AbstractID: 1606 Title: Evaluation of an Automated Seed Loader for Seed Calibration in Prostate Brachytherapy

Automated seed loaders for permanent prostate implants are now commercially available. Besides improved radiation safety, these systems offer seed assay capability and ease of needle loading, making pre-planned as well as intra-operative implant procedures more time-efficient. The Isoloader (Mentor Corporation, CA**)** uses individual I^{125} seeds (SL-125 ProstaSeed) loaded in up to 199 chambers inside a shielded cartridge. The unit performs seed counting and calibration using a built-in solid-state detector.

In order to evaluate the reproducibility and accuracy of the calibration process, two test cartridges were measured with Isoloader itself and compared with a well-type ionization chamber (HDR-1000Plus, Standard Imaging). The first cartridge had 90 seeds with 0.23U/seed (test#1); the second, 69 seeds with 0.59U/seed (test#2). All the seeds from both cartridges were measured 7-10 times using the Isoloader. Four seeds from each cartridge were assayed intensively using both the Isoloader and the well chamber (100-200 times/seed).

The measured air kerma strength for all seeds from the Isoloader had a standard deviation 2.8% for test#1 and 2.6% for test#2, including 2.4% due to seed activity fluctuation associated with manufacturing and 1.5%(test#1) and 1.1%(test#2) due to measuring reproducibility. For the intensively measured seeds, the measuring reproducibility of Isoloader and the well chamber were 0.8-2.8% and 0.6-1.1%, respectively. The variation in the Isoloader calibration is attributed to small detector solid angle, bead instability within seed-capsule (verified by radiographs) and non-uniform radioactivity coating of beads. The standard deviation of the Isoloader was comparable to that of the well chamber and clinically acceptable.