

AbstractID: 10170 Title: Dosimetric Comparison of Helical Tomotherapy with Conventional Techniques for Simultaneous Irradiation of Prone Breast and Regional Lymph Nodes

Purpose: to determine whether helical tomotherapy can simultaneously irradiate the prone breast and regional lymph nodes with target coverage and organ-at-risk (OAR) sparing comparable to what is achievable using conventional 3DCRT or fixed-beam IMRT techniques. **Method and Materials:** plans were generated upon the CT images of a right-breast patient previously simulated and treated prone. Target structures included the ipsilateral breast, axillary nodes, supraclavicular nodes, and internal mammary chain nodes. At least 95% of each target was to receive 45 Gy in 25 fractions. OAR contours included the contralateral breast, each lung, heart, spinal cord, esophagus, and thyroid. The tomotherapy plan was generated using the TomoTherapy Hi-Art System (TomoTherapy, Inc., Madison, WI). The XiO treatment planning system (CMS, Inc., St. Louis, MO) was used to produce a conventional 3DCRT plan (field-in-field technique) and a 5-field IMRT plan. **Results:** target dose homogeneity for the tomotherapy plan was for most dose-volume parameters comparable to or better than that achieved by 3DCRT or IMRT. In particular, the V_{45} , $V_{40.5}$, and $V_{42.8}$ values from tomotherapy were comparable to 3DCRT and IMRT for all targets except the supraclavicular nodes, for which the tomotherapy and IMRT plans were superior. For the ipsilateral lung, tomotherapy did better than 3DCRT or IMRT in sparing the lung from doses above 10 Gy, and V_5 from tomotherapy was substantially better than from IMRT. For the contralateral breast, V_5 was substantially better from tomotherapy than from 3DCRT or IMRT. **Conclusion:** helical tomotherapy can simultaneously cover the entire ipsilateral breast and regional lymph nodes with dose uniformity comparable to or better than what is achievable using conventional techniques. The improved target-dose uniformity achievable using tomotherapy may justify the slightly high doses to the lungs. Since minimizing contralateral breast dose is essential, tomotherapy may be preferable to 3DCRT or IMRT.