

AbstractID: 4727 Title: Surface Dose Measurement in 6 MeV X-ray Beam Using Radiographic Film and TLD

Purpose: The purpose of this study was to estimate and compare the surface dose in 6 MV x-ray beam using TLDs, radiographic film and parallel plate ionization chamber.

Method and Materials: The surface dose measurements were performed in a 6 MV x-ray beam of a medical accelerator (Varian 2100 C/D) with X-Omat V (Ready Pack) radiographic film, LiF thermoluminescence dosimeters (TLD-100) and parallel plate ionization chamber (PTW) for 10x10 cm field size. The film was placed perpendicular to the beam axis at the surface and at different depths of a solid water phantom, placed 100 cm from the source (SSD=100). The film was calibrated to convert optical density to dose. For TLD measurements, five TLDs were inserted in the center of 2 mm thick Perspex plate and placed at different depths in a solid water phantom. Each TLD was individually calibrated. A Parallel Plate Chamber was placed in a solid water phantom at different depths and the doses were extrapolated to estimate the surface dose.

Results: The estimated surface dose with radiographic film was found $17.4\% \pm 3\%$ and with the TLD technique was found $23\% \pm 3\%$ relative to maximum dose. The corresponding parallel plate ionization chamber extrapolated dose was $17.8\% \pm 2\%$ relative to maximum dose.

Conclusion: Radiographic film measurement of surface dose showed good agreement with the parallel plate ionization chamber in this study. With TLD-100, the measured surface dose was higher than chamber and film measurements due to the positioning of the TLD in the phantom and the inaccuracy of the effective point of measurement.