seamlessly string together morphemes to express complex ideas and concepts during language production, the precise contributions of individual cortical areas to this process remains largely unknown. Here, we aimed to provide a systematic investigation of these fundamental constructs of human language and establish a detailed circuit-based model of their dysfunction.

METHODS: We used a multi-modal approach that combined time-resolved cortical stimulation, intracranial neural recordings, and fMRI lesion evaluation in human subject undergoing planned intraoperative neurophysiology.

RESULTS: Here, we identify a small region below the temporal-parietal junction (TPJ), within Wernicke’s area, wherein inhibition selectively impairs the ability to morpho-syntactically inflect-to-be-spoken words but does not affect their lexical and semantic retrieval, comprehension or articulation. Within individuals, this selectivity is abruptly lost within 1 cm above the TPJ. Further, neural recordings reveal localized encoding of morphological properties below the TPJ. Lastly, focal gray-matter loss in this region results in a selective morpho-syntactic deficit.

CONCLUSION: These data reveal a new segregation of linguistic function across the left TPJ, and demonstrate that syntactic processing constitute a functionally and anatomically discrete step in the series of computations essential for the production of speech.

316 Extent of Resection and MGMT Promoter Methylation Status are Independent Risk Factors in IDH1_R132H Wild-type Primary Glioblastomas

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INTRODUCTION: Previous pivotal studies on the influence of extent of resection (EOR) in primary glioblastoma (GBM) have failed to incorporate molecular tumor markers, so the impact of extensive surgical approaches in the light of MGMT methylation and/or IDH mutation status is unclear.

METHODS: We retrospectively analyzed our prospectively collected database of patients undergoing surgery for newly diagnosed GBM WHO IV and included only IDH1_R132H wild-type patients. All patients had volumetric assessment of EOR and received adjuvant treatment according to local tumor board recommendation and patient preference. We hypothesized that gross total resection was associated with better outcome. This analysis was approved by our local ethics committee.

RESULTS: 175 patients (median age: 60 years) were included. Median overall survival (OS) was 18.0 months. MGMT promoter methylation was present in 80 patients (45.7%). Complete removal of contrast-enhancing tissue (CRET) was achieved in 104 patients (59.4%). Median overall survival (OS) was 18.0 months. MGMT promotor methylation was associated with PFS (HR 1.60; 95% CI, 1.14-2.24; P = 0.006) and OS (HR 1.81; 95% CI, 1.51-3.19; P < 0.0001). No significant outcome differences were observed between non-MGMT methylated patients undergoing CRET, and non-CRET, MGMT methylated patients (P = 0.726; OS: P = 0.477).

CONCLUSION: Both CRET and MGMT promoter methylation are independent prognostic factors for improved OS and PFS. Our study incorporates molecular markers and our data highlight the importance of aggressive surgical approaches. If achieved, CRET might compensate for the biological disadvantage of lacking MGMT promoter methylation.

317 Cost-Effectiveness of a Novel Cervical Spine Clearance Protocol: Obviating the Need for Routine Magnetic Resonance Imaging

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INTRODUCTION: Cervical spine injury (CSI) occurs in 2–4% of trauma patients in the USA causing significant decrements in quality of life and even death. Treatment of CSI is estimated to cost $9.7 billion annually. Computed tomography (CT) has an almost 100% negative predictive value (NPV) for cervical spine (c-spine) clearance, in both alert and obtunded patients. However, MRI can depict occult discoligamentous injury in some patients with negative CT scans. It remains unclear whether MRI findings should preclude c-spine clearance and prolong hospital stay. This review intends to critically assess CT-missed CSI patients and derive a safe, economically sustainable protocol for c-spine clearance.

METHODS: A retrospective review of prospectively collected CSI data from two, level-1 trauma centers, was conducted from 2015–2016. Primary outcome measures include: NPV and the incremental cost-effectiveness ratio (ICER) of a novel c-spine clearance protocol compared with standard of care. The protocol included thin-cut CT scans with either weight-bearing or flexion-extension films. The ICER was calculated using standard cost-utility analysis techniques in US dollars ($) per quality-adjusted-life-year (QALY), assuming a willingness-to-pay threshold of 50,000$/QALY.

RESULTS: A total of 614 patients were reviewed. Mean age was 38.3 years (SD 18.6), 147 (23.9%) had altered mentation, and 12 (2%) had clinically meaningful CT-missed acute discoligamentous disruption. Our c-spine clearance protocol had a NPV of 99.8% (CI 96.5-100%). There was no statistically significant difference between awake and obtunded patients (P = 0.74). Mean time to c-spine clearance improved by 1.3 days (SD 0.9). Duration of c-spine immobilization was reduced by 930 person-days. Mean cost savings was $1230 (SD $242) per patient. Mean change in QALY was 0.02 (SD 0.01). The ICER was 61,500$/QALY.

CONCLUSION: Our novel CSI clearance protocol is both safe and highly cost-effective. It improves outcomes at less cost, making it a dominant strategy that centers should consider implementing.

318 Study of the Clinical, ECG and Biochemical Spectrum of Cardiovascular Complications in Patients of Aneurysmal Subarachnoid Haemorrhage An Initial Experience at a Tertiary Centre in India

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INTRODUCTION: Subarachnoid haemorrhage (SAH) following aneurysmal rupture is an extremely fatal condition with mortality as high as 45%. Apart from the intra-cranial causes, there are cardiovascular events which add to the morbidity and mortality. Eg: myocardial ischemia, arrhythmia and heart blocks. These can manifest with deranged cardiac biomarkers. However, quantitative assessment of these biochemical markers and its correlation with prognosis in patients of aneurysmal SAH has not been adequately studied.

METHODS: After obtaining ethical clearance, we conducted a prospective observational study in our department. The study included all patients of aneurysmal SAH with ictus less than 48 hours at the time of admission. Excluded were patients with past history of coronary artery disease or cardiac surgery. The patient’s heart rate, blood pressure, pupillary response, GCS Score, any neurodeficits, cranial nerve palsies, Hunt and Hess/WFNS grade of SAH were noted on admission. Serum cardiac enzymes (Troponin T, Total creatine phosphokinase, cardiac specific creatine phosphokinase), serum brain natriuretic peptide (BNP) and C reactive protein levels were done for 6 consecutive days from the day of admission. Patient also underwent a 12 lead ECG and 2D Echocardiography on days 0, 1 and 5.

RESULTS: Serum levels of troponin T, total creatine phosphokinase and BNP were statistically associated with outcome. Abnormal levels of these markers were associated with a poor outcome. ECG abnormalities were observed in 76% of the cases. Prolonged QTc interval was the most common abnormal ECG finding among the patients who died. One patient developed 3rd degree heart block following aneurysmal SAH and another patient developed left ventricular dysfunction with an ejection fraction of 40%.

CONCLUSION: Cardiovascular complications are common in patients of aneurysmal SAH. Serum quantitative levels of Troponin T, total creatine phosphokinase and BNP show statistical significant association with outcome and can be incorporated in the battery of tests in SAH patients for predicting outcome.

319 Determining the Role of Informed Consent Allegations in Spinal Surgery Medical Malpractice
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INTRODUCTION: Predictive factors associated with increased risk of medical malpractice litigation have been identified including severity of injury, physician sex and error in diagnosis. However, there is a paucity of literature investigating informed consent in spinal surgery malpractice. Our objective was to highlight the failure to obtain informed consent as an allegation in medical malpractice claims for patients undergoing spine-surgery.

METHODS: This was a retrospective case-control study using a national medico-legal database westlaw next. We identified a total of 233 patients (80 with no informed consent allegation, 153 who cited lack of informed consent) who underwent spinal surgery and filed a malpractice claim were studied.

RESULTS: The most common informed consent allegations were failure to explain risks/side effects of surgery (30.4%) and failure to explain alternative treatment options (9.9%). In bivariate analysis, patients in the control group were more likely to require additional surgery (56.3% vs 34.6%, P = 0.002) and suffer from more permanent injuries compared to the informed consent group (P = 0.033). On multivariable regression analysis, permanent injuries were more often associated with indemnity payment following a plaintiff verdict (OR 3.12, 95% CI 1.46 - 6.65, P = 0.003) or a settlement (OR 6.26, 95% CI 1.06 - 36.70, P = 0.042). Informed consent allegations were significantly associated with less severe (temporary/emotional) injury (OR 0.52, 95% CI 0.28 - 0.97, P = 0.043). Additionally, allegations of informed consent were found to be predictive of a defense verdict versus a plaintiff ruling (OR 0.41, 95% CI 0.17 - 0.98, P = 0.046) or settlement (OR 0.01, 95% CI 0.001 - 0.15, P < 0.001).

CONCLUSION: Lack of informed consent is an important cause for medical malpractice litigation. Although associated with a lower rate of indemnity payments, malpractice lawsuits including informed consent allegations still present a time, money, and reputation toll for physicians.

320 The Identification of a Subgroup of Children with Traumatic Subarachnoid Hemorrhage at Low Risk of Neuroworsening
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INTRODUCTION: Pediatric traumatic subarachnoid hemorrhage (tSAH) often results in intensive care unit (ICU) admission, the performance of additional diagnostic studies, and ICU-level therapeutic interventions to identify, and potentially prevent, episodes of neuroworsening (NW). Identification of a subgroup of children with tSAH at negligible risk for NW may avoid unnecessary escalation of care and potentially morbidity interventions, with improvement in healthcare utilization.

METHODS: Data prospectively collected in an institutionally-specific trauma registry at Rady Children’s Hospital between 2006–2015 was supplemented with a retrospective chart review of children admitted with isolated tSAH. Risk of blunt cerebrovascular injury (BCVI) was calculated using the BCVI clinical prediction score. Appropriate statistical analysis was performed.

RESULTS: 317 of 10,395 total pediatric trauma patients were admitted with tSAH. 51(16%), 23 female, 28 male children were identified with isolated tSAH without midline shift on neuroimaging and a GCS of 13–15 at presentation. Median age was 4 years (18 days -15 years). 7 had modified Fisher grade 3 SAH; the remainder were grade 1. 26 (51%) had associated skull fractures; 4 involved the petrous temporal bone and 1 the carotid canal. 39 (76.5%) were admitted to the ICU; 12 (23.5%) to a standard surgical ward. 4 had an elevated BCVI score. 8 underwent CT angiography and no vascular injuries were identified. 6 were administered hypertonic saline in the ICU. The average length of stay for ICU patients was 77% longer (2.02 vs. 1.25 days). NW was not observed in any child.

CONCLUSION: Children with isolated tSAH without midline shift and GCS 13–15 at presentation appear to have minimal risk of NW, despite the finding in some children of vertex and basilar skull fractures, elevated modified Fisher grade, and elevated BCVI score. In this specific subgroup of children with tSAH, ICU-level care and additional ancillary diagnostic imaging may not be warranted.