

AbstractID: 14077 Title: Contura balloon rotations and its impact on patient dosimetry for APBI

Purpose: To determine rotations of Contura™ multilumen HDR balloons from axial CT scan images and coronal or sagittal reconstructions and their impact in the dosimetry of Accelerated Partial Breast Irradiation (APBI) patients. **Methods and Materials:** A methodology for calculating device rotation angles based on matrix rotations was utilized in order to evaluate setup variations. This is especially important for patients with small balloon-skin distance. Catheter 1 and 5 positions in the axial and coronal images were employed to determine the rotations. A phantom was built in order to assess the accuracy of the calculation and dosimetry. The calculated rotation angles were compared with measured ones from phantom scans and from patient data as determined using the treatment planning system (BrachyVision). Dwell position and time data from patient plans were used to evaluate dosimetric changes as a function of balloon rotation. Relative dose differences and distance-to-agreement between the original and rotated dose distributions were performed using DoseLab as well as using the treatment planning system. **Results:** The comparison between calculated and measured rotation angles show good agreement, with an average deviation of 1.2 degrees and 3.2 degrees of absolute deviation on average for the cases studied. Dosimetric differences depend on the degree of asymmetry of the dose distribution which is related to the distance between the balloon and dose limiting structures such as the skin and the chest wall. The maximum skin dose is sensitive to the balloon rotation with maximum point dose differences of up to 64% for 180 degrees rotations. PTV coverage is less sensitive to rotations. **Conclusions:** A methodology to evaluate and track Contura balloon rotations was devised and its accuracy evaluated. Patient dosimetry can be seriously affected if large rotations are allowed.