AbstractID: 9465 Title: Accurate localization of the needle position during the real time seed implant procedure in OR

Purpose: Accurately localize the needle tip position to improve the dosimetry accuracy of real time prostate seed implant in the OR

Method and Materials: Variseed seed implant software version 7.2 was utilized to study the needle identification process. To accurately determine the needle position under the artifact reflection of ultrasound images in the real time planning mode is challenging. We have developed a simplified method to study the true location of the implemented needles during the real time based seed implant procedure. A zero mark pseudo contour was introduced to identify the needle end dwell position with the axial view of the prostate base. It was identified to correlate the true needle position before dropping the seeds. Bladder wall interface on the sagittal view also justified for the needle identification in finding actual seed location. Rotating the ultrasound probe along with the zero mark slice correlation helps to clarify the trajectory of the needles.

Results: With the implant views needle correlation; we have performed the variation study from the optimized plan versus the plan after finishing the seeds dropping. Less than 1% variation of PTV coverage (criteria $V100 > 90\%$, $D90 < 115\%$ prescription for prostate, $V125 < 0$ cc for both urethra and rectum) is achieved with great accuracy. Optimization criteria have not been disturbed by our method, and the post implant CT dosimetry shows great coverage for prostate day 1 and day 30 studies.

Conclusion: Real time prostate implant procedure provides invaluable dosimetry benefit compared to the pre-planned implant method. However, needle tip position correlation during the implant process presents challenging uncertainty for both pre-plan and real time plan process. We developed a simple method to improve the confidence level of the real time implant dosimetry, with implant needle accurately projected during the seed loading process.