

AbstractID: 8967 Title: Prostate Volume Change and Dosimetric Impact of Edema between CT-based HDR Brachytherapy Fractions

The objective is to evaluate the dosimetric consequences due to the variation of prostate volume occurring after insertion of catheters for HDR Brachytherapy. For thirteen consecutive patients, a spiral CT scan was acquired before each fraction, separated by average 20 hours. The catheters coordinates were obtained on three axial CT slices corresponding to apex, mid, and base portion of prostate. A mathematical expansion model was used to evaluate the change of prostate volumes between two fractions. It is to calculate the volume difference in the cube of the average distance between the centroid and catheter positions for two fractions. The variation of implant Dose Volume Histograms (DVHs) between fractions was computed for plans produced either by our inverse planning (IPSA) or geometrical optimization (GEO). For five patients, the prostate volume increased on average by 9 % (range 2 to 17%), while a reduction was observed for eight patients by an average of 7 % (range 2 to 13%). More variation was observed at the prostate base than at mid or apex gland. The comparison of implant DVHs during inter-fraction showed a small reduction of dose volume, with an average of 3.5 % (range 0.6 to 12%) and 2.7 % (range 1 to 6%) for IPSA and GEO plans respectively. The change of prostate volume between two HDR fractions shows either expansion or contraction of up to 17% of the gland. This translates into small implant DVH variations. Clinical relevance of these changes requires further investigation.

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