AbstractID: 10838 Title: Evaluation of RapidArc for Locoregional Radiotherapy of Left-sided Breast Cancer: Comparison with conventional Intensity Modulated Radiotherapy(cIMRT)

Purpose: RapidArc is a novel volumetric modulated arc technique with dynamically variable MLC positions, dose rate and gantry speed. RapidArc is highly efficient and has the potential to reduce monitor units and treatment times compared to cIMRT. This report presents our first experience in performing treatment planning for breast cancer using Eclipse RapidArc optimization software 8.4.10 that supports multiple arcs. RapidArc plans were compared with cIMRT for locoregional radiotherapy of left-sided breast cancer, including the internal mammary nodes (IMN). **Method and Materials**: 4 patients previously treated with cIMRT to the left breast/chest wall and regional nodes, including internal mammary chain, were planned (50Gy/25fractions) using the same contours and CT dataset with the RapidArc technique. Different RapidArc planning strategies were investigated. The endpoints of the comparison between RapidArc and cIMRT plans were breast PTV homogeneity, conformity of the plans, heart V30, left lung V20, mean doses to surrounding structures, number of monitor units (MUs) and treatment time. **Results**: 2 arcs were used due to the large treatment volumes to be optimized and the finite travel range of the multileaf collimator (MLC). Treatment plans generated using RapidArc optimization resulted in similar PTV homogeneity as compared with cIMRT. The best RapidArc plans (2 short arcs of 190 degrees each) reduced the mean dose to heart from 11.2 ± 1.0Gy to 9.7 ± 0.7Gy and ipsilateral lung from 14.5 ± 0.8 to 13.6 ± 0.6Gy. The number of MUs was reduced by 50% and the mean beam on time was reduced from 5.85 ± 1.04 minutes to 1.4 ± 0.05 minutes for RapidArc as compared with cIMRT. **Conclusions**: RapidArc optimization employing 2 arcs is feasible and yielded similar dosimetric plan quality as compared to cIMRT. RapidArc reduced the MUs and significantly reduced the beam on time as compared to cIMRT.