

AbstractID: 5465 Title: Preliminary Analysis of ProQura, a Multi-Institutional Database of Prostate Brachytherapy Dosimetry

Purpose: To analyze the ProQura database in terms of patient implant sequence number for each institution to determine evidence for a dosimetric learning curve.

Materials and Methods: In the ProQura database there are 4,614 patients with postimplant dosimetry implanted at 56 institutions between June 1999 and September 2005. The the mean preimplant prostate volume was 34.5 ± 10.7 cm³, and the mean and median days between implant and postimplant CT scan was 30.4 ± 14.0 and 30 days, respectively. I-125 seeds were used in 3,071 patients, and Pd-103 seeds were used in 1,543 patients.

Results: The mean V100 was $88.9\% \pm 8.6\%$ volume and the mean D90 was $101.9\% \pm 15.1\%$ of the prescribed dose. When analyzed in terms of patient sequence number within each institution, the mean V100 for the first 10 patients was $87.3\% \pm 9.6\%$ volume, while for the second 10-patient cohort for each institution, the mean V100 was $88.6\% \pm 10.1\%$ volume ($p = 0.036$). Similarly, the mean D90 for the first 10 patients was $98.9\% \pm 16.8\%$ prescribed dose, while for the second cohort of ten patients the mean D90 was $102.2\% \pm 16.1\%$ of prescribed dose ($p = 0.001$). There was little further change in V100 or D90 for subsequent 10 patient institutional groupings of patient sequence numbers. Therefore, the first cohort had a significantly lower V100 and D90 than all subsequent cohorts. The mean monotherapy seed activity per prostate volume was 0.94 ± 0.19 mCi/cm³ for I-125 and was 4.51 ± 0.94 mCi/cm³ for Pd-103. The specific monotherapy seed activity fluctuated between cohorts but reached a nadir in the seventh cohort at 0.92 ± 0.18 mCi/cm³ for I-125 and 4.33 ± 0.87 mCi/cm³ for Pd-103.

Conclusion: Dosimetric quality parameters V100 and D90 improve with experience and approach a plateau after 20 – 30 patients.