AbstractID: 5628 Title: The Response of RadioChromic EBT Film in High-Energy Electron Beams

Purpose: To describe the response of a new radiochromic film to high-energy clinical electron beams. GAFChromic® EBT film was designed primarily for verification of high energy photon IMRT treatments. It has been shown to be a very accurate and convenient photon detector. However, there is no literature on this film's response to high-energy electron beams. We initiated a study to characterize the response and utility of this film for routine electron beam dosimetry.

Method and Materials: The linac was first calibrated to ensure that the delivered dose was known accurately. We exposed a series of EBT films at dmax in polystyrene to 6, 9, 12, 16, and 20 MeV electrons to develop standard characteristic curves. All films were from the same batch. We also exposed the EBT films in a solid water phantom to produce central axis depth dose curves. These data were compared against percent depth dose curves measured with either Kodak XV2 film in a solid water cassette, or in a water phantom using an IC-10 ion chamber or a PTW electron diode.

Results: Results showed that the characteristic curve for this film was the same for electron energies from 6-20 MeV. Also, the response of the EBT film along the central axis of the beam matched the central axis percentage depth dose characteristics (R50, Rp) determined using Kodak XV2 film, electron diodes, and corrected ionization chamber measurements.

Conclusion: GAFChromic® EBT film is shown to be an accurate detector for clinical electron beam applications. It is convenient to use since the solid water film cassette can be loaded in the linac room and requires no post-irradiation processing. It gives the same results for electron dosimetry as silver halide films, diodes, and ionization chambers.

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