AbstractID: 1744 Title: A Quick Double Check Method for Prostate Brachytherapy Intra-Op Plans

PURPOSE: The interstitial radiation therapy has become a widely used treatment procedure for prostate cancer. The advanced software capabilities give us the option of preplanning directly in the operating room. This work is looking at a fast algorithm that can verify the number of radioactive seeds used per implant based on the planning volume.

METHOD AND MATERIALS: Two random groups of patients that underwent prostate TRUS Brachytherapy procedure were chosen for Pd-103 and I-125 cases. Prostates over 36 cc were favored I125 implants, whereas Pd103 implants were performed mostly on smaller glands. The Real Time Intra-Op implant activity was compared to the Memorial Nomogram recommended activity considering the differences in measurements and the OR and CT-Post-Op dose coverage parameters.

RESULTS: Double check equations were derived for both I125 and Pd103 implants. There is a slightly lower activity required for I125 implants when using the Real Time Planning Software. This difference increases up to 10% for larger glands over 55cc. The Pd implant cases show that the Nomogram underestimates by more than 20% the required activity for prostate volumes under 18cc, which translates in approximately 10 seeds per implant. This phenomenon is due to the stronger influence of the shape over the volume effect. For Prostate volumes between 18cc-36cc there was a good correlation between the estimated activity and the Real Time Plan.

CONCLUSION: Further work is recommended to develop an accurate treatment plan double check method based on dose calculation algorithm as part of Brachytherapy Treatment Planning QA.