

AbstractID: 8991 Title: Patients positioning accuracy in prostate cancer with OBI guidance including and excluding Gold fiducials.

Purpose: To test, validate and compare registration accuracy in prostate cancer following KV and CBCT image guidance with and without the utilization of implanted Gold fiducial makers. **Method and Material:** Four Gold fiducial were implanted in each of 10 prostate cancer patients enrolled in IMRT daily treatment delivery on a Trilogy system with OBI. By ignoring the fiducial seeds, the image registration with CBCT was first performed by four professional individuals using translational and rotational alignment of the anatomical definition of the prostate as observed from both planning CT and daily CBCT. Contours were also utilized in performing the registration and occasional KV images were also acquired. The shifting coordinates were recorded. Occasionally, KV imaging was also performed and recorded the shift for later comparison with CBCT. Fiducial registration was then performed to provide the actual treatment shifts. Accordingly, a total of 265 image registrations were performed and 510 translational offset shifts were recorded presenting anatomical and fiducial positioning. **Results:** KV and CBCT shifts were correlated in the lateral and longitudinal directions (0.9 and 0.8), but not in the vertical (0.4) with an average overall variation (SD) 2.8 mm. Correlation analysis of the seed relative locations revealed limited inaccuracy in seed registration with CBCT. The overall SD in the lateral, Longitudinal and vertical axis are 0.7, 0.8 and 1.5 mm respectively. Adequate registration would require a margin of 2 mm for lateral and longitudinal and 3.5 mm for the vertical (98% confidence). The anatomical registration requires larger prostate margin; Mean (range) as 3.2 (2.5-4.5) mm, 6.2 (5.2-7.9) mm and 5.5 (4.5-6.1) mm for lateral, longitudinal and vertical directions respectively (98% confidence). **Conclusion:** Daily CBCT fiducial registrations are more consistent as compared to KV\CBCT Fusion. CBCT interpretation is anatomically challenging and requires larger margin compare to fiducial fusion for dose coverage.