

AbstractID: 9412 Title: Comparison of three commercial MOSFET dosimeters for use in Total Body Irradiation

Purpose: To determine the efficacy of three MOSFET dosimeters to perform in vivo measurements of both entrance and exit dose in total body irradiation.

Materials and Methods: Three commercially available MOSFET dosimeters including the Thomson Nielsen Mobile Mosfet (Best Medical) OneDose and OneDose Plus (both from Sixel) were tested under TBI conditions. Measurements were made with two phantoms: a 30cm x 30cm x 21cm solid water phantom and an anthropomorphic phantom. The midlines of the phantoms were placed at 492 cm from the source, the standard TBI condition in our clinic. TBI procedures in our clinic involve irradiation of the patient decubitus with two opposed 6 MV photon beam. To ensure equilibrium, 1.5cm of bolus was used for the Thomson Nielsen MOSFET as well as OneDose. The OneDose Plus system possesses an internal buildup cap. For the solid water phantom, measurements were made at five positions beginning with the central axis. Measurement positions on the anthropomorphic phantom included the head, neck, chest, and umbilicus. Entrance and exit doses were recorded and normalized to an ion chamber reading.

Results: All three MOSFET detector measurements were within 2% of the ion chamber measurements when measuring entrance dose on the solid water phantom. When measuring exit dose, OneDose Plus recorded a 40% over response while the other detectors were within tolerance. Entrance and exit dose measurements using the anthropomorphic phantom saw more variation with results deviating from the ion chamber reading as much as 5%.

Conclusion: The MOSFET dosimeters provide a convenient method for in vivo dosimetry for total body irradiation. Entrance and exit doses under ideal conditions were accurate, but degraded slightly when placed on an anthropomorphic phantom. OneDose Plus showed an over response when measuring exit dose.