

AbstractID: 9151 Title: Optimal Energy for Partial Breast Irradiation using a 360° Coronal Plane Rotation Technique

Purpose: To determine the optimal energy for treating partial breast irradiation in the prone position with a novel treatment technique. This method would rotate 360 degrees around the patient's breast on a coronal plane compared to the standard transverse plane.

Materials and Methods: Partial prone breast patients were planned using a simulated helical tomotherapy with a rotated delivery plane. 17 evenly spaced IMRT fields were placed around the breast in the coronal plane. Fields were setup to cover the entire PTV. Plans using energies of 6MV, 4MV and Cs-137 (simulating ~2MV) were created. The dose was prescribed according to RTOG protocol 0413 such that 95% of the PTV received 38.5 Gy. Optimization was performed to achieve target coverage and minimize normal breast tissue such that <60% of the normal breast tissue received <50% Rx dose and <35% received the full Rx dose. Optimization was not required on the lungs, heart or contralateral breast since no beams intersected them.

Results: Coverage of the target was not affected by the choice of energy. All energies easily covered the PTV. The dose to the skin and normal tissue depended on both the size of the breast and energy of the fields. For the average case 4 MV proved to be the optimal energy for minimizing the dose to the normal breast tissue and skin.

Conclusions: Due to the smaller size of the breast, exit dose plays an important role in the dose to the normal breast tissue and skin. For a standard breast size optimal ratio of the surface dose to the exit dose was a 4 MV beam. The dose differences however were small enough that optimal energy may be determined by cost or shielding requirements.