

AbstractID: 9361 Title: Clinical Validation of a Novel Adaptive Approach for Patients Concurrently Treated with the Prostate and Pelvic Lymph Nodes

**Purposes/Objectives:** One of the challenges for concurrent irradiation of the prostate and pelvic lymph nodes with IMRT is the independent movement of the prostate and the pelvic nodes. To resolve this challenge, we proposed a novel adaptive approach using multiple adaptive IMRT plans (MAP). This study is to validate dosimetric accuracy of this adaptive approach.

**Methods/Materials:** MAP Plans for a patient included five IMRT plans with one planning prostate position and the four shifted prostate positions. Prior to each treatment, daily mega-voltage cone beam CT (MV-CBCT) was acquired to determine the prostate position relative to the pelvic bones, and one of the five MAP plans was selected for the treatment. Seventeen daily MV-CBCTs were available for analysis. Seventeen verification plans were retrospectively created by applying delivery beams to daily MV-CBCTs. For each verification plan, the daily prostate contour was created by shifting the planning contour with the measured prostate movement and the daily pelvic lymph nodal volume was transferred from the planning CT to the MV-CBCT using rigid body image registration. Typical dosimetric endpoints were used to assess the accuracy of this approach.

**Results:** The prostate moved 0.4-0.7 cm superior in 38% days, > 0.8 cm superior in 19%, 0.4-0.7 cm posterior in 12%, and less than 0.3 cm in all directions in 31%. Of these days, 12 (65%) of the daily dose to the 95% of the prostate was greater than 98% of the prescribed dose, 4 (24%) in the range of 93% to 97%, and 2 (11%) less than 90% of the prescription dose. Among these days, the pelvic lymph node volume received 100% of the planned dose.

**Conclusions:** The MAP adaptive approach is a clinically feasible strategy. Verification plan calculated with daily MV-CBCT as a dosimetric monitoring tool provides patient specific dose guidance .