AbstractID: 2036 Title: A clinical procedure for target positioning verification during prostate IMRT using implanted marker seeds

A clinical procedure is developed for daily verification of target positioning during prostate IMRT with the Elekta iViewGT electronic portal-imaging system. The prostate is localized by matching the positions of three gold marker seeds (two implanted at the base and one at the apex) in relationship to the field shape and center with their positions on a reference DRR. The dimensions of the seeds are 1 mm in diameter and 5 mm in length. Two conformal fields with a gantry angle separation near 90 degrees are imaged to determine the isocenter shift needed to correct for any prostate movement. The fields used for imaging are given adequate MUs to make the marker seeds easily visible, and are integrated to the IMRT plan during optimization. Thus, the daily verification does not add extra dose to the patient. The Elekta system allows the treatment to be paused briefly after the portal images are taken so that a decision is made to adjust the table position. Patient specific tolerance of positional variation in each direction is determined based on recalculated GTV coverage, assuming that the planned dose distribution can be accurately delivered with respect to the mechanical isocenter. The dose coverage is most sensitive to target shift in the anterior-posterior direction. The accuracy of recalculated GTV coverage with respect to positional variation is about 1 – 2 mm. An uncertainty of 2 – 3 mm is associated with the field registration using the tools provided by the iViewGT software, as shown by phantom experiment.