AbstractID: 1273 Title: Implementation of MRSI in Radiation Treatment Planning

In patients with malignant glioma previously treated with surgery, radiation, and chemotherapy, clinical and radiographic signs of recurrent disease most often require a differentiation between radiation necrosis from recurrent tumor. Published work from our group suggests that magnetic resonance spectroscopy (MRS) can reliably predict pure tumor from pure necrosis. In this work we present a novel technique used to compare radiation treatment (RT) plans and MRS results by fusion. Spectroscopic images (SI) were acquired both on 1.5T and 3T (GE, Milwaukee, WI) MRI scanners using a 4-slice spin echo sequence (1.5T TE=280ms; 3T TE=140ms; TR=2250) 24-cm FOV, 32x32 phase encoding and 15mm section thickness with nominal voxel volumes of $0.8cm^{3.}$ Images of different spectral features including choline (Cho) and sodium acetyl aspartate (Naa) were created using in-house software. T2, FLAIR, T1 pre and post contrast images were also acquired. T1 SI localizer, Cho and Naa images were resliced from 15mm section thickness to five 3mm slices using in-house software. RT plans were fused first with the T1 SI localizer and then the coordinate transformation was applied to the SI. All fusions were done on the Brain Lab workstation using BrainScan 5.21v226 with modifications developed to incorporate unique features of SI. Areas of interest were isolated and corresponding spectra were evaluated for tumor or necrotic signatures. In conclusion, overlaying SI onto RT plans allows comparison of abnormal spectra, often in areas not coincident with Gd, and the relative dose of radiation applied to that area.