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Assessing the fragility index of randomized controlled trials on carotid artery stenosis: systematic review

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Background: The fragility index (FI) is the minimum number of patients whose status would have to change from a nonevent to an event to turn a statistically significant result to a non-significant result. We used this to measure the robustness of trials comparing carotid endarterectomy (CEA) to carotid artery stenting (CAS). Methods: A search was conducted in MEDLINE, Embase, and PubMed on RCTs comparing CEA to CAS. The trials need to have statistically significant results and dichotomous primary endpoints to be included. Results: Our literature search identified 10 RCTs which included 9382 patients (4734 CEA, 4648 CAS). The primary end points of all included trials favoured CEA over CAS. The median FI was 9.5 (interquartile range 2.25 - 21.25). All of the studies that reported lost-to-follow-up (LTFU) had LTFU greater than its fragility index, which raises concern that the missing data could change the results of the trial from statistically significant to statistically insignificant. Conclusions: A small number of events (FI, median 9.5) were required to render the results of carotid artery stenosis RCTs comparing CEA to CAS statistically insignificant. All of the studies that reported LTFU had LTFU greater than its fragility index.

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Cerebral AVM recurrence post gamma knife obliteration: a 20 year single centre retrospective analysis and review of literature

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Background: Pediatric arteriovenous malformations (AVMs) are rare, but represent the leading cause of intracranial hemorrhage in children. These are traditionally understood to be congenital lesions, however AVMs recurrence within previously unaffected tissue challenges this understanding. Recurrence after microsurgery and endovascular treatment have been studied in greater detail, but little literature exists surrounding recurrence after Gamma Knife Radiosurgery (GKRS). Methods: We performed a retrospective chart review of all pediatric AVMs treated with GKRS at our centre. Charts were assessed by two reviewers to identify cases of AVM recurrence after angiographically confirmed obliteration. To contextualize our institutional patterns, we also performed a structured literature review of published data reporting pediatric AVM recurrence after GKRS. Results: Our institutional review revealed two cases of AVM recurrence after angiographically proven cure, and our review of literature identified nine retrospective reviews and three case reports, which in total reported 22 individual cases of recurrence. The recurrence rate in the retrospective reviews ranged from 0 to 18%. Conclusions: The current work illustrates that while AVM recurrence is rare, it is a possible complication of GKRS. There was also a qualitative suggestion that embolization prior to CT increased risk of recurrence. Both these facts should be included in decision-making and patient counselling.

OTHER MULTIDISCIPLINARY

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An unlikely impersonator of primary brain tumours: Illustrative case report and literature review of primary angiitis of the central nervous system

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Background: Primary angiitis of the central nervous system (PACNS) is a rare inflammatory condition affecting the parenchymal and leptomeningeal vessels of the CNS. PACNS presenting as a solitary mass lesion (ML-PACNS) constitutes a rare subtype of this pathology. Herein we present the first case reported in Canada of ML-PACNS, presenting with clinical and radiographic findings consistent with a high grade glial neoplasm, as well as a review of the literature on ML-PACNS. Methods: Review of the literature from 1987-2023 was conducted using PubMed to identify features of ML-PACNS and possible treatment paradigms. Results: A number of case reports of ML-PACNS were identified, as well as 6 retrospective analyses of a total of 67 patients. Features such as faster rate of symptom onset, and investigations such as MRI vessel-wall imaging and MR spectroscopy were suggested for identification of ML-PACNS. Treatment was highly variable, but followed guidelines for other neuroinflammatory disorders. Conclusions: Preoperative differentiation between ML-PACNS and CNS neoplasms is difficult due to their similar clinical and radiographic features. However, making this distinction is crucial as PACNS mass lesions can regress entirely with immunosuppressive therapy, potentially obviating the requirement for surgical intervention. Beyond diagnostics, further research is required to establish and validate a treatment paradigm.

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Quality of life (QoL) using EORTC QoL-C30 and BN20 among patients who underwent brain tumor resection in a tertiary hospital in Saudi Arabia

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Background: Quality of life (QoL) is the awareness of individuals' well-being in life in physical, personal, mental and social

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

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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

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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

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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