wellbeing and needs to be addressed in brain tumor patients. Methods: A retrospective study conducted in 2017 in a single academic center that included patients diagnosed with brain tumors in a 10 year period. The assessment of the QoL was done using the European Organization for Research and Treatment of Cancer (EORTC), a standardized model (QLQ-C30) that assess several domains (Global Health, Physical function, Role functioning, Emotional Functioning, Cognitive functioning, social functioning and symptoms domain) and Brain cancer model (BN20) to assess symptoms to evaluate all aspects of wellbeing. Results: The total number of patients included in this study is 76 patients with no gender predilection. The most common brain tumor was meningioma by 40% followed by glioma/ others. More than half of the brain tumor patients had a WHO grade I (65%), intermediate grading grade II (15%) and higher grading grade III/IV (20%). The scales and measurements of functioning in life were low in all types of brain tumors. Conclusions: Quality of life in brain tumor patients seemed poor regardless of the type. Further prospective studies are needed to assess QoL worldwide.

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Pituitary apoplexy: a retrospective single center cohort study

E Parker (Halifax) SA Imran (Halifax) A Hebb (Halifax) N Kureshi (Halifax) DB Clarke (Halifax)*

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Background: Pituitary apoplexy is a rare clinical syndrome resulting from infarction or hemorrhage of a pituitary tumor. Here, we present a large single center retrospective cohort study of patients with apoplexy. Methods: Patients with symptomatic apoplexy treated from January 2000 to October 2022 were isolated from the Halifax Neuropituitary Program's database, containing prospectively entered data. Patients treated surgically typically presented with vision deterioration or decreased consciousness. Patient demographics, tumor size, endocrinologic values, and clinical outcomes were analyzed. Results: Eighty-three patients met our inclusion criteria. Seventy-two percent of tumours (n=60) were biochemically non-functioning adenomas. Sixty (72.3%) patients were treated surgically, while twenty-three (27.7%) were treated conservatively. At time of presentation, patients treated surgically had a tumor size in maximum dimension of 2.7±1.4 cm versus 1.6±0.5 cm for those treated conservatively (p=0.0003). There were no significant differences in endocrinological values at time of presentation between groups. Fifteen percent (n=9) of patients treated surgically underwent an additional surgery (mean 2.8±2.0 years from index), of which 67% (n=6) were secondary to tumor recurrence. Conclusions: This is one of the largest reported series of apoplexy with long-term follow up. A subset of surgically treated patients will require additional intervention, highlighting the importance of ongoing follow up in this population.

Other Neurosurgery

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Canadian neurosurgical healthcare spending trends

E Guo (Calgary) R Sanguinetti (Calgary) L Boone (St. John's) BS Karmur (Calgary) S Lama (Calgary) GR Sutherland (Calgary)*

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Background: Neurosurgical conditions impose a significant burden on the Canadian healthcare system. This study quantifies the economic impact and explores predictive models for postoperative length of stay. Methods: We analyzed data from the Canadian Institute for Health Information National Health Expenditure Trends database for 2015-2019, focusing on case volumes, healthcare costs, and lengths of stay (LOS) across age groups and conditions. Decision tree models were created to predict total LOS from patient age and average acute LOS. Results: There was a modest increase in case volumes from 6,220 ± 3,103 in 2015 to 6,492 ± 3,240 in 2018, with a slight decrease in 2019. The total estimated hospital costs ranged from 2.27 ± 0.38 million CAD in 2015 to 2.23 ± 0.44 million CAD in 2019. The highest costs were seen in the 18-59 age group, at 2.53 ± 0.43 million CAD. Decision tree models showed high accuracy for predicting LOS in cases like spinal injury (F1-score: 0.98) but were less accurate for interventions with trauma or complications (F1-scores from 0.66 to 0.97). Conclusions: The study delineates the financial demands of neurosurgery in Canada and suggests decision tree models as useful tools for predicting hospital stay, with variable accuracy depending on the case complexity.

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Endoscopic fenestration of trapped fourth ventricle

KM Libbus (Halifax) SA Walling (Halifax) ED Leck (Halifax) PD McNeely (Halifax)*

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Background: Trapped fourth ventricle (TFV) is a rare entity that occurs when the fourth ventricle is obstructed and isolated from the normal cerebrospinal fluid (CSF) circulation. While not always symptomatic, TFV can lead to compression of the cerebellum and brainstem, with potential for serious consequences. Treatment of TFV can be challenging, with options including CSF diversion via shunts versus open or endoscopic fenestrations. In this report, we describe a case of TFV that was managed endoscopically. Methods: A seven-year-old girl with a history of myelomeningocele and hydrocephalus, presented with a change in neurological status. Imaging of the brain and spine showed syringomyelia, markedly dilated ventricles, and a TFV. An endoscopic approach was used to fenestrate the wall of the

fourth ventricle. Results: While there was an early favorable outcome, the first fenestration closed over within one month, requiring a repeat endoscopic fenestration. Both procedures were complicated by transient seizures, requiring a pediatric intensive care unit (PICU) admission after the second intervention. Pre- and post-operative clinical and diagnostic imaging findings are reported. Conclusions: Endoscopic fenestration can be an effective treatment option for management of TFV. The patient, family, and treating team should be prepared to deal with acute peri-operative complications that may require PICU management.

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Comparison of interhemispheric and transcortical approaches for resection of colloid cysts of the third ventricle

S Benchekroun (Quebec) M Côté (Quebec) P Champagne (Quebec)*

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Background: Colloid cysts are rare benign lesions of the third ventricle that can cause hydrocephalus and intracranial hypertension. Their primary treatment is surgical removal. Although open surgery presents the best opportunity for total resection of the cyst, there is no consensus regarding the optimal choice between the interhemispheric and the transcortical approaches. We aim to compare these two approaches in regard of the radicality of excision, the recurrence rate, and the surgical imprint. Methods: Retrospective cohort study on all patients who underwent surgical resection of colloid cyst between 2003 and 2023 at CHU de Québec. Data on demographics, symptoms, complications, and imaging was gathered. Results: In a cohort of 28 patients (17 interhemispheric, 11 transcortical), the preliminary results demonstrate prolonging operative time (270min. vs. 187min.) and increasing blood loss (193cc vs 100cc) associated with the interhemispheric approach. Despite these results, the hospitalization duration remains similar (p=0.734). However, the interhemispheric approach results in significantly lower surgery-induced encephalomalacia (1.1cc vs. 4.4cc, p=0.006). Conclusions: The interhemispheric approach could lead to potentially lesser consequences due to the reduced volume of encephalomalacia left by the surgical intervention, at the cost of prolonged operating time and higher blood loss.

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Blood loss quantification and management strategies in cranial neurosurgery: a systematic review

DD George (Rochester) J Chrisbacher (Rochester) T Mattingly (Rochester)* T Schmidt (Rochester) K Walter (Rochester)*

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Background: Blood loss quantification and management are important facets of cranial surgery, having been linked with adverse outcomes if management is inadequate. While many studies report estimated blood loss (EBL) as an outcome measure, inconsistencies exist in EBL quantification and management strategies Methods: A systematic review of cranial surgery literature on blood loss measurement and management was conducted according to PRISMA guidelines utilizing a novel software platform, Nested Knowledge Results: Initial search yielded 1029 non-duplicated. 107 full-text studies were included. 70% of studies were retrospective. Most common treatment conditions were 41% craniosynostosis (44/107) and 36% tumor (39/107). Most common EBL measurement methods were comparison of pre-operative and post-operative hemoglobin/hematocrit in 46.7% (50/107), anesthesia record in 26.2% (28/107), and surgeon estimation in 9.3% (10/107). 53.3% of studies did not specify a quantification methodology. Blood loss management strategies also varied, with transfusion being the most common method in 64.5% (69/107) of studies Conclusions: EBL quantification and blood loss management remain important clinical and research metrics. Despite this, significant heterogeneity exists in blood loss quantification and management strategies, with most studies providing no data on EBL quantification. Standardization of EBL quantification/reporting should be undertaken to improve comparability and consistency across studies.

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Neurons in the lateral prefrontal cortex encode task features during virtual navigation

M Abbass (London) B Corrigan (London) R Johnston (Ottawa) R Gulli (New York) A Sachs (Ottawa) JC Lau (London) J Martinez-Trujillo (London)*

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Background: The lateral prefrontal cortex (LPFC) is uniquely found in primates and has been associated with contextual learning. This function is thought to be subserved by neurons that are tuned to abstract concepts and the combination of those concepts. LPFC neuron tuning remains to be fully investigated in naturalistic conditions. Methods: Two macaques were trained to perform a context-colour association task while using a joystick to navigate in an X-shaped maze. They were implanted with two 96-channel microelectrode arrays, targeting the LPFC. Mean firing rates were computed and multivariate linear regressions were used to determine tuning. Results: LPFC neurons were tuned to context (12.4%), color position (6.2%), target side (17.2%), and were selective to more than one feature (21.2%). LPFC neurons acquired tuning to task features in an ordered manner, starting with context (130.1±27.4ms), followed by the colour position (296.2±21.4ms) and then target side (493.3 ±19.3ms). Furthermore, most neurons (54%) changed their tuning over time. Conclusions: We demonstrate that single neurons can encode relevant features embedded in a naturalistic virtual environment. Our results support previous observations that LPFC neurons combine individual features and suggest that these features are also combined temporally. These findings contribute towards understanding the LPFC and have potential practical implications.