

## AbstractID: 11428 Title: Analysis of CW in-vivo Dose Measurements for PMRT using Helical TomoTherapy

**Purpose:** To analyze clinical *in-vivo* skin dose data from post-mastectomy radiation therapy (PMRT) patients who received chest wall (CW) irradiation from the TomoTherapy Hi-Art system.

**Method and Materials:** *In-vivo* CW skin dose measurements were compared with calculated dose for 5 patients. For each of the 5 patients, the *in-vivo* data consisted of TLD-measured CW skin doses at 4 locations near the mastectomy scar for 15 fractions. Doses were calculated at each measurement point using patient planning CT data. The location of each *in-vivo* TLD was defined on the CT by a radiopaque pellet. A permanent mark on the CW at each pellet location had been used to place TLDs prior to treatment. Calculated doses were determined by transferring the TomoTherapy dose distributions to the Pinnacle treatment planning system (TPS) where a Region of Interest (ROI) was defined at each TLD location. The percent difference between the measured (*in-vivo*) and calculated (TPS) doses for each dose point and patient were determined and analyzed (mean  $\pm$   $\sigma$ ).

**Results:** Combining doses for all 4 TLD points over the 15 fractions, percent dose differences for the 5 patients were  $-0.1\pm 3.8$ ,  $-4.1\pm 3.1$ ,  $0.7\pm 3.2$ ,  $-0.8\pm 3.9$ , and  $-2.1\pm 3.7\%$ , respectively. 28% of the measured fraction point doses differed from the calculated dose by more than 5%; 2% differed by more than 10%. Possible factors for the dose differences are inaccuracies in the TPS dose calculation, intra/interfraction motion of the patients, and air cavity between the bolus and patient.

**Conclusions:** Results showed all average doses to be within the limits of clinical acceptability (5%). However, understanding the reasons for point dose differences greater than 5% for a single fraction might allow improvement to our existing technique.

**Conflict of Interest:** This work funded in part by a research grant with TomoTherapy, Inc.