

This study characterizes seed migration and seed losses. Its goals are to evaluate the impact on post-implant dosimetry, to assess the benefits of parallelly inserted stabilization needles and explain the physical causes for seed misplacement.

Thirty prostate cancer cases treated with ultrasound guided ^{125}I transperineal implantation have been studied. Post-implant reconstruction of source coordinates is accomplished using the method of isocentric films. Needle reconstruction is done with the help of the planned loading. Migration is then characterized using individual (seed) displacements and collective (needle) behavior such as displacement, elongation and insertion angle. Finally, post-implant dosimetry is performed using the reconstructed implant and the planning prostate contours.

About 1200 seeds (85%) have been identified with confidence. Two systematic errors in seed placement have been identified. First, the displacement in the cranio-caudal direction is most likely caused by friction between tissues and needles. Friction deforms the gland and causes seeds to cluster at the base. Second, needles have the tendency to diverge from apex to base by an average of 4 degrees. Stabilization needles, when inserted parallel to the Z axis had no noticeable effect on seed migration. The average post-implant DVH(160) is 82 % with TG43 formalism. Seeds implanted outside the prostatic capsule have 7 times more chances to migrate further from the prostate and be lost.

In conclusion, source migration degrades the quality of implant, yet adequate coverage is attained. A better method for stabilizing the prostate must be used. Alternatively, means to reduce friction should be investigated.