

AbstractID: 13575 Title: CT verification of tissue-balloon conformance and skin distance for HDR partial breast irradiation using a multi catheter balloon

Purpose: Intracavitary HDR partial breast irradiation applicators require a planning CT to evaluate appropriateness for treatment. Issues such as tissue-balloon conformance, balloon symmetry and minimal skin distance are considered. Daily kV and ultrasound imaging are sufficient to verify balloon symmetry and treatment position but are not sufficient to evaluate tissue-balloon conformance or skin distance. Plan quality can be compromised if tissue-balloon conformance or skin distance change during the course of treatment. To evaluate the changes in tissue-balloon conformance and skin distance we acquired daily CT scans on 5 patients.

Methods and Materials: Daily CT scans were acquired and evaluation plans were generated from the treatment plan. In compliance with the NSABP B-39 /RTOG 0413 protocol, tissue-balloon conformance and skin distance were evaluated on the daily CT scans. Tissue-balloon conformance was determined by measuring the air/seroma volume (ASV).

Results: Daily imaging facilitated the identification of non-compliant skin distances and ASV's. Patient 2 needed to be replanned to reduce the skin dose because the skin distance decreased from 6 to 3 mm over the course of treatment. After re-planning, the skin dose was reduced from 156.5% to 128.1%. Patients 3, 4, and 5 required suctioning air to achieve a DVH with adequate coverage for the PTV. Before suctioning, the minimum $V90_{PTV_{eval}}$ for patients 3, 4, and 5 was 83.2%, 71.8%, and 78.7%, respectively. After suctioning, $V90_{PTV_{eval}}$ for patients 3, 4, and 5 was 97.6%, 99.2%, and 96.8%, respectively.

Conclusions: This study shows that both skin distance and ASV can change over the course of treatment. These changes can compromise the quality of treatment if the plan is not adapted to account for these changes. It is important to treat with an acceptable skin distance to limit skin toxicity. Treating with a compliant ASV insures dosimetric coverage of the PTV_{eval} .