

AbstractID: 5455 Title: Cone Beam CT Based Treatment Planning

Purpose: To evaluate treatment planning based on cone beam CT (CBCT) using latest software on a LINAC 21IX CBCT imaging system.

Method and Materials: An anthropomorphic chest phantom having bone, soft tissue, and lung components was used to create and evaluate treatment plans based on conventional CT and CBCT images. Conventional CT images of 2.5 mm slice thickness were taken with a GE discovery LS CT/PET system. CBCT images slices were also reconstructed from flat panel system on a Varian LINAC 21IX. Eclipse treatment planning system was used to compare treatment plans from the conventional CT and CBCT images. The AAA algorithm was used in the treatment planning system for inhomogeneity correction. Regions of interest around the bone, soft tissue, and lung in both CT and CBCT images using identical HU threshold values were drawn. Identical targets located in the lung were used in each treatment plan. Analysis of the treatment plans was performed by comparison of geometrical dimensions, total volumes and dose volume histograms of the target and regions of interest.

Results: Geometric comparison of actual external spatial dimensions and others in lung and bone were found to be within 1 mm. Volumetric comparison of the regions of interest resulted in a 2.8% difference of the vertebrae, 3.3% of the right lung, and 3.7% of the total external volume. Dosimetric results show similar dose distributions. Dose volume histograms are also comparable.

Conclusion: Results demonstrate that treatment planning based on CBCT is feasible. Plans created from CBCT images are comparable to plans created with conventional CT systems.

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