

## AbstractID: 7734 Title: Evaluation of Inter-fractional Dosimetric Variations in MammoSite Partial Breast HDR Irradiation

**Purpose:** To evaluate the inter-fractional dose variations due to changes in balloon shape and location in MammoSite partial breast HDR irradiation.

**Method and Materials:** Eleven MammoSite HDR patients were treated with a dose of 34 Gy delivered in 10 fractions twice a day at our institution. For each of these patients, a plan was generated for the first fraction based on the CT scan acquired before treatment. The plan was then used for the remaining 9 fractions without any modification unless a significant change in balloon shape and/or location was observed on the CT scan acquired prior to each treatment fraction. To assess the inter-fractional dose variations, we retrospectively contoured the target (including PTV\_EVAL for planning evaluation) as well as critical structures and positioned the catheter on the CT datasets of fraction 2 – 10. Then, we generated two plans utilizing a multiple and single dwell position approaches while using the same dwell time distribution as for the clinical plan of the first fraction. A total of 220 plans generated on 110 CT datasets were evaluated using the following dosimetric metrics: PTV\_EVAL coverage, target dose homogeneity index (DHI), target dose conformal index (COIN) as well as maximum dose to ipsilateral lung and skin.

**Results:** For the multiple dwell position approach, the average (maximum) percent inter-fractional variation relative to the first fraction was 1.5% (6.2%) for PTV\_EVAL coverage, 1.1% (12.5%) for DHI, 3.4% (11.8%) for COIN, 10.2% (42.6%) for maximum ipsilateral dose, and 6.9% (29.4%) for maximum skin dose. No difference in the dosimetric values was observed using either a multiple or single dwell position approach.

**Conclusion:** The inter-fractional dose variation was patient-specific and dependent upon the balloon deformity and location. While the average variation may not significantly impact the treatment, the maximum variation may be clinically significant.