

AbstractID: 5235 Title: Evolution of Tumor Volume and Motion in Non-Small Cell Lung Cancer During Radiotherapy

Purpose:

To assess changes in tumor volumes and motion trajectories of non-small cell lung cancer patients over the course of radiotherapy.

Materials and Methods:

We acquired repeat CT scans at three time points through the treatment course. Scans were acquired on a Philips large-bore 16-slice scanner using either a respiration-correlated 4D-CT protocol or a breath-hold protocol at moderate-deep inspiration enforced with the Active Breathing Coordinator system. We utilized the Pinnacle treatment planning system to co-register based on vertebral bodies. We contoured the lesions in each data set and measured lesion volumes using model-based segmentation tools. Windowing parameters were kept constant for all scans. Using the contours at each respiratory phase we measured the excursion of the lesion and changes of the excursions from scan to scan.

Results:

Tumor sizes decreased through treatment by 5%, 46% and 48% in three patients analyzed here. The change in the average GTV excursions was (mean \pm s.d. over patients): 3.2 ± 4.3 mm (A/P), 0.4 ± 0.6 mm (R/L) and -0.1 ± 3.1 mm (S/I). The 3D vector excursion increased by 2.9 ± 4.2 mm on average. The changes in motion extent are similar to the motion excursion themselves, and there appears to be a strong variability between patients.

Conclusions:

These preliminary data indicate noteworthy trends of tumor size and motion over the course of radiation therapy. The tumor volume decreases and there is indication that the tumor excursion increases. Further analysis is underway and will be presented. Such long term evolution has important implications for the design and delivery of radiotherapy to lung tumors.