

AbstractID: 8510 Title: Dosimetric comparison of whole breast irradiation using helical tomographic technique and static multileaf collimated field-in-field technique

Purpose:

To review the dosimetry results of whole breast irradiation using a helical Tomotherapy Hi-Art device and discuss the feasibility of such treatment technique by comparing the data with linear accelerator based Eclipse field-in-field (FIF) technique.

Method and Materials:

Twenty breast plans were generated using a Tomotherapy Hi-Art planning system. Among them, 11 were left breast cases and 9 were right breast cases. Treatment planning techniques such as contour delineation and optimization strategy/parameters were described. Key dosimetric results including target dose coverage and organs-at-risk (OAR) dose statistics were compiled and presented. Radio-biological consequences to the OARs were studied using the normal tissue complication probability (NTCP) models. A retrospective study using the forward FIF planning technique was also performed for those 20 patients as comparison benchmark.

Results:

On the ipsilateral side, the Tomotherapy plans performed slightly better than the forward FIF plans in target coverage and dose uniformity ($p=0.0018$), and significantly better in OAR high dose statistics such as V20 in lung ($p=0.0001$) and V30 in heart ($p=0.0003$). Meanwhile, the Tomotherapy plans delivered slightly higher average dose to both ipsilateral and contralateral OAR, including the heart, the lung, the breast, the esophagus, and the spinal cord. However, the differences in NTCPs between the two techniques for the total lung ($p=0.298$) and the heart ($p=0.268$) were statistically insignificant, whereas the NTCPs for the esophagus were too low to compare.

Conclusion:

The Tomotherapy technique can provide better target coverage for breast cancer treatment. The differences in NTCPs associated with slightly higher mean doses to the OAR were insignificant comparing with the forward FIF technique.

Conflict of Interest (only if applicable):

NONE