

AbstractID: 7022 Title: Application of GAFCHROMIC® EBT film for in vivo dosimetry with total body irradiation (TBI) radiotherapy

Purpose: To demonstrate the viability of GAFCHROMIC® EBT film as an *in vivo*, dosimeter for total body irradiation (TBI) procedures.

Method and Materials: Dosimetry results are reported for six anatomical regions (i.e. head, shoulder, chest, umbilicus, hip and thigh) on an anthropomorphic phantom irradiated using a standard procedure of lateral TBI technique in our facility. The films and thermoluminescence dosimeters (TLD) were taped to the phantom with adequate bolus to ensure that the dosimeters were at a depth of electronic equilibrium. To establish the film calibration curve, film samples (2.5 x 1.5 cm² in size) were placed at the isocenter of the accelerator (SAD=100 cm) at depth of 10cm in a water equivalent solid phantom. The GAFCHROMIC® EBT films were exposed to doses from 0 to 400 cGy (with 50 cGy increment) using a 20 x 20 cm² field size. The films were scanned with the Vidar VXR-16 scanner and analyzed with Image J software.

Results: The results indicated that the measured doses at all points as obtained by the GAFCHROMIC® EBT films are in good agreement with the prescribed doses, varying from -3.15% to 1.46%. The comparison of the GAFCHROMIC® EBT dosimetry against the TLD analysis showed a similar agreement (variance from -4.08% to 0.55%).

Conclusions: GAFCHROMIC® EBT film is a viable dosimetry tool providing comparable results as those obtained using TLDs. The elimination of the film processor that usually introduces uncertainties, the almost water equivalent density, the water resistance, and insensitivity to room light are some of the advantages of the EBT films, which make the films easier to handle and a good candidate for *in vivo* dosimetry in TBI and possibly other radiotherapy applications.