

AbstractID: 1755 Title: Tomotherapy vs. IMRT Planning on Dose Uniformity and NTDmean to Normal Tissue in Maximum Inspiratory Breath Hold for Lung Cancer.

Dose uniformity to tumor, NTDmean to normal lung tissue and dose conformity index were evaluated for twenty non-small cell lung cancer plans; 10 plans were generated using conventional linac based IMRT planning system, and 10 plans were generated using Tomotherapy planning system. The same PTVs were used for both sets of plans. Patients were CT scanned in MIBH followed by simulation with visualization of the tumor motion. Average tumor motion between maximal inspiration and expiration was 1.54-cm in the cephalo-caudad directions, 1.26-cm in the antero-posterior directions, and 0.56-cm in the lateral directions. The gross tumor volume (GTV) was evaluated on CT. The clinical target volume (CTV) was then generated by adding a margin based on tumor histology: 6-mm for squamous cell carcinomas and 8-mm for adenocarcinomas and large cell carcinomas. PTVs were generated by adding the standard 1.0 cm margin to the CTVs. All plans were prescribed to deliver 60.0 Gy in 2.0 Gy per fraction to at least 90% of the PTVs and at least 95% of the GTVs. All plans were evaluated by calculating Equivalent Uniform Dose (EUD) to the PTVs, uniformity index, V20, V30, normal tissue normalized total dose (NTDmean) for lung, NTDmean and maximum dose for esophagus. Plans generated with the Tomotherapy planning system show relatively better dose uniformity to the PTVs and lower NTDmean to normal tissues. Larger number of beam projections used in the Tomotherapy treatment planning and delivery system provides the observed higher dose uniformity. Details of our findings will be presented.