THE DEPENDENCE OF PROSTATE POST-IMPLANT DOSIMETRIC QUALITY ON CT VOLUME DETERMINATION

This work investigates the magnitude of the effect that various methods of treatment volume delineation have on dosimetric quality parameters.

8 consecutive prostate brachytherapy patients with a prescribed dose of 145 Gy from I-125 as monotherapy comprised the study population. The mean pretreatment parameters were 30.3 cm^3 ultrasound volume, 51.8 cm^3 planning volume, 131 seeds per patient and 42.9 mCi total activity. On CT study sets obtained less than 2 hours post operatively, target volumes were drawn using three methods: prostate plus a periprostatic margin, prostate only, and transfer of the preplanning ultrasound of the prostate to the post-implant CT scan. Three sets of 5 dosimetric quality parameters corresponding to the different volumetric approaches were calculated: V100, V150 and V200 (fraction of the target volume covered by 100, 150, and 200% of the prescribed dose) and D90 and D100 (the minimal dose covering 90 and 100% of the target volume).

The CT volumes drawn with the prostate plus margin technique were comparable to the initial planning volumes (mean 55.5 cm^3 *vs.* 51.8 cm^3), while those determined via superimposing the preplan ultrasound resulted in volumes nearly identical to the initial ultrasound evaluation. The prostate only approach resulted in volumes approximately 25% larger than the ultrasound volume approach. Despite the volume determinations being markedly different, no significant differences in quality parameters between the approaches were appreciated for these patients in which the prostate plus margin was implanted.