

AbstractID: 14061 Title: Comparison of Annulus and Sector Dosimetry between Prostate Brachytherapy Biochemical Failures and Matched Non-Failures

Purpose: To determine brachytherapy implant dosimetry differences between biochemical failures and matched non-failures based on prostate, annular margins, and various sectors.

Materials and Methods: Nineteen hormone-naïve men with a planning target volume (PTV) day 0 $D_{90} > 100\%$ of Rx and $V_{100} > 90\%$ were biochemical failures after brachytherapy. They were matched to dosimetrically equivalent non-failures on a 1:4 basis. Patients were also matched in terms of type of therapy, Gleason score, PSA, clinical stage, % positive biopsy, and year of implant. Implants were between 1995 and 2006 and had at least 3 years of follow-up. The prostate and PTV were drawn prior to initial post-implant dosimetry. For this study, the PTV was divided into sectors, and the prostate and annulus between the prostate and PTV were analyzed separately.

Results: Using conditional logistic regression, there was no significant difference in D_{90} or V_{100} between failures and controls in terms of either 12 prostate or annular sectors. The lowest dose was in the anterior superior annulus, with mean $D_{90} = 90.7\% \pm 15.6\%$ and mean $V_{100} = 75.6\% \pm 19.2\%$. All other annular sectors had $D_{90} > 108\%$ and $V_{100} > 90\%$. Four-fold radial combinations of sectors into superior, medial and inferior regions showed no dosimetric difference between failures and controls. Three-fold longitudinal combinations of sectors into anterior, posterior, and left and right lateral regions also found no dosimetric differences. The anterior region was the coolest and the lateral regions the hottest. Overall annular dosimetry had mean $D_{90} = 116.8\% \pm 14.8\%$ and mean $V_{100} = 95.1\% \pm 3.9\%$

Conclusion: There were no significant dosimetric differences between biochemical failures and controls in terms of prostate, annular margins or any of 12 sectors and various sector combinations analyzed. In a population with good dosimetry, dosimetry was inadequate to explain biochemical failure.