

AbstractID: 6813 Title: Reducing staff exposure from fluoroscopy during ultrasound guided permanent prostate seed implantation

The use of fluoroscopy during permanent prostate implantation (in addition to ultrasound) provides an added verification method for insuring correct placement of seeds. However, this raises a concern about staff radiation exposure during the procedure. Here, we evaluate the magnitude of this risk, and propose practical exposure reduction techniques.

Radiation exposure from fluoroscopy C-arm directed upon an anthropomorphic abdominal/pelvic phantom in a simulated clinical geometry was measured using an ion chamber, and verified by point measurements on equipment and staff during clinical procedures. Exposure reduction techniques consisted of 1. modifying beam management and 2. use of additional shielding: a) placing drape on the table and b) a sterile shield on the patient.

Measurements were made at 100 and 150 cm from the floor on a grid of 30 x 30 cm. Unshielded exposure rates at the nearest normally occupied space were 536, 118, and 168 mR/hr for the extremity (i.e. hands), eyes, and waist level, respectively. The use of supplemental shielding of 0.5 mm lead equivalent drape on the table and a sterile heavy metal pad shield around the patient's perineum resulted in exposure reductions of approximately 45-78% to 190, 32, and 92 mR/hr for the extremity, eyes, and waist level, respectively. Optimizing beam management techniques, such as reducing the field of view and collimating the beam, resulted in an additional 20-40% reduction in scattered room exposures. In our tests, one layer of the sterile heavy metal pad shield reduced the exposure from I-125 seeds by 98%.

In accordance with the ALARA principle, simple beam management techniques and readily available supplemental shielding can be effectively utilized to reduce scattered fluoroscopy exposures to the extremity, eye, and waist without interfering with the clinical procedure. In addition, exposures from I-125 seeds can be significantly reduced with thin heavy metal pad shielding.