

AbstractID: 8235 Title: Magnitude of shift of tumor position as a function of deep inspiration breath hold: An Analysis of pooled data of lung patients with Active Breath Control in Image Guided Radiotherapy

Purpose: To evaluate the reproducibility and magnitude of shift of tumor position by using an active breathing control (ABC) and iView-GT for tumor targeting in patients with lung cancer with moderate deep inspiration breath hold (mDIBH) for different volumes of air inhaling. **Method and Materials:** Eight patients with lung cancer were treated with ABC. Planning CT and radiation delivery were done by using mDIBH in active breath control (ABC) system. Digital Reconstructed radiographs (DRR'S) from planning system were compared with the images taken from iView-GT for tumor position and potential motion during ABC in treatment room using 2D-2D matching tool. During an ABC procedure, spirometer is utilized to reproducibly apply the same breath-holding level for each session. The system is configurable to each individual patient or procedure, with variable threshold levels and BH durations possible. For the same value of Threshold, different volumes of air inhaling, the shifts in x, y and z directions of target were measured with the help of AP and lateral DRR's. **Results:** A total of 80 fractions of radiation were delivered using ABC. The maximum shift in x direction is 3mm, 3.1mm in y direction and 3.1mm in the z direction. Indicating a change of tumor position over the course of treatment with breath holds at the same phase of the respiratory cycle (mDIBH) with same value of threshold. **Conclusions:** Our data demonstrate good intrafraction reproducibility of lung tumor position using ABC with same volume of air inhaling. Patient cannot inhale same amount of air every time even though threshold is same. As the volume of inhalation is different for every time the patient inhales, the maximum shift observed is less than 4mm. For maximum difference of inhaling volume there is a need for observing the shift.