

AbstractID: 6618 Title: Accuracy in Prostate Delineation from CBCT fo RT Planning

Purpose: Evaluate the accuracy in prostate contours from CBCT scans for RT planning.

Method and Materials: One FBCT and five CBCT scans are taken per each of five prostate cancer patients. The prostate is delineated on all scans three times by each of three observers. The intersection and union contour of each scan by each observer are computed. The prostate contours from the FBCT scan are mapped onto the daily CBCT scans. Three margin strategies (3 or 5 mm expansions about the intersection and 2 mm expansions about the union of the prostate contours) are used to create three PTV's. The three PTV's from each CBCT are used to create 3D plans. Geometrical overlap (FBCT contours to CBCT contours), FBCT prostate contour coverage by the CBCT plans, rectal and bladder dose indices are evaluated on each CBCT.

Results: The average overlap of the FBCT prostate with CBCT PTV's (with 2 to 5 mm margins) range from 92% to 98% with average coverage of the FBCT prostate contours of 93% to 98% of the prescription dose. FBCT prostate contours may extend in some regions up to 5 mm at the base and apex of the unexpanded CBCT prostate for some cases (possibly due to interfraction prostate deformation). However, 3D plans using PTV's resulting from 3mm (L/R and A/P) and 5mm (S/I) margin expansions cover the FBCT prostate contours with more than 95% of the dose.

Conclusion: 3DCRT, CBCT-based planning of localized prostate carcinoma should include a 2-5 mm expansion of the prostate contour to correct for contouring uncertainties, based on comparisons to FBCT-based planning. This result includes the influence of transient prostate deformations between imaging sessions and CBCT imaging uncertainties, but does not include intra- and inter-fractional motion considerations.

Conflict of Interest (only if applicable): None.