

AbstractID: 10645 Title: Evaluation of changes in dose distribution caused by weight loss using megavoltage CT

Purpose:

Weight loss is a factor necessitating re-planning to ensure that prescribed doses are delivered. Daily imaging during RT is useful to reduce uncertainties in the shapes and positions of tumors and healthy tissues. We studied the main characteristics of weight-loss induced dose changes during tomotherapy treatment, based on an analysis of dose-volume histograms.

Method and Materials:

Four head-and-neck cancer patients were scanned in a supine position and a target contour was delineated for each patient using a tomotherapy treatment planning system. To quantify weight-loss induced dose changes, thermoluminescent dosimeter (TLD) measurements were also performed under conditions of changing bolus thickness, which were considered to simulate weight loss.

Results:

The results showed that weight loss results not only in target dose reductions but also affects tumor hot spots. Although the average minimum dose to the gross tumor volume in the four patients decreased from 91.9% to 86.7% of the prescription dose, the average maximum dose increased from 109.0% to 112.4% of the prescription dose. This suggests that weight loss-induced cold spots and hot spots may result in significant dose inhomogeneity, which might be related to clinical outcome.

Conclusion:

Attention should be paid to weight loss during tomotherapy treatment and an adaptive plan should be considered to achieve prescribed doses to targets and to spare nearby critical structures if a patient shows significant weight loss.

Conflict of Interest (only if applicable):