AbstractID: 11716 Title: Skin Dose Evaluation for HDR Accelerated Partial Breast Irradiation

Purpose: Although the physical consideration of minimum skin distance has been well established for partial breast irradiation HDR treatment, there are uncertainties about the actual calculated skin dose. Usually the calculated dose is based on infinite homogenous media. Thus, the actual skin dose will be less than calculated dose due to lack of backscattering. This study confirms this conclusion by using MOSFET dosimeters and Monte Carlo 3D simulation.

Materials & Methods: The MOSFET detector was first calibrated as a function of distance from HDR source. The calibration factors were obtained by recording the voltage variation after delivering exactly 1 Gy. A Contura balloon filled with water was embedded off center in a cylindrical tissue equivalent gel phantom. Four locations along the surface were selected for MOSFET placement. Two plans, one with single dwell position and the other with three dwells, were delivered with the MOSFET at different positions, with and without extra bolus for backscattering. Monte Carlo simulation was validated by simple plans with single source dwell in different catheters of the Contura balloon.

Results: The measurements with bolus matched well with the TPS calculated dose, while the data acquired without bolus had dose discrepancies from 12% to 27%, corresponding to the source to detector distance ranging from 2.8cm to 3.9cm.

Conclusion: MOSFET measurements have proved that the actual skin dose is much less than the calculated dose, which indicates that the minimum skin distance used as selecting criteria may be less than currently established standard.

Conflict of Interest (only if applicable):