AbstractID: 10527 Title: Dose to the body organs from IMRT and 3D-CRT breast radiotherapy: Prone and Supine

Purpose: The potential carcinogenic effect of low dose scattered radiation has been a recent concern in breast cancer radiotherapy. The widespread use of IMRT has heightened this concern, due to increased monitor units.

Method and Materials: An anthropomorphic phantom with customized prone and supine breasts modeled off patient CT scans, was imaged, planned, and treated with 3D conformal and IMRT whole breast plans, in both the prone and supine positions. All plans used a pair of opposed tangent beams. The 3D and IMRT plans used the same field arrangements, but the IMRT plan involved 3.5 times the monitor units. MOSFETs were inserted in various organs throughout the phantom, including both lungs, regions of the heart, the thyroid, and both breasts. They were kept in these locations for all treatments.

Results: The dose to the contralateral (CL) breast and thyroid showed little difference between the prone and supine measurements. Prone plans delivered less dose to the lung than supine plans, especially for the part of the lung near the chest wall (3.3% of the prescribed dose, compared to 9.5%). The heart received less dose prone versus supine. IMRT delivered less dose than the 3D plan in all organs measured.

Conclusion: For all organs, the dose measured mainly depended on the distance from the field edge. The prone position conveyed better lung and heart sparing because the treatment field was more distant from these organs. IMRT delivered less dose than 3D to the heart, lungs and CL breast. The reduction in scatter dose to these proximal organs outweighed any increase in leakage dose. More measurements and Monte Carlo simulations are necessary to explore the differences in anatomy in the prone and supine positions, and from patient to patient, and to assess the very low dose levels far away from the treatment volume.