

AbstractID: 3121 Title: Evaluation of the TomoTherapy Planning Station Heterogeneity Correction Algorithm using an Anthropomorphic Phantom

Purpose: To evaluate the accuracy of the TomoTherapy Planning Station's heterogeneity correction algorithm using an anthropomorphic lung phantom.

Methods and Materials: The Radiological Physics Center's anthropomorphic lung phantom was imaged and then planned using the TomoTherapy Planning Station version 2.1.0.200. The water-filled phantom is comprised of a plastic shell containing two lung-equivalent structures, a heart structure and a spinal cord. The dosimeters were TLD located in the target and radiochromic film located in the 3 major planes passing through the center of the target. A median dose of 10 Gy was prescribed to the target with a helical delivery technique employing a field length of 2.5 cm.

Results: The average TLD/planning system dose ratio in the center of the target was 0.980 ± 0.008 . The dose to the target from the MVCT scan was only 1.05 cGy per scan. The radiochromic film was normalized to the TLD dose in the center of the target. The dose profiles within the target were in agreement with the plan. The preliminary results showed agreement throughout much of the irradiated volume, although the delivered dose was less than the planned dose in the superior and medial directions.

Conclusions: The TomoTherapy Planning Station's heterogeneity algorithm calculated dose accurately inside a target centered in lung. Discrepancies were found in the dose calculated to the surrounding lung material resulting in an underdose.

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