the low accuracies of individual serum markers, we have proposed the use of an integrated, multi-platform approach to biomarker discovery. Methods: A cohort of 107 glioma plasma samples, including 30 pairs, underwent plasma proteomic, consisting of a panel of serum proteins (FABP4, GFAP, NFL, Tau and MMP3,4 &7) quantified through ultrasensitive electrochemiluminescence multiplexed immunoassays, and plasma DNA methylation analysis, captured through cell-free methylated DNA immunoprecipitation and high-throughput sequencing. Results: Unsupervised hierarchal clustering revealed robust separation of primary and recurrent tumors through plasma proteomics, associated with a distinct plasma methylation signature. NFL, Tau and MMP3 levels differed between primary and recurrent samples; pair-wise analysis revealed increased in NFL and Tau concentrations upon recurrence. Tau levels predicted outcome independent of WHO Grade and IDH status. A predictive model created through the integration of the proteomic and methylation signatures revealed an AUC of 0.83. Conclusions: The combination of DNA methylation and plasma proteomics showcases that an integrative approach may improve the ability of these techniques for the serial monitoring of gliomas patients.

P.103

Automated pituitary adenoma segmentation for radiosurgery with deep learning-based model

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Background: Pituitary adenomas are treated with endoscopic surgery, while stereotactic radiosurgery addresses complex cases. Our study highlights AI's role in accurate segmentation, improving treatment planning workflow efficiency Methods: In a retrospective study at Na Homolce Hospital (January 2010 to October 2022), SRS for pituitary adenomas was analyzed. Data were split 80:20 for training and validation. Using nnU-net, a medical image segmentation tool, a model predicted precise tumor, optic nerve, and pituitary gland segmentation. Accuracy was evaluated quantitatively with Dice similarity coefficient and qualitatively by human experts. The study explored the impact of tumor volume and hormonal activity status on segmentation accuracy. Results: The study comprised 582 and 146 patients in training and validation sets, respectively. The model achieved Dice similarity coefficients of 83.1% (tumor), 62.9% (normal gland), and 78.0% (optic nerve). Expert assessments deemed 41% directly applicable, 31.5% needing minor adjustments, and 27.4% unsuitable for clinical use. Larger tumor volume and non-functioning adenomas correlated with higher accuracy. Including T2 weighted scans improved DSC for optic nerve and normal gland. Conclusions: The study showcases deep learning's potential in automating pituitary adenoma segmentation from MRI data, particularly excelling in large, hormonally inactive macroadenomas. Encourages collaborative use with clinicians for improved neurosurgical patient care.

Neurocritical Care

P.104

Prognostic value of NIRS regional oxygen saturation based cerebrovascular reactivity in TBI: a Canadian high resolution traumatic brain injury (CAHR-TBI) cohort study

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Background: Near-infrared spectroscopy regional cerebral oxygen saturation (rSO_2) has gained interest as a raw parameter and as a basis for measuring cerebrovascular reactivity (CVR). This study aimed to identify threshold values of rSO_2 and rSO_2 based CVR at which outcomes worsened following traumatic brain injury (TBI). Methods: A retrospective multi-institutional cohort study was performed. The cerebral oxygen indices, COx (using rSO_2 and cerebral perfusion pressure) as well as COx_a (using rSO_2 and arterial blood pressure) were calculated for each patient. 2x2 tables were created grouping patients by alive/dead and favorable/unfavorable outcomes at various thresholds of COx and COx_a as well as rSO_2 itself. Chi-square values were calculated to identify the most discriminative significant threshold. Results: In the cohort of 129 patients rSO_2 did not have any statistically significant threshold value. For COx and COx_a, an optimal threshold value of 0.2 was identified for both survival and favorable outcomes with values above this associated with worse outcomes. Conclusions: In this study, raw $rSO_2$was found to contain no significant prognostic information. However, rSO_2 based indices of CVR, were found to have a uniform threshold of 0.2, above which clinical outcomes worsened. This study lays the groundwork to transition to less invasive means of continuously measuring CVR.

Neuroimaging

P.105

Corpus callosum changes in children affected by infantile hydrocephalus

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Background: Infantile hydrocephalus is characterized by an atypical accumulation of cerebrospinal fluid in the brain, diagnosed and treated before the age of 2 years. Hydrocephalus development is linked to thinning of the corpus callosum (CC), mainly due to the expansion of lateral ventricles, causing upward

elevation and compression of periventricular and subcortical white matter. Methods: This study investigates structural alterations in the CC in children diagnosed with infantile hydrocephalus. We examined both macrostructural and microstructural facets of the CC, providing insights into the nature and extent of alterations associated with this condition. 18 patients with infantile hydrocephalus (mean age = 9 years), and 18 age and sex matched typically-developing healthy children, participated in the study. Structural magnetic resonance imaging and diffusion tensor imaging were utilized to assess CC volume and microstructure, respectively. Results: Our findings reveal reductions in CC volume, particularly in posterior area, and distinct microstructural disparities, notably pronounced in these same segments. Conclusions: Investigating these structural alterations provides an understanding into the mechanisms underlying the effects of infantile hydrocephalus on CC integrity, given its role as a neural bridge. This knowledge offers a more nuanced perspective on neurological disorders and underscores the significance of investigating the CC's health in such contexts.

P.106

Using optic nerve sheath diameter over ventricular size to assess elevated intracranial pressure in pediatric patients with pineal region tumors

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Background: Pineal region tumors are a heterogenous group of pathologies often symptomatic due to occlusive hydrocephalus leading to elevated intracranial pressure (ICP). High ICP may not always be associated with clinical signs. A non-invasive technique for assessment of ICP is measuring the optic nerve sheath diameter (ONSD). The goal of this study was to determine the utility of preoperative and postoperative ONSD measurements for assessment of elevated ICP in children with pineal region tumors. Methods: Retrospective data analysis was performed in patients operated for pineal region tumors at our tertiary care center between 2003 and 2022. Preoperative and postoperative MRI scans were reviewed. Clinical data and ONSD at multiple time points were analyzed and correlated. Results: Thirty-four patients with forty operative cases met the inclusion criteria. Hydrocephalus was seen in 80% of patients preoperatively (n=32/40). Presence of hydrocephalus was associated with significantly elevated ONSD preoperatively (p=0.006) and postoperatively (p=0.017). There was significant decrease in ONSD immediately postoperatively (p<0.001), at 3 months (p<0.001) and 12 months (p<0.001). In patients without hydrocephalus, no significant changes in ONSD were observed (p=0.369). Conclusions: ONSD is a useful adjunct for the identification of high ICP preoperatively and evaluation of treatment response postoperatively in patients presenting with pineal region tumors.

P.107

How often does digital subtraction angiography change management in CT angiogram negative subarachnoid hemorrhages?

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Background: Subarachnoid hemorrhages (SAH) are emergencies that require expedient workup. While Aneurysms and vascular malformations are a common cause, a subset of cases may lack detectable structural causes. If a CT angiogram (CTA) is negative, the more invasive Digital Subtraction Angiogram (DSA) is used for diagnosis. It is unclear how often DSA alters treatment for CTA negative SAHs. Methods: A retrospective review of SAH patients from our institution (Vancouver General Hospital) with a negative CTA with subsequent DSA in the past 25 years. Results: Our preliminary analysis included 233 patients. The median age was 55. 105 (45%) were female, and 128 (55%) were male. The average length of hospitalization was 9.6 days, and 226 (97%) were discharged alive. The median number of CTAs and DSAs administered were 2 and 1 respectively. In 12 (5%) cases, DSA detected an abnormality not seen on CTA, which led to endovascular or open surgery treatment in 5 (2%) cases. 5 DSA procedures led to complications including transient neurologic changes and ischemia. Conclusions: In SAH patients with CTA negative scans, additional DSA testing identified actionable pathology in only a small minority of cases. Clinicians must weigh the benefit of DSAs in these cases.

P.108

Rate and clinical utility of early postoperative CT head in adult craniotomy

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Background: Postoperative cranial neurosurgical imaging practices are highly variable. We evaluated the rate and utility of early postoperative computed tomography (EPCT, defined as a CT head scan within 24h of surgery) in consecutive adult craniotomies. Methods: We retrospectively reviewed consecutive adult craniotomies at the University of Alberta Hospital over a 45-day period (17/09/2022 to 01/11/2022). Electronic medical records were reviewed to extract data on the rate, timing, and utility of EPCT as well as the rate of neurologic deterioration and repeat surgical intervention. Results: A total of 56 patients (27 female; 55.5 ± 2.1 yrs, range: 19-84 years) were identified. All patients underwent EPCT, including 10/56 (17.9%) on POD0 and 46/56 (82.1%) on POD1. Surgical complications (bleeding, extensive pneumocephalus, edema, ischemia) were identified in 8/56 (14.3%) of the EPCT, of which 6 (10.7%) were reported to