AbstractID: 13413 Title: Patient Characteristics that Predict the Need for Breast IMRT

Purpose: Dose inhomogeneities in RT of the breast have been associated with increased acute and late toxicity. IMRT can reduce dose inhomogeneities, but is associated with increased costs, requires additional department resources and not all patients require IMRT. This work seeks patient variables that predict the need for IMRT to achieve dose homogeneity.

Method and Materials:
100 patients were planned with an algorithmic forward planning technique. Subfields were added to initial open fields to reduce dose inhomogeneity. Characteristics, including separation, size, breast volume and maximum open field dose and number of subfields, were recorded. Receiver operator characteristic analysis evaluated the ability of binary classifiers of patient characteristics to predict the number of subfields.

Results: Variable values were (median [min- max]) will be presented. One third of patients required seven or more subfields to achieve the planning method's dose homogeneity goal. No single variable predicted the number of subfields with a zero rate of false positives or false negatives. A composite index, created from separation, size and volume, selected roughly 2/3 of these patients but with only a 5% false positive rate.

Conclusion: The majority of tangent breast cases did not require IMRT to attain the desired dosimetric outcome. Neither geometric measures nor composite measures could select all patients requiring a large number of fields without including a greater number of patients that require fewer fields. Dosimetric evaluation of the patient at the time of simulation offers the highest specificity with a sensitivity of 1 for a large number of fields. Dose cutoff of 120% predicts necessity for 8 or more subfields with high specificity and selectivity. Including relatively simple dosimetric calculations in the simulation process may be in the effort to optimize use of department resources.

Conflict of Interest (only if applicable):