

AbstractID: 13238 Title: Dose-escalation for a dominant intraprostatic lesion using a combination of IMRT and VMAT

YI AWARD

**Purpose:** To study the feasibility of boosting the dose delivered to a dominant intraprostatic lesion (DIL), identified by functional imaging, requiring higher dose for better tumor control using Intensity-Modulated Radiation Therapy (IMRT) and Volumetric Modulated Arc Therapy (VMAT).

**Materials and Methods:** Treatment planning was performed on 2 patient CT-scans with hypothetical DIL (1/8 the size of the prostate) in the inferior-posterior-left side of the prostate using Pinnacle treatment planning system (Philips Medical Systems). Three types of plan were generated, (A1) 10 Gy 5-field IMRT boost to the DIL-PTV followed by 76 Gy 5-field IMRT to the Prostate-PTV, (A2) 10 Gy VMAT boost to the DIL-PTV followed by 76 Gy 5-field IMRT to the Prostate-PTV and (A3) 10 Gy VMAT boost to the DIL-PTV followed by 76 Gy VMAT to the Prostate-PTV. Plans were delivered using Varian clinac and verified using MapCheck and MapPhan (Sun Nuclear).

**Results:** For plans A1, A2 and A3, the DIL-PTV received a mean dose of  $87.0 \pm 0.7$  Gy,  $86.4 \pm 0.4$  Gy and  $87.5 \pm 0.8$  Gy respectively, and the Prostate-PTV – DIL-PTV received a mean dose of  $77.9 \pm 1.1$  Gy,  $77.7 \pm 0.7$  Gy and  $78.1 \pm 1.3$  Gy respectively. All three plans did not exceed the normal tissue tolerances from the guidelines of the RTOG 0126. Plan A2 had a slightly lower dose to the rectum and bladder. All the plans were delivered and verified successfully. The plan A3 had better dose conformity to DIL-PTV.

**Conclusions:** This study demonstrates the feasibility of using any of the three treatment methods in treating a DIL without exceeding normal tissue tolerances. However, considering the speed of VMAT delivery over the 5-field IMRT and better conformality of the dose distribution, a VMAT boost to a DIL followed by a VMAT to the Prostate-PTV is a preferable treatment option for DIL dose-escalation.

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