

P.081**Using functional MRI to assess the applicability of surgery or radiosurgery for vascular malformations near eloquent cortex**

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Background: Although surgery is the gold standard for treating brain arteriovenous malformations (AVMs), surgical techniques may not be suitable if the AVM is located in eloquent regions of the brain, such as the motor cortex. An alternative method for these cases is stereotactic radiosurgery. Localization of the motor cortex using functional magnetic resonance imaging (fMRI) is useful for helping the neurosurgeon determine which type of surgery is appropriate. We report a patient with a left frontal AVM near the motor cortex. fMRI was requested to localize motor functioning. **Methods:** The tasks included bilateral finger tapping, arm rubbing against the scanner, and abdominal tightening. All fMRI analyses were performed using BrainVoyager. **Results:** The fMRI results revealed that finger tapping and arm rubbing activated the precentral gyrus and supplementary motor area, and abdominal tightening activated the paracentral gyrus. These regions of activation were shown to be just posterior to the AVM and were mapped using neuronavigation during surgery. **Conclusions:** Given that the fMRI activation in the motor cortex was posterior to the AVM, the neurosurgeon felt confident that surgery could be performed. These findings elucidate the utility of fMRI for pre-surgical localization and for determining whether surgery or radiosurgery is appropriate in cases in which the AVM is near eloquent cortex.

P.082**Neural Reorganization Following Compression of the Motor Cortex: An fMRI and DTI Case Report**

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Background: Functional magnetic resonance imaging (fMRI) and diffusion tensor imaging (DTI) are noninvasive and reliable tools for mapping eloquent cortex and white matter tracks prior to brain surgery. In this case, fMRI and DTI were used to inform the surgical approach in the resection of a deep cavernous malformation near the right lentiform nucleus. Post-surgery, the patient developed a fluid collection in the frontal cortex that applied pressure to M1, which led to reorganization of the motor cortex. **Methods:** The tasks included finger tapping, arm rubbing, and lip licking. All fMRI analyses were performed using BrainVoyager. Tensors were tracked from 20-direction diffusion MR images using DSISudio. **Results:** An fMRI scan one-month pre-surgery revealed activation in M1 for the three tasks. A six-month follow-up scan revealed motor activation had been displaced by the fluid collection. A ten-month follow-up scan revealed that activation had shifted from its original location to more lateral and anterior regions. DTI revealed atrophy in the tracts through the insula, but increase in tracts through the lentiform nucleus. **Conclusions:** The results provide evidence that components of motor processing subserved by M1 can

be taken over by adjacent regions, and that the rapid onset of pressure can lead to reorganization in a relatively short time period.

P.083**Characterization of an arteriovenous malformation using 7T structural and functional imaging: A case report**

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Background: Cerebral arteriovenous malformations (AVMs) are a type of vascular abnormality characterized by abnormal connections between arteries and veins without the normal interposed capillary bed. The gold standard for diagnosis is digital subtraction angiography (DSA). Functional MRI (fMRI), particularly with the increased sensitivity at ultra-high field ($\geq 7T$), may help to further characterize AVMs, but has not been performed in this population. **Methods:** We present a functional and structural neuroimaging analysis of an AVM at 7T. Resting-state fMRI was analyzed using independent components analysis (ICA) and compared to normal controls. Structural T1-weighted images were obtained at 1.5T and 7T. The patient also underwent DSA. **Results:** A 44 year-old, right handed man presented with a generalized tonic-clonic seizure. MRI at 1.5T and 7T revealed an AVM located in the pineal region measuring 3.2 cm. Multiple large feeder vessels were identified, and the AVM drained into the vein of Galen, clearly visualized on the 7T images. Functional imaging revealed an altered default mode network and ICA-identified vascular networks corresponding to the AVM. **Conclusions:** Imaging at 7T clearly delineates AVM structure. Functional connectivity is altered by the AVM. Vessel-specific independent components were identified that may be helpful for AVM characterization.

NEUROSURGICAL SUBSPECIALTIES**FUNCTIONAL NEUROSURGERY AND PAIN****P.084****Single-centre follow-up of TYRX Antibiotic Envelope for neuromodulation unit implantation**

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Background: Studies have placed the rate of infection associated with neuromodulation units to be up to 20%. We present our experience with the TYRX absorbable antibiotic envelope. Our length of follow-up adds to the body of evidence around the use of antibiotic envelopes. **Methods:** We conducted a retrospective chart review of patients referred to our center for either new implantation or revision of neuromodulation units between July 2014 and September 2016. Consecutive cases were included for analysis. We included a control group of consecutive patients with neuromodulation units placed immediately prior to our experience with the TYRX envelopes for comparison. **Results:** Between July 2014 and September 2016, 76 pa-

tients had 81 instances of neuromodulation unit insertion. All patients received the TYRX antibiotic envelope. There were no incidences of infection involving antibiotic envelope-containing implants over an average follow-up period of 11 months. In 77 consecutive cases of neuromodulation unit implantation prior to usage of the antibiotic pouch, there were 4 instances of infection (5.2%). *Conclusions:* Our single center experience demonstrates a significant drop in the rate of infections with the use of an antibiotic envelope for neuromodulation unit implantation. We consider the routine use of the envelope to be a cost-effective method of infection avoidance.

P.085

Spinal cord stimulator for chronic pain syndromes: a national awareness survey

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Background: The expansion of neuromodulation intervention for complex pain syndromes has been significant in the last few decades. Considering the increased load of patients, we thought about evaluating the level of awareness among different medical experts to help assessing their familiarity with spinal cord stimulator (SCS). *Methods:* Survey has been sent to general practitioners, family physicians, pain specialists and spine surgeons. The main outlets of the survey aims to assess the followings:

1. The main source of their knowledge about SC
2. Familiarity with candidates who may benefit from SC
3. Introducing the concept of SC to their patients as an adjunctive treatment
4. Frequency of patients' referral for SC
5. Main reason for referring their patients
6. Familiarity with centres providing SCS

Results: EResults will be provided upon analysing the data from the collected surveys. *Conclusions:* The expansion in neuromodulation is expected to help patients with intractable pain syndromes. Hence, the survey would potentially help to explore the deficiencies in health workers awareness about SCS and outline future directions toward proper patients counseling and optimising their referral to neuromodulation centres.

SPINE AND PERIPHERAL NERVE SURGERY

P.086

Endoscopic assisted ulnar nerve decompression: a technical note

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Background: Cubital tunnel syndrome is the second most frequent upper extremity entrapment neuropathy. Various surgical approaches have been described in the literature for Ulnar nerve decompression, ranging from open In-situ decompression to endoscopic Ulnar nerve release. In this technical note we describe a new endoscopic approach

for Ulnar nerve decompression. *Methods:* Four cadavers, a total of eight fresh arms were dissected using our new endoscopic technique. The technique involves a 2.5cm skin incision placed 2.5cm distal to the medial epicondyle, and perpendicular to the long nerve axis. Early identification of motor branches was achieved using this skin incision. Under endoscopic view using 30 degree rigid scope Ulnar nerves were decompressed. *Results:* Early identification of motor branches was achieved using distally placed skin incision in all eight arms. *Conclusions:* The safety of identifying Ulnar nerve motor branches in the early steps of the procedure, and the avoidance of scar formation over the elbow joint are the proposed advantages of this approach. More clinical studies needed to validate this outcome.

P.087

Association of pre-operative hyponatremia with morbidity and mortality in patients undergoing elective degenerative spine surgery

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Background: Hyponatremia has been found to be associated with increased complications in a variety of surgical populations. No study looked specifically at patients undergoing spine surgery. We also specifically address whether it has an effect on the typical low-risk patient admitted for degenerative spine disease, a population that forms the major bulk of clinical practice. *Methods:* Data was obtained from the American college of surgeons National Surgical Quality Improvement Program (ACS-NSQIP). All patients who underwent elective spinal surgery for degenerative disease from 2011 to 2013 were included. The two arms (normonatremic and hyponatremic) were then compared. *Results:* A total of 58049 patients were included, 3037 were hyponatremic. Hyponatremic patients were older and had more comorbidities. They also developed more minor and major complications. When all comorbidities were controlled for, hyponatremia was only associated with increased minor but not major complications. These patients were more likely to require a blood transfusion (OR=1.23, CI 1.10-1.43) and a prolonged hospital stay (OR=1.52, CI 1.33-1.75). *Conclusions:* This study finds an association between hyponatremia and postoperative adverse events in a low risk population that forms the major bulk of clinical practice. This addresses a potential target for quality improvement strategies with significant cost saving implications.

P.088

Spinal computer-assisted intra-operative three-dimensional navigation in Canada: a population-based time trend study

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Background: Spinal computer-assisted navigation (CAN) is proven to increase instrumentation accuracy. Adoption remains limited by workflow restrictions, learning curves and costs. Here, we assess spinal CAN usage among Ontario surgeons to identify gaps