

P.162**Neurosurgical trialists are not as diverse as the participants they enroll: A systematic sampling review**

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Background: Diversity of healthcare personnel has been associated with improved care of diverse populations. To determine whether neurosurgical clinical trialists were as diverse as the populations they treated, we investigated the sex/gender and race/ethnicity of participants and compared them to authors of randomized controlled trials (RCTs) in neurosurgery, orthopedic surgery, general surgery and plastic surgery. **Methods:** Embase and MEDLINE were systematically searched from 2001 to 2021. RCTs were limited by impact factor and selected using a series technique. Data on author and trial characteristics were extracted independently and in duplicate, and compared for each speciality. **Results:** 1548 articles were included. Interim analysis revealed the mean proportion of women authors was lowest in neurosurgery (5%) and highest in plastic surgery (50%). Trialists that were most reflective of their participants sex/gender were general surgery (42% authors vs 46% participants) and plastic surgery (50% authors vs 66% participants). 94% of RCTs did not report participants' race/ethnicity. No RCTs excluded participants based on sex/gender or race/ethnicity. **Conclusions:** Compared to other surgical fields, neurosurgery had the poorest correlation of author sex/gender with the population being studied. Efforts are needed to improve the diversity of neurosurgical trialists, access to RCTs for underrepresented groups and standardized reporting of participants' race/ethnicity.

OTHER NEUROSURGERY**P.163****Endoscopic third ventriculostomy for VP shunt malfunction during the third trimester of pregnancy: illustrative case**

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Background: Endoscopic third ventriculostomy (ETV) is a successful procedure for treating noncommunicating hydrocephalus as an alternative to initial ventriculoperitoneal (VP) shunt placement and as a salvage procedure when a VP shunt fails. Physiological changes of pregnancy can lead to VP shunt failure and complicate the management of shunt malfunction, particularly in the third trimester. **Methods:** Case report: ETV was successfully used in the third trimester (31 weeks of gestation) of pregnancy for acute hydrocephalus due to VP shunt malfunction, and the patient went on to deliver a healthy baby at term; the

patient remained well in the long-term follow-up. An English-language PubMed literature review revealed four cases of VP shunt failure successfully treated with an ETV in the first or second trimester but no such reports in the third trimester of pregnancy. **Results:** This case report adds to the sparse literature regarding the use of an ETV to treat VP shunt malfunction in the third trimester of pregnancy. This appears to be a unique first-time report of the use of an ETV during this specific challenging prenatal period. **Conclusions:** ETV appears to be a safe and effective alternative to VP shunt replacement in the late prenatal period of pregnancy in well-selected candidates.

P.164**Analysis of MNI OR log book over Dr Wilder Penfield's Career: Practice profile of epilepsy cases**

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Background: Dr. Penfield was a pioneer in neurosurgery and his contribution continues to impact the practice today. Our objective is to analyze the epilepsy surgeries during his career. **Methods:** Analysis of original operating room books from 1934-1960. **Results:** He performed 2338 procedures during his career. 601 (26%) epilepsy, 524 (22%) oncology, 441 (19%) general neurosurgery, 379 (16%) functional, 230 (10%) spine, 80 (3%) trauma, 54 (2%) vascular, 29 (1%) nerves.

Epilepsy cases were divided: local vs. general anesthesia and a focal resection or lobectomy. From 1934-1945 he performed 167 procedures, 146 local anesthesia with focal resection. From 1946-1950 223 procedures, introduction of lobectomies with 30. Most right-side procedures under general anesthesia. From 1951-1955 152 procedures, 88 focal resection, 64 lobectomies. From 1956-1960 59 surgeries, similar number of focal resection and lobectomies. **Conclusions:** To our knowledge this is the most complete and comprehensive account his surgical career. In early years patients were treated through large craniotomies with EEG stimulation to tailor focal resections now known as the "Montreal procedure". This led to a better understanding of human cortex and the division of the brain functions. During later years, there was a reduction in the number of cases done under local anesthesia and increase in lobectomies.

P.165**Using artificial intelligence to quantify dynamic retraction of brain tissue and the manipulation of instruments in neurosurgery**

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Background: There is no objective way to measure the amount of manipulation and retraction of neural tissue by the surgeon.

Our objective is to develop metrics quantifying dynamic retraction of cerebral tissue and the manipulation of instruments during a neurosurgical intervention. Methods: We trained a convolutional neural network to analyze microscopic footage of neurosurgical procedures and thereby generate metrics evaluating the surgeon's dynamic retraction of brain tissue and the surgeon's manipulation of the instruments themselves. U-Net image segmentation is used to output bounding polygons around cerebral parenchyma of interest, as well as the vascular structures and cranial nerves. Results: On the validation set, our network achieves a state of the art Intersection over Union (IoU) of 70.1% (Recall = 89%) and 74.3% (Recall = 91%) for surgical tools and biological structures respectively. Multivariate statistical analysis was used to evaluate dynamic retraction and tissue handling. Conclusions: We describe a semantic segmentation model for surgical instruments and intracranial structures to evaluate dynamic retraction of soft tissue and manipulation of instruments during a surgical procedure, while accounting for movement of the operative microscope. Using the intraoperative footage, this model can potentially provide the surgeon with objective feedback.

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Subcutaneous intrathecal catheter and port implants for administration of Nusinersen in patients with Spinal Muscular Atrophy

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Background: Until recently, no effective treatment was available for spinal muscular atrophy (SMA). In 2017, Health Canada approved intrathecal Nusinersen a medication that prevents degeneration of the motor neurons in the spinal cord. The administration is intrathecally most commonly via lumbar puncture (LP) to have a direct effect on the motor neurons of the spinal cord.

Many older patients with SMA and concomitant spinal deformities present technical challenges to access the thecal sac. Different routes have been described for delivery of the medication. These techniques may require sedation, are associated with radiation exposure, and demand experience personnel. Methods: A new surgical technique has been proposed to overcome these obstacles by combining two Health Canada approved devices: 1) an intrathecal catheter designed for intrathecal baclofen pumps and 2) an implantable subcutaneous port designed for intravascular medication administration Results: We describe the technical nuances and outline the clinical outcomes of six patients with complex spine deformities who have undergone such an implant for administration of Nusinersen. Conclusions: We discuss the benefits of the procedure which includes: 1) administration in the outpatient setting without sedation, 2) avoidance of costly imaging and experienced personnel, and 3) placement of the catheter in the cervicothoracic junction.

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Documented growth of a de novo intracranial capillary hemangioma: a case report

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Background: Intracranial capillary hemangiomas are rare, particularly in adults, and diagnosis can be challenging. The literature lacks visualization of intracranial capillary hemangioma growth over time. Here we document growth of a de novo intracranial capillary hemangioma, initially interpreted radiologically as a glioma. Methods: We report a case of a 64 year old male with history of HIV, recent Lyme disease and unconfirmed prior COVID-19 infection, who presented with exhaustion and confusion. Imaging demonstrated an intra-axial high T2/FLAIR signal lesion centred in the subcortical white matter of the posterior right temporal lobe. There was faint enhancement, and a few mildly prominent vessels were seen along its anterior aspect. Imaging 2 years prior had not shown the lesion. Stereotactic biopsy was nondiagnostic. Craniotomy and resection was carried out. Results: Pathological examination and immunohistochemistry returned the diagnosis of capillary hemangioma. We review how this case adds to proposed theories of de novo intracranial capillary hemangioma growth. Our patient's co-morbidities support possible inflammation related triggers for symptomatic progression of these uncommon lesions. Conclusions: This unusual case documents the radiological appearance and progression of a de novo intracranial capillary hemangioma. It represents the first time such growth has been visualized in an adult male.

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Improving transitioning from pediatric to adult care: a qualitative study of patients with hydrocephalus and their caregivers

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Background: Hydrocephalus is a common pediatric condition but many neurosurgeons cannot continue to care for patients into adulthood. Although gaps in care are thought to exist for youth transitioning to adult care, little is known about how patients/caregivers feel about the process. This study examined the perceptions of adolescents and young adults transitioning from pediatric to adult care at a single centre. Methods: We explored the perceptions of patients/caregivers with hydrocephalus about the transitioning process using semi-structured interviews and the qualitative research methodologies of grounded theory. 40 patient/caregivers (7 adolescents, 13 young adults, 20 parents) from BC Children's Hospital and the Hydrocephalus Clinic at Vancouver General Hospital. Interviews were transcribed verbatim and coded, with common themes identified. Results: Four themes