AbstractID: 3386 Title: A Comparison of Forward and Inverse Planned IMRT Treatment of Breast Cancer

Purpose: To compare a forward planning technique with a commercial inverse planning module for breast IMRT treatments.

Method and Materials: Currently, our clinic uses the Pinnacle IMRT InvPlan module for left breast IMRT treatment planning. Before the planning, the treatment volume (TV), the heart and the lungs are contoured on the patient CT scans. The isocenter and two tangential fields are defined in our treatment planning system (TPS), and an IMRT treatment plan was then generated using the inverse planning module. For the purpose of this study, we created forward planned IMRT breast plans with the same isocenter and tangential beams. Beam intensities in the forward plan were modulated by adding "control points" (CP), a special functionality provided by Pinnacle TPS. CP combines multiple tangential beams into a step-and-shoot IMRT field with multiple segments. A tangential beam in a forward IMRT breast plan typically consists of one open segment and 4 MLC segments blocking hot spots. A typical inverse IMRT breast plan has 6 to 7 segments in each beam. Isodose distributions and DVH's were compared between the breast IMRT plans generated using the forward planning technique and the inverse planning module. The statistical results were examined for the TV volumes receiving 95%, 100% and 105% of the prescription dose, the lung volume receiving more than 20 Gy and the heart volume receiving more than 30 Gy.

Results: Five left breast cases were studied. The DVH's generated from both methods were comparable. It was found that the forward planned breast IMRT plans used fewer segments. The average values for V95, V100 and V105 between forward and inverse planed IMRT breast plans were within 2%.

Conclusions: The forward planning technique can generate comparable breast IMRT plans and these plans met the clinical constraints used in our IMRT breast protocol.