AbstractID: 13678 Title: Dosimetric Comparison of Prone Whole-Breast Irradiation Techniques: Conventional Forward Plan versus TomoTherapy

Purpose: Prone breast radiotherapy can minimize the critical organ exposure. Accompanying the technology that has evolved, a new treatment machine, Tomotherapy, was applied to the clinic. This study is to compare prone whole breast radiotherapy dosimetric results in helical tomotherapy IMRT (HT-IMRT) and conservative linac simplified intensity-modulated radiation therapy (sIMRT). **Methods and Materials:** 20 patients with clinical stage 0-II breast without distal lymph nodes involved were selected for CT simulation in prone position. Among them, 10 were left breast cases and 10 were right breast cases. Each scan was using to perform the sIMRT treatment plan by Varian ECLIPSE and HT-IMRT by Hi-Art TomoTherapy treatment planning system. All the dose-volume histograms of PTV and organ-at-risk (OAR) doses were presented. The normal tissue complication probability (NTCP) models were used to analyze the radiobiological consequences of OARs. **Results:** Both techniques were able to delivered at least 95 % of prescribed dose to PTV. The PTV homogeneity index ($p<0.001$) and coverage index ($p<0.001$) are significantly better presented in HT-IMRT, but is not significantly different in conformity index ($p= 0.084$). On the ipsilateral side, the Tomotherapy plan performed significantly better in OAR dose statistics, such as V30 in heart ($p<0.001$) and V20 in lung ($p<0.001$). In NTCPs comparison, the total lung ($p=0.0365$) is insignificant. However, the HT-IMRT presented significantly better in heart ($p=0.0015$) if the affective side is the left breast. **Conclusion:** The Tomotherapy technique provided better tumor dose homogeneity and coverage in whole-breast radiotherapy. The NTCPs results showed, HT-IMRT versus sIMRT, slightly significant better in total lung; in the left breast cancer case, the mean dose of heart was significantly less in Tomotherapy plan.