variables on diagnosis of epilepsy. Diagnostic concordance between SSC nurses and epileptologists was also assessed. *Results:* Predominant referral sources were emergency department physicians and general practitioners. Mean wait-time for first assessment was significantly reduced by 70.5% employing the SSC model versus historical usual care. A diagnosis was established at first-contact in 80.5% of cases while 16.0% of patients required a second visit. Eighty-two patients (41.0%) were diagnosed with epilepsy. The most common non-seizure diagnosis was syncope (24.0%). An abnormal EEG was found in 93.9% of patients diagnosed with epilepsy. Sixty-three patients were started on anti-epileptic drugs. In 18% of cases driving restrictions were initiated by the SSC. There was moderate correlation between SSC nurses and physicians (kappa=0.54; p<0.001) diagnoses. *Conclusions:* The SSC model reduces wait-times, streamlines assessments, and impacts clinical care decisions.

CNSS Chair's Select Abstracts

C.01

CNSS K.G. McKenzie Memorial Prize in Clinical Research

Intrathecal morphine following lumbar fusion: a randomized, placebo-controlled trial

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doi: 10.1017/cjn.2016.67

Background: Despite the ease of intraoperative injection, intrathecal morphine (ITM) is rarely provided in lumbar spine surgery. We therefore sought to demonstrate the safety and efficacy of ITM following lumbar fusion. *Methods:* In this double-blind trial, 150 patients undergoing elective instrumented lumbar fusion were randomly assigned to receive a single injection of ITM (0.2 mg) or placebo (saline) prior to wound closure. Primary outcomes were postoperative pain on the visual-analog scale during the inital 24 hours after surgery and respiratory depression. Secondary outcomes included related adverse events, opioid requirements, and length of stay. Outcome curves were estimated in an intention-to-treat, repeated-measures analysis. *Results:* Age, disability, operative times, and pre-operative pain were similar in both groups. ITM was associated with less pain both at rest (p<0.002) and with movement (p<0.02) during the initial 24 hours following surgery. ITM did not increase the cumulative incidence of respiratory depression (hazard ratio 0.86, p=0.66). While ITM reduced postoperative opioid requirements (p<0.03), there was no significant difference in length of stay (p=0.67). Adverse events did not significantly differ between groups. The early benefits of ITM on postoperative pain were no longer apparent after 48 hours. *Conclusions:* A single ITM injection safety reduces postoperative pain following lumbar fusion. (ClinicalTrials.gov NCT01053039)

C.02

CNSS K.G. McKenzie Memorial Prize in Basic Neuroscience Research

Whole genome expression profiling of blood-brain barrier endothelial cells after experimental subarachnoid hemorrhage

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doi: 10.1017/cjn.2016.68

Background: The pathophysiology of subarachnoid hemorrhage (SAH) is complex and includes disruption of the blood-brain barrier (BBB). We freshly isolated BBB endothelial cells (BECs) by 2 distinct methods after experimental SAH and then interrogated their gene expression profiles with the goal of uncovering new therapeutic targets. *Methods:* SAH was induced using the prechiasmatic blood injection mouse model. BBB permeability studies were performed by administering intraperitoneal cadaverine dye injections at 24h and 48h. BECs were isolated either by sequential magnetic-based sorting for CD45-CD31+ cells or by fluorescence-activated cell sorting (FACS) for Tie2+Pdgfrb- cells. Total RNA was extracted and analyzed using Affymetrix Mouse Gene 2.0 ST Arrays. *Results:* BBB impairment occurred at 24h and resolved by 48h after SAH. Analysis of gene expression patterns in BECs at 24h reveal clustering of SAH and sham samples. We identified 707 (2.8%) significant differentially-expressed genes (403 upregulated, 304 downregulated) out of 24,865 interrogated probe sets. Many significantly upregulated genes were involved in inflammatory pathways. These microarray results were validated with real-time polymerase chain reaction (RT-PCR). *Conclusions:* This study is the first to investigate in an unbiased manner, whole genome expression profiling of freshly-isolated BECs in an SAH animal model, yielding targets for novel therapeutic intervention.

C.03

CNSS K.G. McKenzie Memorial Prize in Clinical Research (2nd place)

Progressive contralateral hippocampal atrophy following surgery for medically refractory temporal lobe epilepsy

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doi: 10.1017/cjn.2016.69

Background: It remains difficult to predict which patients will experience ongoing seizures or neuropsychological deficits following Temporal Lobe Epilepsy (TLE) surgery. MRI allows measurement of brain structures, such as the contralateral (non-resected) hippocampus (cHC) after TLE surgery. Preliminary evidence suggests that the cHC atrophies following surgery, however, the time course of this atrophy, relation to cognitive deficits and seizure outcome remains unclear. *Methods:* T1-weighted MR imaging and hippocampal volumetry in 26 TLE patients pre- and post-TLE surgery (and 12 controls) as: 1) two-scan group (TSG) (pre- and post-operatively at 5.4 years) and 2) longitudinal group (LG; pre- and on post-operatively on day 1,2,3,6,60,120 and at an average 2.4 years. Seizure outcome and

pre- and post-operative neuropsychological assessment was performed. *Results:* The TSG had significant atrophy by 12% of the unresected cHC ($p<0.0001$) most pronounced (27%) in the hippocampal body alone. The LG revealed that this atrophy occured rapidly over the first week (1.3%/day; 3%/day cHC body). Significantly greater cHC atrophy was observed in those with ongoing seizures versus the seizure free ($p=0.048$). *Conclusions:* Significant cHC atrophy following TLE surgery that begins immediately, progresses over the first week, and remains signficantly depressed. The severity postoperative cHC atrophy may represent an early biomarker of the propensity for delayed seizure recurrence.

C.04

CNSS K.G. McKenzie Memorial Prize in Basic Neuroscience Research (2nd place)

Motor cortex electrical stimulation to promote spinal cord injury repair in an animal model

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doi: 10.1017/cjn.2016.70

Background: Electrical stimulation (ES) to promote corticospinal tract (CST) repair has been recently examined, though remains under investigated. We examine the role of motor cortex ES on axonal re-growth and functional recovery in a spinal cord injury (SCI) rat model. *Methods:* A partial transection was performed at C4 in 48 rats. Animal groups included: ES333 rats (n=14; 333Hz, biphasic pulse, 0.2ms every 500ms), ES20 (n=14; 20Hz, biphasic pulse, 0.2ms every 1ms), SCI only (n=10), and sham (n=10; electrode insertion without ES). Rats were trained in stairwell-grasping with subsequent SCI and ES. Post-injury reaching scores were recorded weekly, and histology completed quantifying axonal re-growth. *Results:* Post-SCI grasping ($p<0.01$, ANOVA) and well reached were lower than baseline values ($p<0.01$, ANOVA) for all groups. ES20 animals had lower grasping scores ($p=0.03$, ANOVA) and farthest well reached scores post-SCI than controls ($p=0.03$, ANOVA). ES333 rats had more axonal collaterals (axonal sprouts rostral to lesion) compared to control animals ($p<0.01$, M-W). No difference was found between groups with respect to axonal regeneration into the lesion ($p=0.13$, ANOVA). *Conclusions:* Cortical ES of the injured CST results in greater axonal outgrowth, and influences functional outcomes depending on ES parameters. ES is a potentially promising SCI therapy, but further investigation is required.

C.05

Canadian neurosurgery operative landscape

MK Tso (Calgary) M Bigder (Winnipeg) A Dakson (Halifax) C Elliott (Edmonton) D Guha (Toronto) C Iorio-Morin (Sherbrooke) M Kameda-Smith (Hamilton) P Lavergne (Quebec City) S Makarenko (Vancouver) M Taccone (Ottawa) B Wang (London) A Winkler-Schwartz (Montreal) S Christie (Halifax) T Sankar (Edmonton)*

doi: 10.1017/cjn.2016.71

Background: The Canadian Neurosurgery Research Collaborative (CNRC) is a trainee-led multi-centre collaboration made up of representatives from 12 of 14 neurosurgical centres with residency programs. To demonstrate the potential of this collaborative network, we gathered administrative operative data from each centre in order to provide a snapshot of the operative landscape in Canadian neurosurgery. *Methods:* Residents from each training program provided adult neurosurgical operative data for the 2014 calendar year, including the number of surgeries in the subcategories cranial, spinal, and peripheral nerve. Because some residency programs have surgeries distributed among more than one hospital, we calculated mean case load per residency program and per hospital. *Results:* Interim results from 6 neurosurgery residency programs are presented (with data from other programs forthcoming). Overall, there were on average 2,352 operative cases per residency program (n=6) and 1,176 operative cases per adult hospital (n=12). Among 5 programs with more detailed operative data, the mean numbers of cranial, spinal, peripheral nerve, and miscellaneous surgeries per residency program were 757 (47%), 487 (30%), 47 (3%), and 319 (20%) respectively. *Conclusions:* We show as a proof-of-concept that a trainee-led nation-wide research collaborative can generate meaningful data in a Canadian context.

C.06

Surgical resection of pediatic posterior fossa tumours in the molecular era

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Background: Aggressive surgical resections of posterior fossa tumours result in tremendous neurological sequelae as a result of damage to the brainstem. As such we sought to re-evaluate the role of aggressive surgical resections in the molecular era. *Methods:* 820 posterior fossa ependymoma and 787 medulloblastoma were genomically profiled and correlated with pertinent clinical variables. *Results:* Across 787 medulloblastoma cases, the value of extent of resection was greatly dampened when accounting for molecular subgroup. Near-total resections are equivalent to gross total resections across all four subgroups even when correcting for treatment. The prognostic value of a gross total resection as compared to a subtotal resection (>1.5cm2 residual) was restricted to Group 4 tumours (HR 1.26). Across 820 posterior fossa ependymoma PFA ependymoma was a very high risk group compared to PFB ependymoma, and a subtotal PFA ependymoma conferred an extremely poor prognosis. Gross totally resected PFB ependymoma could be cured with surgery alone. Prognostic nomograms in both medulloblastoma and ependymoma revealed molecular subgroup to be the most important predictor of outcome. *Conclusions:* The prognostic benefit of EOR for patients with medulloblastoma is marginal after accounting for molecular subgroup affiliation. In both molecular subgroups of posterior fossa ependymoma, gross total resection remains an important predictor of outcome.

C.07

Door to decompression should be the benchmark in trauma craniotomies

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doi: 10.1017/cjn.2016.73

Background: Quality control indicators for mass lesion in TBI use the delay between emergency department (ED) and OR arrival