Unsupervised clustering methods were used to define two distinct molecular subgroups of VS which were explored using computational techniques including bulk deconvolution analysis, gene pathway enrichment analysis, and drug repurposing analysis. Methylation data from two other cohorts were used to validate our findings. Results: A total of 75 tumours were analyzed. Consensus clustering and similarity network fusion defined two subgroups ("immunogenic" and "proliferative") with significant differences in immune, stroma, and tumour cell abundance. Gene network analysis and computational drug repurposing found critical differences in targets of immune checkpoint inhibition PD-1 and CTLA-4, the MEK pathway, and the epithelial-to-mesenchymal transition program with associated candidate drug targets, suggesting a need for subgroup-specific treatment/trial design in the future. Conclusions: We leverage computational tools with multi-omic molecular data to define two robust subgroups of vestibular schwannoma with differences in microenvironment and therapeutic vulnerabilities.

F.3

Comprehensive multiplatform analysis of CDKN2A alterations in meningiomas

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Background: In meningiomas, CDKN2A/B deletions are associated with poor outcomes but are rare in most cohorts (1-5%). Large molecular datasets are therefore required to explore these deletions and their relationship to other prognostic CDKN2A alterations. Methods: We utilized multidimensional molecular data of 560 meningiomas from 5 independent cohorts to comprehensively interrogate the spectrum of CDKN2A alterations through DNA methylation, copy number variation, transcriptomics, and proteomics using an integrated molecular approach. Results: Meningiomas with either CDKN2A/B deletions (partial or homozygous loss) or an intact CDKN2A gene locus but elevated mRNA expression ($CDKN2A^{high}$) both had poor clinical outcomes. Increased CDKN2A mRNA expression was a poor prognostic factor independent of CDKN2A deletion. CDKN2A expression and p16 protein increased with tumor grade and more aggressive molecular and methylation groups. $CDKN2A^{high}$ meningiomas and meningiomas with CDKN2A deletions were enriched for similar cell cycling pathways dysregulated at different checkpoints. p16 immunohistochemistry was unreliable in differentiating between meningiomas with and without CDKN2A deletions, but increased positivity was associated with increased mRNA expression. $CDKN2A^{high}$ meningiomas were associated with gene hypermethylation, Rb-deficiency, and lack of response to CDK inhibition. Conclusions: These findings support the role of CDKN2A mRNA expression as a biomarker of clinically aggressive meningiomas with potential therapeutic implications.

F.4

Relationship between poor postoperative pain control and surgical outcomes after elective spine surgery

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Background: Inadequate pain control after spine surgery is common, but its impact on long-term surgical outcomes has not been studied. Accordingly, this study aimed to investigate the relationship between poor postoperative pain control and surgical outcomes. Methods: Consecutive adult patients undergoing elective spine surgery were enrolled. Poor surgical outcome was defined as failure to achieve a minimal clinically important difference (MCID) of 30% improvement on the Oswestry Disability Index or Neck Disability Index at follow-up (3-months, 1-year, 2-years). Poor pain control was defined as a mean numeric rating scale score of >4 within 24-hours postoperatively. Univariable analyses followed by multivariable random-effects models were used, after adjusting for known risk factors that impact surgical outcomes. Results: 42.8% of 1305 patients failed to achieve MCID at follow-up. 56.9% had poor postoperative pain control. Poor pain control was independently associated with failure to achieve MCID (OR 2.15 [95%CI=1.42-3.25], $p<0.001$), after adjusting for age ($p=0.15$), sex ($p=0.59$), PHQ-9 score ($p=0.030$), ASA physical status >2 ($p<0.001$), ≥3 motion segment surgery ($p=0.003$), revision surgery ($p=0.032$), and follow-up time ($p<0.001$). Conclusions: Poor pain control 24-hours after elective spine surgery was an independent risk factor for poor surgical outcome. Perioperative strategies to improve pain control may lead to improved outcomes.

F.5

Spinal column and spinal cord injuries secondary to mountain biking accidents: a 15-year review at a provincial spine referral centre

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Background: Mountain biking (MTB) is an increasingly popular sport that has been associated with serious spinal injuries, which can have devastating effects on patients and significant impacts on healthcare resources. Herein, we characterized the occurrence of these MTB spinal injuries over a 15-year period and analyzed the affiliated acute-care hospital costs. Methods: Patients seen at Vancouver General Hospital for MTB spinal injuries between 2008-2022 were retrospectively reviewed. Demographics, injury details, treatments, outcomes, and resource requirements for acute hospitalization were collected. The Canadian Institute for Health Information was referenced for cost analysis. Results: Over the 15 years of analysis, 149 MTB spinal injuries occurred. The majority (87.2%) were male. 59 (39.6%) were associated with spinal cord injury; most of these were in the cervical spine (72.3%) and majority were AIS

Grade A (36.1%). 102 patients (68.5%) required spine surgery; 26 (17.4%) required intensive care; 34 (22.8%) required inpatient rehabilitation. Mean length of stay was 13.5 days and acute admission costs for the healthcare system averaged $35,251 (95% CI $27,080-$43,424). Conclusions: MTB spinal injuries are associated with significant medical, personal, and financial burden. As injury prevention remains paramount, further investigation of the roles of education and safety measures is recommended.

F.6

Cranial neurosurgery medicolegal cases in Canada: a ten-year analysis of Canadian Medical Protective Association (CMPA) data

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Background: Neurosurgery is a high-risk specialty with a low margin of error. We aim to assess the risk of neurosurgeons being involved in medicolegal cases in Canada. Methods: This retrospective descriptive study evaluated ten years (2012-2021) of closed legal cases, college cases, and hospital complaints against neurosurgeons with data from the CMPA. Included cases were cranial cases, VP shunts, or cases where a catheter or wire was inserted into the brain. Cases excluded angiography, radiation, ultrasound, or percutaneous procedures. Results: We identified 77 cases (66 urgent or emergent). Neurosurgeons had a significantly higher medicolegal risk than the CMPA surgeon membership, however lower risk compared to all physician specialties. Legal cases accounted for 69% with favourable outcomes in 52%. Forty-one cases involved post-operative complications and 16 cases involved VP shunts. Multiple surgeons or residents could be involved spanning age groups and years in practice. Thirty-four cases had a harmful incident, 41% of these severe. The majority of cases occurred at urban centers. The average case duration was 41 months. Conclusions: This study provides a recent medicolegal analysis of cranial neurosurgery in Canada. We identified areas of common complaints and hope the data can be used to mitigate risk surgical risk in the future.

POSTER PRESENTATIONS

Adult Neurology (CNS/CSC)

Dementia and Cognitive Disorders

P.001

Application of low-intensity transcranial focused unltrasound to the hippocampus in Alzheimer's Disease

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Background: The purpose of this study was to evaluate the safety and efficacy of low-intensity tFUS under the threshold for BBB disruption in patients with AD. In addition, we assessed changes in the regional cerebral metabolic rate of glucose (rCMRglu) using F-18 fluoro-2-deoxyglucose positron emission tomography (FDG-PET) and cognitive function after tFUS. Methods: Eight AD patients were recruited. We applied low-intensity tFUS to the right hippocampus for 3 minutes using an image-guided tFUS system. For multi-modal neuroimaging guidance, MRI and CT data were spatially co-registered using the maximization of normalized mutual information. The subjectspecific coordinates of the hippocampus in the right hemisphere were identified as the tFUS target location. Results: Radiological evidence of contrast enhancement associated with BBB opening was not found in neither the visual inspection nor the ICA of the DCE-MRI data. No adverse events were observed during the hospitalization and follow-up outpatient visits for 5 to 24 months. The immediate recall and recognition memory on the SVLT were significantly improved after the sonication. The PET analysis showed the increased level of rCMRglu in the right hippocampus. Conclusions: Application of low-intensity tFUS to the hippocampus with MB did not open blood brain barrier but increased hippocampal glucose metabolism and memory function.

P.002

Increased epileptiform activity during N2 and slow wave sleep in Alzheimer's Disease

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Background: Recent evidence shows that epileptiform activity (EA) in sleep can present early in Alzheimer's Disease (AD) with faster cognitive decline. Existing literature examining sleep, AD and seizures is mostly qualitative. We conducted a systematic review to quantify the sleep stage most associated with EA in AD and amnestic mild cognitive impairment (aMCI)Methods: We searched MEDLINE and Embase using MeSH terms: "Alzheimer's Disease" AND "Epilepsy" OR "Seizures'' AND "Sleep" OR "REM" (rapid eye movement sleep). We extracted data to determine the EA distribution across sleep stages. We averaged percentages across studies. If a study had AD and aMCI subgroups, we averaged percentages to represent that study. Results: 4/14 articles had quantitative sleep stage EA data from a total of 111 AD or aMCI patients. Most EA occurred in the non-REM stage (N2; 36.1±17.8%). EA next most frequently occurred in slow-wave sleep (SWS; 34.1±9.9%), N1 (15.5±6.7%), and REM (14.4±11.6%). Conclusions: N2 and slow-wave sleep were most associated with sleep EA in AD or aMCI. This suggests the importance of therapeutic interventions that may decrease N2 and slow-wave sleep and increase REM. Future studies could explore whether it is the quantity or quality of the N2 and slow-wave sleep that is associated with EA.