

Pre-implant planning of permanent I-125 prostate implants is often performed using ultrasound images. Implant quality is usually verified by post implant dose reconstruction based on CT/film data. This verification is not robust because of differences in ultrasound and CT volumes and shapes. In this study, we have studied the feasibility of directly using post-implant US images to reconstruct dose distributions. In the operating room, an identical sequence of transverse US images was obtained immediately before and after the implant. These images were then printed out on film and compared, to identify the seed locations based on their resonant artifact. The patients were simulated on a conventional and a CT simulator within 24 hours of the implant. Prostate dimensions and volumes obtained from the CT and US images were compared. Post implant dose distributions were generated using both sets of data. Theoretical accuracy of seed reconstruction in both methods was evaluated. Various physical and dosimetric indices were evaluated. The number of implanted seeds that could be identified in the US images was inter- and intra- observer dependent and patient dependent, and averaged about 85%; the number of seeds reconstructed on CT was greater than 95%. While the fractional number of seeds reconstructed accurately was found to be larger in CT, the post implant prostate shapes from US images correlated better with those used for pre-implant planning. Due to these two offsetting factors, it is possible that comparable accuracy in dose reconstruction can be achieved with both methods.