

AbstractID: 2762 Title: 3D MRI-based tumor delineation of ocular melanoma and its comparison with conventional techniques

Purpose: The aim of this study was to compare the delineation of the tumor volume for ocular melanoma on high-resolution 3D T2-weighted fast spin echo MRI images with conventional techniques of A- and B-scan ultrasound, transcleral-illumination and placement of tantalum markers around tumor base.

Materials and Methods: High-resolution 3D T2-weighted fast spin echo (3D FSE) MRI scans were obtained for 50 consecutive ocular melanoma patients using a 1.5 T MRI in a standard head coil. These patients were subsequently treated with proton beam therapy at the UC Davis Cyclotron. The tumor was delineated by placement of tantalum rings around the tumor periphery during surgery. The patients were planned using EYEPLAN software and the tumor volumes were obtained. For analysis, the tumors were divided on tumor height and basal diameter. In order to assess the impact of high-resolution 3D T2 FSE MRI, the tumor volumes were outlined on the MRI scans by two independent observers and the tumor volumes calculated for each patient.

Results: 12% of 50 patients with tumor heights ≤ 3 mm were not visible on 3D MRI images. A small intra-observer variation with a mean of $(-0.5 \pm 4)\%$ was seen in tumor volumes delineated by 3D T2 FSE MR images. The mean variation of tumor volume measurements between MRI scan to EYEPLAN was $(0.1 \pm 2.5)\%$. The tumor shapes obtained from 3D MRI images were comparable to the tumor shapes obtained using EYEPLAN software.

Conclusion: The demonstration of intraocular tumor volumes with the high-resolution 3D FSE MRI is excellent and provides additional information on tumor shape. We found a high degree of accuracy for tumor volumes with direct MRI volumetric measurements in uveal melanoma patients. The MRI scan provided shape information on the tumor, which was comparable with the shape data obtained from EYEPLAN software.