

AbstractID: 11049 Title: Evaluation of dosimetric characteristics of electron beam arc therapy using Gafchromic EBT film

Purpose: Evaluation of dosimetric characteristics of therapeutic electron beam arc therapy using GAFCHROMIC-EBT film. **Method and Materials:** Output, PDDs and profiles were obtained using EBT film for 6 and 9MeV static and arc beam from Clinac2100CD linear accelerator using slab and cylindrical solid water phantom with gel bolus of thickness 1.5/2.0cm. For static beams, the measurements were carried out at SSD 100cm while for arc various SSDs of 80, 82, 85, 87 and 90cm were used. Measurements of EBT film were validated with ion chamber (PPC05 and FC65G). The effect of isocenter depth and the dose rate dependence were evaluated. Films were scanned with the Vidar dosimetri-pro(red) scanner and analyzed with Omni-PRO software. **Results:** Relationship of the dose vs optical density was linear within $\pm 1\%$ for 6 and 9MeV arc beam. PDD of arc beams show higher penetration and the dose-maximum of 6 and 9MeV beam occurs at a slightly greater depth, 2 and 4mm respectively as compared to static beam. Arc beam resulted in higher x-ray contamination towards the center of rotation and lesser surface dose, however, surface dose was found to be decreasing with increase in SSD as compared to static beam. An increase in relative dose was observed with SSD, however for larger SSDs (>85cm) the increase was rapid. Ion chamber measurements showed a higher relative output (6%) for the lower dose rates (100-300MU/min), whereas less dependent(<1%) for higher dose rates (400-1000MU/min). The response of EBT film was found to be dose rate dependent (3%) for lower dose rate in the range of 100-200MU/min, however, profiles obtained for various dose rates were independent of the dose rate. **Conclusion:** All the parameters evaluated in this study were found to be within acceptable limits, hence Gafchromic film can be a valid choice of dosimeter for electron beam arc therapy.