

P.018**The Ottawa Epilepsy Program: region-wide coordinated and multidisciplinary care in the 21st century**

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doi: 10.1017/cjn.2021.300

Background: Epilepsy is the most common chronic neurological illness worldwide, affecting more than 330, 000 people in Canada, 10, 000 of which reside in the Ottawa area. Despite facing higher mortality, stigma and social barriers, PLE (people living with epilepsy) incur treatment gaps even in high income countries like ours. Our goal was to address this burden locally with the creation of novel, community-integrated, care delivery for PLE in our area; we describe its inception. **Methods:** A transition program bridging pediatric and adult institutions was created to address the care continuity gap in 2017. Following a meeting of key stakeholders in the region in 2019, the community group was integrated into the model of care and the city-wide program was created incorporating adult, pediatric, transition and community pillars. A patient friendly website was launched in 2020 (ottawaepilepsyprogram.ca). **Results:** 170 patients were followed in the transition program since 2017. Adult and pediatric pillars have referred 70 patients to the community program between 2019-2020, 48 between 2020-2021. Through this, PLE are able to access the Clinic to community (C2C) and UPLIFT programs for social support services and mental health, respectively. **Conclusions:** An interconnected region-wide program can support PLE and foster innovative care integration across disciplines.

P.019**A machine learning approach to asymmetric burst suppression and refractory status epilepticus outcome**

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doi: 10.1017/cjn.2021.301

Background: Treatment of refractory status epilepticus (RSE) is often titrated to achieve EEG burst suppression. However, optimal burst suppression characteristics are largely unknown. We used an unsupervised machine learning algorithm to predict RSE outcome based on the quantitative burst suppression ratio (QBSR). **Methods:** We conducted principal component analysis (PCA) as a linear combination of 22 QBSR features from non-anoxic adult RSE patients at the Winnipeg Health Sciences Centre. We also determined the most predictive components that significantly differed between survivors and non-survivors. **Results:** Using 135,765 QBSRs from 7 survivors and 10 non-survivors, PCA identified a predominantly non-survivor cluster of 8 patients (75% non-survivors). The first 2 PCA components comprised 75% data variance. The most important first component feature was skewness of QBSR distribution in the right or left hemisphere (0.52 each). The most important second component feature was third QBSR quantile of the left hemisphere (0.49). Only right hemispheric QBSR features

significantly differed between groups: QBSR skewness for the first component (Benjamini-Hochberg adjusted $p=0.038$) and average QBSR for the second component (0.32, Benjamini-Hochberg adjusted $p=0.046$). **Conclusions:** Our pilot study shows that RSE patient survival may be impacted by QBSR, with differential hemispheric EEG burst suppression characteristics predicting poor RSE outcome.

P.020**The North American AED Pregnancy Registry: A Canadian Subgroup Analysis (1997-2019)**

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doi: 10.1017/cjn.2021.302

Background: This study aims to provide data on the care of pregnant women with epilepsy (pWWE) that is directly applicable to the Canadian context. **Methods:** Between 1997 and 2019, pWWE from Canada and the USA who enrolled into the North American AED Pregnancy Registry (NAARP) completed a questionnaire on their AED (anti-epileptic drug) usage. Enrollment rates to NAARP were compared between the two countries, and between the different Canadian provinces using population-based enrollment rate ratios (PERR). The AED prescription pattern among Canadian pWWE was analysed and compared with the USA. **Results:** During the study period, 10,215 women enrolled into NAARP : 4.1% ($n=419$) were Canadian, below the expected population-based contribution (PERR=0.42; $p<0.01$). Within Canada, the three northern territories (PERR=0; $p<0.01$), Prince-Edward Island (PERR=0; $p<0.01$), and Quebec (PERR=0.41; $p<0.01$) had the lowest enrollment rate ratios. Lamotrigine was the most commonly prescribed AED among Canadian pWWE; they were, however, more likely to be on polytherapy (25%; $p=0.13$), on Carbamazepine (24%; $p<0.01$) or valproic acid (21%; $p<0.01$) than their American counterparts. **Conclusions:** Greater enrollment of Canadian women to NAARP, through enhanced clinician referrals, in particular from underrepresented provinces/territories, could lead to more accurate population-specific data and help identify gaps in the care of this vulnerable patient population.

P.021**Electdetect: An Artificial Neural Network for the Detection of Artifacts in Intracranial EEG Recordings From Patients with Epilepsy**

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doi: 10.1017/cjn.2021.303

Background: Intracranial electroencephalography (iEEG) recordings are obtained from the sampling of sub-cortical structures and provide extraordinary insight into the spatiotemporal dynamics of the brain. As these recordings are increasingly obtained at higher channel counts and greater sampling frequencies, preprocessing through visual inspection is becoming untenable. Consequently, artificial neural networks (ANNs) are now

being leveraged for this task. **Methods:** One-hour recordings from six patients diagnosed with drug-resistant epilepsy at Toronto Western Hospital were obtained alongside fiducial ECG and EOG activity. R-wave peaks and local maxima were identified in the ECG and EOG recordings, respectively, and were time-mapped onto the iEEG recordings to delimit one-second epochs around 1.6 million cardiac and 600 thousand ocular artifacts. Epochs were then split into train-test-evaluation sets and fed into an ANN as one-second spectrograms (0 - 1,000 Hz) over 30-time steps. **Results:** The ANN model achieved formidable classification results on the evaluation set with an F1, positive predictive value, and sensitivity scores of 0.93. Furthermore, model architecture computed the classification probability at each time-step and enabled insight into the spatiotemporal features driving classification. **Conclusions:** We expect this research to promote the public sharing of new ANN from multiple institutions and enable novel automated algorithms for artifact detection in iEEG recordings.

P.022

The effect of vagus nerve stimulation on the quality of sleep in medically refractory epileptic patients

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doi: 10.1017/cjn.2021.304

Background: The quality of sleep is frequently impacted in patients with epilepsy. Vagus Nerve Stimulation is a relatively common treatment used in patients with medically resistant epilepsy. Some studies show an improvement in quality of life, however, there is limited data on the impact on sleep quality. **Methods:** A database analysis was conducted on Medline, Embase, and Cochrane to find studies that examined the VNS's effect on quality of sleep in medically resistant epilepsy. These studies included randomized clinical trials, case studies or reports, cohort studies, and systematic reviews. **Results:** 75 papers were reviewed and 16 studies from eight countries were included in the analysis. A total of 93 patients with ages ranged from 10 – 49 were included. Analyzing the change in the quality of sleep after VNS was evaluated using Multiple Sleep Latency Test. The literature showed that at low stimulus intensities, VNS treatment improves daytime sleepiness in patients. However, VNS setting titration has a dose-dependent effect on obstructive sleep apnea where higher VNS frequencies are related to higher apnea events. **Conclusions:** Limited data is available on the impact of VNS on the quality of sleep. Further studies are required to evaluate the improvement of sleep in patients with VNS.

P.023

Neurostimulation in Drug-Resistant Epilepsy: Systematic Review and Meta-Analysis from the ILAE Evidence-Based Epilepsy Surgery Task Force

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doi: 10.1017/cjn.2021.305

Background: Drug-resistant epilepsy (DRE) can affect up to one third of individuals with epilepsy. We conducted a systematic

review and meta-analysis of vagus nerve stimulation (VNS), responsive neurostimulation (RNS), and deep brain stimulation (DBS) in patients with DRE to summarize the current evidence on efficacy and tolerability for these neuromodulation modalities. **Methods:** We searched three online databases with a pre-specified search strategy. We included published randomized controlled trials (RCT) and their open-label extension studies, as well as prospective case series, with samples greater than 20 participants, reporting efficacy and tolerability. **Results:** We identified 31 studies, six of which are RCTs and 25 prospective observational studies. At long term follow-up, five observational studies for VNS reported a pooled mean decrease in seizure frequency at last follow-up of 35%. In the extension studies for RNS, the median seizure reduction was 53%, 66% and 75.0% at two, five and nine years respectively. For DBS, the median reduction was then 56%, 69% and 75% at two, five and seven years respectively. **Conclusions:** Neurostimulation modalities are effective for the treatment of DRE, with improving outcomes over time and few major complications. Higher quality long-term data on DBS and RNS suggest larger seizure reduction rates than VNS.

GENETIC/METABOLIC DISEASE

P.024

A multi-faceted lifestyle intervention for mitochondrial A8344G associated multiple symmetric lipomatosis (MSL): a successful patient initiated novel therapy

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doi: 10.1017/cjn.2021.306

Background: A female carrying the common MERRF mitochondrial DNA A8344G mutation had multiple symmetric lipomatosis (MSL) as the primary disease manifestation. **Methods:** Case report of a mitochondrial disease patient treating her severe lipomas by lifestyle modifications including a modified ketogenic diet. **Results:** The patient required lipoma reduction surgery after a rapid rate of lipoma progression. Following a difficult recovery, the patient independently researched an alternative therapy for her disease. The intervention was multi-faceted (dietary, physical activity, meditation) and progressive over two years. A carbohydrate reduced (5–10% of calories) modified ketogenic diet was a major part of the treatment owing to its incidental success in MSL management in her brother for management of glioblastoma multiforme. The outcome of her intervention was positive: weight loss, lipoma size reduction, improvement in physical activity/strength, laboratory markers of insulin resistance, and sense of well including a return to full time work. **Conclusions:** A potential non-surgical therapy for mitochondrial disease associated MSL appears feasible over the short term. The success of the lifestyle intervention in MSL therapy is unprecedented and, importantly, was fully patient initiated. This novel therapy provides potential insight into the mechanism of MSL exacerbation: suggesting insulin resistance or other lifestyle modifiable factors as mediators of disease progression.