AbstractID: 3389 Title: Effects of Beam Energies on IMRT Treatments of Large-Sized Prostate Patients

Purpose: The energy dependence of intensity modulated beams for prostate cancer treatments has been extensively reported for regular sized patients. In this study, we evaluate whether 6-MV intensity modulated beams can be used for treating large sized patients (≥ 25 cm in anterior-posterior separation and ≥ 35 cm in lateral separation).

Method and Materials: Five prostate patients with AP separations of 25 to 34 cm and lateral separations of 35 to 47 cm were planned for IMRT treatments. Each patient was planned with 6-MV and 18-MV beams for comparison. The plans were optimized using identical dose volume constraints on a commercial treatment planning system (Pinnacle, Phillips Medicals). To limit dose streaking effects outside of the PTV, we imposed the optimization constraints to the surrounding normal tissue extending from PTV with ~1 cm margin to the skin surface. Dose volume histograms (DVH) of 6-MV and 18-MV plans were analyzed.

Results: The DVH curves for PTV, GTV, rectum and bladder were found to be nearly indistinguishable between 6-MV and 18-MV treatment plans. The dose hot spots were marginally lower (0-2%) for the 6-MV plans. The integral dose to the surrounding normal tissue was slightly (< 1% - 10%) higher for the 6-MV plans. Considering the large volume of the surrounding normal tissue, such small difference suggested that the low entrance dose from the 18-MV beam is mostly balanced out by the higher exit dose of the beam.

Conclusion: Intensity modulated beams of 6 MV are equivalent to 18 MV for large prostate patient treatments.