outcomes since the first VNS device insertion till the last follow up after AspireSR® (with cardiac-based seizure detection) using McHugh seizure outcome classification. **Results:** The study population was comprised of 15 patients. The mean age at seizure onset was 2.7 years old, with mean age of initial VNS1 placement being 10.1 years and mean age of replacement with VNS2 being 14.9 years of age. Three of the fifteen patients had reported status epilepticus prior to initial VNS insertion, and none reported episodes following insertion. Two patients showed at least one class improvement in McHugh seizure outcomes at last follow up after VNS2. **Conclusions:** Through our preliminary data at the present time, we note that the majority of our patients maintains their seizure control following replacement with VNS2 with a few showing improvement.

P.100

A Retrospective Study of Alberta Emergency Room Utilization by Pediatric Epilepsy Patients

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doi: 10.1017/cjn.2021.378

Background: Epilepsy, a common neurologic condition, instigates a large number of emergency room (ER) visits annually. This project aims to retrospectively review the patterns and characteristics of Alberta ER visits by pediatric epilepsy patients. **Methods:** Methods: Alberta Health administrative databases, including the Inpatient Discharge Abstract Database, the National Ambulatory Care Reporting System, Diagnostic Imaging and Medical Laboratory, were used to identify ER utilization patterns among children with epilepsy in Alberta, Canada between 2012–2018. **Results:** Of 5,419 pediatric epilepsy ER patients between 2012–2018 in Alberta, 59% were developmentally delayed children. Children in this particular group, when compared to developmentally normal children with epilepsy, had the following characteristics: they were significantly more likely to utilize ERs in children's hospitals versus other hospitals; they presented at a significantly younger age; they had a significantly longer length of stay; they had higher triage scores; they were subjected to significantly more investigations; and they had significantly more hospital admissions for epilepsy. **Conclusions:** Discussion: This novel Alberta-wide study of resource utilization of pediatric epilepsy patients shows that developmentally delayed children with epilepsy use significantly higher resources compared to developmentally normal children with epilepsy. Whether this is justified or not requires further study.

P.101

Response to high dose nocturnal diazepam in children with ESES

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doi: 10.1017/cjn.2021.379

Background: To assess the response to high dose daily nocturnal diazepam (HDD) in children with encephalopathy associated with electrical status epilepticus in sleep (ESES). **Methods:** A prospective cohort of patients (4-12 years), newly diagnosed with ESES, initiated on the first course HDD, was followed for ≤ 1-year. Sleep EEG scores (SES) pre and post HDD were evaluated. An EEG grading system based on both sleep spike wave index (sSWI) (Grade: 1-4) and distribution of epileptiform discharges (Grade: 0-4) was used and summed to yield an aggregate SES (ASES) (Grade: 1-8). **Results:** Eighteen eligible children (M:F 12:6; median age, 7.6 years) were initiated on first course HDD (median, 0.5 mg/kg/d). sSWI decreased from 85.7% (mean, SD 13.9) to 32.6% (mean, SD 37.1) at subsequent EEG (95% CI = -70.60- -35.62; $p < 0.001$). ASES decreased from 6.5 (SD 1.3) to 3.1 (SD 1.9) (95% CI = -4.17- -2.60; $p < 0.001$). EEG relapse after a period of improvement occurred in 10 children. Minimal response to HDD occurred in 2 children. Five patients manifested mild side effects; behavior (2), hyperactivity (2), and lethargy (1). **Conclusions:** HDD safely and significantly reduces both SWI and aggregate sleep EEG score in children with ESES.

P.102

Childhood Absence Epilepsy: Prevalence of treatment resistance and neuropsychiatric comorbidity.

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doi: 10.1017/cjn.2021.380

Background: Seizures in childhood absence epilepsy (CAE) are usually easily controlled with anti-seizure medications (ASMs). Factors predictive of treatment resistance remain unclear. Our objectives were to assess prevalence of neuropsychiatric problems and factors influencing refractoriness in a cohort of CAE at a single centre. **Methods:** We retrospectively reviewed patients with CAE (ILAE 2017 classification) diagnosed between January 1999 and December 2016 with at least 1-year follow-up. Treatment resistance was defined as failure to respond to two or more appropriate ASMs. Exclusion criteria included eyelid myoclonia with absence, myoclonic absence, and generalized tonic-clonic (GTC) seizure before developing absences. **Results:** The

study population comprised 164 patients (65 males) 6.25-year-old on average at absence onset. 22% had treatment-resistant seizures. The first ASM was Ethosuximide in 63.4%, Valproic acid in 23.2%, and Lamotrigine in 6.7%. Statistical differences between response groups included developing a second seizure type specifically GTC, the second and third ASM, and absence of EEG normalization. At last follow-up, 43.3% of children were seizure-free off ASMs. 32.9% of children had learning disabilities, 28% ADHD, and 12.8 % anxiety. **Conclusions:** 22% of children with CAE had treatment-resistant seizures. Photoparoxysmal response was not predictive of treatment resistance. Neuropsychiatric problems were common with learning disabilities increased with refractory absences.

P.103

Midline Spikes and Intractable Seizures in Pediatric Epilepsy

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doi: 10.1017/cjn.2021.381

Background: Epileptic discharges localized to the midline vertex are rare. However, they have been associated with intractable seizures and severe long-term consequences in the developing brain. Our study aimed to understand the etiology of pediatric midline seizures and define post-surgical seizure outcomes. **Methods:** We reviewed charts, electroencephalography (EEG), and neuroimaging studies of ten pediatric patients with epileptic discharges localized to the midline vertex in the Comprehensive Epilepsy Program. The seizures were classified according to the International League Against Epilepsy criteria, patient age, sex, neuroimaging results, seizure etiology and outcomes were obtained. **Results:** Age of seizure onset was within the first 10 years of life in 90% of patients, with focal seizures being the most prevalent. Focal cortical dysplasia (FCD) was the most common etiology present in 50% of patients. These children had normal neuroimaging studies and intractable epilepsy. However, seizure freedom was achieved following surgical resection of the epileptogenic zone. **Conclusions:** We demonstrated that patients with midline epileptic discharges are associated with intractable focal seizures and early seizure onset. Despite normal neuroimaging reports, FCD was the most common pathology. Thus our study suggests early localization and resection of the epileptogenic zone may be beneficial for achieving seizure freedom in children with this electroclinical syndrome.

P.104

Children with Trisomy 21 and Lennox-Gastaut Syndrome with predominant myoclonic seizures

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doi: 10.1017/cjn.2021.382

Background: Lennox-Gastaut syndrome (LGS) is a severe form of pediatric epilepsy that is classically defined by a triad of drug-resistant seizures, characteristic EEG patterns, and intellectual disability. Long-term prognosis is generally poor with progressive intellectual deterioration and persistent seizures. At present, there are few reported cases of LGS and Trisomy 21 (T21) in the literature. To further delineate the spectrum of epilepsy in T21, we reviewed children with T21 and LGS at one center over 28 years. **Methods:** This is a retrospective case series. At our institution, all EEG results are entered into a database, which was queried for patients with T21 from 1992-2019. Pertinent electro-clinical data was obtained from medical records. **Results:** 63 patients with T21 and epilepsy, 6 (10%) had LGS and were included in the study. Four of the six patients were male and 5/6, had neuro-imaging, which was normal. Follow-up ranged from 3-20 years. Notably, 5/6 had predominant myoclonic seizures throughout the course of their epilepsy, associated with generalized spike-wave discharges. **Conclusions:** Myoclonic seizures appear to be a predominant seizure type in patients with T21, suggestive that T21 patients may have a unique pattern of LGS.

P.106

Intravenous lacosamide use in pre-school children

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doi: 10.1017/cjn.2021.383

Background: Data on intravenous lacosamide use in young pediatric patients is scarce, especially of pre-school age. **Methods:** We retrospectively reviewed the medical records of all patients less than 6 years old who received intravenous lacosamide at our tertiary pediatric hospital. Data on dose, timing and order of administration was collected. Clinical and electrographic response was independently assessed with EEG interpretation blinded to time of administration. For adverse effects surveillance, heart rate was noted before and 1 hour after dose. **Results:** Eleven patients (8 boys), received lacosamide between 2013 and 2018. Mean age was 2 years (11 days – 5,3 years). Medical indications were: refractory status epilepticus (n=6), repetitive seizures (n=4), and inability to take oral lacosamide (n=1). On average, lacosamide was the fifth (1^{st}-8^{th}) IV antiepileptic drug administered 78 hours (SD 11 hours) after presentation. The most frequent dose was 5 mg/kg. Clinical response was confirmed in 7 patients, while electrographic response was proven in 3 patients. Seizure relapse at 24 hours was noted in 6 patients. No bradycardia occurred post-lacosamide. **Conclusions:** Although very safe, therapeutic response to lacosamide in young pediatric patients was inconclusive, mostly due to delay in administration, suboptimal dose, and high number of other IV antiepileptic drugs previously given.

P.107

Response to the Ketogenic Diet in refractory epileptic spasms at BC Children's Hospital

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doi: 10.1017/cjn.2021.384

Background: Epileptic spasms (ES) are a devastating seizure type with poor neurodevelopmental outcome; 1/3 are resistant to