AbstractID: 13892 Title: Dosimetric Comparison of Three Arc Techniques in Prostate Treatment Planning

Purpose: The purpose of this study was to evaluate prostate treatment planning utilizing three planning paradigms: volumetric modulated arc delivery using SmartArc and RapidArc and a hybrid technique consisting of a combination of dynamic conformal arcs and static IMRT beams. The impact of this study was to evaluate three arc systems for prostate treatment planning. **Method and Materials:** Ten randomly selected previously-treated patients were used for this study. Each patient received 180cGy per fraction for 44 fractions for a total of 7920cGy to the prostate and proximal seminal vesicles. Pinnacle System v9.0 was used for SmartArc planning, Eclipse was used for RapidArc planning and iPlan was used for HybridArc planning. Each treatment plan was optimized following departmental guidelines. The ten patient plans were then analyzed for several dosimetric endpoints: %PTV coverage; maximum plan hotspot; conformality index; and volume of rectum and bladder receiving 75Gy, 70Gy, 50Gy and 20Gy. **Results:** All three planning systems were able to meet/exceed our standard departmental guidelines. When compared to SmartArc and RapidArc, HybridArc plans demonstrated a small, though statistically significant, increase in the volume of rectum receiving 75Gy, 70Gy and 50Gy. RapidArc plans demonstrated a statistically significant improvement in the volume of bladder receiving 75Gy, 70Gy, and 50Gy as well as an improvement in the conformality index when compared to SmartArc and HybridArc plans. RapidArc plans delivered more monitor units when compared to SmartArc and HybridArc plans. **Conclusions:** Our results demonstrate that all three arc treatment strategies can be utilized to achieve the same strict dosimetric criteria. While the differences between some of the dosimetric parameters for the planning systems were statistically significant, these differences were overall quite small and are likely to be of minimal clinical consequence. We are currently exploring methods of reducing monitor units in our RapidArc plans.