

AbstractID: 12821 Title: Significant dosimetric impact of variable FSDs during prostate IMRT: The role of CBCT

Purpose: The modulated beam fluence used for IMRT treatments requires a volumetric approach to check for variations in daily patient contours. Cone Beam CT (CBCT) can be used to compare the body contour at the time of treatment with the planning CT. This study investigates the random and systematic changes in FSDs detected with CBCT off central axis.

Method and Materials: FSD structures +/- 1 and 2cm from the body were created. CBCTs were scheduled for fractions 1-3 and then weekly. Each CBCT was reviewed and a variation of > 1 cm in FSDs required a repeat CBCT the following day. For three consecutive variations > 1cm, patients were resimulated and the dosimetry evaluated.

Results: 19 patients with 198 CBCT images over 640 treatment fractions were analysed. Overall 68% of CBCT body contours were 0-1 cm, 28% 1-2 cm and 4% > 2 cm. The deviations occurred most commonly in the postero-lateral direction, and generally coincided with a sharp increase in fluence along the rectal/prostate interface. Six patients (32%) did not require repeat CBCT. In the remaining 13 patients, 20 further CBCTs were performed and 4 patients (21%) required re-simulation. Three of these four patients had a decrease in their FSDs resulting in a decrease in D95 coverage of the PTV of between 4 and 18% per fraction. Of the 198 CBCT images, there was only one variation in FSDs >1cm on the central axis.

Conclusion: A CBCT obtained during a patient's treatment enables a simple, off-axis method to estimate FSD variations. In our cohort 21% of patients were found to have a significant change in their body contour with the potential to impact on their delivered dose. Manual central axis FSD measurement was not sufficient for this cohort to highlight patients with significant body contour changes.