

AbstractID: 8654 Title: Displacement of implanted gold fiducials due to rectal marker placed for delineating the luminal surface of rectum

Purpose:

To evaluate the displacement of implanted gold fiducials secondary to the placement of a rectal marker to delineate the luminal surface of rectum

Method:

Five prostate-cancer patients were scanned by using a CT scanner (Brilliance Big Bore, Philips) for planning purposes. CT images were acquired with a rectal marker (Intermark Inc., UK) and then followed by images without the marker. For all of the patients, two or three gold fiducials were implanted into the prostate for image-guided radiation treatment. Both CT images were fused and registered based on the bony structure and then the gold fiducials were contoured for evaluating the displacement due to the rectal marker. Displacements of gold fiducials with and without the rectal marker were computed. Also, displacements of gold fiducials against the isocenter as well as femoral head were computed for comparison.

Results

Mean displacement of gold fiducials was less than 2.5 mm in all directions (lateral: 0.12 ± 0.15 cm, vertical: 0.21 ± 0.29 cm, longitudinal: 0.14 ± 0.27 cm). However, the maximum displacement of fiducials in anterior-posterior and superior-inferior directions was approximately 3.5mm and all cases were skewed toward the anterior direction, demonstrating that the movement of gold fiducials due to a rectal marker was strongly related. Maximum change in distance between gold fiducials with and without the rectal marker was 0.12 ± 0.13 cm. In addition, maximum displacement between the gold fiducials and insocenter/femoral head with and without the rectal marker was 0.17 ± 0.09 cm for insocenter and 0.15 ± 0.08 cm for femoral head, respectively. This finding confirmed that the treatment margin of 5mm was adequate to cover the deformation of prostate as well as rectum caused by rectal marker insertion, especially in the anterior-posterior direction.

Conclusions

Overall, the relative positions of gold fiducials were minimally changed with and without rectal marker. However, the rectal marker forced up the rectal wall and prostate anteriorly (mean: 0.21 ± 0.29 cm) with maximum displacement of 3.5mm.

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