

AbstractID: 10525 Title: Role of Image guided patient repositioning and online planning in localized prostate cancer IMRT

Purpose: Compare image-guided IMRT for localized prostate cancer involving on-line patient repositioning and online planning (replanning).

Method and Materials: Ten early-stage prostate cancer patients receive approximately 10 CT scans each, totaling 108 studysets. Each CT is segmented manually to identify the prostate, bladder and rectum. Using a Philips Medical, Pinnacle 8.1x RTPS, image-guided repositioning starts with an IMRT plan to irradiate a PTV resulting from a 3-mm margin around the prostate, on the first CT scan of each patient, which is then registered on the 2-N, serial scans. For replanning, an IMRT plan is made on each of the serial (2-N) CT scans using 0 and 3 mm margins. The dose distributions from scans 2-N are then deformed to the initial CT using a mesh-based B-Spline deformation method, for each method. The deformed doses are added on the initial CT scan of each patient for DVH and isodose analyses.

Results: Fractional volumes of rectum receiving 90 and 95% of the prescription dose (V90 and V95) range from 2-3% for 3 mm margins with repositioning and replanning, and 1-1.5% for 0 mm margins replanning. The difference in doses to rectum and bladder in repositioning and replanning with 3 mm margins are statistically insignificant. The V95 to prostate is 96.0, 97.4 and 93.8 % for repositioning with 3 mm margins, replanning with 3 mm margins and replanning with 0 mm margins, respectively.

Conclusions: Image guided IMRT using 3 mm PTV margins with patient repositioning and replanning are largely comparable in target coverage and critical organ sparing, while replanning with 0 mm margins shows a statistically significant but small reduction in the doses to rectum and bladder and target coverage. Thus, a limited need exists to replan localized prostate IMRT, under image guidance.

Conflict of Interest (only if applicable): None.