GP.4

Can Quantitative Susceptibility Mapping Help Diagnose and Predict Recovery of Concussion in Children?

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Background: Quantitative susceptibility mapping (QSM) is an MR sequence that has potential as a biomarker in concussion. We compared QSM in pediatric concussion patients versus a comparison group of children with orthopedic injuries (OI) and assessed QSM's performance relative to the current clinical benchmark (5P risk score) for predicting persistent postconcussion symptoms (PPCS). **Methods:** Children (*N*=967) aged 8-16.99 years with either concussion or OI were prospectively recruited from 5 Canadian centers. Participants completed QSM at a post-acute assessment 2-33 days post-injury. QSM z-score metrics for 9 regions of interest (ROI) were derived from 371 children (concussion=255, OI=116). PPCS at 1-month post-injury was defined using reliable change methods. **Results:** The concussion and OI groups did not differ significantly in QSM across ROI. Increased frontal white matter (WM) susceptibility predicted reliable increases in parent-rated cognitive symptoms (p=0.001). Together, frontal WM susceptibility and the 5P risk score were better at predicting persistent cognitive symptoms than the 5P risk score alone (p=0.0021). AUC were 0.71(95%CI: 0.62-0.80) for frontal WM susceptibility, 0.67(95%CI: 0.56-0.78) for the 5P risk score, and 0.73(95%CI: 0.64-0.82) for both. **Conclusions:** This is the first study to demonstrate a potential imaging biomarker that predicts persistent symptoms in children with concussion compared to the current clinical benchmark.

GP.5

Entropy on routine EEG: an interictal marker of seizure frequency?

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Background: Sample entropy (SampEn) can quantify the unpredictability of a physiological signal. We sought to assess if SampEn on EEG could reflect recent seizure activity. **Methods:** Charts of all patients undergoing an outpatient EEG between January and March 2018 were reviewed to assess seizure occurrences in the follow-up period between the two clinical visits surrounding the EEG. 9s-EEG segments were extracted at pre-specified time points. SampEn was calculated for all segments and values aggregated at the 25thpercentile. We performed a multivariate zero-inflated analysis to test the association between SampEn and seizure rate around the EEG, after controlling for age, presence of IED, presence of abnormal slowing, and presence of a focal brain lesion. **Results:** 269 EEGs were screened and 133 met inclusion criteria (112 patients). 80 EEGs (60%) were from patients with epilepsy, of which 47 had at least one seizure within the year preceding the EEG. Remaining EEGs were from patients who were deemed not to have epilepsy at last follow-up. Each 1SD decrease in SampEn was associated with a 3.93-fold increase in the rate of daily seizures (95% CI: 1.19–12.99, p = 0.02). **Conclusions:** Sample entropy of EEG is a potential objective method to assess contemporary seizure occurrence.

GP.6

Improving Triaging of EEG Referrals for Rule out Infantile Spasms (ITERIS)

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Background: Infantile spasms (IS) is a devastating pediatric seizure disorder for which EEG referrals are prioritized at the Hospital for Sick Children, representing a resource challenge. The goal of this study was to improve the triaging system for these referrals. **Methods:** Part 1: descriptive analysis was performed retrospectively on EEG referrals. Part 2: prospective questionnaires were used to determine relative risk of various predictive factors. Part 3: electronic referral form was amended to include 5 positive predictive factors. A triage point system was tested by assigning EEGs as high risk (3 days), standard risk (1 week), or low risk (2 weeks). A machine learning model was developed. **Results:** Most EEG referrals were from community pediatricians with a low yield of IS diagnoses. Using the 5 predictive factors, the proposed triage system accurately diagnosed all IS within 3 days. No abnormal EEGs were missed in the low-risk category. The machine learning model had over 90% predictive accuracy and will be prospectively tested. **Conclusions:** Improving EEG triaging for IS may be possible to prioritize higher risk patients. Machine Learning techniques can potentially be applied to help with predictions. We hope that our findings will ultimately improve resource utilization and patient care.

Chair's Select Abstracts - Adult Neurology and Neurophysiology

A.1

CSF Findings in Early Active Autoimmune Encephalitis

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Background: Treatment decisions for patients with autoimmune encephalitis (AE) frequently need to be made before results from autoantibody testing are available, as early treatment is