AbstractID: 11604 Title: Metabolic Changes in Malignant Brain Tumors During Mid-course Radiation Therapy: Initial Findings of 3Tesla Volumetric Magnetic Resonance Spectroscopic Imaging

Purpose: Metabolic activity of tumors obtained non-invasively by magnetic resonance spectroscopic imaging (MRSI) during mid-course of radiation therapy (RT) can be useful in the evaluating tumor response as well as to design effective boost RT plans. The purpose of this work is to assess the changes in metabolic status of malignant brain tumors using 3Tesla volumetric proton MRSI at three weeks of radiation therapy. **Method and Materials:** The MRSI data from 11 patients with malignant brain tumors acquired during pre- and at 3rd week of RT were analyzed retrospectively. The 3D MRSI was performed on a Siemens 3T TRIO TIM scanner using PRESS (point resolved spectroscopy) sequence with TE/TR: 135/1510 ms, 16x16x 8 matrix, FOV: 16x16x8 resulting in MRSI voxel size of 10x10x10 mm^3. Linear combination (LC) model was used to analyze the acquired spectra. Tumor activity was determined from the values of metabolites ratio "Choline to N-Acetyl-Aspartate" (Cho/NAA). MRSI voxels segmented from metabolically active tumor regions were compared for further analysis. **Results:** The mean Cho/NAA values at 3rd week of RT compared to their pre-RT values were found to decrease 26% to 79% in 7 out of 11 patients and increase73% in one case. Three patients had minimal changes (-6% to +17%). Voxels with higher tumor activity (i.e., larger Cho/NAA value) at pre-RT were observed to show large decrease at 3 weeks of RT. The spatial patterns of metabolic abnormality considerably altered during 3 weeks of RT compared to that of pre-RT. **Conclusion:** MRSI derived metabolic status of malignant brain tumors in patients undergoing RT obtained during mid-course of treatment provides valuable functional tumor information that is not available from other conventional anatomical imaging methods and it could help to devise patient-specific effective treatment interventions.

Conflict of Interest (only if applicable): None.