

AbstractID: 8351 Title: Three-Field IMRT for Large Breasts

Purpose: IMRT planning of tangential beams for large breasts is challenging because significant hotspots occur near d_{max} due to rapid fall off of low energy PDD curves. In clinical practice, we have realized that adding a near-AP beam to tangential IMRT plan can significantly reduce hotspots while delivering satisfactory dose to breast and keeping increase in dose to left lung and ventricle clinically insignificant. This study investigates three-field IMRT technique and its clinical merit for large breasts.

Method and Materials: IMRT plans with tangential 6MV beams were generated using DAO inverse planning with fixed weights for open segments. The three-field IMRT plan was generated by adding a third beam at a gantry angle ranging from 335 to 355 degrees. To prevent too much dose delivered to left lung and ventricle, a region of interest is drawn to define the boundary of the near-AP beam. Six segments per beam are set for all plans. DVH curves of all two-field plans are normalized to have same mean dose to breast and three-field IMRT plans were normalized to 95% prescribed-dose of their counterpart's breast DVH. Comparison of plans focuses on hotspots.

Results: Eight cases were examined and the breast volume ranges from 408.1 to 1247.4 cc and the dimensions along the tangential central beam line vary from 17.2 to 24.1 cm. The studied cases show that by using the three-field technique reduction of 107% hotspots volume is case dependent and ranges from 21.1% to 93.3% while the increase in dose to left lung and ventricle is kept clinically insignificant.

Conclusions. Three-field IMRT planning is a clinical proven efficient technique for large left breasts. It significantly reduces hotspots over the traditional tangential IMRT and reduction of the 107% hotspots volume ranges from 21.1% to 93.3% while maintaining satisfactory dose to breast and critical organs.