

PLATFORM PRESENTATIONS

GRAND PLENARY ABSTRACTS

GP.01

CNSS K.G. MCKENZIE MEMORIAL PRIZE IN BASIC NEUROSCIENCE RESEARCH

Quantification of computational geometric congruence in surface-based registration for spinal intra-operative three-dimensional navigation

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Background: Computer-assisted navigation (CAN) may guide spinal instrumentation, and requires alignment of patient anatomy to imaging. Iterative-Closest-Point algorithms register anatomical and imaging datasets, which may fail in the presence of significant geometric congruence leading to inaccurate navigation. We computationally quantify geometric congruence in posterior spinal exposures, and identify predictors of potential navigation inaccuracy. *Methods:* Midline posterior exposures were performed from C1-S1 in four human cadavers. An optically-based CAN generated surface maps of the posterior elements at each level. Maps were reconstructed to include bilateral hemilamina, or unilateral hemilamina with/without the base of the spinous process. Maps were fitted to symmetrical geometries (cylindrical/spherical/planar) using computational modelling, and the degree of model fit quantified. *Results:* Increased cylindrical/spherical/planar symmetry was seen in the subaxial cervical spine relative to the high-cervical and thoracolumbar spine ($p < 0.001$). Inclusion of the base of the spinous process decreased symmetry independent of spinal level ($p < 0.001$). Registration with bilateral vs. unilateral hemilamina did not significantly reduce geometric symmetry. *Conclusions:* Geometric congruence is most evident at C1 and the subaxial cervical spine, warranting greater vigilance in navigation accuracy verification. At all levels, inclusion of the base of the spinous process in unilateral registration decreases the likelihood of geometric symmetry and navigation error.

GP.02

CNSS K.G. MCKENZIE MEMORIAL PRIZE IN CLINICAL RESEARCH

Resting state functional connectivity: a biomarker for pre-operative cognitive function and cognitive outcome following surgery in patients with diffuse glioma

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Background: Resting state functional connectivity (RSFC) in the fronto-parietal network (FPN) has been associated with cognitive ability. For this reason, it was hypothesized that RSFC connectivity of the FPN would be related to cognition in patients with diffuse glioma. To assess this relationship, pre-operative cognitive status was correlated to patient specific connectivity within the FPN. Further, we assessed

whether RSFC could predict neuropsychological outcome following surgery. *Methods:* Sixteen patients with diffuse glioma underwent neuropsychological assessment and pre-operative task and resting state fMRI. Thirteen had post-operative cognitive assessment at one-month post-surgery. RSFC in a subject-specific FPN was correlated with pre- and post-operative cognitive scores. *Results:* Higher connectivity within the FPN was associated with lower composite cognitive scores, while higher connectivity of the parietal node of the tumor-affected hemisphere was associated with lower fluid cognition but not crystallized cognition. Higher connectivity values between the parietal node of the healthy hemisphere and the rest of the FPN was associated with better neuropsychological outcome one month after surgery. *Conclusions:* RSFC between key nodes of the FPN is associated with cognitive performance in patients with diffuse glioma and is a promising biomarker for cognitive outcome following surgery.

GP.03

CNS FRANCIS McNAUGHTON MEMORIAL PRIZE

Outcomes after gastrostomy tube placement in patients with acute stroke: A 10-year population-based study using the Ontario Stroke Registry

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Background: Dysphagia is a common and devastating complication after acute stroke. Percutaneous endoscopic gastrostomy (PEG) tubes are often placed for persistent dysphagia. However, little is known regarding outcomes after PEG tube placement. *Methods:* We used a 10-year Ontario Stroke Registry to shed light on the clinical outcomes of patients with PEG tube insertion after ischemic stroke or intracranial hemorrhage compared to patients with only NG tubes, including rate of pneumonia, disability, and mortality. *Results:* Using propensity score matching, 1,793 patients were successfully matched and had similar baseline characteristics. Compared with NG, patients with PEG had a higher rate of pneumonia (32.6% vs. 20.6%; RR 1.59), higher disability at discharge (modified Rankin Scale Score 3-5; 74.0% vs. 65.4%; RR 1.13), and higher rate of long-term care placement (27.1% vs. 9.3%; RR 2.9). From stroke onset, there was a lower rate of death in patients with PEG compared to NG at 30 days (15.3% vs. 34.3%; RR 0.45) but no difference at 2 years (52.8% vs. 53.5%; RR 0.99, $p = 0.71$). *All significant $p < 0.0001$. *Conclusions:* In conclusion, PEG tube placement after stroke may prolong survival in patients with poor outcomes. Our study provides a framework for discussions between physicians, patients, and families with regards to expected prognosis after PEG tube placement.