AbstractID: 12700 Title: Absorption spectra of a new radiochromic film for various energies of therapeutic photon and electron beams.

Purpose:

GAFCHROMIC EBT2 (G-EBT2) films were introduced to replace G-EBT1 films in 2009. The component and construction of G-EBT2 films are different from those of G-EBT1 films. Detailed data of the absorption spectra as a function of absorbed dose are important for understanding the differences in dosimetric sensitivity between those two products. In this study, we investigated the dose response of G-EBT2 film to therapeutic beams.

Method and Materials:

The absorption spectra of G-EBT2 films were measured and compared with those of G-EBT1 films. The films were inserted in a 30 x 30 x 30 cm^3 water equivalent phantom. The radiation energies were 6 and 18 MV, and 6, 9 and 12 MeV for photon and electron beams, respectively. Absorbed spectra of the films were obtained in the wavelength ranging from 350 to 800 nm. The films were analyzed with an ultraviolet photoelectron spectrometer one day after the irradiation.

Results:

With a marker dye and a yellow colored dye for G-EBT2 films, the absorption in the wavelength between 350 and 500 nm was high without irradiation. The net frequency of absorption spectra on G-EBT2 films, however, was similar to that on G-EBT1 films. For all films, the absorption peaks were observed at the wavelength of 583 and 634 nm (red channel). The sensitivity of dose response increased by approximately 10% compared to G-EBT1 films. The net absorption below 500 nm (blue channel) was hardly changed. This means that G-EBT2 films have good sensitivity for photon and electron beams, while maintaining UV sensitivity. These characteristics justify the use of the red/blue channel method.

Conclusion:

The absorption spectra of G-EBT2 films were analyzed. While the absorption spectra of the G-EBT2 films were similar to G-EBT1 films, the new films exhibited higher radiation sensitivity.

Conflict of Interest (only if applicable): none