AbstractID: 7113 Title: Assessment of skin dose for breast chest wall radiotherapy as a function of bolus material

Purpose: Skin dose assessment to the chest wall is important to ensure sufficient dose to the near-surface target volume without undue skin reaction. Bolus is often used for a portion of the treatment course, but removed if clinically necessary because of skin toxicity. This study quantifies changes to the surface dose as a function of bolus material for conventional and IMRT techniques using a thermoluminescent dosimeter (TLD) extrapolation technique.

Methods and Materials: Three types of bolus materials (2mm solid, 2mm fine mesh, and 3.2mm large mesh aquaplasts) were compared with Superflab (Med-Tec). Surface dose measurements were performed using the Attix (parallel-plate) chamber in a flat solid water phantom with the bolus materials for 10×10 cm^2 and 10×20 cm^2 jaw fields at 0^0, 45^0 and 70^0 incident angles. The Attix chamber measurements were used to validate the TLD extrapolation technique (0.89, 0.38, 0.15 mm thicknesses). TLDs were used to measure the surface dose on an anthropomorphic phantom for conventional and IMRT tangential fields.

Results: Surface dose increased with increasing angles and field sizes. Oblique incidence has a larger influence on the surface when no bolus is present (from 20% to 48% for 10×10 cm^2). The skin dose of solid 2mm aquaplast was larger than that of fine mesh aquaplast (22% for 10×10cm^2-0^0 incidence, and 11% for 10×10cm^2-70^0 incidence). Compared to conventional tangential fields, the skin dose for IMRT decreased ~5%. For the conventional tangential fields, skin doses of fine mesh, solid, and large mesh aquaplasts were 21%, 11% and 9% less than that of superflab, respectively. For IMRT fields, skin doses were 22%, 12% and 10% less than that of superflab, respectively.

Conclusion: For chest wall radiotherapy, the bolus type can be selected to compromise near-skin target dose vs skin tolerance dose for optimal clinical outcome.