## P.081

### Using functional MRI to assess the applicability of surgery or radiosurgery for vascular malformations near eloquent cortex

*L Gould (Saskatoon)* M Kelly (Saskatoon) C Ekstrand (Saskatoon) T Ellchuk (Saskatoon) R Borowsky (Saskatoon) M Mickleborough (Saskatoon)*

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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

*L Gould (Saskatoon)* M Kelly (Saskatoon) M Mickleborough (Saskatoon) C Ekstrand (Saskatoon) T Ellchuk (Saskatoon) K Brymer (Saskatoon) R Borowsky (Saskatoon)*

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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 DSIStudio. *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

*KM Ikeda (London)* JC Lau (London) SM Mirsattari (London) SP Lownie (London)*

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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 (>=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

*S Ahmed (Saskatoon)* K Waterhouse (Saskatoon) A Vitali (Saskatoon)*

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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 envelops. *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-