Purpose: Auto-contouring of daily kV conebeam CTs (kVCBCT) is critical for online adaptive radiotherapy. We surveyed a set of geometric and dosimetric measures to determine which best assess the suitability of kVCBCT contouring algorithms for use in prostate region adaptive planning.

Methods: Six patients with daily kVCBCT undergoing IMRT of the prostate to 78 Gy were selected. Dose was recalculated with patient density forced to water. Contours were generated on nine kVCBCT for each patient using ABAS (Elekta Ltd.) and also by a physician. The prostate mean dose, D100, D98, where determined and V70 (% and cc) and mean dose for the bladder and rectum for both physician and auto contours. The Dice’s Coefficient (DC) was calculated between auto and physician contours, as well as a restricted DC (rDC) which combines geometric and dosimetric information by comparing only the volume within a high dose region.

Results: Prostate accuracy can only be discerned with D100, additionally there is no correlation (R2=0.036) between D100 and DC. For all organs, mean dose does not reflect contour suitability. There is large variation in V70 (% and cc) for rectum and bladder, implying V70 is a sensitive indicator of contour suitability. There is however no correlation of V70 with DC. A dose region (>57 Gy) to calculate rDC was chosen to provided optimal correlation (R2>0.81) to V70 (% and cc, rectum and bladder).

Conclusions: V70 for rectum and bladder shows the most sensitivity to contour suitability, by concentrating on where accuracy is most vital. Prostate contouring is less critical due to treatment margins, D100 provides the most discerning metric. DC and mean dose are not useable. In lieu of V70, rDC could be used. The rDC can be approximated by limiting to within 2-3 cm of the prostate contour, alleviating the need to calculate dose.

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