

AbstractID: 14073 Title: Phantom Studies of Difficulties with Seed Detection Software Following I-125 Prostate Implants

Purpose: In our experience, both recent versions (7.1 and 8.0) of the Variseed software have shown variability in seed detection capabilities—wrong identification, missing seeds. A phantom study was begun to improve our understanding of the effectiveness of seed identification in CT scans of patients following prostate implantation.

Materials and Methods: A simple planar phantom was constructed for investigation of the effects of seed spacing, orientation, and CT slice thickness on the ability of commercial software to detect the positions and numbers of seeds accurately. Single seed spacings were varied from 4 mm to 11 mm in the longitudinal direction and from 1.9 to 8 mm in the axial plane; stranded seeds (10 mm spacing) were used to test the effect of plane orientations of 90, 75, and 60 deg (relative to the axial CT plane); CT slice thicknesses were varied from 1 to 5 mm; two versions of Varian's seed finder software (7.1 and 8.0) were compared for loose seed detection. V8.0 was used for the angular/slice thickness study. Non-radioactive STM 1251 seeds were supplied by Bard Brachytherapy, Inc.

Results: V 7.1 was slightly superior to V8.0 for loose seed identification in the longitudinal (100% vs 93%), but inferior (13% vs 98%) in the cross direction. No effect of slice thickness was observed. Increasing the angle between the seed plane and CT cross plane tended to increase both mean and maximum errors in seed spacing (up to 5 mm). Slice thicknesses of 2 or 3 mm seemed optimal.

Conclusions: The seed phantom revealed differences between the two versions of the Variseed software for seed detection, a dependence on seed plane angle and confirmed the recommended CT slice thickness of 2-3 mm (TG137).