

Optimization of the CT scanning after permanent prostate implants with 4.5 mm ^{125}I and ^{103}Pd radioactive seeds was studied. It was found that, for conventional 3 mm contiguous slicing with window setting of 750 and level 50, about 40% of seeds show up on two adjacent slices. Such double-registration makes post-implant evaluation more difficult. To minimize this, we explored possibilities of non-contiguous and contiguous slicing with different scan parameters. In non-contiguous CT scanning, we considered the thinnest slices available (1 mm on GE "Advantage" scanner) at the optimal spacing between the slices. In order to find this spacing, the orientation of 600 implanted seeds was determined from orthogonal radiographic films. The average deviation of the seeds from the CT axis was $34^{\circ}\pm 7^{\circ}$ with the average seed projection on the CT axis equal to 3.7 mm. As a result, any seed that protrudes by about 1.2 mm into a 3 mm conventional contiguous slice will be fully imaged. This suggested the usage of 1 mm noncontiguous slices 3 mm apart or 5 mm contiguous slices. Both imaging techniques were tested using a phantom specially built from decayed seeds and 1 cm thick bolus sheets. The seeds in the phantom were positioned at different angles to the CT axis and were shifted by 1 mm from each other along the axis and by 20 mm in perpendicular direction. It was found that the usage of the techniques suggested can reduce the double-registration more than twice and thus improve the post-implant evaluation.