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.

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

N Balasubramaniam (Laval) M Cerny (Praha) J May (Praha) L Hamackova (Praha) J Novotnyml (Prague) D Barucic (Prague) J Kybic (Prague) M Majovsky (Praha) H Hallak (Riyadh) R Liscak (Prague) D Netuka (Praha)*

doi: 10.1017/cjn.2024.206

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

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

A Gomez (Winnipeg) L Froese (Winnipeg) D Griesdale (Vancouver) EP Thelin (Stockholm) R Raj (Helsinki) L van Iperenburg (Maastricht) J Tas (Maastricht) M Aries (Maastricht) KY Stein (Winnipeg) C Gallagher (Calgary) F Bernard (Montreal) AH Kramer (Calgary) FA Zeiler (Winnipeg)*

doi: 10.1017/cjn.2024.207

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

D Adil (London) E Duerden (London) R Eagleson (London) S de Ribaupierre (London)*

doi: 10.1017/cjn.2024.208

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

https://doi.org/10.1017/cjn.2024.206 Published online by Cambridge University Press