

AbstractID: 13675 Title: Comparison of RapidArc vs. Fixed Beam IMRT for Treatment of Prostate Cancer at Fox Chase Cancer Center

**Purpose:** Volumetric modulated arc therapy is an attractive treatment approach primarily due to potential decreases in treatment time affecting immobilization, patient comfort and throughput. However, this time savings must be weighed against plan quality and subsequent outcomes. We have compared the Varian RapidArc delivery method to fixed-gantry step-and-shoot IMRT for the treatment of prostate cancer as we have a large experience and well defined acceptance criteria for this patient population.

**Method and Materials:** For a series of patients, 10MV fixed-beam IMRT, single and dual arc RapidArc plans were generated. In all cases the fixed beam plans were generated first with strict adherence to our clinical acceptance criteria. The arc plans were generated in an iterative manner to assure that they are at least dosimetrically equivalent to the routine IMRT plans where possible with respect to the aforementioned criteria, and allow for a faster delivery time.

**Results:** As compared with fixed-gantry IMRT, single arc plans resulted in average increases of 2.3% and 9.1% of the rectum receiving 65Gy and 40Gy, respectively. Dual arc plans resulted in 0.6% and 0.4% decreases in these cut-points. Average total MU decreased by 392 and 261 with treatment time decreases from approximately 5min to 70sec and less than 2.5min for single and dual arc plans, respectively. The high-dose conformity index (CI) was equivalent for the three methods while the low-dose CI reduced from 4.94 to 4.68 and 4.63 for single and dual arc plans, respectively.

**Conclusions:** While single-arc plans demonstrate the greatest decrease in treatment time the increases in rectal dose, particularly in the low-dose regions, are of concern with respect to potential secondary rectal cancers. The average improvement in low-dose CI for dual arc plans, combined with the decrease in treatment time demonstrates the efficacy of this modality for this disease site.