AbstractID: 14020 Title: Comparison of intrafractional motion between supine and prone patient positions during radiation therapy of pelvic malignancies using a 3D surface imaging system

Purpose: To compare intrafractional motion between supine and prone positions during radiation therapy of pelvic malignancies using a 3D surface imaging system.

Method and Materials: Five patients with pelvic malignancies treated with radiation therapy were enrolled, three treated in supine and two in prone position. For each patient, **both** supine and prone position simulation CTs were performed. Body surfaces were generated from simulation CT and then exported to AlignRT as reference images. *AlignRT motion tracking was performed for both supine and prone position for each patient* once per week for five weeks. The length of the tracking record was between 1.5 to 2 minutes. The maximum and the standard deviation of patient displacement were calculated and compared along the vertical, longitudinal and lateral directions for both positions.

Results: A fairly strong correlation was observed between the intrafractional displacement and the BMI. Generally, the displacements were smaller in prone position for patients with a normal BMI in both vertical and longitudinal directions. This is reasonable as the magnitude of the respiratory induced motion is compressed to be smaller in prone position. This phenomenon was reversed for the obese patient with a large BMI value of 30, where the intrafractional displacement was smaller in supine position. For obese patients, it is more difficult to hold still on their large belly with regular respiratory motion. In lateral direction, however, the intrafractional motion did not have statistically difference between supine and prone positions for all the patients.

Conclusion: The intrafractional motion between supine and prone position during radiation therapy of pelvic malignancies depends on patient's BMI. Normal BMI patients have a smaller intrafractional motion in prone position in vertical and longitudinal directions, while obese patients have a smaller motion in supine position.