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 foci lesion evaluation in human subject undergoing planned intraoperative neurophysiology.

RESULTS: Here, we identify a small region below the temporoparietal 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

Florian Gessler, MD; Anne Braczynski, MD; Stephanie Tritt, MD; Peter Baumgarten, MD; Patrick Harter; Joshua Bernstock, MSc, MPH; Tianxia Wu, PhD; Michel Mittelbronn, MD; Volker Seifert, MD, PhD

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 4IV 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%). In Cox regression analysis, both MGMT-promoter methylation (HR 1.55; 95% CI, 1.01-2.19; \(P = 0.013\)) and CRET (HR 1.48; 95% CI, 1.06-2.07; \(P = 0.020\)) were significantly associated with favorable progression-free survival (PFS). Further, both MGMT promoter methylation (HR 2.13; 95% CI, 1.45-3.12; \(P = 0.0001\)) and CRET (HR 1.81; 95% CI, 1.24-2.63; \(P = 0.002\)) were independently associated with longer OS. No benefit was seen for resections <99%. Of other risk factors analyzed, only age (>60 vs. <= 60 years) was significantly associated with PFS (HR 1.60; 95% CI, 1.14-2.24; \(P = 0.006\)) and OS (HR 2.19; 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 (PFS: \(P = 0.726\); OS: \(P = 0.477\)).

CONCLUSION: Both CRET and MGMT promotor 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

Jared Ament, MD, MPH; Barr Thaci, MD; Mena Said, BS; Ripul Rajen Panchal, DO; Kee Duk Kim, MD; J. Patrick Johnson, MD, MS

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 $24) per patient. Mean change in QALY was 0.02 (SD 0.01). The ICER was 61,500$/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

Charandeep Singh Gandhoke, Mch; Simran Syal; Daljit Singh, MS, MCh; Bhawna Mahajan; Monica Tandon