AbstractID: 10290 Title: Dosimetric Comparison of Whole-breast Irradiation Techniques: Supine Versus Prone Positions Using Helical Tomotherapy

Purpose: Whole breast irradiation is typically delivered in supine position. However, prone position delivery has also been proposed as an alternative technique for women with large breasts. The aim of this study was to compare the dosimetric results of whole breast irradiation delivered in prone and supine positions using helical Tomotherapy.

Methods and Materials: Twenty patients with clinical stage 0-II breast cancer underwent CT imaging in both supine and prone positions and were selected for treatment planning using the Tomotherapy Hi-Art planning system. Dose-volume histogram analysis was performed and the mean dose value as well as other dosimetric parameters of PTV and organs-at-risk (OAR) were compared in all patient cases.

Results: In all twenty patient cases, the completed treatment plans were able to deliver at least 97% of the prescribed dose to PTV and the maximal dose was no larger than 108% in both supine and prone positions. The PTV coverage for prone position (97.98%) was slightly better (p=0.0009) than that of supine position (97.47%). There were no significant differences between the prone and supine positions in terms of hot spots and field homogeneity. The mean dose and V_5 in OARs such as lung, heart and ipsilateral breast were significantly lower (29%-86% reduction depending on specific OAR) in prone position than in supine position plans.

Conclusion: The prone-position radiotherapy technique performed better than the supine-position technique for breast cancer treatment in Tomotherapy with improved target coverage and lower incidental radiation doses to heart, lung and contralateral breast. However, comparing to the supine position technique, the prone-position technique has limitations for big body size patients due to the requirement of positioning the prone board inside the bore of the Tomotherapy device.