

E.09**Cost-minimization analysis comparing intravenous immunoglobulin (IVIg) with plasma exchange (PLEX) in the management of patients with myasthenia gravis: different perspectives for different payers**

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Introduction: A cost-minimization analysis (CMA) was performed comparing IVIg and PLEX in the management of patients with exacerbation of myasthenia gravis (MG). *Methods:* This study combines Ontario-based health costing data with clinical data from a randomized clinical trial where patients with moderate/severe MG received either IVIg or PLEX. The CMA was undertaken under the perspective of a public health care insurer and under the perspective of a tertiary hospital payer. *Results:* The IVIg group (n=32) was comparable with the PLEX group (n=38) regarding demographics, disease characteristics and severity. PLEX was less costly than IVIg among patients with body mass index (BMI) ≤ 15.7 Kg/m², under the perspective of a public health care insurer (CAN\$6,271.18 versus CAN\$8,309.72, $p < 0.0001$). However, PLEX was more costly than IVIg under the perspective of the hospital payer when the costs of blood products were excluded (CAN\$4,815.36 versus CAN\$1,486.12, $p < 0.0001$). *Conclusions:* PLEX may be a short-term cost-minimizing therapy when compared with IVIg for treatment of MG exacerbation among patients with BMI ≤ 15.7 Kg/m², under the perspective of a public health care insurer. However, when the costs of blood products are absorbed by a third party, the hospital administration may see IVIg as a more attractive therapeutic alternative.

E.10**Neuroimaging for Disorders of Consciousness: Ethical Priorities in Research, Policy, and Translation**

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Background: Acquired brain injury is a critical health problem in Canada, placing greater demands on health resources as improvements in intensive care lead to more patients in long-term care. Clinical diagnosis of patients with disorders of consciousness remains difficult, but advances in neuroimaging research have the potential to reshape clinical management of such patients or provide unprecedented ways to communicate with them. Building on our earlier work, this study identifies ethically salient priorities for research and policy before translation of this promising technology. *Methods:* We interviewed 27 Canadian researchers, ethicists, lawyers, practitioners, allied health care professionals, and patient advocacy leaders, with expertise in neuroimaging or disorders of consciousness. Interviews were semi-structured and data were analyzed for emergent themes. *Results:* Participants were optimistic that neuroimaging could lead to improved clinical care. They discussed mitigating the risks of misinterpreting results and communication, creating guidelines for clinical use, and defining legal competence in this neuroimaging context as key ethical priorities for translation.

Conclusions: The transition of neuroimaging techniques for disorders of consciousness from research to clinical care may yield substantial benefits to these patients, but first requires resolution of research, policy, and translational issues.

CNSS**PLATFORM PRESENTATIONS****F.01****Recurrence pattern of surgically-resected skull base versus superficial meningiomas, signs of divergent pattern**

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Background: To identify differences in the recurrence pattern of surgically-resected skull base meningiomas compared with superficial intra-cranial meningiomas *Methods:* A retrospective hospital-based study of all patients referred to our institution from 1990 to 2014 for surgical resection of meningiomas was conducted (both primary and recurrent cases). Survival analysis was performed using IBM SPSS v22.0. *Results:* Overall, 398 intra-cranial meningiomas –129 (32%) skull base - were reviewed. Skull base tumors had a lower MIB-1 index ($p = 0.001$) and were more likely to be WHO I ($p = 0.003$). Meningiomas in all locations demonstrated a recurrence rate of 30% at 100 months of follow-up. Afterwards, the recurrence of skull base meningiomas plateaued (longest follow-up: 250 months) whereas superficial lesions had a recurrence rate of 80% at 230 months ($p = 0.02$). In multivariable analysis, patients with a first-time diagnosis ($p = 0.02$), those with WHO I or II tumors ($p = 0.02$ and 0.05), and those with a total resection ($p < 0.01$) were less likely to experience a recurrence. *Conclusions:* Skull base meningiomas are less aggressive than superficial lesions and may not need to be followed beyond 100 months. The WHO grade, complete resection, and prior recurrence are predictive factors of recurrence.

F.02**Recent Canadian neurosurgery graduate employment outcomes**

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Background: The American Board of Neurological Surgeons (ABNS) made persons beginning neurosurgical training in Canada after 1997 ineligible for ABNS board exams and certification in the United States (US). We set out to track employment outcomes for graduates who are “ABNS ineligible.” *Methods:* Graduates from Canadian neurosurgical programs who began training from 1998 to 2008 (ABNS ineligible) were followed regarding their employment status (n=143). Data was obtained from public-domain websites and direct connections through Canadian Neurosurgical Society (CNSS) members. Association between pursuit of research during residency

(MSc, PhD, or ≥ 2 years of non-degree research) and full employment was determined by Fisher's exact test. *Results:* 60% and 26% of graduates currently have full-time staff positions in Canada and the US, respectively. "Underemployment," defined as failure to secure a full-time position in neurosurgery despite a desire to do so (including locums, additional fellowship positions, unemployment and career changes) is currently seen in 12% of graduates, with 20% having been underemployed at some point within 5 years of graduation. Pursuit of research during residency was significantly associated with obtaining full employment (94% vs. 73%, $p=0.011$). *Conclusions:* Underemployment is a significant issue in recent neurosurgical graduates from Canadian training programs. Research training during residency appears strongly associated with obtaining full employment.

F.03

Management of post-traumatic bilateral jumped facets: a systematic review

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Background: Bilateral jumped facets (BJF) are serious cervical spine injuries that require reduction and surgical stabilization. Closed reduction often performed, however, the argument of having disc herniation suggested deferred treatment until MRI is done. The later has been criticised for delaying the treatment. *Methodology:* We conducted a systematic review focusing on BJF in order to assess the validity of performing an MRI prior to closed reduction. The immediate neurological state after reduction and long term outcome were the primary goals. *Results:* A total of 49 articles were found (1973-2014). Only 20 of them fit our criteria. A total of 203 BJF were evaluated with C6/7 and C5/6 being the most common level of injury. Closed reduction was performed in 194 patients with no MRI in 118 patients. Clinical changes had occurred in 7 patients (3 improved, 2 worsened, 2 transient worsening). The long term outcome showed no significant difference between the two groups who had closed reduction before or after the MRI ($p>0.05$) *Conclusion:* The risk of neurological worsening with closed reduction prior to MRI is low and insignificant. The MRI will be helpful post reduction to assess the status of the cord and adequacy of closed reduction, especially in comatose patients.

F.04

Use of neuropathic pain questionnaires in predicting the development of failed back surgery syndrome following lumbar discectomy for radiculopathy

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Objective: Failed back surgery syndrome (FBSS) describes neuropathic pain that occurs when extremity symptoms in lumbar disease persist despite structurally corrective spinal surgery. It is unclear whether specific preoperative pain characteristics predict patients prone to such postoperative disabling symptoms. *Methods:* This prospective study analyzed surgical patients with painful radiculopathy secondary to lumbar degenerative disease. Clinical parameters included general demographic information, preoperative and postoperative clinical examination, self-reported pain and disability scores,

and neuropathic pain scoring. The neuropathic pain screening tests used in this study were the Douleur Neuropathique 4 (DN4) and Leeds Assessment of Neuropathic Symptoms and Signs (LANSS), with correlation tested for ordinal score and screen positivity. Multiple logistic regression analysis defined predictors of postoperative symptomatology. *Results:* Among 250 surgical radiculopathy patients, 12% were classified with FBSS. The condition was highly associated with abnormal preoperative screens for neuropathic pain, but not gender, smoking status, or preoperative pain severity (multiple logistic regression, $\alpha=0.05$). Good correlation was seen between the two screening tests used in this study for absolute ordinal score (Spearman's $\rho=0.84$, $p<0.001$) and thresholding for neuropathic pain features (Spearman's $\rho=0.48$, $p<0.001$). *Conclusion:* Higher neuropathic pain screening scores correlated with likelihood of postoperative leg pain. Further work will develop more accurate prognostication tools for radiculopathy patients undergoing structural spinal surgery.

F.05

Parachute Canada/ThinkFirst Hockey Spinal Injuries Registry update

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Background: The Registry has collected data on spinal injuries in hockey for 30 years. This paper identifies the nature and incidence of spinal injuries in Canadian ice hockey and the impact of prevention programs. *Methods:* Data about spinal injuries with and without spinal cord injury in ice hockey have been collected by Parachute Canada/ThinkFirst's Canadian Ice Hockey Spinal Injury Registry since 1981 through retrospective questionnaires from practitioners, ice hockey organizations and media reports. Injury risk factors assessed include age, gender, location, and injury mechanism. *Results:* From 1943-2011, 355 cases have been documented. Injuries were primarily sustained by males (97.7%), and were cervical (78.9%) in location, resulting mainly from impact with the boards (64.2%). Checking/pushing from behind (36.0%) was the most common cause of injury, although slightly lower during 2006-2011. Major differences between provinces continue; Ontario and Quebec, continue to show markedly different injury rates, with Ontario's more than twice that of Quebec. *Conclusions:* Spinal injuries in hockey continue to occur, although at lower rates than in the peak years from 1981-2000. Injury prevention education and rules reinforcement (e.g. no checking/pushing from behind). Data indicate that multifaceted prevention programs have reduced the risk of injury.

F.06

Regional variation in lumbar spine surgery in Saskatchewan: a population-based analysis

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Background: Unexplained significant variation may suggest a quality care problem in a health care system. The objective of this study was to determine the extent of variance in spine surgery Saskatchewan and determine possible causes. *Methods:* Provincial billing