

AbstractID: 11361 Title: Evaluation of a commercial software package for incorporating biological MRI into treatment planning of gliomas

Purpose: To investigate the feasibility of incorporating biological imaging information into the treatment planning of gliomas using Prism View™, a commercially available medical imaging application for processing anatomical and functional/physiologic brain imaging data.

Method and Materials: The patient first underwent whole brain axial fluid-attenuated-inversion-recovery (FLAIR) MRI, followed by three-dimensional magnetic resonant spectroscopy imaging (MRSI) measurements and perfusion MRI. All three MR image sets were loaded into the Prism View™ software and the MRSI and perfusion MRI overlaid on the FLAIR MRI. Contrast of MRSI was adjusted so that only two levels (high and low) of Cho/Cr ratios were shown. The fused images were then converted to a grayscale image set, exported in DICOM format and imported into the Eclipse treatment planning system. Two planning target volume (PTVs) were contoured on the FLAIR images: PTV1 corresponded to the FLAIR enhancement and the low Cho/Cr region plus 15mm margin, and PTV2 represented the high Cho/Cr area plus 5mm margin. The fused MR image set were then co-registered with the simulation CT images, and an IMRT dose-painting plan was generated that simultaneously delivers two different dose levels (59.4 Gy and 66 Gy) to PTV1 and PTV2, respectively.

Results: The above treatment planning process was performed for one patient. Fusion of FLAIR, MRSI and perfusion MRI was successfully performed with the Prism View™ software. Import of the fused DICOM MR images into the Eclipse treatment system was smooth and didn't encounter any problems. Dose-painting IMRT plans were also generated with good coverage (at least 95% volume received 95% prescription dose) for both PTVs.

Conclusion: It is feasible to incorporate biological imaging data into the treatment planning of gliomas with Prism View™ software. However, this software lacks the ability to display absolute metabolite ratios, making it difficult to determine tumor severity from MRSI.