

## AbstractID: 5681 Title: Analysis of Early Treatment Failure in Patients with Newly Diagnosed GBM using Advanced MR Imaging

**Purpose:** To seek imaging characteristics predictive of early treatment failure (EF) following concurrent radiation/chemotherapy (RT/CHT) in patients with newly diagnosed GBM s/p surgical resection using advanced MRI techniques (3D<sup>1</sup>H spectroscopy (MRSI), diffusion weighted (DWI) and perfusion weighted (PWI) imaging).

**Methods and Materials:** 26 patients were imaged at 1.5T prior to RT/CHT (pre-RT) and immediately after RT (post-RT). Analyzed imaging parameters included peak heights of choline (Cho), creatine, N-acetyl-aspartate (NAA), lactate and lipid; Cho-to-NAA (CNI), Cho-to-Cr (CCrI) indices and excess-choline (Ex(Cho)); parametric maps of percent-recovery and apparent diffusion coefficient (ADC) were calculated. Mutually exclusive morphologic abnormalities were contoured as contrast-enhancement (CE), T2-hyperintensity (T2), resection-cavity, necrosis, and a reference for normal appearing white matter. Patients were categorized as EF if any new CE appeared or if the CE volume increased by >25% at post-RT. Imaging parameters were subjected to a Wilcoxon Rank Sum to test statistical significance between EF and non-EF.

**Results:** 9/26 patients were classified as EF. Both patient groups did not differ statistically in terms of age, volume of CE or T2 at pre-RT. There were trends to higher Cho, CNI, and Ex(Cho) for the EF group at pre-RT, however, these did not reach statistical significance. Statistically significant findings within CE at post-RT were mainly associated with Cho and related indices and included lower ADC and %recovery values suggesting higher cellularity and increased leakiness of vessels in the EF vs non-EF group.

**Conclusion:** Even though our preliminary data on 26 patients could not identify imaging parameters significantly different between EF and non-EF patients at pre-RT, the demonstrated trend encourages further evaluation of additional 31 additional patient data sets acquired at 3T in order to increase statistical power. In addition, the reported significant changes at post-RT suggest that the parameters may be valuable in assessing treatment effects.