

P.202**Image-Guidance for Ventricular Drains Insertion: A Systematic Review and Metanalysis**

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Background: The use of Image-guidance to improve the accuracy during ventricular drain insertion has been attempted. We aim to assess the effect of use of Image-guidance on accuracy, drain failure rate and number of ventricular cannulation attempts. **Methods:** MEDLINE, EMBASE and Cochrane Library databases were searched from inception to February 2021 looking for studies comparing image-guided versus freehand ventricular drain insertion. Two reviewers independently screened studies, extracted data and assessed risk of bias and quality of evidence. Metanalysis was conducted in compliance with PRISMA guidelines using a random-effects model and GRADE tool was used to assess quality of evidence. **Results:** 17 studies with 3404 patients were included, all of which were of non-randomized design. Pooled data on drain accuracy and drain failure rates showed favourable effect of image-guidance with risk ratio of 1.31 (95% CI of 1.13 – 1.51, low quality evidence) and 0.63 (95% CI 0.48 – 0.83, moderate quality evidence), respectively. Pooled data were equivocal for number of attempts with mean difference score of -0.11 times (95% CI -0.31 – 0.09, very low-quality evidence). **Conclusions:** Image-guidance likely enhances drain accuracy and reduces drain failure rate. No clear recommendation can be drawn on the benefit of intervention on number of drain insertion attempts.

P.203**Clinical outcomes of endoscopic endonasal odontoidectomy: A single center experience**

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Background: Odontoidectomy for basilar invagination and craniocervical junction pathology has traditionally been performed using a transoral route. However, the endoscopic endonasal approach to the anterior craniocervical junction may offer safer and more effective access when compared to transoral approaches. **Methods:** This study is a retrospective chart review of all adult patients who underwent an endoscopic endonasal odontoidectomy at a single tertiary care center between January 2011 and May 2019. **Results:** Seventeen patients were included in the study. The median admission age was 67 years (range: 33-84 years) and 65% of the patients were female. One patient (1/17, 6%) had vertebral artery injury which was coiled with no neurological deficits, and 4 patients (4/17, 24%) had intraoperative CSF leaks with no postoperative leak. Fourteen patients (14/17, 82%) were extubated by POD 1. Three patients (3/17, 18%) developed postoperative sinus infections and required antibiotics. Eight patients (8/17, 47%) developed transient postoperative dysphagia. One patient (1/17, 6%) had postoperative epistaxis

and one patient (1/17, 6%) had postoperative lower cranial nerve symptoms. The median length of hospital stay was 13 days (range: 2-44 days). **Conclusions:** Endoscopic endonasal odontoidectomy is a feasible and well-tolerated procedure for anterior decompression of craniocervical junction, associated with satisfactory patient outcomes and low morbidity.

P.204**Integration of patient directed approach in pituitary tumor management – The Ottawa Hospital experience**

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Background: Pituitary adenomas are common and often require complex multidisciplinary care with multiple specialists. This may result in a health care system that is challenging for patients to navigate. Audits of care at our institution revealed opportunities for improvement to better align care with patients' needs. **Methods:** A quality improvement initiative that incorporated a patient advisory committee of patients who had received treatment for pituitary adenoma at our center and their family members was used to help identify opportunities for improvement. The patient-identified gaps in care included the need to coordinate and minimize appointments and the desire for better communication and education. Based on this information, changes were implemented to the pituitary program, including increasing access to the multidisciplinary clinic and developing a standardized and centralized triage process. **Results:** A pre and post-intervention analysis consisting of retrospective chart reviews revealed that these changes had an impact on wait times for first assessment, and a significant shift in location of this first visit – with a larger proportion of patients being seen in the multidisciplinary clinic after intervention. **Conclusions:** We demonstrate that patient involvement, beyond individual patient-physician interactions, can lead to meaningful and observable changes, and can improve the quality of care for pituitary adenoma.

P.205**Association Between Vein of Galen Aneurysmal Malformation and Hirayama Disease: A Clue into Pathophysiology?**

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Background: Hirayama Disease (HD) is a rare disorder consisting of insidious onset of unilateral weakness and atrophy of the forearm and intrinsic hand muscles. Vein of Galen aneurysmal malformations (VGAMs) are rare congenital cerebral vascular malformations, consisting of high-flow arteriovenous shunting between a persistent median prosencephalic vein and arterial feeders. **Methods:** 14 years old boy known for VGAM

presented with left-sided HD. His cervical MRI revealed enlarged epidural with anterior, left-ward displacement of the posterior dura and spinal cord. He underwent surgical treatment by laminotomies, along with tenting of an autologous duroplasty to the overlying laminae. **Results:** We decided to combine epidural venous plexus coagulation with posterior duraplasty and dural fixation using tenting suture which led to a favorable clinical outcome has not been previously proposed in the literature.

We hypothesize that in this context, an abnormal vasculature could also predispose to posterior epidural venous plexus engorgement, anterior dural displacement in cervical flexion, and microvascular changes in the anterior spinal arterial circulation, leading to the progressive anterior horn cell ischemia that lead to the clinical phenotype of HD. **Conclusions:** The association between HD and VGAM in this patient may provide clues with regard to the pathophysiology of HD.

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Tissue Plasminogen Activator in Addition to Twist Drill Drainage as a Treatment for Chronic Subdural Hematomas – A Descriptive Analysis

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Background: Current literature provides little consensus on universal guidelines for first-line treatment of chronic subdural hematomas (cSDH). However, administration of local tissue plasminogen activator (tPA) may enhance the traditional method of twist drill drainage (TDD). The study aims to explore the efficacy of TDD with and without tPA, at achieving clinically relevant drainage (200mL) and reducing recurrence of cSDH. **Methods:** A retrospective review of patients (N=34) with cSDH is presented. Patients who received TDD with tPA (n=17) were identified and matched, based primarily on age and hematoma volume, to a control group (n=17), TDD without tPA. Variables of interest include initial hematoma volume, volume drained, length of stay, and recurrence rates. Descriptive analysis was run. **Results:** Average age for patients was 74.6 with 76% male. Mean drainage volumes for the tPA cohort was 381.6mL and TDD without tPA cohort was 151.3mL. The addition of tPA resulted in drainage volumes nearly double (1.9x) the clinically relevant amount and had low recurrence rates (12.5%). TDD without tPA failed to result in clinically relevant drainage and had a recurrence rate of 52.9%. Average length of stay differed by two days (9.71 tPA; 7.71 control). **Conclusions:** TDD with tPA was effective at treating cSDH in our population.

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Reducing the risks of proximal and distal shunt failure in adult hydrocephalus: A Shunt Outcomes Quality Improvement (ShOut-QI) Study

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Background: Ventriculoperitoneal (VP) shunt failures in adult patients are common and subject patients to multiple surgeries and a decreased quality of life. A prospective cohort Shunt Outcomes Quality Improvement (ShOut-QI) initiative was implemented to reduce shunt failure incidence through neuronavigation-assisted proximal catheter insertion and laparoscopy-guided distal catheter anchoring over the liver dome to drain CSF away from the omentum. **Methods:** “Pre-ShOut” and “Post-ShOut” groups of patients included those with and without neuronavigation/laparoscopy, respectively for insertion of a new VP shunt. The primary outcome was shunt failure which was defined as any return to surgery for shunt revision as determined with a standardized clinical and radiology follow-up protocol. **Results:** 244 patients (97 Pre-ShOut, 147 Post-ShOut), mean age 73 years, were enrolled over a 7-year interval and observed for a mean duration of 4 years after shunt insertion. Neuronavigation improved proximal catheter placement accuracy by 20% ($p < .001$), and shunt failure occurred in 57% vs 23% in the Pre-ShOut and Post-ShOut groups, respectively ($p = .008$), representing a 53% relative risk reduction in the incidence of shunt failure. **Conclusions:** Adult shunt failure incidence may be significantly reduced by improving the accuracy of proximal catheter placement with neuronavigation and reducing the risk of distal catheter failure with laparoscopic-guided placement.

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Pilot Study of a Multi-center, Randomized, Blinded, Placebo-Controlled Trial of Shunt Surgery in Idiopathic Normal Pressure Hydrocephalus

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Background: To describe preliminary results of a multi-center, randomized, blinded, placebo-controlled, pilot trial of shunt surgery in idiopathic normal pressure hydrocephalus