

of health service use of the pediatric patient population in Alberta using provincial linked administrative databases. **Methods:** We used linked administrative data to identify patients under the age of 18 years from 2010-2017 and ICD-10 headache type at diagnosis and health service utilization including cost, medication use, outpatient/ED visits and hospitalizations. Patient geographic location was mapped. We explored health system use in the 3 years before and after diagnosis by identifying visits to community physicians, outpatient clinics emergency departments an inpatient admissions. **Results:** Over the 7 year study period 45,454 patients were identified under 18 years, 60% of patients first diagnosed with migraine, 11.7% (5308) with tension headache and 28.2 (12,833) with unspecified headache. Higher health system utilization seen immediately before and after headache diagnosis, returning to pre-diagnosis values within the 3 years following. **Conclusions:** This is the first population based reporting of pediatric headache prevalence and health resource utilization in Alberta. This contemporary prevalence and health resource data use should help inform future policy and headache care in the province of Alberta.

B.5

Hospitalization in school aged children with cerebral palsy and population-based Controls: A Data Linkage Study

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doi: 10.1017/cjn.2021.274

Background: Predictors of hospitalization and reasons for admissions can inform healthcare planning and prevention. We sought to characterize the hospitalization pattern and risk factors for admission of children with cerebral palsy (CP). **Methods:** Data from the *Registre de paralysie cérébrale du Québec* and provincial administrative databases were linked. The CP cohort contained children born between 1999 and 2002. Data related to admissions were captured in 2012. Relative risks (RR) were calculated to identify factors increasing hospitalization risk. Peers without CP were matched from administrative databases in a 20:1 ratio. Chi-square tests and Student's T-tests were used to compare cohorts. **Results:** 301 children with CP and 6040 peer controls were selected. Hospitalizations were increased in children with CP (raw mean difference (RMD) 5.0 95% CI 4.7 to 5.2), with significantly longer lengths of stay (RMD 2.8 95% CI 1.8 to 3.8) and number of diagnoses per hospitalization (RMD 1.6 95% CI 1.4 to 1.8). Increased risk of any hospitalization was observed in children with a more complex profile. **Conclusions:** Children with a more severe profile of CP and greater health care complexity face more frequent and longer hospital stays. Coordinated interdisciplinary care is needed in school-aged children with CP and medical complexity.

B.6

High dose diazepam treatment for Electrical Status Epilepticus in Sleep (ESES): Is it effective?

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doi: 10.1017/cjn.2021.275

Background: Epileptic encephalopathy with electrical status epilepticus in sleep (ESES) is a pediatric epilepsy syndrome with sleep induced epileptic discharges and acquired impairment in cognition, language and/or behavior. Despite the widespread use of high dose diazepam, there is limited research on its efficacy. **Methods:** Single-center, retrospective case-series of children presenting with cognitive/ language regression and ESES from 2014-2019. All children underwent baseline overnight EEG followed by diazepam (1mg/kg) administered per rectum, and continuation of 0.5 mg/kg of oral diazepam for 3 months. Follow up EEGs were performed following the first dose and after 6-9 weeks of treatment. **Results:** 23 children were included [male 14 (60%); mean age 7 years (4-12)]. 10 children (45%) had symptomatic epilepsy (defined by abnormal MRI and/or genetic evaluation). Decrease in more than 25% of the spike activity was seen in 18 (78%). This effect was sustained in 11 children (47%) after 6 weeks. Only 6 (60%) children from the symptomatic group had EEG response, while 11 (91%) responded from the idiopathic group. 5 children (21%) had clinically significant cognitive/ language improvement. **Conclusions:** Treatment with diazepam reduces epileptiform activity in ESES in majority of children. Despite this reduction only minority of patients experience clinically significant cognitive improvement.

B.7

Nutrition in the first two weeks of life, neonatal brain growth and cognitive outcomes in children born very preterm

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doi: 10.1017/cjn.2021.276

Background: Nutrition in early life plays a critical role in the growth and neurodevelopment of preterm neonates. However, whether early nutrition modified the association of white matter injury (WMI) with brain maturation and neurodevelopmental outcomes remains unclear. **Methods:** In this prospective cohort study, very preterm neonates were recruited from the NICU at BC Women's Hospital. MRI and measures of NAA/choline were obtained. Energy intake was recorded over the first two weeks of life and the cohort was dichotomized. Neurodevelopmental outcomes were assessed at 4.5 years of age using WPPSI-III. **Results:** Neonates in the high lipid group had higher levels of NAA/choline in the basal ganglia. When accounting for confounders, this relationship was only significant in neonates without WMI (p=0.04).

Overall, neonates with larger WMI volumes had lower IQ scores at 4.5 years (p<0.001). However, this relationship was attenuated in the high lipid group (p=0.002) relative to the lower

lipid intake group. **Conclusions:** In this cohort, higher energy intake is associated with increased brain maturation. Similarly, neonates with large WMI had higher full-scale IQ if they received greater lipid intake in the neonatal period, suggesting that greater early lipid intake may contribute to blunting the deleterious effects of WMI on neurodevelopmental outcomes.

CHAIR'S SELECT ABSTRACTS - NEUROSURGERY AND NEUROIMAGING

C.1

Time Metrics and Clinical Outcomes of Thrombectomy in Acute Stroke Patients Before and After Implementation of COVID-19 Infection Protocols in Nine Canadian Stroke Centres

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doi: 10.1017/cjn.2021.277

Background: The coronavirus disease 2019 (COVID-19) pandemic has led an implementation of institutional infection control protocols. This study will determine the effects of these protocols on outcomes of acute ischemic stroke (AIS) patients treated with endovascular therapy (EVT). **Methods:** Uninterrupted time series analysis of the impact of COVID-19 safety protocols on AIS patients undergoing EVT. We analyze data from prospectively collected quality improvement databases at 9 centers from March 11, 2019 to March 10, 2021. The primary outcome is 90-day modified Rankin Score (mRS). The secondary outcomes are angiographic time metrics. **Results:** Preliminary analysis of one stroke center included 214 EVT patients (n=144 pre-pandemic). Baseline characteristics were comparable between the two periods. Time metrics “last seen normal to puncture” (305.7 vs 407.2 min; p=0.05) and “hospital arrival to puncture” (80.4 vs 121.2 min; p=0.04) were significantly longer during pandemic compared to pre-pandemic. We found no significant difference in 90-day mRS (2.0 vs 2.2; p=0.506) or successful EVT rate (89.6% vs 90%; p=0.93). **Conclusions:** Our results indicate an increase in key time metrics of EVT in AIS during the pandemic, likely related to infection control measures. Despite the delays, we found no difference in clinical outcomes between the two periods.

C.2

The use of magnetic resonance guided focused ultrasound for refractory psychiatric illness

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doi: 10.1017/cjn.2021.278

Background: Obsessive compulsive disorder (OCD) and major depressive disorder (MDD) are common, often refractory,

neuropsychiatric conditions for which new treatment approaches are urgently needed. Magnetic resonance guided focused ultrasound (MRgFUS) is a novel surgical technique permitting incisionless ablative neurosurgery. **Methods:** We examined the safety profile, clinical response, and imaging correlates of MRgFUS anterior capsulotomy (MRgFUS-AC) in patients with refractory OCD (n=7) and MDD (n=10). **Results:** There were no serious adverse clinical or radiographic events. 5/7 OCD patients and 3/10 MDD patients met pre-established clinical response criteria. Neurocognitive performance improved on several measures of executive function (p<0.05). By 6 months, there were significant reductions in cerebral glucose metabolism, and reductions in the bilateral tracts connecting the thalamus with the orbitofrontal cortices, anterior cingulate cortex (p<0.05). Preoperative functional connectivity between the right ventral striatum and hippocampus was predictive of eventual clinical response (p-FDR<0.05). **Conclusions:** MRgFUS-AC is safe and demonstrates important evidence of efficacy in treatment resistant psychiatric disease, particularly OCD. The procedure was associated with structural and metabolic changes in brain networks implicated in affective regulation, Resting-state fMRI offers the ability to predict response, and potentially select patients most likely to improve.

C.3

Activated Gene Pathways in Post-Infectious Hydrocephalus (PIH): Proteogenomics and the PIH Expressome

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doi: 10.1017/cjn.2021.279

Background: Proteogenomics, the integration of proteomics and RNASeq expands the discovery landscape for candidate expressed gene networks to obtain novel insights into host response in post-infectious hydrocephalus (PIH). We examined the cerebrospinal fluid (CSF) of infants with PIH, and case controlled against age-matched infants with non-postinfectious hydrocephalus (NPIH) to probe the molecular mechanisms of PIH, leveraging molecular identification of bacterial and viral pathogens. **Methods:** Ventricular CSF samples of 100 infants ≤ 3 months of age with PIH (n=64) and NPIH (n=36) were analyzed with proteomics and RNASeq. 16S rRNA/DNA sequencing and virome capture identified *Paenibacillus spp.* and cytomegalovirus as dominant pathogenetic bacteria implicated in our PIH cohort. Proteogenomics assessed differential expression, gene set enrichment and activated gene pathways. **Results:** Of 616 proteins and 11,114 genes, there was enrichment for the immune system, cell-cell junction signaling and response to oxidative stress. Proteogenomics yielded 33 functionally and genetically associated gene sets related to neutrophil activation, platelet activation, and cytokines (interleukins and interferon) signaling. **Conclusions:** We identified PIH patients with severe disease at time of hydrocephalus surgery, to have differential expression of proteins/genes involved in neuroinflammation, ependymal barrier