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The spectrotemporal characteristics of NMDA receptor encephalitis

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Background: NMDA receptor encephalitis (NMDA-RE) is an autoimmune disorder caused by antibodies to the NR1-NR2B heterodimer of the NMDA receptor. Currently, disease status is tracked primarily by the presence of auto-antibodies in the cerebrospinal fluid (CSF) and serum. Using serological and CSF markers along with clinical parameters to track disease progress can be challenging since patient symptoms and disease progress can vary widely. *Methods:* EEGs were reviewed in a 31 year old male patient with proven NMDA-RE. EEG data were sampled from various times before and after diagnosis, as well as during various stages of treatment. All analyses were performed using Matlab (Mathworks). *Results:* We showed that using a simple 1/f model of spectral behaviour (Buzsaki and Draguhn, 2004), we could fit the power spectra of the raw data at various instances during routine EEGs. We have demonstrated that the values of specific fitting parameters vary in relationship to the patient's clinical status across various stages of illness. *Conclusions:* The aim of this project was to explore the potential utility of EEG as a complement to the usual clinical metrics used in monitoring NMDA-RE. The analysis techniques presented here highlight the use of EEG as a practical, minimaly-invasive tool to monitor progress and potentially aid in clinical decision making.

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Transient osteoporosis of the hip during pregnancy associated with EMG signs of acute regional denervation

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Background: Transient osteoporosis is an infrequent musculoskeletal condition most often seen in middle-aged males, but can rarely present during late pregnancy in females. Patients present with sudden onset of severe joint pain. MRI typically shows T2 hypersignals and bone marrow edema. Abnormal neurophysiological findings have only rarely been described in the literature. *Methods:* Case report *Results:* A 35-year old patient presented at 34 weeks of pregnancy with acute onset of right hip and leg pain. MRI showed marked T2 hypersignals in the head of the femur with distal extension and bone marrow edema pathognomonic of transient osteoporosis. Neurophysiological studies showed normal nerve conductions of the lower extremities, but fibrillation potentials and positive sharp waves were found acutely in proximal muscles of the affected extremity and not limited to a single nerve territory. Inflammatory markers were unremarkable. Treatment was conservative with rest and reduction of weight bearing and pain resolved in the hip, but recurred in the ipsilateral knee several months after delivery suggesting evolution toward regional migratory osteoporosis. *Conclusions:* Transient osteoporosis of the hip may be associated with EMG signs of denervation that could suggest a contributing neurogenic mechanism. Their prevalence may be underestimated and we suggest considering serial EMG studies in its investigation.

Neurosurgery

Critical Care / Neuro Trauma

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Rates of infection following craniotomy or craniectomy with subsequent cranioplasty in traumatic brain injury

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Background: Postoperative infection is a significant cause of morbidity and mortality in traumatic brain injury (TBI) patients who undergo craniotomy and/or craniectomy. Data on the rates of infections associated with these procedures are limited. We present a single-center retrospective study on the rates of infection in post-traumatic craniotomies, craniectomies and cranioplasties. *Methods:* Data on 100 TBI adult patients who underwent a craniotomy, craniectomy and/or cranioplasty from 2011-2015 will be analyzed. Demographic and perioperative data including open/closed TBI, peri/postoperative infections, duration of procedure, type and mode of bone flap preservation will be retrieved. *Results:* Following our data collection (to be completed by the end of February), we expect infection rates of 3-20% in our study. Upon instituting a protocol similar to the Hydrocephalus Clinical Research Network's (HCRN) ventriculoperitoneal shunt (VP) protocol, we hope to reduce our post-TBI craniotomy/craniectomy/cranioplasty infections rates to less than 10%. Our projection is based on the HCRN protocol's 3.15% absolute risk reduction of VP shunt infections. *Conclusions:* The results of this study will emphasize the need for instituting robust perioperative protocols to reduce infections. Further research will be pursued following this study to establish a protocol similar to the VP shunt protocol from the HCRN, in an attempt to reduce perioperative rates of infection.

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Epidemiology of traumatic spinal cord injury patients in New Brunswick

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Background: Characteristics of traumatic spinal cord injury (tSCI) patients admitted to the Saint John Regional Hospital and the Stan Cassidy Center for Rehabilitation from 2011 to 2014 were examined. *Methods:* Demographic, neurological and functional outcome data for 18 patients, who had consented to participate in a database for tSCI in Canada, was obtained. *Results:* The majority of patients were male (88.9%), with a mean age of 41. 33 ($SD = 17.17$). The most common causes of tSCI were motor vehicle accidents (41.2%) and falls (29.4%). Cervical spine injuries (70.6%) and an ASIA impairment scale classification of D (38.9%) predominated. The median latency from injury to surgery was 22.67 hours. Functional independence Measure scores ($M = 64.17$, $SD = 25.84$) indicated that motor/functional independence was impaired ($M = 32.44$, $SD = 19.15$) relative to cognitive independence ($M = 31.83$, $SD = 4.07$). *Conclusions:* The results suggest that characteristics of tSCI patients in New Brunswick are similar to the Canadian tSCI patient