

AbstractID: 3117 Title: Incorporation of isodose-level control to a simplified intensity-modulated radiation therapy (sIMRT) technique for whole breast radiotherapy

Purpose: To incorporate isodose-level control in a simplified intensity-modulated radiation therapy (sIMRT) technique (*Med. Phys.* **29**, 522-529, 2002) for radiotherapy of large intact breast.

Method and Materials: The parallel-opposed tangential beam configuration has been used in many implementations of intensity-modulated radiation therapy (IMRT) for large breast because of the dose constraints of contralateral breast and lung and the geographical constraint of breast target volume. For this beam configuration, a simplified IMRT (sIMRT) technique (*Med. Phys.* **29**, 522-529, 2002), based on delivering equal prescription dose to the mid-point of breast tissue seen by each pair of beamlets of intensity-modulated 6 MV beams, provides efficient and robust IMRT planning. However, hot spots greater than 10% still exist near the base in the medial and lateral aspects of breast when the irradiated tissue in the beamlet path is greater than 20 cm. These beamlet paths often include part of ipsilateral lung and rib cage, to which the dose should be reduced. Modifications to the sIMRT algorithm were made so that dose to lung and consequently the hot spots in the medial and lateral aspects of breast can be reduced.

Results: An automated algorithm, which delivers prescription dose to tissues near the lung-breast tissue interface and to the mid-point of the breast tissue, and a manual user-definable isodose-level control algorithm were developed and tested. Incorporation of these algorithms in sIMRT yielded lower dose to lung with smaller medial and lateral hot spots, in addition to the reduction of hot spots in the superior and inferior aspect of breast.

Conclusion: sIMRT with isodose-level control at the lung-breast tissue interface near the base of large breast can be used efficiently for whole breast radiotherapy using the parallel-opposed tangential beam setup.

Conflict of Interest (only if applicable): None