AbstractID: 10315 Title: Skin dose measurement for partial breast brachytherapy using OneDose MOSFET dosimeter

Purpose: To calibrate a new-designed OneDose MOSFET dosimeter to Ir-192 HDR radiation and use it to measure the skin dose from partial breast HDR brachytherapy.

Method and Materials: A set of cylindrical phantoms of different sizes (from 2cm to 8cm diameter) were made with a central hole to hold the HDR catheter, so that the treatment distance of 1cm to 4cm can be measured. Ten OneDose MOSFET dosimeters were placed outside of the phantom equal-distance in order to get the average reading and thus remove the inter-dosimeter variance for each phantom. The dosimeters' build–up side (1mm water-equivalent thickness) was facing the HDR source. The dosimeters and phantom were immersed into water in a 30x30x30cm tank to get full scattered environment. Nucletron microSelectron HDR was used to deliver the radiation. Monte Carlo data published on CLRP website http://www.physics.carleton.ca/clrp/seed_database/Ir192_HDR/microSelectron_v2/ was used to calculate the expected dose. The ratio of the measured dose and expected dose is the calibration factor for each distance. For patient measurement, a CT-simulation process was performed to find a skin point and a fiducial marker was placed on that point, so that it is shown in the treatment planning CT and the expected dose from the treatment planning system (Nucletron Oncentra Brachy) can be obtained. A skin mark was made on that point so that the dosimeters placement is inter-fraction reproducible. The measured dose is compared to the TPS calculated dose and the differences are recorded.

Results: The calibration factors at different treatment distances were obtained and used for dose correction from the dosimeter reading. Two patients were measured so far and more are expected (work in progress). The expected results are that the measured dose is less than the TPS estimated dose since there are no backscatter as assumed in the TPS.