

AbstractID: 10296 Title: Dosimetric comparison between intensity-modulated arc therapy and helical tomotherapy plans for simultaneous boost treatment of esophageal cancer

**Purpose:**

In a previous work, we compared helical tomotherapy (HT) plans with static-beam IMRT and 3-dimensional conformal radiotherapy plans for simultaneous boost treatment of esophageal cancer. Recently, intensity-modulated arc therapy is emerging as a new technique to deliver IMRT. The goal of this study is to compare RapidArc plans with HT plans for esophageal cancer treatment in terms of dosimetric distributions.

**Method and Materials:**

Six esophageal cancer patients with locally advanced mid-distal esophageal carcinoma were treated with chemoradiation with surgery. RapidArc and helical tomotherapy plans were generated retrospectively to deliver 50 Gy to the gross planning target volume (PTV) and 45 Gy to elective PTV in 25 fractions. Plans were normalized so that the prescription isodose volume covers 95% of the gross PTV. RapidArc and helical tomotherapy plans were compared in terms of dose homogeneity to the PTV's, and dose-volume histograms for critical organs.

**Results:**

HT plans achieved slightly better dose homogeneity for the gross PTV, and achieved significantly better homogeneity for the elective PTV (mean homogeneity index: 0.14 vs. 0.33,  $p < 0.05$ ). HT and RapidArc plans provided comparable dose sparing to the heart (based on V30 and V45) and spinal cord (based on maximum dose). While HT was able to achieve better V15 and V20 to the lungs than RapidArc plans ( $p < 0.05$ ), the mean dose to the lungs were comparable in both sets of plans. RapidArc plans used significantly less monitor units than HT plans (average MU: 565 vs. 9,975).

**Conclusion:**

Both RapidArc and HT achieved highly conformal plans for simultaneous boost treatment of esophageal cancer. HT plans resulted in better dose homogeneity to the elective PTV, while RapidArc plans required shorter delivery time and could potentially lead to less leakage radiation during treatment.