Epilepsy

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Limbic system involvement in absence seizures

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Background: Absence epilepsy (AE) is believed to be generated by a thalamocortical network. Our laboratory showed that hippocampal neuronal firings were synchronous with the SWDs in the gamma butyrolactone (GBL) model of AE in rats. Here, we hypothesize that high frequency oscillations (HFOs) in the hippocampus and other parts of the limbic system were phase modulated by SWDs *Methods:* GBL (200 mg/kg i.p) was injected to induce SWDs in 6 male Long-Evans rats. Spontaneous local field potentials (LFPs) were recorded from electrodes implanted in the hippocampus and ventrolateral thalamus bilaterally and the right frontal cortex. For each LFP, modulation index (MI) gives the cross-frequency amplitude modulation of the HFOs (;90-250 Hz) by the phase of the SWD frequency at 2-8 Hz *Results:* Phase modulation of the HFOs by 2-8 Hz frequency increased for >45 min after GBL injection. MI increase was higher for hippocampal than thalamic LFPs, and not significant for frontal cortical LFP. MI for the nucleus accumbens LFP (N= 1 rat) also increased after GBL *Conclusions:* The modulation of HFOs (presumed local neural activity) by SWD frequency provides further support that the hippocampus and connected limbic system may become synchronous with the SWDs in AE

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Hippocampal deep brain stimulation provides drastic relief for intractable seizures

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Background: Deep brain stimulation (DBS) is the application of electrical currents via depth electrodes to regulate neuronal activity. DBS has been shown as a productive intervention for seizure control in patients with drug-resistance. This case had both a failed response to antiepileptic drugs (AEDs) and a temporal lobectomy. *Methods:* This case details the evolution of epilepsy in a 29-year-old female with seizures since the age of around 10. The patient has been followed for 6 months to monitor the treatment effects. No medication changes were made post-procedure. *Results:* The patient experienced a seizure frequency of 2-5 events per month. The patient had a right temporal lobectomy at age 12, which led to only 3 years in remission. The events are complex partial seizures characterized by unresponsive staring, lip smacking, hand automatisms and confusion. The patient failed 7 AEDs. Intracranial recording showed the most frequent activity coming from the left anterior and posterior hippocampus. Two depth electrodes were implanted accordingly. Stimulation began in September 2016 and the patient has since had only 2 seizures. *Conclusions:* Deep brain stimulation provides extensive relief for this case of intractable epilepsy. The patient's level of awareness, mood, and quality of life all improved significantly in response to treatment.

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Waiting times for assessment and epilepsy surgery at the epilepsy program of the University of Saskatchewan

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Background: Epilepsy surgery remains one of the most underused of all current medical interventions. It is estimated that less than 1% of patients with drug-resistant epilepsy are referred to specialized centers. The average delay from onset of seizures to surgical procedures is between 10 to 20 years *Methods:* In this study we describe the waiting times from the diagnosis of epilepsy to the assessment and epilepsy surgery at the epilepsy center of the University of Saskatchewan (SEP) *Results:* We included 70 patients assessed in the epilepy program between 2007 and 2015. Mean age of patients was 42.2±13. The time from the diagnosis of epilepsy to the referral was 16 years. The times for the for assesment and testing were the following: to the first consult with the epileptologist was 208 months, to the neuropsychological test was 201 months, to the video-EEG telemetry 219 months, to the first consult to neurosurgery 227 months and finally to the epilepsy surgery was 238 months. *Conclusions:* This study shows that patients with complex epilepsy in Canada are waiting significant time to be properly diagnosed and treated. Our study shows similar waiting times to otehrdeveloped countries suggesting a global problem in the reference of patients to epilepsy programs.

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The impact of waiting time on the assessment of the first seizure onset in pediatrics

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Background: Childhood epilepsy has increased in global incidence. Children with epilepsy require immediate healthcare evaluation and monitoring. Waiting times between first seizure onset and pediatric neurology assessment may impact seizure outcome at follow-up. Quality of medical care for children with first seizure onset will be assessed and the impact of pediatric neurology clinic waiting times on seizure outcomes will be determined *Methods:* This retrospective study, based on chart review, includes patients with first seizure evaluation at the Royal University Hospital in Saskatoon between January 2012 and December 2015. The interim period before first assessment and other factors were studied in relation to seizure outcome on follow-up. *Results:* 1158 patients were assessed. 378 (32.6%) patients had first seizure clinic assessment. 197 (52%) had epileptic events. 181 (48%) had non-epileptic events. The mean age of patients was 8.8 years. The mean waiting time for assessment by a pediatric neurologist was 4.33 months. The mean duration of follow-up was 20.9 months. At the last seizure assessment, 132 patients were free of seizures and 65 patients had a recurrence of seizures. *Conclusions:* First seizure assessment is crucial for management of children with epilepsy. Waiting time and other factors may influence seizure outcome, representing opportunities to improve standard medical care.