BANG gel has been shown to be a valuable dosimeter for qualitative evaluation of 3D dose distributions. The gel's utility for quantitative dosimetry evaluation has been limited, however, because no method exists for correlating the measured and calculated dose distributions. In this study, three MR and CT compatible fiducials were placed on spherical volumetric flasks containing bang gel. These fiducials defined the central axial plane. Four different treatment plans were developed using high resolution CT scans of the flasks, and the plans were delivered using our systems for stereotactic radiosurgery/radiotherapy. Three dimensional dose maps were created from MR images of the gels. These dose maps were transferred to an image correlation program, and the dose maps were fused to the treatment planning CT scan through a rigid body match of the MRI/CT compatible fiducials. These dose maps were imported into the treatment planning system for quantitative comparison with the calculated treatment plans. Calculated and measured isodose shells agreed to within 2 mm at the regions of largest disagreement within the dose distributions. These results are excellent, considering that the inplane pixel resolution of the MRI dose maps is 1.56x1.56 mm. All points within the dose distributions were well within established tolerances for treatment planning commissioning and quality assurance, although the quantitative evaluation presented here tests the accuracy of the entire treatment planning delivery process. The research described in this abstract was performed in collaboration with MGS

Research, Inc. and Sofamor Danek, Inc.