

AbstractID: 10737 Title: In vivo dose measurements for Total Body Irradiation using optically stimulated luminescent dosimeters

Purpose: *In vivo* dose measurements for Total Body Irradiation using optically stimulated luminescent dosimeters

Method and Materials: The institution's standard of care for total body irradiation uses a 6 MV Varian 600C linac with the gantry angle at 90 degrees and field size of 40x40 cm². The patient's midline is at 350 cm. A 1.2 cm acrylic spoiler is placed 40 cm from the surface of the patient and an acrylic tray holding lead compensators is at the head of the gantry. Phantom measurements were made to determine suitability of optically stimulated luminescence dosimeters (OSLDs) for *in vivo* dosimetry of patients undergoing total body irradiation (TBI). A 30x30x30 cm³ solid water phantom was placed at 350 cm SAD. A calibrated plane parallel ROOS ion chamber was placed at the center of the phantom under 1 cm of build up. OSLDs and TLDs were also placed on the phantom adjacent to the ROOS chamber at 1 cm depth. A treatment plan was created to deliver 100 cGy to the midplane of the phantom for 1 field. All three dosimeters were irradiated. A similar setup was created using an anthropomorphic phantom at 350 SAD, TLDs and OSLDs at three different locations. In addition, *in vivo* measurements were made for three patients undergoing total body irradiation at nine different body points.

Results: OSLD phantom measurements were in agreement of the ROOS chamber (2.6%) and TLDs (3.8%) when using the solid water phantom. Comparative measurements between TLDs and OSLDs differed by as much as 4.5% for the anthropomorphic phantom irradiation. *In vivo* dosimetry using OSLDs for the three patients agreed within (7.6%) for TLDs.

Conclusions: Results for both the phantom and patient measurements confirm that OSLDs are both suitable and recommended for required *in vivo* dosimetry in Total Body Irradiation.