

## AbstractID: 3598 Title: Thoracic organ motion as assessed by 4D CT: prone versus supine

**Purpose:** Radiotherapy is sometimes carried out with the patient in prone position. The purpose of this work is to study the changes of respiratory organ motion for patients in prone versus in supine position.

**Method and Materials:** We obtained 4D CT datasets for 15 patients, 5 in prone and 10 in supine position, using a GE LightSpeed 4D CT scanner. Patients in both positions were immobilized by Alpha cradle. Lung movement (the change in lung spatial dimensions between maximum and minimum inspiration) in the superior-inferior (S/I) direction was measured on the 4D CT, as well as in the anterior-posterior (A/P) and left-right (L/R) directions in two transverse CT images near the diaphragm and near T4. We also measured the movement of the anterior chest wall with respect to the table top on the T4 transverse CT image as well as on the transverse image defined by the nipple.

**Results:** Average lung movement changes from supine to prone position were: in 17.8 to 11.5 mm in S/I direction changes, and 1.6 to 0.5 mm in the A/P direction on the T4 image. In the transverse image defined by the nipple, we observed chest wall average movement of  $0.1\pm 0.4$  mm in prone position versus  $1.9\pm 0.4$  mm in supine position. Similarly, at the level of T4, the chest wall moved  $0.3\pm 0.3$  mm in prone setup and  $2.0\pm 0.7$  mm in supine position.

**Conclusion:** Respiratory organ motions in thorax are generally reduced when patient position is changed from supine to prone. We have found a significant reduction in anterior chest wall movement for the prone position, an advantage of treating breast cancer in the prone position.