

AbstractID: 6255 Title: Dosimetric Comparison of Cesium-131 and Palladium-103 for Permanent Prostate Brachytherapy

Purpose: To evaluate the dosimetric differences in treatment planning between Cesium-131 and Palladium-103 in prostate brachytherapy.

Introduction: Due to the short half-life of Cesium-131 and the energy emitted, when compared to Palladium-103, planning guidelines must be established. This study focuses on seed count, dose to critical structures and homogenous dose distribution.

Materials and Methods: Thirty patients were planned using Varian's Variseed 7.1, both with Palladium-103 and Cesium-131 for monotherapy, to a prescribed dose of 125Gy and 115 Gy respectively. The average gland size was 28.48 cc. All volumes were contoured and sources were placed using Palladium-103 at an activity of 2.0u. Another treatment plan was developed using Cesium-131 at an activity of 2.0u. All prostatic contours were identical between the two treatment plans for each patient. The following quantities were derived from each plan: total seed count, total needle count, D90, V150, V100, V90, V80, R100, and U10.

Results: In the series, there was a decrease of 17.46% planned seeds (70 vs. 59) and 6% planned needles (18 vs. 17) when planning for Cesium-131 as compared to Palladium-103. There was a decrease in the V150 of 35.53% (39.31% for Cs131 vs. 60.97% for Pd103), while maintaining an average D90 of 115.46% for Cs131 and 115.29% for Pd103. There was a decrease in the R100 of 44.23% (0.15cc for Cs131 vs. 0.28cc for Pd103). A small decrease in U10 of 1.98% was also noted.

Conclusion: Cesium-131 as an alternative to Palladium-103 for prostate brachytherapy is favorable in this study as it reduces the overall seeds and needles needed for implants while offering an improved homogeneous dose distribution; reducing the overall dose to the rectum and prostatic urethra. Further studies on these patients are in progress to assess the actual post-implant dosimetry and morbidity associated with Cesium-131.