AbstractID: 1164 Title: Dosimetric characteristics of the HDR Leipzig applicator in surface radiation treatments

The Nucletron Leipzig applicator is designed for ^{192}Ir HDR treatments of surface lesions. The dosimetric characteristics of this applicator were investigated using Monte Carlo (MC) simulations and phantom measurements. The MC method was validated for simulations of the bare source against published data. A calibration factor was obtained to convert MC scoring to dose-rate per air kerma strength at the TG-43 defined reference point. Radiochromic films and MOSFET detectors were used for phantom measurements. Films irradiated using the double exposure technique and MOSFET detectors were calibrated using the bare HDR source in a water phantom against MC calculations. The film and MOSFET measurements have relative uncertainties of 3-7% and 3-5% respectively. The calculated 2D normalized planar dose-rate distributions agree well with film measurements. The MC calculated dose-rate at 5mm depth in water along the applicator's central axis is 0.241 cGy U^{-1} h^{-1}, 7% lower than the film and 3% higher than the MOSFET measurements. This corresponds to positional uncertainties of 0.7mm and 0.3mm respectively. The calculated relative depth dose and percentage dose profiles at depths of 2mm and 5mm agree well with film measurements. The MC calculated absolute doses for the Leipzig applicator agree with the average of the film and MOSFET measurements to within 3%. The relative depth dose and percentage dose profiles will be tabulated for treatment planning purposes.