

MAR07-2006-000684

Abstract for an Invited Paper
for the MAR07 Meeting of
the American Physical Society

Methods to Differentiate Radiation Necrosis and Recurrent Disease in Gliomas¹

LARS EWELL, University of Arizona Department of Radiation Oncology

Given the difficulty in differentiating Radiation Induced Necrosis (RIN) and recurrent disease in glioma patients using conventional techniques (CT scans, MRI scans), researchers have looked for different imaging modalities. Among these different modalities are Diffusion Weighted Magnetic Resonance Imaging (DWMRI) and Magnetic Resonance Spectroscopy (MRS). In DWMRI, an *Apparent Diffusion Coefficient* (ADC) is calculated for a Region Of Interest (ROI), and then monitored over time (longitudinally). In the brain, different anatomical features can complicate the interpretation of ADCs. In particular, the density and spatial variation of the cerebral spinal fluid filled fissures known as *sulci* can influence how a change in an ADC is explained. We have used the covariance of pixel intensity in T1 weighted MRI scans to study how intra-patient and inter-patient sulci density varies, and will present these results. MRS uses the shift in the MR signal due to the local chemical environment to determine the concentration of brain metabolites like choline and creatin. The ratio of metabolites such as these has been shown to have the power to discriminate between RIN and recurrent disease in glioma patients. At our institution, we have initiated a protocol whereby we will use DWMRI and MRS to study how best to utilize these complimentary forms of imaging.

¹Arizona Biomedical Research Commission