

AbstractID: 10332 Title: Quantitative Analysis of Prostate Motion Using Implanted Fiducial Markers Based on Port Film Image Guidance.

Purpose: To assess daily localization of prostate using implanted fiducial markers with port film based image guidance. **Methods and Materials:** 2640 Prostate shift data for 60 patients were used to analyze the interfraction movement of the prostate. Three non-migratable gold seeds were implanted approximately at base, apex and mid prostate. Prior to treatment, orthogonal radiographs were taken at 45° and 315° for clear visibility of the markers. The images were imported to dedicated software and the required positional shifts calculated in superior-inferior, left-right and anterior-posterior directions by digitizing seeds. If shift exceeded 3 mm in any direction, the treatment table was moved to required distances and radiographs were repeated to confirm the target was within 3 mm. The dose at isocenter was also measured with port films in a phantom. **Results:** From the analyzed data, 57% of patients had shifts had >3mm, 28% between 3-5 mm, 25% between 5-10mm and 5% >10mm. The median values of deviation from all data were: 1.7 mm laterally, 2.0 mm longitudinally, and 3.6 mm vertically. From this data there is a risk of underdosing the PTV and delivering higher doses to the rectum and bladder without image guidance. With our treatment protocol of 7740 cGy/43 fractions the repeat portal imaging required for field verification after shift delivers an estimated average additional 287 cGy. **Conclusion:** From the analysis, image guidance with the appropriate modality is of prime importance for treatment of prostate cancers. The present technique of daily portal imaging gives good beam localization but with higher potential total dose than with kV based cone beam CT published in the literature.