

SESSION 2 – ONCOLOGY ASBTRACTS

Redo craniotomy or Bevacizumab for symptomatic steroid refractory true or pseudoprogression following IMRT for Glioblastoma

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Objectives. There is minimal evidence to support decision-making for symptomatic steroid-refractory pseudoprogression or true progression occurring after IMRT for glioblastoma (GBM). This study assessed the survival outcome of patients managed with redo craniotomy (RedoSx) or Bevacizumab (BEV) for steroid-refractory mass effect after IMRT for GBM.

Design. Retrospective analysis from a prospective ethics approved database

Subjects. Patients with GBM managed between 1/2008 and 4/2019 with the EORTC-NCIC Protocol. Those with symptomatic steroid-refractory mass effect within 6 months of IMRT managed with either RedoSx or BEV were identified for analysis.

Methods. Outcome of management with either RedoSx or BEV was performed. For the primary endpoint of median overall survival (OS) post intervention, outcome was analysed in regards to potential prognostic factors, and differences between groups assessed by log-rank analyses.

Results. Of 428 patients managed with the EORTC-NCIC Protocol, 78 (18%) required an intervention within 6 months of IMRT completion for either true or pseudoprogression (49 with RedoSx and 29 with BEV). Clinical Features generally favoured the RedoSx group: Patient with BEV were older (55% >60yrs vs 41%) and more had biopsy at initial Sx (28%vs12%). Pre-intervention no patients with BEV were ECOG 0,1 vs 26.5% of RedoSx. Median OS post intervention was 8.5months (95% CI, 5.8 - 12.5) for RedoSx, and 9.7months (95% CI, 7.9 – 13.6) for BEV (p=0.19). Age, time from IMRT, and ECOG performance status were not associated with OS. The pathology at RedoSx was predominantly treatment effect in 71.2% of patients. 24.5% had necrosis only, 46.9% had necrosis with residual atypical cells whilst 28.6% had residual gross tumour. There was no difference in median survival for those patients with atypical cells compared to necrosis only (11.6 months vs 32.3months); but significant difference to gross tumour with median survival of 4.6 months.

Conclusions. At time of symptomatic steroid-refractory contrast enhancement occurring in the six months following IMRT for GBM, an intervention with BEV was equivalent to RedoSx in terms of median survival.

Accuracy of Perfusion-MRI in differentiating treatment-related change and tumour progression in post-resected glioblastoma

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Objectives. This study aims to evaluate the accuracy of non-quantitative and quantitative DSC-MRI assessment of progression and pseudoprogression in patients with high grade gliomas. Our second aim was to identify statistically significant DSC-MRI and DWI parameters which could be used as a diagnostic value. We hypothesise that DSC-MRI parameters will be significantly higher in patients with progression compared to pseudoprogression.

Design. Retrospective cohort study.

Subjects. Patients with high grade gliomas who had undergone surgical resection and adjuvant radiotherapy and chemotherapy were retrospectively identified.

Methods. Regions of interest were drawn around the contrast enhancing regions and co-registered to DSC-MRI and DWI maps. ROIs were mirrored to the contralateral normal-appearing parenchyma for calculation of semi-quantitative relative cerebral blood volume (rCBV). The mean, maximum and minimum rCBV and ADC of progression and pseudoprogression groups were assessed using a multinomial logistic regression to identify the best performing parameters in distinguishing the two groups. Receiver operating characteristic (ROC) analysis was used to identify the best performing threshold value to differentiate the two groups and a Mann-Whitney-U test was performed on the best performing parameters.

Results. We identified a total of 35 patients 20 patients with progressive disease and 15 with pseudoprogression. The average rCBV (ACBV) and minimum rCBV (MNCBV) were the best performing parameters ($p = 0.005$ and 0.0073 respectively). Quantitative analysis showed the AxCB and maximum CBV (MXCBV) was significantly higher in patients with progression than pseudoprogression. ROC analysis showed a threshold AxCB value of 1.00 was able to distinguish progression from pseudoprogression with 100% sensitivity, 86.67% specificity, and area under curve of 0.92.

Conclusions. Non-quantitative assessment of DSC-MRI is accurate in determining patient progression or pseudoprogression from the first DSC-MRI study. We found significant, quantitative differences in DSC-MRI parameters between patients with progression and pseudoprogression; and such parameters can be used to accurately differentiate progression from pseudoprogression.

Longitudinal white matter damage association with visuospatial perception

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Objectives. Cognitive dysfunction is highly prevalent among GBM patients. One of these impairments is in the domain of sustained attention and deficits therein impact various activities in daily life, such as reading. We aim to identify surgery-induced white matter (WM) tract disruptions in glioblastoma patients and relate this to sustained attention. We hypothesised that reductions in fractional anisotropy (FA) in major deep WM tracts correlate with severity of sustained attention deficits.

Design. A longitudinal within-subject study to measure changes in FA and accompanying changes in sustained attention. Multisequence MR imaging was performed and included T1 and DTI sequences. These were obtained before surgery and up to three weeks after surgery. Cognitive assessments were also performed before and after surgery.

Subjects. Sixteen glioblastoma patients (mean age = 57.7; SD = 9.7; 10 males; right-handed) from the PRaM GBM study.

Methods. Neuropsychological assessments were performed on an iPad using the OCS-BRIDGE tool to measure sustained attention. DTI data were processed in FMRIB Software Library (FSL). FA parameters were calculated and fed into voxel-wise statistics using Tract-Based Spatial Statistics (TBSS) to measure WM deterioration and its relation with changes in patients' neurocognitive test scores, as measured with the Sustained Attention Lighthouse Task.

Results. Significant positive correlations were found between post-operative changes in FA and post-operative decreased reaction times in sustained attention in the right inferior fronto-occipital fasciculus (IFOF; $p = 0.042$), right superior longitudinal fasciculus (SLF; $p = 0.034$), right cingulate gyrus (CG; $p = 0.042$), and forceps minor (FM; $p = 0.038$). P-values are corrected for multiple comparisons.

Conclusions. We demonstrate that disruptions of the right IFOF, right SLF, right CG, and FM tracts are associated with decreased reaction times during sustained attention. The current results can help neurosurgeons to perform risk analyses before surgery and guide targeted cognitive rehabilitation.