HIGHLIGHTS FROM INTERNATIONAL NEUROSCIENCE MEETINGS

American Epilepsy Society (AES) 63rd Annual Meeting Boston (MA), December 4th - 8th 2009

Sonia Khan, *MD.*
Neurosciences Department, Riyadh Military Hospital, Kingdom of Saudi Arabia

This year's meeting was held in Boston, USA over 5 days from 4-8 December 2009. The program included sessions on basic science, clinical research, clinical practice for adults or children, psychiatry, surgery, nursing, and professionals in epilepsy care. The scientific material was presented as courses, plenary sessions, special interest group meetings, investigators workshops, satellite symposia, platform, and posters sessions. A brief overview of interesting abstracts from the meeting will be presented in the following pages.

Abstracts

Seizure recurrence risk and early identification of refractoriness after a first seizure following epilepsy surgery

L. Jehi, R. Sarkis, W. Bingaman, P. Kotagal, I. Najm

Seizures will recur in most patients presenting with their first postoperative event. The period of highest risk is within the few subsequent months. A third will become seizure-free with the risk for refractoriness assessed by easily ascertainable measures at 6 postoperative months.

Stem cell protein expression and motor pathway activation distinguishes type I from type II focal cortical dysplasias (FCD)

V. Tsai, K. Orlova, M. Baybis, G. Heuer, S. Sisodiya, M. Thom, K. Strauss, E. Aronica, P. Storm, P. Crino

The results of this study suggest that FCD type II but not type I express stem cell marker proteins and exhibit aberrant activation of the mTORC1 cascade. Furthermore, the results distinguish type II from type I dysplasias and may signify a disparate pathophysiology of the 2 types of FCDs. We demonstrate for the first time that cells from FCD can be cultured in vitro. The results of this study suggest that cells in type II dysplasias may retain the capacity for cell division and thus type II FCDs may represent a dynamic cortical lesion.

Dose effects on verbal and nonverbal cognitive functions at age 3 in children exposed in utero to antiepileptic drugs

K. Meador, M. Cohen, N. Browning, G. Baker, J. Clayton-Smith, P. Pennell, L. Kalayjian, J. Liporace, M. Privitera, A. Kanner, D. Combs-Cantrell, D. Loring

Higher valproate dose was associated with lower scores in verbal and non-verbal cognitive domains, consistent with our previous finding of lower overall IQ. Carbamazepine dose was associated with lower language scores, raising concerns that higher doses during pregnancy may adversely affect a child's language ability. Additional research is needed to confirm this finding.

Long-term health and seizure outcomes of children treated with the ketogenic diet (KD)

E. Kossoff, A. Patel, P. Pyzik, J. Rubenstein, Z. Turner

This is the first study to report on the long-term effects of the KD years later. Although nearly all parents would recommend it, only half would do so as first-line therapy. Importantly, the KD appears to have long-lasting beneficial effects on seizure control without later adverse effects on growth, lipids, liver or kidney functions.

HIGHLIGHTS FROM INTERNATIONAL NEUROSCIENCE MEETINGS

Modern monotherapies in newly diagnosed epilepsy: comparative retention and efficacy

G. Sills, J. Leach, E. Wilson, P. Parker, K. Kelly, I. Hamill, J. Greene, R. Duncan, M. Brodie

There were no differences in short- or longer-term retention on treatment amongst Levetiracetam (LEV), Topiramate, and Lamotrigine. In terms of seizure freedom, the early advantage of LEV at 6 weeks after starting treatment may be explained by a more rapid titration to therapeutic dose but this was diminished during longer-term follow-up. These data suggest there is little to choose between the effectiveness of modern monotherapies in newly-diagnosed epilepsy.

Does the nature of a SCN1A mutation influence the temporal evolution of seizure types in Dravet syndrome?

A. Brunklaus, R. Birch, J. Duncan, S. Stenhouse, S. Zuberi

A specific type of mutation (truncating mutation) is associated with an earlier onset of hemi-clonic seizures and atypical absences in Dravet syndrome. It appears that missense and truncating mutations in SCN1A related Dravet syndrome result in similar seizure types but different ages of onset. The nature of the SCN1A mutation influences the temporal evolution of disease but not the overall occurrence of seizures.

EEG seizure-onset patterns and surgical outcome in non-lesional extratemporal epilepsy

T. Zakaria, E. So, K. Noe, G. Cascino, F. Meyer, W. Marsh, E. Wirrell, G. Worrrell

A focal low voltage high-frequency activity at seizure onset on scalp or intracranial EEG may identify non-lesional extratemporal epilepsy patients who are likely to have a favorable outcome after surgery. Further studies are required to understand the pathophysiology underlying the favorable outcome in these patients.

Vagus nerve stimulation (VNS) for refractory epilepsy: single surgeon experience of over 700 consecutive operations

R. Elliott, A. Morsi, S. Kalhorn, J. Marcus, J. Sellin, M. Kang, A. Silverberg, C. Carlson, E. Geller, O. Devinsky, W. Doyle

In this large series of consecutive patients, VNS was a safe and effective treatment for medically-refractory epilepsy in adults and children. Almost 60% of patients experienced at least 50% reduction in seizure burden. Patients who had failed intracranial epilepsy procedures prior to VNS therapy had similar outcomes to those who did not have prior surgery.

Brain MRI characteristics of epileptogenic tuber and predictors of intractable epilepsy in tuberous sclerosis complex (TSC)

S. Viravan, K. Velayudam, P. Kotagal, D. Lachhwani, E. Wyllie, I. Tuxhorn, W. Bingaman, A. Gupta

Intractability of epilepsy in TSC is likely in seizures of infantile (<4 months) onset and focal motor semiology. Infantile spasms, cognitive delay, brain MRI, and EEG abnormalities are not good predictors of intractability. On brain MRI, epileptogenic tuber(s) are likely to be a single large or a partially confluent multi-tuber complex with extensive deep white matter abnormalities and calcification.

Differences between epileptogenic tubers in tuberous sclerosis complex (TSC) 1 and 2

C. Batista, D. Chugani, A. Luat, R. Govindan, X. Lu, C. Juhasz, O. Muzik, H. Chugani

Increased tryptophan metabolism measured in vivo is related to increased expression of indoleamine 2,3-dioxygenase expression (IDO) in resected epileptogenic tubers. Higher expression of major vault pr otein (MVP) in patients with TSC2 may be related to a more severe course of the disease compared to patients with TSC1. Both IDO and MVP might represent novel therapeutic targets for patients with TSC and may be individualized for type of mutation.

HIGHLIGHTS FROM INTERNATIONAL NEUROSCIENCE MEETINGS

Thalamic lesions increase the frequency of spiking during sleep

E. Tas, M. Takeoka, J. Molino, M. Gregas, Y. Eksioglu, A. Rotenberg, S. Kothare, T. Loddenkemper

Structural lesions involving the thalamus may contribute to sleep potentiation of epileptic spikes and to an increased spike wave index. Disrupted thalamo-cortical circuits, possibly in the setting of periventricular leukomalacia or early acquired strokes may play a role in the generation of frequent nocturnal spiking. Careful examination of the thalamus in patients with abnormal neuroimaging may assist in the earlier identification of the patients at risk for electrical status epilepticus in sleep, regional sleep potentiated spiking and related neurologic morbidity. Similarly, detailed anatomic imaging of the thalamus, and perhaps of the thalamo-cortical white matter connectivity may be warranted in patients with sleep-potentiated spikes on EEG.

Complications after temporal or extra-temporal epilepsy surgery - a systematic review

W. Hader, S. Wiebe, J. Tellez-Zenteno, C. Kwon, N. Jette

A variety of complications may occur after epilepsy surgery. The majority of these complications are considered minor or temporary, as they tend to completely resolve. Major permanent neurological complications however, may occur in up to 5% of patients and the most common are contralateral hemiparesis and major visual deficits, occurring in up to 2% of patients of patients undergoing temporal lobe resections. Mortality as a result of epilepsy surgery in the modern era is rare however.

Seizure outcome after selective amygdalo-hippocampectomy in bilateral compared to unilateral Ammon`s horn sclerosis

M. Malter, H. Tschampa, H. Urbach, M. Von Lehe, H. Clusmann, C. Elger, C. Bien

Patients suffering from refractory temporal lobe epilepsy with bilateral Ammon`s horn sclerosis (bAHS) should not be excluded from presurgical diagnostics per se. In our cohort, the proportion of patients finally operated on was lower in the bAHS compared to the unilateral Ammon`s horn sclerosis (uAHS) patients. However, the seizure-free outcome in both groups was not different. Also, no differences were found in age at disease onset or disease duration at operation. To achieve sufficient diagnostic certainty, intracranial EEG recordings are probably inevitable in bAHS patients. Further studies are required to compare the memory outcome in bAHS and uAHS patients before and after subarachnoid hemorrhage.

Vagus nerve stimulation in patients with tuberous sclerosis complex: efficacy of new implantations and association of device inefficacy with subsequent outcome of intracranial epilepsy surgery

S. Kalhorn, R. Elliott, C. Carlson, Y. Moshel, H. Weiner, O. Devinsky, W. Doyle

Vagus nerve stimulation (VNS) is a safe and effective treatment option for medically-refractory epilepsy in tuberous sclerosis complex patients. Nine of 11 patients (82%) experienced at least a 67% reduction in seizure burden. Lack of response to VNS does not preclude subsequent improvement in seizure burden with intracranial epilepsy surgery.

Early somatosensory symptoms in refractory temporal epilepsy

A. Weil, W. Surbeck, A. Bouthillier, P. Cossette, L. Carmant, A. Lortie, D. Nguyen

These preliminary observations suggest that the presence of early ictal somatosensory symptoms in apparent refractory temporal lobe epilepsy predicts a poorer surgical outcome. Potential explanations include unrecognized insular or parietal lobe seizures.

HIGHLIGHTS FROM INTERNATIONAL NEUROSCIENCE MEETINGS

Quality of life outcome after temporal or extra-temporal epilepsy surgery: a systematic review

H. Dhaliwal, S. Macrodimitris, S. Wiebe, J. Tellez-Zenteno, A. Metcalfe, L. Hernandez-Ronquillo, N. Jette

This systematic review demonstrates that epilepsy surgery patients show improvements in quality of life (QOL) post surgery, particularly when compared to epilepsy control patients either being medically treated or awaiting surgery. Future research is required to further elucidate the threshold of reduced seizure frequency required to improve QOL post-surgery. Additional research is also required to explore other predictors of post-surgery QOL outcomes.

Temporal lobe surgery: a comparison in outcome between populations based on MRI findings

F. Vale, S. Benbadis

Surgical treatment for mesial temporal lobe epilepsy is effective. The MRI findings predict higher seizure control after surgery. A well selected group of patient with N-MRI will benefit from surgical intervention. Early referral to an epilepsy center can not be overemphasized even in situations when brain MRI is normal.

Prospective longitudinal 5- and 10-year seizure outcome of resective epilepsy surgery in Sweden

K. Malmgren, I. Olsson, R. Flink, B. Rydenhag

In this study of seizure outcome 5 and 10 years after resective epilepsy surgery the seizure free rates are similar to the 2-year follow-up and higher for temporal lobe resection. For patients the probability of obtaining long-term seizure freedom is an important issue in the decision to accept the irrevocable treatment option of resective epilepsy surgery.

Who should be referred for an epilepsy surgery evaluation? Development of an appropriateness and necessity rating tool

N. Jette, J. Tellez-Zenteno, W. Hader, S. Macrodimitris, L. Hamiwka, E. Wirrell, H. Quan, E. Sherman, J. Burneo, A. Metcalfe, L. Hernandez-Ronquillo, C. Kwon, F. Andermann, P. Camfield, L. Carmant, J. Davenport, J. Farmer, D. Gross, R. Huntsman, M. Sadler, O. Snead, D. Steven, M. Wheatley, S. Wiebe

For the literature review, 5061 abstracts were screened, with 763 articles selected for full review. Fifteen topics were summarized, 7 as systematic reviews. The first round of rating included 3072 indications for a surgical referral. This number was reduced to 2646 during the second round of appropriateness ratings. Of the 2646 scenarios, 20.6% were rated as appropriate (scale ≥7), 17.2% as uncertain (scale 4-6), and 61.5% as inappropriate (scale 1-3) for a surgical evaluation. The remaining 0.8% of cases could not be classified due to lack of consensus. Of the 544 appropriate cases, 56% were rated to be most necessary, 41.6% moderately necessary and 1.8% minimally necessary. No consensus was reached for the remaining 4 scenarios. None of the appropriate cases were rated as unnecessary. Failure of one antiepileptic drug (AED) only was always rated as inappropriate for a referral. Failure of 2 AEDs was usually rated as appropriate only if either MRI or both MRI and EEG were abnormal. EEG abnormalities without MRI abnormalities had minimal impact on appropriateness ratings. Additional examples of appropriate or inappropriate scenarios will be presented. This study provides a comprehensive guide, based on the available evidence, for determining candidacy for an epilepsy surgery evaluation. The resulting decision support tool with all indications will be available on our study website.

Surgical outcome following resection of rolandic focal cortical dysplasia (FCD)

R. Sarkis, L. Jehi, W. Bingaman, I. Najm

Patients with rolandic FCD (including Type IIB subtype) can achieve a good surgical outcome after a complete resection. However, an incomplete surgical resection in rolandic type IIB FCD may lead to acute postoperative seizure worsening suggesting an in situ inhibitory anti-epileptic role for the center of the balloon cell-rich FCD.

HIGHLIGHTS FROM INTERNATIONAL NEUROSCIENCE MEETINGS

Vagus nerve stimulation in children with refractory generalized epilepsy or focal epilepsy due to diffuse cortical abnormalities or damage

A. Cukiert, C. Cukiert, J. Burattini, P. Mariani, C. Baise, M. Argentoni-Baldochi, V. Mello, C. Forster

This patient population appeared to represent a set of patients with better seizure and cognitive outcome after vagus nerve stimulation. Seizure frequency reduction was noted with stimulation parameters lower (1 mA) than those needed in adults and earlier during treatment.

Concordance between distribution of interictal fast ripples and resection area may contribute to seizure freedom for epilepsy surgery

T. Akiyama, C. Go, A. Ochi, I. Sugiyama, E. Donner, S. Weiss, O. Snead III, J. Rutka, J. Drake, I. Elliott, H. Otsubo

Interictal high frequency oscillations (HFO) >250 Hz (fast ripples) were better indicators for good seizure outcome than HFO >80 Hz (ripples), when their distribution was concordant with resection area. Interictal HFO, especially fast ripples, in residual brain regions might play a significant role for seizure recurrence.

Subclinical seizures in critically ill patients

D. Eliashiv, I. Tsimerinov, A. Pirrozi, T. Lin, C. Miller, D. Palestrant, J. Chung

Subclinical and clinical seizures are relatively common in the neuro-intensive care unit. These seizures may be unrecognized during initial EEG recordings and may be associated with increased length of stay.

Predictors of survival in prolonged refractory status epilepticus (PRSE)

R. Kilbride, D. Costello

This study identifies a small group of patients with highly refractory seizures who present with a commonly seen neurological emergency. To date there is little evidence to assist the treating clinician regarding best clinical practice for Prolonged Refractory Status Epilepticus (PRSE). We identify a clinical profile of those who survived to discharge from hospital, despite prolonged uncontrolled seizure activity. This cohort of survivors outlines clinical features which suggest a possibility of good outcome in the face of prolonged apparently unresponsive seizures.

Mortality in epilepsy - results from a large Danish cohort

J. Christensen, C. Pedersen, J. Olsen, P. Sidenius, M. Vestergaard

Mortality in epilepsy is increased even after exclusion of persons with co-morbid disorders and people with abnormal birth outcomes.

Depth of EEG suppression does not predict outcome of refractory status epilepticus

A. Crepeau, S. Sabesan, N. Wang, D. Treiman

Among the 29 patients identified, depth of EEG suppression did not correlate with outcome. We examined one aspect of treatment, but there are many variables to consider. Although the patients were all at one institution, there was neither a standard antiepileptic drug (AED) treatment nor a standard goal for suppression on EEG. Etiology varied between vascular, malignant, infectious, metabolic, anoxic, and cryptogenic causes. Co-morbidities also influenced the dose of AEDs that patients could receive to induce suppression. The lack of consensus on management reflects the complexity of refractory status epilepticus (RSE). Further research is needed to better guide management of RSE in order to optimize outcome.

HIGHLIGHTS FROM INTERNATIONAL NEUROSCIENCE MEETINGS

Factors predicting seizure control in patients with idiopathic generalized epilepsies (IGE)

J. Szaflarski, C. Lindsell, C. Banks, M. Privitera

This study shows that several factors may be associated with seizure control in patients with IGEs including age of onset, diagnosis (juvenile myoclonic epilepsy versus other IGE), initial response to valproate and EEG symmetries/asymmetries. Whether the intractable IGE patients have a different subtype of IGE or focal (possibly frontal) epilepsy that mimic IGE requires further investigation.

Clinical experience with Rufinamide (Banzel) in patients with intractable epilepsy

P. Bruno, P. Venna, J. Hirshberg, J. Paolini, R. Thibert, E. Thiele

In our experience of patients with refractory epilepsy, varying in type and etiology, Banzel appeared to be effective in providing improved seizure control in at least 1/3, including one patient with infantile spasms. It also appeared to be very well tolerated with minimal side effects noted. Initiating treatment at lower doses and increasing at a slower rate may help to prevent side effects of nausea, vomiting, headache and dizziness, although it did not prevent fatigue. It is possible that the fatigue may, in part, be due to concomitant medications, and possible drug-drug interactions should be considered.