

**Purpose:** To demonstrate the feasibility of radiation dose calculation in patients using in-room 3D conebeam computed tomography (CBCT) imaging during treatment, independent of the prior simulation.

**Methods:** Stereotactic body radiotherapy (SBRT) treatment plans from ten patients with primary lung tumor were retrospectively reviewed. Virtual simulation was performed using planning computed tomography (pCT) scan and a CBCT image was acquired on each fraction of treatment. Contours of the gross tumor volume (GTV), planning tumor volume (PTV) and organs at risk (OAR) were drawn by the physician on pCT and CBCT images. These contours were transferred from CBCT to the pCT image, after rigid-registration between the image pair. Treatment plan dose and dose volume histograms (DVH) were calculated in the pCT image for the two set of contours which were then compared.

**Results:** In this retrospective study on ten lung cancer SBRT patients, a small reduction in the mean and maximum dose delivery were observed in the GTV (-1.1% and -0.05%) and PTV (-2.4% and -0.07%). A larger reduction in the minimum dose to the GTV (-4.3%) and PTV (-19.4%) was also observed. The mean and maximum doses to spinal cord (0.6% and 2%) and esophagus (6% and 0.2%) showed a negligible increase and were within the tolerance levels of 26 Gy or 6.5 Gy/fraction for spinal cord and 30 Gy or 7.5 Gy/fraction for esophagus, as defined by RTOG protocol 0915.

**Conclusions:** The feasibility of independent verification of radiation dose delivered by utilizing CBCT imaging system has been demonstrated. This deserves special attention for moving targets in SBRT where the dose levels involved are high.