METHODS: Sixty patients were randomly assigned to two groups, with 1:1 allocation, stratified after tumor type (glioma or metastasis) and previous treatment with radiotherapy. Remote ischemic preconditioning was induced by inflating a blood pressure cuff placed on the upper arm three times for 5 minutes at 200 mmHg in the treatment group after induction of anesthesia. Between the cycles, the blood pressure cuff was released to allow reperfusion. In the control group no preconditioning was performed. Early postoperative MR images were evaluated blinded to randomization for the presence of ischemia and its volume.

RESULTS: Fifty-eight of the 60 patients were assessed for occurrence of postoperative ischemia. Of these 58 patients, 44 (75.9%) had new postoperative ischemic lesions. The incidence of new postoperative ischemic lesions was significantly higher in the control group (87.1%) (27/31) than in the rIPC group (63.0%) (17/27) ($P = 0.03$). The median infarct volume was 0.36 cm$^3$ (IR: 0.0-2.35) in the rIPC group compared with 1.30 cm$^3$ (IR: 0.29-3.66) in the control group ($P = 0.09$).

CONCLUSION: Application of rIPC significantly reduced the incidence of postoperative ischemic tissue damage in patients undergoing elective brain tumor surgery. This is the first study indicating a benefit of rIPC in brain tumor surgery.

388 Prognostic Value of N-Terminal Pro-B-Type Natriuretic Peptide Concentration in Brain Tumor Patients: A 5-Year Follow up Study

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INTRODUCTION: Increased N-terminal pro-B-type natriuretic peptide (NT-proBNP) concentration predicts poor prognosis of non-CNS cancer patients. We evaluated the association of NT-proBNP concentration with disease severity, discharge outcomes and prognosis of patients undergoing elective craniotomy for brain tumor.

METHODS: From January, 2010 until September, 2011 two-hundred and forty-five patients (mean age 55.05 ± 14.62 years) admitted for brain tumor surgery were evaluated for NT-proBNP serum concentration. Outcome at hospital discharge was evaluated with the Glasgow Outcome Scale (GOS). Ninety-four patients were also evaluated for cognitive functioning (Mini Mental State Examination or MMSE), functional status (Barthel Index or BI) and depressive symptom severity (Hospital Anxiety and Depression scale or HADS). Follow-up continued until November, 2015.

RESULTS: The majority of patients were diagnosed with meningioma (37%) and high-grade glioma (20%). NT-proBNP concentrations was elevated in 80 (33%) patients. Greater NT-proBNP concentration was associated with lower BI (rho = –0.305) and MMSE scores (rho = –0.314) and with greater HADS-Depression score (rho = 0.240). NT-proBNP concentrations above the reference range ( = 157 ng/l) was associated with greater odds for unfavorable outcome at hospital discharge (GOS score = 3) adjusting for age, gender and histological diagnosis (HR = 2.268 95%CI [1.04-3.493], $P = 0.039$). NT-proBNP concentration above the median value ( = 93.15 ng/l) was associated with greater 90-day (HR = 4.416, 95%CI [1.157 16.851], $P = 0.03$) and 5-year (HR = 1.687; 95%CI [1.038-2.743], $P = 0.035$) mortality risk controlling for age, gender, histological diagnosis and adjuvant therapy.

CONCLUSION: Greater pre-operative NT-proBNP concentration is associated with worse health status, unfavorable outcome at hospital discharge and greater mortality risk of brain tumor patients.

389 Advanced Intraoperative Navigated Ultrasound in Brain Tumor Surgery Lessons Learnt from a Personal Experience of 300 Cases

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INTRODUCTION: Navigated 3D-ultrasound (nUS) is a powerful and multi-purpose adjunct during tumor resections. We review our cumulative results in a dedicated neuro-oncology service spanning a six year period, highlighting its role in glioma surgery.

METHODS: Since 2011 we have been used a navigated 3D ultrasound system for intraoperative image guidance during brain tumor surgery in 300 cases. A prospectively updated database was queried to retrieve demographic, clinico-radiological and pathological details. Specifically, we evaluated the utility of the IOUS in different setups and assessed its predictive accuracy and impact on extent of resection (EOR) as well as survival in gliomas.

RESULTS: 300 (204 males/96 females) brain tumors were operated [197 high grade gliomas, 28 LGG, 24 Meningiomas, and 51 other tumors]. Radical resection/debulking was intended in 270 (90%). In 30 (10%), only frameless biopsy was performed. The US was intended for resection control in 219 (73%) tumors, most of them being intrinsic gliomas. Intermediate scans prompted further resection in 101 cases (46%). A final resection control scan was performed in 176 cases (confirming complete excision in 99, and residual tumor which could not be further resected in 77). The nUS was a very useful tool in tumor surgery, providing a good diagnostic accuracy (85-90%) in predicting tumor residue. It also helped us improve the EOR in malignant gliomas as well as non-enhancing gliomas. In the subset of resectable tumors, the gross total resection rate was 88%. Further, in a small subset of malignant gliomas, we demonstrated that it helps extend tumor resection beyond the contrast enhancement zone. In GBMs, in a multivariate model, use of the nUS was an independent predictor of survival.

CONCLUSION: Considering the ease of use, widespread accessibility and low-cost nature, IOUS can be a potentially useful adjunct during a range of neurosurgical procedures, especially tumor resections.

390 The Impact of Extent of Resection on IDH1 Wild-Type or Mutant Low-Grade Gliomas

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INTRODUCTION: Accumulating evidence suggests that maximizing extent of resection (EOR) improves outcomes for patients with WHO grade II low-grade gliomas (LGG). However, recent studies demonstrate that LGGs bearing a mutation in the isocitrate dehydrogenase 1 (IDH1) gene are a distinct molecular and clinical entity. It remains unclear whether maximizing EOR confers an equivalent
clinical benefit in IDH mutated (mtIDH) and IDH wild-type (wtIDH) LGGs. To answer this question, we evaluated a cohort of patients with surgically-resection WHO grade II gliomas and known IDH1 mutation status, to assess the impact of EOR on malignant progression-free survival (MPFS) and overall survival (OS).

METHODS: We performed a retrospective review of 74 patients with WHO grade II gliomas and known IDH mutational status undergoing surgical resection at a single institution. EOR was assessed with quantitative three-dimensional volumetric analysis. The effect of predictor variables on MPFS and OS was analyzed with Cox regression models and the Kaplan-Meier method.

RESULTS: 52 (70%) mtIDH patients and 22 (30%) wtIDH patients were included. Median pre-operative tumor volume was 37.4 cm³ (range: 0.9-190.2 cm³). Median EOR was 57.6% (range: 0.08% - 99.3%). Median follow-up was 44.4 months. Malignant progression was identified in 31 patients and 17 patients died. Univariate Cox regression analysis confirmed EOR as a prognostic factor for the entire cohort. However, Cox regression analysis stratified by IDH status demonstrated that a greater EOR independently prolonged MPFS and OS for wtIDH patients (HR = 0.002 [95% CI 0.000 - 0.074] and HR = 0.001 [95% CI 0.00 - 0.108], respectively), but not for mtIDH patients (HR = 0.84 [95% CI 0.17 - 4.13] and HR = 2.99 [95% CI 0.15 - 61.66], respectively).

CONCLUSION: Increasing EOR confers oncologic and survival benefits in IDH1 wild-type LGGs. However, the impact of EOR on IDH1 mutant LGGs is less significant and requires further study.