

AbstractID: 5554 Title: Impact on nodal dose distribution from daily fiducial tracking for IMRT prostate and pelvic node treatments

Purpose: In prostate only treatments, fiducial seeds can be implanted in the prostate and used for accurate daily targeting of the prostate. For high-risk disease, the regional nodes are simultaneously treated with the prostate using intensity-modulated radiotherapy thereby sparing the rectum, bladder, bowel, and femoral heads. However, the implanted fiducials do not indicate the position of the nodes as the nodes are anchored to the patient's bony anatomy.

Method and Materials: We measured the displacement of the fiducials with respect to the bony anatomy for each treatment fraction as a surrogate for the displacement of the nodes with respect to the prostate from their original planning position. The displacements, taken from the clinical cases were measured to the nearest 0.01 cm, in LR, AP, and SI directions and were used to perform a forward calculation of the IMRT plan that the patient received during treatment. The dose coverage to the nodes, femoral heads and bowel were evaluated using isodose curves and dose volume histograms.

Results: Our results indicate for an average patient, the maximum shifts of the seeds with respect to the original DRR position was 0.78 cm inferior, 0.28 cm left, and 0.46 cm posterior. A weighted average of the same directions would be: 0.46 cm, 0.05 cm and 0.13 cm. Forward planning using the weighted average shifts, shows changes in the nodal maximum dose of -0.6% and mean dose -0.2%. The maximum bowel dose changed by -0.5% and the mean dose by -1%. The dose to the left and right femoral heads increased by +2% and +1.2%, respectively.

Conclusion: The results indicate that for an average patient the difference in the dose planned to the nodal targets and the organs-at-risk are not clinically significant to those received during treatment using fiducial tracking of the prostate.