The 5th Annual Saudi Epilepsy Society Conference, 1st GCC Epilepsy Conference, 2nd Joined Emirate Saudi Epilepsy Conference, 8th Annual Eastern Province Epilepsy Conference, 14th Annual Saudi Chapter of Epilepsy Conference 7-9th November 2015, Dammam, Saudi Arabia,

Raidah S. Al-Baradie, *MD, ABMS.*
Pediatric Neurology Department, Neuroscience Center, King Fahd Specialist Hospital, Dammam, Kingdom of Saudi Arabia.

The 5th Annual Saudi Epilepsy Society Conference, and the 1st GCC Epilepsy Conference was held in Le-Meridian Hotel, Al Khobar, Kingdom of Saudi Arabia on 7th-9th November, 2015 organized by Saudi Epilepsy Society in collaboration with the Department of Pediatric Neurology, Neuroscience Center, King Fahd Specialist Hospital, Dammam, Saudi Arabia. The scientific program was loaded with innovative and interactive presentations from respected and reputable speakers from different parts of the world. Abstracts were carefully selected and reviewed based on their scientific value and relevance to the clinical, surgical, academic, and research aspects of epilepsy in the Saudi Arabia, and the world. Approximately 2400 participants joint this important meeting.

Meeting Highlights

Treatment and prognosis of symptomatic generalized epilepsy

Sonia Khan, MD, FRCP, Consultant Neurologist, Epileptologist, Prince Sultan Military Medical City, Riyadh, Kingdom of Saudi Arabia

Symptomatic generalized epilepsy (SGE) incorporates a group of challenging epilepsy syndromes. As a group, SGE has 3 main features. This includes multiple seizure types, especially generalized tonic and atonic seizures, brain dysfunction other than the seizures, in the intellectual domain (mental retardation or developmental delay) and in the motor domain (cerebral palsy); and EEG evidence of diffuse brain abnormality. Symptomatic generalized epilepsy can occur at different ages. Epileptic syndromes under the category of SGE include early myoclonic encephalopathy, early infantine epileptic encephalopathy with suppression bursts or Ohtahara syndrome, West syndrome, epilepsy with myoclonic atonic seizures, epilepsy with myoclonic absence, LennoxGastaut syndrome and progressive myoclonic epilepsies. Symptomatic generalized epilepsy is often intractable to antiepileptic medications, and no consensus has been reached on how it should be treated. Many drug trials are needed to achieve reasonable seizure control. A Cochrane Database Systematic Review found strong evidence that high-

dose hormonal treatments of prednisolone alleviates spasms faster and improves long-term developmental delay compared with vigabatrin for infantile spasms of no underlying cause. West syndrome associated with tuberous sclerosis responds best to vigabatrin, and, in this setting, vigabatrin has become the drug of choice in many countries. Lennox-Gastaut syndrome treatment involves valproate, lamotrigine, topiramate, rufinamide, and felbamate. Antiepileptic drugs to avoid include carbamazepine, oxcarbazepine, phenytoin, and vigabatrin. Myoclonic atonic treatment involves valproic acid, lamotrigine, and benzodiazepine. Seizures are worsened by carbamazepine, oxcarbazepine, phenytoin, vigabatrin, and phenobarbital. Myoclonic absence treatment involves a combination of ethosuximide and valproate. Progressive myoclonic epilepsy treatment involves a combination of valproic acid, ethosuximide, benzodiazepines, phenobarbital, zonisamide, and lamotrigine. Antiepileptic drugs to avoid because they may exacerbate myoclonus include phenytoin, carbamazepine, vigabatrin, and tiagabine. Lamotrigine should be used with caution as it can exacerbate myoclonus.When seizures remain uncontrolled with antiepileptic drugs, nonpharmacologic options should be considered, such as ketogenic diet, vagus nerve stimulation, and surgical options such as callosotomy because patients with SGE often have long-term complications from antiepileptic drug adverse effects; thus, maximizing all treatment options such as ketogenic diet and vagus nerve stimulation are encouraged. The prognosis in many SGE is poor.

Integration of new antiepileptic drugs into clinical practice

Prof. Emilio Perucca C. Mondino, National Institute of Neurology and Clinical Pharmacology Unit, Department of Internal Medicine and Therapeutics, University of Pavia, Pavia, Italy

Approximately one third of patients with epilepsy do not respond fully to older generation antiepileptic drugs (AEDs), and many of those who achieve seizure control suffer from significant adverse effects. In an attempt to overcome these problems, a large number of so-called second-generation AEDs have been introduced in the last 20 years. For most of these compounds, clinical experience is already extensive and for some of these agents the distinction between "old" and "new" no longer makes sense, while for others, information is more limited. New AEDs differ in their spectrum of anti-seizure activity, efficacy in some co-morbid conditions, and adverse effects profiles. In newly diagnosed epilepsy, second generation AEDs are generally not more efficacious than older agents, but their preferential use can be justified in selected cases. In adjunctive-therapy controlled trials, between 20 and 50% of refractory patients treated with these drugs experience a greater than 50% reduction in seizure frequency, although cumulatively less than 20% of severely refractory patients achieve sustained seizure freedom after addition of second -generation AEDs, and the search for newer, more efficacious agents continues. Overall, the current availability of 25 AEDs to treat epilepsy is a welcome development because it improves our ability to tailor drug choice to the characteristics of the individual. The availability of so many drugs, however, also complicates treatment choices and demands special knowledge to ensure that each drug is exploited at best for clinical benefit. Challenges currently faced in the development of newer drugs for epilepsy will be discussed.

Are seizure medicine so bad?

Prof. James Riviello Sergievsky, Family Professor of Neurology and Pediatrics Chief, Division of Child Neurology, Department of Neurology, Columbia University Medical Center, Chief of Child Neurology, Morgan Stanley Children's Hospital, New York, Presbyterian, United States of America

Antiepileptic drugs are used to treat seizures. Seizures themselves may have a negative effect on cognition and development, especially during pregnancy and the neonatal period, during the time of brain development. However, seizure medications themselves may also cause dysfunction. This lecture reviews brain development, the general effects of seizure medications on cognition and behavior, especially fetal exposure and the effects on

brain development and cognition and behavior, apoptosis, and the neurotoxic effects of anesthetic agents on the developing brain.

Are neonatal seizures so bad?

Prof. Gregory Holmes, Chair Department of Neurological Sciences Inaugural, Professor of Neurological Sciences and Pediatrics, University of Vermont, College of Medicine, Physician Leader of Neurology, Fletcher Allen Health Care, recognized researcher in epilepsy

The highest incidence of seizures occurs during the first hours to days after birth. The immature brain is prone to seizures because of reduced inhibition. Gamma amino-butyric acid is the primary inhibitory neurotransmitter in the mature brain is depolarizing and excitatory in the immature brain. Seizures are an ominous sign indicating either an acquired brain insult or a genetic abnormality. Neonatal seizures are an important sign of a potentially severe brain disorder and require immediate investigation in regards to etiology since the cause of the seizures is the most important determinant of outcome. Most neonatal seizures are reactive, namely they are a response to an acute brain disorder and are self-limited; however, there is evidence that seizures can add to the neurological injury and they should be treated promptly. There is increasing evidence that neonatal seizures, particularly if frequent or prolonged, can adversely affect the developing brain. Animal data indicates that the sequelae of seizures are strongly age-dependent: seizures will affect the developing and plastic neuronal circuitry much differently than the relatively fixed circuitry of the mature brain. Seizures at an early developmental stage can dramatically affect the construction of networks resulting in severe and permanent handicaps in some patient. In the young brain, the long lasting detrimental consequences of seizures are caused by an alteration of developmental programs rather than by neuronal cell loss, as occurs in adults. In animal models, neonatal seizures result in decreases in neurogenesis, sprouting of mossy fibers, and long standing changes in signaling properties. Seizures in rat pups are also associated with abnormalities in firing patterns of single cells in the hippocampus. Furthermore, these anatomical and physiological changes correlate well with behavioral dysfunction.

Dense array EEG and EEG source localization in clinical practice

Amina Gargouri Berrechid, Neurology Department, Razi Hospital, Tunis, Tunisia

Localization of neural brain sources is important in neuroscience and in clinical practice, especially in the study of cortical organization and integration, and in some areas of clinical neuroscience, such as preoperative planning and epilepsy. Localization of active sources of brain is termed as EEG source localization. The EEG source localization, which is used to localize the electrical activity of brain has been an active area of research as it provides useful information for study of brain's physiological, mental and functional abnormalities. Since the foundation of this field until today, many methods were developed with the aim of in-depth localization, high resolution, reduction in localization/energy error, and decreased computational time. The efforts to understand the localization problem began 40-years ago by correlating the existing body of electro physiological knowledge on the brain to the basic physical principles controlling the volume currents in conductive media. Recently, it has become possible to record dense array EEG (dEEG) with 128 or 256 channels in the clinical setting. Dense array EEG is a method of recording electroencephalography (EEG) with many more electrodes (up to 256) than is utilizing with the standard techniques that typically employ 19-21 scalp electrodes. The rationale for this approach is to enhance the spatial resolution of scalp EEG. In addition to sampling epileptic discharges from the whole head surface, dEEG allows electrical source imaging (ESI) of the neural generators. Although dEEG localization of seizure onset is preferred, dEEG localization of spikes alone has been shown to be more effective in predicting the seizure onset zone than

other methods including Positron Emission Tomography (PET), MRI, and ictal single photon emission computed tomography.

The role of Marijuana in the treatment of epilepsy

Taoufik Alsaadi, MD, FAAN, Chief of Adult Neurology, Sheikh Khalifa Medical City, Abu Dhabi, United Arab Emirates

There is some scientific evidence about cannabinoid, cannabidiol (CBD) with regard to its relevance to epilepsy treatment. Cannabis has been used to treat disease since ancient times. Δ9-Tetrahydrocannabinol (Δ9-THC) is the major psychoactive ingredient and CBD is the major non-psychoactive ingredient in cannabis. Cannabis and Δ9-THC are anticonvulsant in most animal models, but can be proconvulsant in some healthy animals as well. The CBD is anticonvulsant in many acute animal models, but limited data of its efficacy in chronic models. The CBD has neuroprotective and anti-inflammatory effects, and it appears to be well tolerated in humans. The studies of its efficacy in human epilepsy have been inconclusive, due to the small numbers and limited methodological studies of CBD in epilepsy. More recent anecdotal reports of high-ratio CBD: Δ9-THC medical marijuana have claimed efficacy, but studies were not controlled. However, a recent dose-tolerability and double-blind randomized, controlled studies focusing on target intractable epilepsy populations such as patients with Dravet and Lennox-Gastaut syndromes is currently underway and the preliminary results are quite promising. Similarly, several family surveys explored the use of cannabidiol-enriched cannabis in children with treatment-resistant epilepsy and provided some evidence to its efficacy and tolerability in this age group. On the other hand, the short-term side effects of cannabis are well reported and include impairment of memory, judgment, and motor performance. High levels of Δ9-THC are associated with psychosis and an increased risk of motor-vehicle accidents. With long-term use there is a risk of addiction, which occurs in approximately 9% of long-term users. Other effects of long-term use include cognitive impairment, decreased motivation, and an increased risk of psychotic disorders. Well-powered double-blind randomized, controlled studies across several treatment-resistant epilepsy syndromes are warranted to determine the effectiveness of medical marijuana in epilepsy.

Debate:
a) Should we treat anoxic/myoclonic seizures?

Brahim Tabarki Melaiki, MD, FBPN, BBPN, Prince Sultan Military Medical City, Riyadh, Kingdom of Saudi Arabia

Many patients remain comatose after successful cardiopulmonary resuscitation (CPR) due to brain damage caused by hypoxemia. Anoxic/myoclonic seizures occurs in approximately 19-37% of these patients, typically within the first 24 hours after CPR, but knowledge on this illness is limited. The origin can be cortical and/or subcortical and this might be an important determinant for treatment options and prognosis. The broad variety of drugs used for treatment shows the existing uncertainty about treatment options.

b) Post anoxic seizures

Shireen Qureshi, MD, FRCPC, Consultant Neurologist/Clinical Neurophysiologst

Post anoxic myoclonic seizures are common manifestation bearing poor prognostication and grave sequel. Nonetheless, with advancement and standardization of hypothermia therapy as care post anoxic patients. American Academy of Neurology guidelines concede that hypothermia makes early determination of prognosis challenging. Many institutes recommend withdrawal of care based on the presence of myocloinc status as an "Agonal" rhythm early that does not incorporate other independent predictors namely: brainstem reflexes, myoclonus, unreactive EEG and absent Cortical SSEP Our prediction of outcomes are unpredictable in Era of therapeutic hypothermia. Recent studies suggest better prognosis with hypothermia. Pros of rather aggressive treatment of myoclonic seizures is rationalized in this debate.

HIGHLIGHTS FROM INTERNATIONAL NEUROSCIENCE MEETINGS

Driving and epilepsy in diagnosed patients attending King Fahad Specialist Hospital in Dammam, Eastern Province of Saudi Arabia

Esra' Hussain Abdullah Al Zaid, MD

BACKGROUND: Most physicians and organizations are uncertain and debatable on driving and epilepsy. Patients with Epilepsy (PWE) with uncontrolled seizures for the past one year who practice driving are at increased hazard for a road traffic accidents (RTA) with subsequent property destruction as well as injury or death to themselves and others. For many PWE, restrictions on driving cause severe restraints on their ability to participate in social activities and therefore drastically reduce the quality of life and their independence. Existing policies and recommendations try to equalize these hypothetically contradictory goals. The purpose of this study is to measure the prevalence of unfit drivers among PWE and determine their readiness for withdrawing their driving license. METHODS: A descriptive cross-sectional patient-based study was conducted on epileptic male patients attending the King Fahad Specialist Hospital in Dammam, Kingdom of Saudi Arabia during the period from December 2014 to January 2015. Phone interviews, answering a structured validated self administered questionnaire, and medical records were reviewed and used to collect the data from 118 PWE, with a response rate of 80%. RESULTS: The prevalence of unfit drivers among PWE attending King Fahad Specialist Hospital in Dammam was 54%. Looking carefully at the results, we can see that from the 118 PWE, 21 (17.7%) did not drive, while 97 (82.3%) were driving. From the 21 who did not drive, 14 (11.8%) never drive, and 7 (5.9%) stopped because of their condition. On 104 who practiced driving in any point of their life, 45 (43.2%) had a history of seizure attack while driving. Thus, it results in 28 (26.9%) accident caused and 17 (16.3%) ER admission or hospitalization. Approximately half of PWE studied were ready to give up their driver license for the sake of road safety. CONCLUSION: There is a need to generate a structured regulation and materials for licensing driving for PWE. In conformity with standards in other countries, it would be safer if seizure attacks were controlled for about one year before unlimited authorization for driving allowance. Patients with Epilepsy are generally ready to give up their driver license in sake of road safety.

Depression in epileptic patients is influenced by the duration of epilepsy. *A cross sectional study involving patients with epilepsy in southern Saudi Arabia*

Mohammed Alqahtani, Fawzi Babtain,[1,2] Mohammed Alqahtani,[1] Dlaim Alqahtani,[1] Faisal Al Malwi,[1] Muhannad Asiri,[1] Harsha Bhatia,[2] Muthusamy Velmurugan,[2]

[1]College of Medicine, King Khalid University, Abha, [2]Division of Neurology, Aseer Central Hospital, Abha, Kingdom of Saudi Arabia,

Introduction: Depression is a common psychiatric disorder seen in up to 35% of patients with epilepsy, which was found to negatively influenced patient's socio-economic status. It is yet unknown when depression started in epileptic patients for which this study was conducted. Methods: A total of 249 were seen in our hospital between 2010 and 2014, who were newly diagnosed with epilepsy, but only 131 patients were studied, who responded to survey to enquire about depression. Beck Depression inventory (BDI- II) was used to identify and scale depression and its severity. Patients were divided into 2 groups; newly diagnosed epileptics (had up to one year from the time of the diagnosis), and old epileptics (had more than a year from the diagnosis). Patient's demographics, epilepsy etiology and semiology, MRI and EEG findings were obtained using epilepsy registry in our hospital. Results: There were 68 men (52%), the mean age at the diagnosis was 21 years (range; 13-80), and the mean duration of epilepsy was 2 years (range: 0-4 years). Epilepsy was thought to be idiopathic in 34 patients (26%), cryptogenic in 46 (35%), and symsptomatic in 49 (37%). According to BDI, depression was identified in 68 patients (52%), which was mild and moderate in 23 (18%) and 24 patients (18%) respectively, and severe in only 21 patients (16%). There were 46 patients (35%) considered to be newly diagnosed, and 85 (65%) patients were considered old

epileptics. According to the former classifications, depression was seen in 33 patients (72%) of the newly diagnosed versus (vs) 35 patients (41%) of those who had their epilepsy diagnosed more than a year (p<0.001). Depressed patients were slightly but insignificantly younger than none depressed (20 vs 22 years, p=0.06), but nor gender nor epilepsy classification or etiology was associated with the presence of depression. Conclusions: Depression was very common in our patients, but observed significantly more in those newly diagnosed with epilepsy. This supports the need to screen epileptic patients for depression, but more attention to be paid to those newly diagnosed, which may be related to the adjustments that these patients went through after being diagnosed, but larger studies would is suggested to confirm our observation.

Is parental consanguinity a risk factor for epilepsy? *A Cases-control study assessing epilepsy risks in southern Saudi Arabia*

Khalid Assiri, Resident,[1,3] Fawzi Babtain,[1,2] Abdulelah Al-Shahrani,[1] Abdulaziz Al-Kahaili,[1] Harsha Bhatia,[2] Muthusamy Velmurugan,[2]

[1]College of Medicine, King Khalid University, Abha, Kingdom of Saudi Arabia, [2]Division of Neurology, Aseer Central Hospital, Abha,[3] Department of Internal Medicine, King Faisal Specialist Hospital, Jeddah, Kingdom of Saudi Arabia,

Rationale: Parental consanguinity is a common marital habit in Saudi Arabia that is known to be associated with a higher incidence of genetic diseases, yet, scarce data is available to associate this habit with epilepsy for which this study is aimed to evaluate such an association. Methods: This is a retrospective case-control study, matched for age and gender, conducted among Saudi population in 2 major government hospitals in the city of Abha, Kingdom of Saudi Arabia between January and December of 2012. Epilepsy data obtained from the ongoing epilepsy registry, where full records of 543 patients were available at the time of the study. This group was compared with none epileptic control seen for reasons other than epilepsy. Enquiries pertaining to the presence or absence of parental consanguinity (PC, defined as a union between a couple related as second cousin or closer) and family history of epilepsy (FHE, defined as an epileptic family member being first cousin and closer, or second cousin and closer in case of PC) were obtained for both groups. Results: A total of 1086 cases were studied, 543 in each group. The mean age was 27 years (range; 13-85, SD=13.2 years). There were 536 men (49%). First degree PC was seen in 5% less in epileptic patients (13% vs 18%, p=0.024, OR=0.7, 95% CI; 0.5-0.9). On the other hand, 2nd degree PC increased the risk of developing epilepsy more than 2 times (14% vs 7%, p=0.001, OR=2.04, 95% CI; 1.3-3.0). Yet, PC (both 1st and 2nd) was seen equally in both groups (27% vs 26%, p=0.63, OR=1.1). family history of epilepsy was significantly seen more in epileptic patients (26% vs 20%, p=0.014, OR=1.4, 95% CI; 1.1-1.9). Multivariate regression analysis showed that 2nd degree PC and FHE were strongly associated with epilepsy (OR=1.8 and 1.5 respectively, p<0.001), and men with 2nd degree PC are 2 and half times more likely to have epilepsy among the studied population (p=0.006, OR=2.5, 95% CI; 1.3-4.7). Conclusion: There is a lack of association between PC (considering 1st and 2nd degrees together) and the risk of developing epilepsy, probably because of the heterogeneous genetic basis of epilepsy, but FHE, a known risk of epilepsy, an observation replicated in our study.

Prevalence of epilepsy stigma in Riyadh, Saudi Arabia

Abdulrahman Khalid Al-Yemni, Final year medical student, Dr. Sajida Agha, Associate Professor of Psychology, Salman Aldakhil, Final year medical student

King Saud Bin Abdulaziz University for Health Sciences, Riyadh, Kingdom of Saudi Arabia

Objectives: To determine the factors associated with epilepsy related stigma among the Saudis and non Saudis population. Methods: This cross sectional study was carried out in King Abdul Aziz Medical City for National Guard Health Affairs (NGHA). Total of 166 participants including males (n=50) and females (n=66) were contacted for the study. A self-developed questionnaire was designed to collect the responses including personal data (age, profession, gender, education level) and the general perception of epilepsy. The questionnaire was given to those who visited NGHA during the study time and were willing to participate. Statistical analysis was performed using Statistical Package for Social Sciences version 18 (SPSS Inc, Chicago, IL, USA). Descriptive statistics was used to assess stigma expression among different groups in the population. A two-sided probability of <0.05 was considered as statistically significant. Results: Results showed that most of the participants were aware of the causes of epilepsy,

and perceived it as one of the hereditary problem. They were in the opinion that schooling and marriage for such patients could be possible. The majority (72%) rated seizure as a cause of death to these patients and is not curable (8%). Participant opined that marriage of epilepsy patients is possible (78%), but they should not have children (86%). Conclusion: This study confirms the prevalence of stigma among the males and females. To get more significant result, further study on a larger sample is recommended.

The hazy temporal neocortex sign on magnetic resonance imaging. *clinical significance in temporal lobe epilepsy.*

Samar Shetawe, Mashael Alkhateeb, Faisal Al-Otaibi, Shatha Alharbi, Samar Shetawe, Salah Baz, Tareq Abalkhail, Hesham Aldhalaan, Ibrahim Thubaiti, Abdulaziz Alsemari

Neurosciences Department, King Faisal Specialist Hospital and Research Center, Riyadh, Kingdom of Saudi Arabia

Purpose: To investigate the clinical and metabolic significance of the hazy temporal neocortex (HTN) sign on magnetic resonance imaging. Method: A retrospective analysis was conducted in 124 consecutive patients who underwent temporal lobectomy for epilepsy. Grading of the HTN sign was carried out based on the density of temporal white matter on MRI, cortical segmentation, relative intensity map, and gradient map. Correlation between MRI findings, surgical outcome, electroencephalographic (EEG) findings, positron emission Tomography (PET) scan, and histopathology was carried out. Comparison was conducted using Chi-squared and Fisher's exact tests. Results: Significant positive correlation was found between HTN high density on MRI and clinical-radiological variables such as duration of epilepsy, PET scan hypometabolism, EEG localization, and degree of heterotopia in neocortex histology. Hazy temporal neocortex was evident on MRI even in the absence of heterotopia in neocortex histology (6 cases) and histological hippocampal sclerosis (4 cases). Lateralization failed in bilateral hippocampal sclerosis (3 cases). High density HTN was found in all cases with radiological hippocampal sclerosis and neocortical atrophy. Conclusion: Hazy temporal neocortex on MRI correlates well with the lateralization of temporal epilepsy, and may be used as a radiological lateralizing sign even in the absence of radiological hippocampal sclerosis features.