being leveraged for this task. **Methods:** One-hour recordings from six patients diagnosed with drug-resistant epilepsy at Toronto Western Hospital were obtained alongside fiduciary 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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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 trails, 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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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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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.