

AbstractID: 4345 Title: Breath-hold Cone-Beam CT for Patient Setup in Stereotactic Body Radiation Therapy for Lung Tumors

Purpose: To investigate the feasibility of using breath-hold cone-beam CT (CBCT) on the treatment table to set up patients for stereotactic body radiation therapy (SBRT) for lung tumors.

Method and Materials: After observing the motion of the patient's lung tumor by fluoroscopy, each patient was taught to hold his or her breath for 35 to 45 seconds. If negligible motion was observed during breath-hold fluoroscopy, a planning CT was obtained during a single breath-hold with a CT-simulator. This breath-hold planning CT was used to design a radiation treatment plan with 7-9 static, noncoplanar beams in accordance with a Radiation Therapy Oncology Group SBRT protocol. A CBCT acquired on the treatment table in three breath-holds was used to set up each patient. A single breath-hold was used for the acquisition of each kilovoltage radiograph and portal image and the delivery of each treatment beam.

Results: The CBCT setup technique was found to be more reliable than using orthogonal kilovoltage radiographs on the treatment table because the tumor could always be seen in the CBCT images, but not always in the radiographs. For some patients, registering the setup image with the planning CT using only bony anatomy, the only practical method with orthogonal radiographs, would make the setup inaccurate. The time required for CBCT setup was acceptable.

Conclusion: For setting up SBRT treatments of lung tumors, a breath-hold CBCT on the treatment table is feasible and more reliable than using orthogonal radiographs. For some patients, the CBCT setup is more accurate because the tumor can always be seen in the CBCT images and registering images with bony anatomy alone may not place the isocenter in the center of the tumor.