus titer, reason for stopping natalizumab, and any significant side effect. Results: Fourteen patients were in this study. Twelve patients were on first line drugs and two were drug naive. All 12 patients were changed to natalizumab either because of relapse while on the first-line drug or progression in EDSS or appearance of new T2 or GAD-enhancing lesion. Median duration of natalizumab was 24 months, with maximum duration is 68 and minimal duration was 6. Thirteen patients had JC Virus <0.9 and one patient had >1.5 at the beginning of therapy. At the end of treatment with natalizumab, EDSS of two patients increased, four patients are reduced, and eight patients remain unchanged. None of the patient had a relapse while on natalizumab. One patient died due to severe urosepsis. One patient was lost to follow-up. Natalizumab was stopped in eight patients because of JC Virus titer increase. Three patients are still continuing on natalizumab. One patient has developed relapse 5 months after stopping drug. None of the patient’s had any drug or infusion related adverse effects. Conclusion: Natalizumab is very effective in active RRMS and has excellent clinical response in control of progression of disease under close supervision.

AO6/303
Incidence, comparative clinical and radiological features, and long-term follow-up of pediatric and adult patients with acute disseminated encephalomyelitis: Experience from a large tertiary care hospital in South India
Manikinda J, Meena AK, Kaul S, Borghoin R, Suryaprabha T, Mridula R
Department of Neurology, Nizam’s Institute of Medical Sciences, Hyderabad, Telangana, India

Objectives: To study the incidence, clinical, and radiological features of pediatric and adult patients with acute disseminated encephalomyelitis (ADEM) and study the outcome of these patients over 3-year follow-up. Methods: This is a prospective study conducted between November 2013 and November 2015, in Department of Neurology, Nizam’s Institute of Medical Sciences, Hyderabad. A total of 49 patients were evaluated in the study. Results: Out of 49 patients studied, 31 patients were adults and 18 patients were pediatric. Mean age of ADEM patients was 30 years. 59.2% of patients were between 10 and 30 years of age at the time of presentation. Pediatric patients constituted 24.4% of ADEM patients. Pediatric patients were found to have higher frequency of altered sensorium (38.8%), headache (44.4%), seizures (22.2%), optic neuritis (27.7%), and preceding infection (38.8%) compared to adults. On comparison of lesion distribution on MRI, deep white matter, periventricular white matter, basal ganglia, and thalamic and cerebellar lesions were more common in adult patients. Conclusion: Pediatric patients constituted 36.7% of the ADEM cohort and were found to have higher frequency of altered sensorium (38.8%), headache (44.4%), seizures (22.2%), and preceding infection (38.8%) compared to adults. Juxtacortical white matter and brain stem lesions were common in pediatric patients. Response to steroids was very significant with 91.8% of patients showing clinical recovery.
specificity, positive predictive value, negative predictive value, and accuracy value of 74.57% (95% confidence interval [CI]: 66.43%–80.94%), 82.96% (95% CI: 70.09%–91.25%), 92.30% (95% CI: 86.36%–95.20%), 55.15% (95% CI: 47.28%–61.83%), and 76.94% (95% CI: 70.08%–82.03%), respectively. Overall, HRUS had good correlation with NCS in diagnosis of CTS. **Conclusion:** HRUS can be used as a complementary screening tool to NCS.

CNO2/193

A study of clinical, electrophysiological, and histopathological correlation in chronic inflammatory demyelinating polyneuropathy

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**Background:** Clinical and electrophysiological data may not always be conclusive regarding the etiology of the condition, and many patients can be misdiagnosed and deprived of available treatment options. **Objective:** The objective of this study is to establish correlation of clinical and electrophysiological parameters with histopathology in chronic inflammatory demyelinating polyneuropathy (CIDP).

**Materials and Methods:** All patients presenting with features of chronic peripheral neuropathy were examined and those meeting the EFNS/PNS clinical inclusion criteria of CIDP were included in the study. The patients underwent detailed clinical examination, nerve conduction study, and nerve biopsy. A correlation between the clinical scores (INCAT/ONLS), nerve conduction parameters, and histopathological findings was done. **Results:** Fifty-one patients were included in the study and 42 patients underwent nerve biopsy. Typical CIDP presentation was observed in 56.9% of participants. About 43.1% had atypical presentation. Nearly 66.7% of cases had histopathological findings which were suggestive of CIDP, and in 33.3% of cases, they were not suggestive of CIDP. Although there was no statistically significant difference in electrophysiological and histopathological findings, on subanalysis, there were few important observations. Fourteen patients fulfilling the EFNS/PNS electrophysiological criteria did not have features suggestive of CIDP on histopathology. There were eight patients who did not fulfill the EFNS/PNS electrophysiology criteria, but on nerve biopsy, all of them had features suggestive of CIDP, of them six patients had atypical presentation. **Conclusion:** Nerve biopsy aids in confirming the diagnosis where there is a diagnostic dilemma, chiefly with patients having atypical presentations, or when electrophysiological findings are ambiguous.

CNO3/200

Respiratory assessment of myasthenia gravis patients using repetitive nerve stimulation of phrenic and intercostal nerve

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**Background:** Repetitive nerve stimulation test (RNST) is a sensitive test for detecting weakness in any muscle using peripheral nerves. Therefore, RNST of the phrenic and intercostal nerve was performed for predicting the respiratory function in myasthenia gravis patients. **Methods:** All patients of myasthenia gravis were included in the study, and demographic profile and clinical features were noted. RNST of the peripheral and phrenic nerve was performed using standard protocol. Intercostal nerve RNST was done using active electrode 1 cm above xiphoid process, reference electrode was placed 2.5 cm away from it, and site of stimulation was in the seventh intercostal space. **Results:** Totally seven patients of myasthenia gravis were included in the study. Mean age was 36.82 ± 18.2 years. Four patients were of generalized myasthenia gravis, one was MUSK, and rest were bulbar myasthenia. Two bulbar myasthenia gravis were negative for antibodies. RNST of the peripheral nerves was negative in two patients of bulbar myasthenia and one patient of generalized myasthenia gravis. Out of two patients who were bulbar myasthenia as well as antibody negative, RNST showed decrement only in the intercostal and phrenic nerves even when RNST of other peripheral nerves was negative. Mean decrement in the intercostal nerves at baseline and postexercise was 29.95% ± 17.96%, 34.48% ± 19.7%, and 36.31% ± 23.58%. Phrenic nerve decrement at baseline, postexercise 1 min, and postexercise 2 min was 29.2% ± 26.10%, 33.7% ± 19.71%, and 29.28% ± 11.2%, respectively. **Conclusion:** Intercostal and phrenic nerve RNST is a sensitive test for assessing respiratory involvement, especially in patients presenting with bulbar symptoms and having negative RNST of peripheral nerves.

CNO4/224

Cardiovascular complication in Guillain–Barre syndrome and its relationship with outcome

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**Background and Aim:** The study was aimed to assess cardiovascular complication in Guillain–Barre syndrome (GBS) and its relationship with outcome. **Materials and Methods:** Eighty patients were included in the study. All consecutive patients of GBS according to Brighton case definitions included in the study. Patients with known cardiovascular disease were excluded from the study. All included patients underwent detailed clinical history and thorough examination. The participants were investigated as per a predetermined algorithm of investigations which included nerve conduction studies, cerebrospinal fluid studies, routine blood investigations, electrocardiography (ECG), two-dimensional echo, cardiac markers (troponin T, ProBNP), and autonomic function testing. **Observations:** Eighty patients were enrolled in the study. Out of eighty patients, two are excluded due to known cardiovascular disease. There were 43 males and 35 females, with a mean age of 24.5 years (14–60 years). On the basis of classification, there were 35 patients of acute inflammatory demyelinating polyneuropathy, 29 patients of acute motor-sensory axonal neuropathy, and 24 patients of acute motor axonal neuropathy variant. All patients were present with quadripareisis, 31 patients had facial nerve involvement, out of which 2 patients had unilateral facial involvement, and rest had bilateral involvement. Bulbar involvement was seen in 19 patients and respiratory failure was seen in 11 patients. ECG abnormality
In IPD patients, the presence of SSEBR was an observational tool in differentiating from CBS and also IPD (early) tremor, and depression. BRRC may be used as a supportive marker was seen in 17 patients. Echo abnormality was seen in 5 patients. Autonomic dysfunction was seen in 49 patients, out of which 18 patients had severe autonomic dysfunction. 

**Conclusion:** Cardiovascular complication is associated with morbidity and mortality in GBS patients.

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**CNO5/361**

**Blink recovery pattern and somatosensory-evoked blink reflex in patients with Parkinson’s disorders and its correlation to clinico-imageological features**

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**Introduction:** Somatosensory-evoked blink reflex (SSEBR) is release phenomenon transmitted through brainstem reticular formation which may be clinically relevant in degenerative neurological disorders associated with functional abnormalities of brainstem reflexes. Our aim is to assess SSEBR and blink reflex recovery curve (BRRC) in patients with Parkinsonism (idiopathic Parkinson’s disease [IPD], CBS, PSP) and normal population; substantia nigra (SN) hyperechogenicity and its volume by transcranial sonography. 

**Materials and Methods:** Patients with Parkinsonism syndromes and essential tremor (ET) attending neurology outpatient department and willing to participate in the study were included in the study. SSEBR, BRRC pattern, and transcranial sonography were performed. 

**Results:** Totally ninety participants were included in the study. Sixty were Parkinsonian syndromes (40 – IPD, 10 – PSP, and 10 – CBS), 10 – ET, and 20 – healthy controls. The presence of SSEBR was more common in IPD patients and positively correlated with dysphagia, tremor, dyskinesia, and depression. There was statistically significant difference in terms of R2 amplitude from interstimulus interval of 100–300 ms between IPD and ET patients and 100–400 ms between PSP and CBS patients. IPD patients had a large area of SN hyperechogenicity with a mean size of 0.27 ± 0.11 cm² and had more proportion with marked hyperechogenicity compared to PSP and ET patients. 

**Conclusion:** In IPD patients, the presence of SSEBR was associated with increased probability of dysphagia, dyskinesia, tremor, and depression. BRRC may be used as a supportive tool in differentiating PSP from CBS and also IPD (early) from ET. Transcranial ultrasonography showing marked hyperechogenicity of SN in IPD may guide in differentiating from other Parkinsonism syndromes.

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**CNO6/AWPN18**

**Epidural steroid injections compared with oral treatment for lumbosacral radicular pain: A comparative efficacy study**

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**Background:** Spinal pain is the most common of all chronic pain disorders. Conservative treatment, percutaneous spine interventions, and surgery have all been used as treatments for this condition. The aim of the present study is to compare the addition of epidural steroid injections to the oral treatment for better pain relief and improve the quality of life of the patients. 

**Objective:** The objectives of this study were as follows: (1) to evaluate the efficacy of epidural steroids in lumbosacral radiculopathy and (2) to evaluate the comparative efficacy of combining epidural steroids and oral drug treatment (gabapentin/pregabalin and/or amitriptyline) and oral drugs alone in refractory pain of lumbosacral radiculopathy. 

**Materials and Methods:** This study was conducted in xxx in the period of 1 year. Patients with clinical and Magnetic Resonance Imaging features suggestive of lumbosacral radiculopathy were given epidural steroid injections who were already taking oral medications (pregabalin/gabapentin and amitriptyline) or escalating doses of these oral medications. The pain scores (visual analog scale [VAS] and functional rating index [FRI]) before and after the treatment in the two groups were compared. 

**Results:** Totally sixty patients were enrolled and final analysis was carried out in 47 patients. After 6 months, there was a significant decrease in the mean VAS and FRI scores in both treatment groups. There was a statistically significant difference between the mean VAS and FRI scores of two groups at the time of discharge and at 1 month of follow-up, but there was no difference at 3- and 6-month follow-up. 

**Conclusion:** The results of our study suggest that both the modalities are effective in reducing pain in patients of lumbosacral radiculopathy. However, when compared, the combined treatment provides better pain relief as compared to oral medications alone.

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**Saturday, September 29, 2018, 16:30-17:30 h, Hall A**

**Platform Session 10: Miscellaneous Disorders**

**MI07/108**

**Differential awareness among preprimary, primary, and middle schoolteachers about the neurological factors that affect learning disability**

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**Background:** Empowering the teacher to identify and effectively diagnose specific learning disorder (SLD) in students can help in early intervention for the same. 

**Aim:** The aim of this study is to find the knowledge, attitude, and practice (KAP) among schoolteachers about the neurological factors that affect SLD and to find the effect of short-term intensive teaching on KAP of teachers. 

**Materials and Methods:** An observational study was carried out among 51 (16 preprimary, 18 primary, and 17 middle school) teachers from 3 private schools in Trivandrum at the schools where they were employed. We used a multiple choice questionnaire format with eight questions. 

**Results:** The mean scores of preprimary teachers before and after training were 3.69 and 5.69 and of primary schoolteachers 3.44 and 5.11, respectively, indicating a significant improvement in their posttest (P < 0.01) score. The pre- and post-test scores of middle schoolteachers (4.29 and 5.35) though showing improvement were not statistically significant. 

**Discussion and Conclusions:** The mean score on the baseline KAP questionnaire administered to middle schoolteachers was higher compared to primary and preprimary schoolteachers as observed in other studies showing their better KAP regarding SLD [Lingeswaran 2014; Lopes and Crenitte 2013]. However,
the training program did significantly improve KAP of primary and preprimary teachers regarding SLD. There was an improvement in KAP of the middle school teachers also though it did not reach statistical significance due to their high baseline score. Intensive teaching programs of short duration can empower teachers regarding specific learning disability.

MiO8/299
Hypertrophic pachymeningitis: Clinicoradiological and etiological spectrum

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Hypertrophic pachymeningitis (HP) is a fibrosing inflammatory process that causes localized or diffuse enlargement of the dura mater. These changes in the meninges can be identified in a variety of neoplastic, immune, and infectious disease processes. Idiopathic hypertrophic meningitis is a diagnosis of exclusion. Objective: The objective of this study is to enumerate the clinicoradiological features and treatment options of a cohort of 45 patients with HP. Materials and Methods: A retrospective chart review was conducted on 45 patients admitted with HP under Neurology Unit in Christian Medical College, Vellore, from January 2012 to June 2018. The clinical profile, serology, radiological data, and outcomes were looked at. Results: There were 45 patients in this cohort with a mean age of 43 ± 12.5 years and M:F ratio of 0.8:1. Mean disease duration was 2½ years. Twenty-six out of 45 participants (58%) were diagnosed as idiopathic HP, while 19/45 (42%) had secondary causes. Nineteen (68%) of them were inflammatory etiologies (IgG4-4, ANCA associated-6, Sarcoidosis-3, HLA B27 associated spondyloarthropathy-1), neoplastic 15% (carcinoma prostate with Dural metastasis-1, meningeal carcinomatosis-2) and 2 cases (10%) were infections (1-TB, 1-Aspergillosis). Dural biopsy was done in 11 patients (24%). Nearly 96% of them had headache and 52% of them had multiple cranial neuropathies. Predominant magnetic resonance imaging pattern was tentorial, skull base, and cerebral convexity. Immunomodulation was instituted in all patients with idiopathic and inflammatory pachymeningitis. Conclusion: HP is an important cause of recurrent cranial neuropathies and headaches. Clinical presentation, imaging, and laboratory investigations help in differentiating secondary causes of pachymeningitis from HP.

MiO9/300
Pattern of intracranial metastasis and neurological paraneoplastic profile in carcinoma lung

Gunasekar PK, Ranganathan LN, Ramamurthy G, Suriyakumar G, Srinivasaraman G, Manickavasagam J, Murugesan ASM
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Background: The carcinoma of the lung manifests with neurological signs and symptoms through metastatic and paraneoplastic involvement of the neuraxis. The propensity of neuraxial involvement by lung cancer is high. Aims and Objectives: The aims of this study are to assess the metastatic potential and paraneoplastic manifestations of the nervous system by carcinoma lung and to analyze the pattern of intracranial metastasis. Materials and Methods: Patients who were diagnosed with carcinoma lung were assessed for intracranial metastasis assessed using 18F-fluorodeoxyglucose positron emission tomography scan. The patients were analyzed for number, location, and pattern of intracranial metastasis and for the neurological paraneoplastic manifestations. Results: Seventy-four patients (45 males, 29 females) with carcinoma lung had intracranial metastasis. The average age of the participants was 57.5 ± 10.9 years. These patients had 31 solitary and 43 multicentric metastases amounting to 116 metastatic lesions. The most common sites of intracranial involvement in patients with solitary lesions are frontal (35.48%), cerebellar (29.03%), parietal (25.8%), occipital (3.22%), temporal (3.22%), and corona radiata (3.22%). The most common sites of intracranial involvement in patients with multicentric lesions are cerebellar (30.5%), parietal (18.82%), frontal (17.64%), temporal (8.2%), occipital (7.05%), brainstem (7.05%), thalamocapsular (5.9%), corona radiata (2.3%), gangliocapsular (1.2%), and suprasellar (1.2%). The most common neurological paraneoplastic manifestations included sensory neuronopathy (3), polyneuropathy (2), cerebellar degeneration (2), Lambert–Eaton myasthenic syndrome (1), and autonomic neuropathy (1). Conclusion: In carcinoma, lung multicentricity is more common than solitary metastasis. Cerebellar metastasis is the most common site of metastasis than the individual lobes. The paraneoplastic profile of carcinoma lung is varied.

MiO10/316
Paraneoplastic neurological syndromes: A tertiary care center experience

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Background: Paraneoplastic neurological syndromes (PNSs) are heterogeneous group of disorders which can present with central and peripheral nervous system involvement. The symptoms of PNS often precede the manifestations of cancer. Onconeural antibodies are important in the diagnosis and management of these disorders. Objective: The objective of this study is to analyze the clinical spectrum of PNS in a tertiary care setting. Methods: A retrospective cohort study of PNS was performed in Christian Medical College, Vellore. The medical records of 96 PNS patients were reviewed between 2007 and 2018. Results: A total of 96 patients diagnosed with PNS were included in the study. They were classified as “definite” and “possible” PNS based on published criteria. Thirty-two (33.3%) patients had classical PNS and 64 (66.6%) had nonclassical PNS. Fifty-eight (60.4%) patients had “definite” PNS and 38 (39.6%) had “possible” PNS. Peripheral neuropathy, cerebellar ataxia, and paraneoplastic encephalopathy were the three most common neurological syndromes. Tumors were detected in 38 (39.5%) patients, and lung carcinomas were the most common primary tumor detected. Antibodies were detected in 46 (47.9%) patients. Anti-MA-2 and Anti-YO antibodies were the most common antibodies found. Patients received symptomatic therapy (47.9%) and immunotherapy (52.1%). A favorable outcome was seen in 52.1% of patients. Immunotherapy included...
steroids, intravenous immunoglobulin, plasmapheresis, cytotoxic medications, and rituximab. Conclusion: A high index of clinical suspicion is important for early diagnosis and management of PNS. Anticonvulsant antibodies and a thorough cancer screening play an important role in making an accurate diagnosis.

**MiO11/344**

**Educational outcome and school life in children with epilepsy**

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Aim: Epilepsy is frequent among school-aged children and its prevalence is estimated at 0.5%. The aim of this study is to explore how epilepsy affects students in schools. Methods: This was a prospective study conducted at neurology department of GSVM Medical College, Kanpur, from January 2017 to May 2018. We enrolled 200 children aged 6–18 years and who had a diagnosis of childhood idiopathic epilepsy and similarly matched healthy controls for the study. Parents were interviewed using a written questionnaire and schoolteachers by telephonic questionnaire that included questions specifically addressing the impact of epilepsy on the child’s academic life. Results: About 30% of children had stopped attending the school. Nearly 90% of patients in the study missed at least 1 day of school due to seizures. The main reason for nonattendance was fear of occurrence of seizures. Nearly 85% of teachers reported lowering grading standards for students with epilepsy. Almost 30% of the schools would not like to prefer to admit children in their schools with major fits. About 60% of schools do not have proper trained medical staff to provide first aid. Only 17% of the teachers were well informed and many had negative attitudes and misconceptions about epilepsy. Conclusion: Seizures have a significant impact on school attendance and school dropouts. Most of the schools are ill-equipped and the negative attitude of the teachers and staff is still alarmingly high. Proper legislation, awareness, and strategy are required to help the children with epilepsy in improving their educational outcome.

**MiO12/289**

**Prognosis of postcardiac arrest brain injury: A multimodal approach**

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Introduction: Cardiac arrest is devastating event associated with high mortality. Even after successful resuscitation patients’ lands into “postcardiac arrest syndrome. “ One should suspect hypoxic brain injury in those patients who remain comatose after the survival from arrest. Prognosis of these patients is a real challenge for physicians in developing country like India, due to lesser insurance penetration and out-of-pocket expenses for family members. In this study, we observed 67 patients, who suffered from hypoxic brain injury on the basis of clinical profile, electroencephalography (EEG), and imaging studies. Observations and Results: Survival on day 30 was 29/67 (43%). Mortality was more in male gender and in higher age group. Clinical assessment in the form of cerebral performance category (CPC) score and Glasgow Coma Scale (GCS) was done on days 1, 3, and 30. EEG was done as routine test and was divided into three patterns, highly malignant, malignant, and benign. Mortality was more in those with highly malignant pattern (78%). Fatal outcome was seen in those with abnormal computed tomography scan which was statistically significant. On magnetic resonance imaging brain, both cortex and deep gray matter involvement was the most common type and those with diffuse cortical involvement had fatal outcome. Conclusion: Higher age group (>75 years), male sex, nonshockable rhythm, presence of myoclonus, coronary artery disease and chronic liver disease and hypertension, CPC >2 and GCS (motor score) <3 on day 3, highly malignant EEG, and abnormal imaging studies were predictors of fatal outcome. Ideal time for prognosis should be delayed up to 72 h.

**SO7/132**

**A study on clinicoradiological correlation of aphasia and its prognosis**

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Introduction: Aphasia is defined as a disorder of language that is acquired secondary to brain damage. Objectives: The objectives are to study the clinicoradiological correlation of aphasia and its prognosis. Materials and Methods: This observational study was conducted in the Institute of Neurology, Madras Medical College, Chennai, from August 2015 to June 2018. Aphasia due to acute ischemic stroke, hemorrhagic stroke, and venous stroke was included. All aphasic patients were evaluated clinically and using computed tomography brain and magnetic resonance imaging brain. Speech therapy was given for all patients. Results: Among 68 aphasic patients, ischemic stroke was noted in 51 patients, hemorrhagic stroke in 14, and venous stroke in 3. Males were 47 and females were 21. Mean age of the patients was 56.2 years. Clinically, Broca’s aphasia was noted in 22, Wernicke’s aphasia in 17, global aphasia in 15, subcortical aphasia in 8, and mixed transcortical aphasia in 3 patients. One patient each had transcortical motor aphasia, conduction aphasia, and anomic aphasia. The common site of lesion in Broca’s aphasia was left inferior frontal gyrus, Wernicke’s aphasia was left superior temporal gyrus, and global aphasia was both left inferior frontal and superior temporal gyrus with much of the parietal lobe in between. In subcortical aphasia, lesion was either in the left thalamus or left basal ganglia. Conclusion: Aphasia due to vascular pathology correlates well with the clinical and radiological localization. Prognosis depends on the site and the extent of lesion. Broca’s aphasia recovers nearly totally.

**SO8/135**

**New dual aspiration with push and fluff technique for stent retrievers in acute stroke with large vessel occlusion: Increasing the success rate of recanalization**

Banga V, Goel G, Malaijan A, Das B
New dual aspiration with push and fluff technique (DAFT) for stent retrievers in acute stroke with large vessel occlusion (LVO) increases the success rate of recanalization.

**Background and Purpose:** Combined aspiration–stent retriever-assisted technique has significantly increased our rate of success of recanalization as compared to standard unsheathing technique by increasing the rate of first-pass reperfusion. We investigated the efficacy of new DAFT technique in the treatment of acute stroke.

**Methods:** We retrospectively reviewed the 23 patients with acute LVO using a new DAFT technique. We used aspiration at the 5MAX ACE catheter and Neuron MAX 088 6F catheter along with stent retriever-assisted technique. Detailed analyses of medical records were done to obtain demographic and clinical history of the patients.

**Results:** First-pass mTICI 3 reperfusion was achieved in 18 out of 23 patients (78%) with a mean groin puncture to reperfusion time of 39.0 ± 12 min and mTICI 3 was accomplished in 19 out of 23 cases (82%) with a maximum of 3 attempts. Successful reperfusion (mTICI ≥ 2b) was achieved in all patients (100%) with a mean time from groin puncture to reperfusion of 45 min ± 20.3. At present, the median National Institutes of Health Stroke Scale score was 12 and favorable neurological outcome by the modified Rankin score (≤2) was achieved in 14 out of 23 patients (61%).

**Conclusion:** DAFT is newer and very effective technique in terms of first-pass complete reperfusion in patients with LVO.

**SO9/142**

Clinicoradiological and hemodynamic profiles of internal and cortical border-zone infarcts

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**Background:** The data regarding clinical and hemodynamic profile of internal and cortical border-zone infarcts (IBZ and CBZ) is still in its evolving stage. Both types have been combined into a single group in most reports. **Methods:** We identified 400 acute ischemic stroke patients admitted to Santokba Durlabhji Memorial Hospital over 20 months and evaluated patients of borderzone infarct (BI). We classified them based on diffusion-weighted imaging images into subtypes. Baseline characteristics and clinical and neuroradiological profiles were compared amongst CBZ and IBZ. **Results:** We identified total 52 (13%) BI patients (20 of IBZ and 32 of CBZ). Two (6.2%) patients of CBZ had infarcts in anterior cerebral artery:middle cerebral artery (MCA) watershed territory, 9 (28.1%) had in PCA:MCA territory, while 21 (65.6%) had in both. Four (20%) IBZ were in corona radiata and 16 (80%) were in centrum semiovale. Three (15%) IBZ infarcts were confluent while 17 (85%) were partial. Thirty-six (69.2%) BI patients (22 [68.8%] of CBZ and 14 [70%] of IBZ) had symptoms of progression >30 min. Thirty (57.7%) BI patients (23 [71.9%] of CBZ and 7 [35%] of IBZ, P < 0.05) had prior history of hypovolemia/hypotension. Degree of carotid/MCA stenosis, presence of small cortical infarct, PSCE, and modified Rankin score at admission and at discharge did not differ between CBZ and IBZ (P > 0.05).

**Conclusions:** BI infarcts have unusual pattern of subacute onset. Systemic hypotension seems to be contributing greatly to the genesis of BI more in CBZ. Association of BI with large vessel atherosclerosis and embolic phenomenon is common and its contribution to CBZ and IBZ seems to be equal.

**SO10/144**

Stem cell therapy in patients with ischemic stroke: a meta-analysis

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**Background and Aims:** Stem cell therapy has emerged as a potential therapy for the treatment of stroke. We performed a meta-analysis of published studies using stem cell therapy in patients with ischemic stroke (IS). **Methods:** Literature was searched using Sciedirect.com, Google Scholar, MEDLINE, PubMed, EMBASE, Trip Database, Cochrane library, and clinicaltrials.gov to identify studies on stem cell therapy in IS till December 2017. STATA version 13 was used for carrying out meta-analysis. **Selection Criteria:** We included comparative nonrandomized trial or randomized controlled trials (RCTs) if stem cell was infused to treat patients with IS in any phase after the index stroke. Fixed effect model was used if heterogeneity was <50%, otherwise random effects model to compute the standardized mean difference (SMD) in stroke outcome between intervention and control group.

**Results:** Four randomized trials and four nonrandomized comparative trials were included in the present meta-analysis. Significant improvement in term of SMD in stroke outcome was observed in the stem cell therapy group as compared to controls (SMD: 0.43, 95% confidence interval: 0.25–0.59, P < 0.001). The pooled difference in the safety outcomes was not significant between both the groups. **Conclusion:** Our meta-analysis suggests that stem cell therapy is safe and feasible and may have potential to improve outcome in patients with stroke. Well-designed RCTs are required to provide more information on the efficacy of stem cell transplantation in patients with IS.

**SO11/161**

Transcranial Doppler to assess cerebral vasoreactivity in hypertensive patients

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**Introduction:** Chronic hypertension leads to decreased cerebral vasoreactivity which is postulated as a reason for developing complications. Studies have proven association between hypertension duration and complications. **Materials and Methods:** A cross-sectional study was done in Madras Medical College from April 1, 2018, to June 30, 2018, to assess chronic hypertension effects on cerebral vasoreactivity using transcranial Doppler (TCD). Baseline means middle cerebral artery velocity and after breath holding for 30 s was done, and breath holding index (BHI) was calculated. **Results:** Thirty hypertensive patients were evaluated and matched with 20 controls. There were 21 men and 9 women. Fifteen hypertensives were <5 years, 11 between 5 and 10 years, and 4 >10 years. Seventeen had central nervous system (CNS) complications and 13 did not. Among 17, 15 had BHI <1.5, and in the 13, 3
had BHI <1.5. In the complication group, 5 had hypertension for <5 years compared to 10 in other. Discussion: Eleven of 17 with complications had hypertension >5 years while only 3 among 13 in the other suggesting linear relationship between hypertension duration and complications. Ten in the complication group had BHI <1.5 while 3 in the other group suggesting loss of vasoreactivity as hypertension duration increases and similar linear relationship between BHI and complications. The association of hypertension duration with CNS complications and BHI is statistically significant (P < 0.05). Conclusion: BHI using TCD is a useful screening method to assess cerebral vasoreactivity and predict complications in chronic hypertensives.

SO12/343
Prevalence of symptomatic and asymptomatic coronary artery disease in patients with stroke and transient ischemic attack
Bhatia R, Sharma G, Ray A, Patel G, Garg A, Singh N, Bali P, Sisodia P, Sreenivas V, Srirastava MVP, Prasad K
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Background: Ischemic stroke (IS) and coronary artery disease (CAD) have similar risk factors and can often coexist. No definitive guidelines exist on the evaluation of CAD among patients with IS. We aimed to determine the prevalence of symptomatic and asymptomatic CAD in patients with IS and transient ischemic attack (TIA). Methods: Three hundred and fifty-three patients with IS/TIA were recruited. All patients underwent optimal investigations for stroke evaluation. After evaluation by a cardiologist, patients asymptomatic or clinically suspected for any CAD underwent stress-rest gated technetium-99m MIBI myocardial perfusion single-photon emission computed tomography (MPS). Results: Three hundred and four patients completed the study. Forty-four patients were definitive CAD based on previous evaluation and treatment. Twelve patients were clinically suspected to have CAD, of which ten patients underwent MPS and all had normal MPS. Among the asymptomatic patients (n = 248), 11 patients had an abnormal MPS, among which 4 patients underwent coronary angiography and one of them underwent coronary revascularization. As per the TOAST classification, the odds of having CAD in patients with cardioembolism was 5.1 (95% confidence interval [CI]: 1.4–18.5, P = 0.013) and with large artery disease was 2.9 (95% CI: 1.07–7.8, P = 0.035). The prevalence of CAD among patients with stroke was 18.0% and that of asymptomatic CAD was 4.4%. Patients with diabetes, hyperlipidemia, and hypertension had higher likelihood for the presence of CAD. Conclusion: A considerable number of patients with stroke may have associated CAD. An optimal management strategy in stroke patients who have silent CAD may improve clinical outcomes.

Saturday, September 29, 2018, 16:30-17:30 h, Hall C
Platform Session 12: Movement Disorders
MO1/11
The response to oral medication in eye blinking and eye closure blepharospasm: A study of twenty patients
Ranganathan P
Diagnosis of OMAS

...females) fulfilled the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition criteria for catatonia. Most common clinical features were waxy flexibility, mutism, negativism, and catalepsy. Initial diagnosis by EMO/residents was extrapyramidal syndrome in 7, meningitis in 2, and conversion reaction, acute psychosis/encephalopathy, and nonconvulsive status epilepticus in 1 each. Final diagnosis was catatonia due to general medical condition in 6 (PSP in 2, poststatus epilepticus in 1, and acute renal failure-related encephalopathy, glioblastoma multiforme, and TBM in 1 each), catatonia due to major depressive disorder in 4, and schizophrenia in 1. All patients improved with lorazepam and amantadine. Conclusion: Extrapyramidal syndrome is a common mimic of catatonia in the neurology settings. Catatonia was most common secondary to organic causes followed by affective disorders and schizophrenia.

MO3/169

The prevalence of nonmotor features in patients of Parkinson's disease, treated in Tirunelveli Medical College Hospital

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Introduction: Parkinson’s disease is characterized by resting tremors, rigidity, hypokinesia, and postural instability. It is also associated with nonmotor features such as postural hypotension, constipation, urinary urgency and incontinence, anosmia, insomnia, and rapid eye movement (REM) sleep disorders being the most prominent among them. Aim and Objectives: The aims of this study are to investigate the prevalence and distribution of the major nonmotor features in Parkinson’s disease, within the selected population residing in and around Tirunelveli district of Tamil Nadu. Results: About 71% of all the studied cases had at least one nonmotor symptom. Nearly 49% had two or more symptoms and 29% had three or more nonmotor systems. Insomnia was the most common symptom, which was present in 43% of cases. Constipation was present in 26%, REM sleep disorders in 23%, postural hypotension in 20%, and anosmia in 26% with anosmia testing being positive only in about 6%, while the rest gave a history of smell impairment. Urinary frequency, urgency, and incontinence were present in 26%, of which 9% had urinary incontinence. The average age of study participants was 60.8. The average duration of illness was 3.6 years. Patients with insomnia and constipation belonged to comparatively older age groups (mean age of 63.2) Postural hypotension was present in a relatively younger age group (mean age of 58.3). About 71% of patients with anosmia and also had coexisting REM sleep disorder. Conversely, 63% of those with REM sleep disturbance also had anosmia.

MO4/191

Catatonia from a neurologist’s perspective: What we learned in the last decade?

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Background: Catatonia is characterized by stupor, negativism, mutism, agitation, mannerism, posturing, catalepsy, mutism, waxy flexibility, echolalia, echopraxia, and stereotype. Catatonia is grossly under diagnosed in nonpsychiatric settings. It is probably because it is mimicked by other medical conditions. Aims: The aims of this study are to determine the mimics of catatonia in neurology settings. Methods: Patients discharged from a single neurology unit from 2007 to 2017 with the diagnosis of catatonia were collected. Their case files were reviewed for the initial diagnosis made by neurology residents after their first evaluation in the emergency department. Their clinical features, initial and final diagnosis, and outcome are discussed. Results: Eleven patients (age: 22–55 years, 7 females) fulfilled the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition criteria for catatonia. Most common clinical features were waxy flexibility, mutism, negativism, and catalepsy. Initial diagnosis by EMO/residents was extrapyramidal syndrome in 7, meningitis in 2, and conversion reaction, acute psychosis/encephalopathy, and nonconvulsive status epilepticus in 1 each. Final diagnosis was catatonia due to general medical condition in 6 (PSP in 2, poststatus epilepticus in 1, and acute renal failure-related encephalopathy, glioblastoma multiforme, and TBM in 1 each), catatonia due to major depressive disorder in 4, and schizophrenia in 1. All patients improved with lorazepam and amantadine. Conclusion: Extrapyramidal syndrome is a common mimic of catatonia in the neurology settings. Catatonia was most common secondary to organic causes followed by affective disorders and schizophrenia.

MO5/206

Dancing eyes and dancing limbs: Opsoclonus-myoclonus-ataxia syndrome as an acquired movement disorder

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Aim: Opsoclonus-myoclonus-ataxia syndrome (OMAS) is a distinct cause of acquired movement disorder in young children. We aim to describe the clinical profile and response to treatment in children with OMAS from our center. Methods: This was a retrospective review of case sheets of all children diagnosed with OMAS between 2013 and 2017. Results: During this 5-year period, 15 children (males = 8) presented with OMAS. The median age of the children was 38 months (range: 18–100). The median age of onset of symptoms was 19 months (range: 9–83 months). All children had opsoclonus, myoclonus, and ataxia at presentation; irritability and sleep disturbance were present in 10 (66.7%) and 4 (26.7%), respectively. Five (33.3%) children had an underlying neuroblastoma (paravertebral = 4, suprarenal = 1). Urinary vanillylmandelic acid was elevated in two children and one had hypertension. Nine children (60%) received steroids. Five children (33%) received combination (steroids plus immunoglobulins) therapy. Three patients (20%) had relapse and were treated with multimodal therapy (steroids, rituximab, and immunoglobulins). One child had spontaneous recovery. Median follow-up duration was 18 months (range: 4–60 months). Twelve (80%) children were in remission, four (26%) had mild-to-moderate developmental delay, and three (20%) were lost to follow-up. Conclusions: Diagnosis of OMAS needs a high clinical suspicion and prompt identification as it is often associated with an underlying neuroblastoma. Remission was achieved in nearly all the children with multimodal immunotherapy.

MO6/AWPN29

Application of Indian smell identification test as a screening test to study unawareness of hyposmia in patient of idiopathic Parkinson's disease

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...seen in TRODAT scan? Hence, we postulate that follow-up TRODAT scans on a long-term basis are needed to support the study.

Annals of Indian Academy of Neurology, Volume 21, Supplement 2, 2018
Background: Loss of olfaction is a hallmark of neurodegenerative disorders such as idiopathic Parkinson’s disease (IPD) and may precede the clinical syndrome of IPD by many years. Olfactory bulb involvement may be the earliest site of pathology in PD. This study examines the frequency of unawareness of hyposmia in study cohorts with and without IPD. Objective: In this study, olfactory function has been assessed using an Indian Smell Identification test (INSIT) smell test to evaluate the unawareness of hyposmia in the IPD. Materials and Methods: Olfaction was assessed in thirty IPD patients and thirty healthy controls using an INSIT. In this test, the participants were asked to identify the smell from a set of choices and were scored out of 10. The cutoff used for hyposmia was an INSIT score ≤4. Unawareness was defined as reporting normal sense of smell in the setting of a low INSIT. Results: The mean age for the IPD and control group was 64.3 ± 10.6 and 63.9 ± 10.2 years, respectively. Most of the participants were males, 53% and 56% in the IPD and control group, respectively. Out of the 30 patients in each group, 18 patients were unaware of hyposmia in the IPD group as compared to 4 patients in the control group, which was found to be statistically significant with P < 0.001. Conclusion: Unawareness of hyposmia in IPD is high compared to the elderly without Parkinsonism. This all leads to a premise whereby population screening using INSIT could be used for early detection of IPD of those already harboring the earliest pathology of neurodegeneration.

Sunday, September 30, 2018, 9:00-10:00 h, Hall A
Session: Award paper-Neurology

AWPN_1/09

Decompresive hemicraniectomy: Outcome and its prognostic markers in malignant middle cerebral artery infarction

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Background: Decompresive hemicraniectomy (DC) has been considered as a surgical treatment for malignant middle cerebral artery (MCA) territory infarction for years. However, decompressive hemicraniectomy has shown reduced mortality; the functional outcome and prognostic markers are still indecisive. Objective: The objective of this study is to determine the functional outcome of decompressive hemicraniectomy in patients with malignant MCA infarction and factors affecting its prognosis. Methods: A prospective observational study was done from November 2015 to March 2018 at tertiary care hospital. A total of sixty-one patients with massive MCA infarct were analyzed thoroughly and divided into two groups based on the functional outcome by modified Rankin scale (mRS) during the follow-up period of 6 months. Results: Among 61 patients, 26 patients (42.6%) had favorable outcome (mRS ≤3) and 35 patients (57.4%) had unfavorable outcome (mRS ≥4). The factors associated with favorable outcome were patients younger than 45 years (57.7%), right-sided hemisphere infarction (57.1%), absence of clinical signs of herniation (57.6%), and when surgery done before 24 hours (66.7%). Nineteen patients (31.1%) died in this observation. History of vomiting before admission and postoperative infection were insignificant statistically. Conclusion: Decompressive hemicraniectomy can be considered as a useful procedure for massive MCA infarction, especially in patients with age <45 years, right-sided infarction, and those operated within 24 h from ictus before clinical signs of herniation were considered as good prognostic factors.

AWPN_2/11

Evidence for α-synuclein and inflammasome relationship: A new insight into pathogenesis of Parkinson’s disease

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Background: There is evidence for systemic involvement of α-synuclein pathology and neuroinflammation in Parkinson’s disease (PD). However, clinical evidence for α-synuclein and inflammation interrelationship remains unknown. Objective: The objective is to study NLRP3 inflammasome activation and α-synuclein levels in PD patient serum and establish the association of α-synuclein with inflammation, clinical symptoms, disease duration, and severity. Materials and Methods: We compared the serum levels of total α-synuclein, phosphorylated α-synuclein, and pro-inflammatory interleukin (IL-1β) and NLRP3 in 27 PD patients and 15 healthy participants using ELISA. UPDRS III, Hoehn and Yahr, MMSE, and Mattis DRS-2 were used to assess clinical parameters. Statistical analysis was performed to explore the interrelationship of the above-mentioned biochemical and clinical parameters. Results: Estimated levels for NLRP3 inflammasome (PD: 33.50 ± 4.71 vs. control: 6.97 ± 1.44 ng/ml); IL-1β (PD: 219.83 ± 53.31 vs. control: 45.53 ± 15.06 pg/ml); total α-synuclein (PD: 21.23 ± 1.88 vs. control: 24.87 ± 6.69 ng/ml); phosphorylated α-synuclein (PD: 17.51 ± 2.38 vs. control: 23.15 ± 4.69 ng/ml). In PD, Pearson’s correlation coefficient of total α-synuclein and NLRP3 was 0.733, P = 0.001; phosphorylated α-synuclein and NLRP3 was 0.549, P = 0.001; total and phosphorylated α-synuclein was 0.487, P = 0.001; and IL-1β and NLRP3 was 0.682, P = 0.001. Discussion: IL-1β and NLRP3 in PD were significantly higher than controls, whereas total and phosphorylated α-synuclein levels showed insignificant changes. Interestingly, significant correlations were found among total α-synuclein, phosphorylated α-synuclein, and NLRP3 inflammasome. Conclusion: The study findings reveal a relationship between inflammasome and α-synuclein which can open up avenues for better understanding the disease.

AWPN_3/07

Clinical and radiological profile of disseminated neurocysticercosis

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Background: Neurocysticercosis (NCC) is a major public health problem and common cause of seizures in developing countries such as India. It is caused by larvae of a tapeworm, Taenia solium. Objective: The objective is to study the clinical
and radiological profile of patients with multiple NCC and their response to medications. **Materials and Methods:** This is a chart review of multiple NCC cases from 2012 to 2017. **Results:** Twenty-four (M:F – 21:3) patients were diagnosed with multiple NCC with minimum of 20 lesions in the brain, of which 16 (66.67%) cases were showing dissemination into various body parts (disseminated NCC). Mean age of presentation was 36.20 ± 14.01 years. Headache was the predominant symptom in all (100%) cases followed by seizures (87.5%), vomiting (37.5%), behavioral disturbances (29.2%), fever (16.7%), visual disturbances (16.7%), encephalopathy (8.3%), muscle pain, and limb weakness (4.2%). Computed tomography brain showed multiple active parenchymal cysts in all 24 cases. Calcifications were seen in 66.6% of cases. Magnetic resonance imaging brain revealed involvement of cortex and subcortical structures in all cases followed by cerebellum (87.5%) and brainstem (62.5%). Spine involvement was seen in 8.3% of cases. Albendazole was used in 23 cases as antiparasitic therapy, of which 2 (8.3%) deaths were noted. Among 22 cases, seizures subsided in 95.5% of participants; headache subsided in 86.4% of participants. Two participants had persistent memory and behavioral abnormality. One participant worsened after starting antiparasitic therapy requiring decompressive craniectomy. **Conclusion:** Antiparasitic therapy can be given under the cover of steroids and antihistamines in disseminated neurocysticercosis.

**AWPN_4/18**

**Epidural steroid injections compared with oral treatment for lumbosacral radicular pain: A comparative efficacy study**

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**Background:** Spinal pain is the most common of all chronic pain disorders. Conservative treatment, percutaneous spine interventions, and surgery have all been used as treatments for this condition. The aim of the present study is to compare the addition of epidural steroid injections to the oral treatment for better pain relief and improve the quality of life of the patients. **Objective:** The objectives of this study were as follows: (1) to evaluate the efficacy of epidural steroids in lumbosacral radiculopathy and (2) to evaluate the comparative efficacy of combining epidural steroids and oral drug treatment (gabapentin/pregabalin and/or amitriptyline) and oral drugs alone in refractory pain of lumbosacral radiculopathy. **Materials and Methods:** This study was conducted in xxx in the period of 1 year. Patients with clinical and magnetic resonance imaging features suggestive of lumbosacral radiculopathy were given epidural steroid injections who were already taking oral medications (pregabalin/gabapentin and amitriptyline) or escalating doses of these oral medications. The pain scores (visual analog scale [VAS] and functional rating index [FRI]) before and after the treatment in the two groups was compared. **Results:** Totally sixty patients were enrolled and final analysis was carried out in 47 patients. After 6 months, there was a significant decrease in the mean VAS and FRI scores in both treatment groups. There was a statistically significant difference between the mean VAS and FRI scores of two groups at the time of discharge and at 1 month of follow-up, but there was no difference at 3- and 6-month follow-up. **Conclusion:** The results of our study suggest that both the modalities are effective in reducing pain in patients of lumbosacral radiculopathy. However, when compared, the combined treatment provides better pain relief as compared to oral medications alone.

**AWPN_5/19**

**Noninvasive carotid plaque imaging**

Kumar SP, Ranganathan LN, Jawahar M, Pavei TN, Manickavasagam J, Shanmugasundaran K, Sathyangathan BP, Kiruba K  
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**Background:** Extracranial carotid atherosclerosis presenting as vulnerable plaques in vulnerable patients leads to acute ischemic events. Several noninvasive imaging tools are available to study the characteristics of vulnerable plaques. **Objective:** In our study, plaque characteristics and laterality of plaques were compared in addition to degree of stenosis and compared across categories. **Materials and Methods:** B-mode carotid Doppler was done in 117 patients of acute ischemic stroke and transient ischemic attacks as a part of stroke protocol at the Institute of Neurology, Madras Medical College, Chennai. Thirty-one vulnerable patients were identified based on carotid plaque echolucency and surface ulceration. They were subject to magnetic resonance (MR) plaque imaging including black-blood sequences, and the characteristics of the plaque were defined. **Results:** The most common site of plaque by sonology was left carotid bulb followed by right carotid bulb and left internal carotid artery. Statistical significance is found between the right and left side based on carotids with lipid-rich necrotic core on MR imaging (MRI) and the number of vulnerable lesions. Majority of the vulnerable plaques belonged to the <50% stenosis category (38.71%) on MRI. **Discussion:** Vulnerable lesions based on Doppler and MRI were common in the left than the right. Several hemodynamic factors such as bifurcation angle and branching predispose to lesions occurring commonly on the left side. **Conclusion:** Plaques in hemodynamically insignificant stenosis (<50% stenosis) warrants risk factor modification and periodic sonological monitoring to prevent vascular events. Imaging of carotid plaques by MR is an important tool in the armament of management of carotid strokes.

**AWPN_6/10**

**Brain and spinal cord lesions in leprosy: A magnetic resonance imaging-based study**

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**Background:** Neuritropism and infiltration by *Mycobacterium leprae* of the peripheral nerves causing neuropathy is well studied, but reports on central nervous system (CNS) damage are exceptional. **Objective:** In this report, we document magnetic resonance imaging (MRI)-based lesions of the brain, spinal cord, and plexus in patients of leprosy.
confirmed to demonstrate *M. leprae* DNA in affected nerve tissue. **Materials and Methods:** Seven patients with ages between 17 and 40 years underwent a detailed clinical, electrophysiological, histopathological, and MRI study. **Results:** All had prominent sensory-motor deficits with hypopigmented and hypo/anesthetic skin patches and thickened peripheral nerves. All received multdrug therapy (MDT) and follow-up imaging were performed in four patients. Case 1 had enhancing facial nuclei and its nerves which resolved the following treatment. Cases 2–7 had spinal cord lesions which disappeared in two cases on follow-up MRI. Thickened brachial and lumbosacral plexus were observed in five and one patient, respectively. There was a partial resolution on follow-up MRI. **Discussion:** The site and side of the MRI lesions corresponded with the location and side of neurological deficits. This precise clinicoradiological correlation could suggest direct invasion of CNS and plexus by lepra bacilli in our patients. This assumption is further augmented by resolution of these lesions following MDT. **Conclusion:** CNS affliction in leprosy could provide further insight into disease pathophysiology and the proximal migration of lepra bacilli. Thus, MRI could be useful in noninvasive evaluation and follow-up in leprosy.

**AWPE_1/04**

**Sociopersonal accomplishments in people with epilepsy: A family unit-based exposed-unexposed survey from India**

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**Background:** Childhood-onset epilepsy adversely impacts several sociopersonal spheres of those affected. **Objective:** The objective of this study is to document the impact of childhood-onset epilepsy on educational achievement, employment, marriage, and driving. **Methods:** A prospective, questionnaire-based survey administered to a hospital-based sample of adults with childhood-onset epilepsy and their unaffected older siblings. Responses were compared in the two sets of respondents and the influence of sociodemographic covariates studied. **Results:** Analyzable elements in the sample included 444 people with epilepsy and their older, unexposed gender-matched siblings. In univariate analyses, people with epilepsy were less likely to undertake higher education (*P* = 0.0001), be employed (*P* = 0.0001), married (*P* = 0.0001), driving (*P* = 0.0001), or in possession of a driving license (*P* = 0.0001). Likewise, in multivariate models, people with epilepsy were less likely to achieve higher educational status (odds ratio (OR): 0.91; 95% confidence interval (CI): 0.88, 0.95; *P* = 0.0001), take up employment (OR: 1.92; 95% CI: 1.28, 2.86; *P* = 0.001), be married (OR: 2.86; 95% CI: 1.67, 4.89; *P* = 0.001), drive a vehicle (OR: 3.15; 95% CI: 1.81, 5.51; *P* = 0.0001), or possess a driving license (OR: 3.09; 95% CI: 1.84, 5.19; *P* = 0.0001). **Conclusion:** People with childhood-onset epilepsy experience lower levels of educational achievements, reduced rates of employment, poorer marital prospects, and reduced driving privileges in comparison to their older gender-matched sibship.

**AWPE_2/08**

**Magnetoencephalography imaging of interictal neural oscillatory spectrum indicates that high-frequency (80–200 Hz) oscillations are associated with seizure freedom**

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**Background:** Accurate delineation of epileptogenic zone (EZ) is crucial in patients with medically refractory epilepsy (MRE) warranting surgery and at least 33% will have seizure recurrence postsurgery. Intracranial electroencephalography studies had showed that high-frequency oscillations (HFOs; 80–200 Hz) can accurately localize the epileptogenic cortex and patients could attain better postsurgical seizure freedom, if brain regions generating HFOs had been resected out. However, none of the noninvasive electrophysiological studies had evaluated the clinical utility and efficacy of HFOs in presurgical localization and prediction of surgical outcome. **Objective:** We investigated epileptic HFOs and wideband source imaging for delineating the EZ and predicting the seizure freedom. **Materials and Methods:** Fifty-two patients (M:F = 37:15; age = 23 ± 8.9 years; disease duration: 11.4 ± 7.7 years) with MRE were longitudinally recruited and studied with magnetoencephalography. Each interictal epileptic discharge (IED) was marked by assessing spatial topography. Semi-realistic head model was constructed from subject-specific spatially normalized magnetic resonance imaging. This was discretized into a regular three-dimensional grid voxels of 10-mm resolution. Source reconstruction was performed with frequency beamformer, by attenuating the source power at a specified location, subject to unit-gain constraint. At each grid position, gain matrix was determined and cross-spectral density matrix on a Fourier-transformed data was calculated at seven distinct frequency bands; 8–14, 14–30, 1–30, 30–54, 55–80, 30–80, and 80–200 Hz. From the available clinical data, EZ was defined, resective surgery was performed, and surgical outcome was assessed. The congruency was established by comparing the source construction with the EZ and surgically resected cortex at four levels for each band, while strength was quantified by kappa statistic. Sensitivity, positive predictive value (PPV), and accuracy were calculated to assess the efficacy of source localization. Source localization error (SLE) was determined on the basis of minimum Euclidean distance between the peak of reconstructed sources with the volume of the resected cortex. Logistic regression analysis was used to calculate the predictors of surgical outcome. **Results:** With surgery, 44 (84.6%) patients had good (Engel-I) and 8 (15.4%) patients had poor (Engel-II–IV) clinical outcome during the mean follow-up of 22.1 ± 10 months. Compared to other frequency bands, interictal HFO imaging accurately delineated the epileptogenic cortex in 80.3% (*k* = 0.44 ± 0.12; *P* < 0.001) of the patients, with 80.8% sensitivity, 100% PPV, and 80.32% accuracy. The highest possible concordance rate of 78.8% (*k* = 0.46 ± 0.1; *P* < 0.001) with the surgically resected cortical volume was observed for the reconstructed HFO sources. HFO source reconstruction did correlate with the seizure freedom (*P* < 0.05) with 78% sensitivity, 100% PPV, and 78.84% accuracy.
Among patients \( (n = 8) \) who had recurrent seizures following surgery, 75\% \( (n = 6) \) of the patients had unresected HFO activity persisting after surgery. The SLE negatively correlated with the reconstructed source power in 8–14 Hz \( (r = 0.39; P = 0.008) \) and 1–30 Hz \( (r = 0.29; P = 0.03) \) frequency band. However, SLE did not correlate with the surgical outcome. Routine IED dipole modeling had poor spatial congruence with presumed EZ and surgically resected cortex 57.7\% \( (k = 0.2 \pm 0.1) \) and 59\% \( (k = 0.19 \pm 0.1) \). **Conclusion:** To date, this is the first ever largest prospective and noninvasive (magnetoencephalography [MEG]) study to establish the clinical role of the HFO in presurgical localization and postsurgical outcome prediction in patients with MRE. The observations from the current study suggest that HFOs could precisely delineate the epileptogenic cortex and predict the patients who might achieve seizure freedom with surgery. This supports the fact that HFOs could play a dominant role in clinical context, as a biomarker for the epilepsy.

**AWPE_3/02**

**Comparison of magnetoencephalography versus single-photon emission computed tomography and magnetic resonance imaging seizure localization in patients with drug-resistant focal and secondary generalized epilepsy**

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**Background:** Magnetoencephalography (MEG) and single-photon emission computed tomography (SPECT) are done to localize the site for surgery in patients with drug refractory epilepsy in addition to video electroencephalography (EEG) and magnetic resonance imaging (MRI). SPECT is cumbersome to perform due to availability of investigation only during working hours and unpredictability of occurrence of seizure during this narrow time window. **Objectives:** The objectives are to study the proportion of patients with nonlocalizing SPECT and those who have technical difficulty in undergoing SPECT. Outcome in such patients after resection of MEG focus.

**Methods:** This was a prospective observational study. Results of localization of video EEG, MRI, SPECT, positron emission tomography, MEG, and other investigations were discussed and a final surgical plan made. The concordance of various pairs of investigations and the surgical outcomes were compared.

**Results:** One hundred and two patients were studied. MEG was done in 101 cases. SPECT was done in 57 patients and was available for localization in 42 and nonlocalizing in 15 patients. In 45 patients, SPECT could not be done due to delay in injection or due to technical factors such as prolonged stay in the epilepsy monitoring unit, but the patient did not have seizures during which SPECT dye could be injected. In the patients in whom SPECT was not available, resection of MEG focus was associated with better outcome (odds ratio: 7.83; 95\% confidence interval [CI]: 1.28–47.96, \( P = 0.040 \)). In 31\% of patients who had nonlocalizing SPECT, MEG decided the focus to be resected. **Conclusion:** MEG gives additional information in selecting patients for surgery and strategizing the surgical approach and significantly better outcomes.

**AWPE_4/06**

**Problems faced by married women with epilepsy in Indian scenario: A hospital-based study**

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**Background:** Epilepsy is still being considered as a social stigma, especially in developing countries such as India. This study was conducted to analyze the problems faced by married women with epilepsy in various aspects of personal and social life. **Objectives:** The objective is to study the psychosocial problems, drug compliance, clinical course, attitude of in-laws, and effect of epilepsy on pregnancy and its outcome in married women with epilepsy in Indian scenario. **Design, Materials, and Methods:** This is a prospective observational study including 100 patients during February–November 2017. Questionnaire-based face-to-face interview of all the patients was done. Patients were divided into informed and concealed groups and various attributes and their significance were compared. Statistical analysis is done with SPSS 20.0 and Microsoft Office Excel. **Results:** Out of 100 patients, totally 58 (58\%) patients had informed before marriage while 42 (42\%) concealed it. Attitude of husband was negative in 33\% (14 out of 42) of concealed group and is statistically significant \( (P = 0.03) \). Statistically significant adverse marital outcome was observed in concealed group and Muslim community \( (P = 0.0001) \). Majority of the patients in both groups (86\%) opined that it should be disclosed before marriage. **Conclusion:** In a developing country like India, epilepsy is still considered a social stigma that can manifest as felt or enacted stigma. Previous studies clearly indicate increasing awareness. Social stigma associated with epilepsy can only be eliminated with collaborative efforts of health-care professional, government, and general public.

**AWP/BNS1**

**NMDA receptor GluN2 subtype control epileptiform events in the hippocampus**

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NMDA receptors (NMDARs) play a key role in synaptic plasticity and excitotoxicity. Subtype-specific role of NMDAR in neural disorders is an emerging area. Recent studies have revealed that mutations in NMDARs are a cause for epilepsy. Hippocampus is a known focal point for epilepsy. In hippocampus, expression of the NMDAR subtypes, i.e., GluN1/GluN2A and GluN1/GluN2B is temporally regulated. However, the pharmacological significance of these subtypes is not well understood in epileptic context/models. To investigate this, epilepsy was induced in hippocampal slices by the application of artificial cerebrospinal fluid that contained high potassium but no magnesium. Epileptiform events (EFEs) were recorded from the CA1 and DG areas of the hippocampus with or without subtype-specific antagonists. Irrespective of the age group, CA1 and DG showed epileptiform activity. The NMDAR antagonist AP5 was found to reduce the number of...
EFEs significantly. However, the application of subtype-specific antagonists (TCN 201 for GluN1/GluN2A and Ro 25-69811 for GluN1/GluN2B) revealed that EFEs had area-specific and temporal components. In slices from neonates, EFEs in CA1 were effectively reduced by Ro 25-69811 but were largely insensitive to TCN 201. In contrast, EFEs in DG were equally sensitive to both of the subtype-specific antagonists. However, the differential sensitivity for the antagonists observed in neonates was absent in later developmental stages. The study provides a functional insight into the NMDAR subtype-dependent contribution of EFEs in the hippocampus of young rats, which may have implications in treating childhood epilepsy and avoiding unnecessary side effects of broad-spectrum antagonists.

**AWPN/BSN2**

Differential GABA<sub>A</sub> receptor-mediated synaptic transmission revealed distinct epileptogenic network patterns in pediatric and adult patients with focal cortical dysplasia

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**Objective:** Focal cortical dysplasia (FCD) is associated with dysmature neuronal network and is known to be large-scale network disorder. In resected brain samples obtained from pediatric patients with FCD type II, increased activity of tonically active GABA<sub>A</sub> receptors has been reported. However, it is yet to be ascertained if the GABAergic activity is also altered in adult patients with FCD and is there any difference in this phenomenon between adult and pediatric patients. Moreover, if the enhanced GABA<sub>A</sub> receptor activity is restricted only to the primary focus or it is present in regions remote of epileptic foci, remains to be determined. This study was designed to test the hypothesis that the GABAergic activity in epileptic foci varies between adult and pediatric patients with CD type II. We also suspect that there will be differential GABA<sub>A</sub> receptor-mediated synaptic transmission in brain specimens obtained from the maximally abnormal area (MAX) and minimally abnormal area (MIN) of the epileptic foci. To this end, targeted brain samples (both MIN and MAX) were obtained from pediatric and adult CD type II patients and spontaneous inhibitory postsynaptic currents (IPSCs) were recorded from normal pyramidal neurons. **Methods:** Patch-clamp technique was used to record spontaneous IPSCs from pyramidal neurons in resected samples from the MIN and MAX regions of pediatric and adult patients with FCD type II (n = 12). Slices with thickness of 350 µM were prepared from the resected samples collected under physiological conditions. Pyramidal neurons in the slice preparations were localized using infrared-assisted videomicroscopy with differential interference contrast. Spontaneous IPSCs were recorded from pyramidal neurons under whole-cell configuration at a holding potential of 0 mV. **Results:** We observed that in pediatric cases, the frequency of spontaneous IPSCs recorded from pyramidal neurons in the samples obtained from MAX area was higher compared to that in case of nonseizure control specimens. This finding is in agreement with the concept that pediatric FCD type II patients possess immature cerebral cortex and thereby having an increased GABAergic transmission. The frequency of spontaneous IPSCs in samples obtained from MIN area was comparable to that in MAX area of pediatric patients. However, when similar experiments were performed on adult patients with FCD type II, we observed that the enhanced GABAergic activity, as depicted by higher frequency of IPSCs, was restricted only to the samples from the MAX region, while the frequency of spontaneous IPSCs in the MIN region was comparable to that in case of nonseizure controls. These findings demonstrate that in adult patients with FCD type II, excessive GABA<sub>A</sub> receptor activity is confined to the MAX region of epileptic foci, but in pediatric patients, it is also present in the regions beyond the MAX area suggesting more diffused epileptiform activity in pediatric patients. **Conclusion:** Our findings suggest that the reinforced GABAergic synaptic connections to form a network in the pediatric patients with FCD type II could be different from that in case of adult patients. Varying degree of GABA<sub>A</sub> receptor-mediated neurotransmission in adult and pediatric patients with FCD suggested that cortical dysmaturity is more diffused in pediatric patients compared to adults. Our findings thereby suggest that the pattern of epileptogenic networks in pediatric patients with FCD is different from that in case of adults, thereby warrants a more tailored surgical approach for better seizure outcome.