

AbstractID: 2914 Title: Comparison of High Dose Rate (HDR) Vs Intensity Modulated Radiation Therapy (IMRT) for Prostate Boost Treatment

Purpose:

The objective of this study is to compare dosimetric characteristics of prostate treatments using HDR brachytherapy and IMRT technique.

Method and Materials:

Five HDR patients were selected for IMRT planning. Patients underwent ultrasound guided catheter placement for HDR. CT images were obtained and imported into the Nucletron PLATO Brachytherapy system. The prostate, urethra, bladder and rectum were contoured on axial slices. The dose was calculated and optimized by graphical optimization. The CT images of these structures were exported from the PLATO to Eclipse workstation for IMRT planning and comparison. For each patient, the DVH of HDR and IMRT plans were generated, drawn on the same scale and compared.

Results:

In IMRT plans the DVH curves for PTV dropped sharply and reached to zero volume of the prostate at about 6.4 Gy. In HDR plans the DVH curves for PTV showed a long tail up to a very high dose. About 10% of the PTV for prostate received greater than 12 Gy (200%) of the prescribed dose (6 Gy) in HDR plans. In contrast, the same volume in IMRT plans received less than 6 Gy (100%). Average prostate V90 and V100 dose was about 6.3 Gy and 4.12 Gy respectively for HDR, and 6.09 Gy and 5.74 Gy for IMRT plans, respectively. Urethra V90 dose for IMRT plans showed similar levels (93%), whereas in HDR the dose varied widely (60 to 100%). In all plans, the dose to the bladder and rectum was significantly lower in HDR than in IMRT plans.

Conclusions:

HDR brachytherapy may reduce normal tissue toxicities in prostate boost treatments, even though the dose homogeneity inside the PTV is far worse than in IMRT treatments. Another advantage of HDR over IMRT is that the organ motion is not a significant concern as in IMRT.