## AbstractID: 13355 Title: IGRT with Megavoltage Cone Beam CT for Prostate Patients with Fiducial Markers: Action Levels and Population Margins

**Purpose:** To present and evaluate the results of the use of Image Guided Radiotherapy (IGRT) using Megavoltage Cone Beam CT (MVCBCT) in prostate patients with fiducial markers. **Method and Materials:** 14 patients with 3 gold seed markers each were treated. The treatment unit was a Siemens Primus. The MVCBCT images were acquired using 3 MU, after skin mark alignment, prior to the treatment and registered manually with the planning CT using the seeds as surrogates. The resulting table coordinates shift in each direction (Lateral, Longitudinal and Vertical) to align the prostate in respect to the isocenter was stored. Different action levels (AL) were simulated and population margins  $(2.5\Sigma+0.7\sigma)$  calculated for each scenario considering a residual error of 2 mm for intra-fraction and observer errors; as well as the fraction of the days that would need table corrections. **Results:** 335 MVCBCT images were generated. The average prostate localization errors detected prior to the treatment were:  $2\pm 2$  mm (Lateral),  $3\pm 2$  mm (Longitudinal),  $3\pm 3$  mm (Vertical). The population margins calculation for a non-AL and for ALs from 8 to 2 mm, indicates that the margins for the non-AL scenario of 5, 7 and 6 mm, in the Lateral, Longitudinal and Vertical directions respectively, can be reduced to 3 mm in all directions, applying IGRT daily with an AL of 3 mm, and thus acting in 84% of the days. **Conclusion:** The technique enables a fast and precise prostate localization with low dose. The AL is an important choice and will have a direct impact in the CTV to PTV margin that can be used for the procedure. The simulations indicate that with a 3 mm action level, a 3 mm margin could be used and thus reducing toxicity without compromising the local control.