AbstractID: 3563 Title: Feasibility of a Novel Gafchromic film for Routine IMRT QA

Purpose:
To assess the feasibility of using an improved Gafchromic film, EBT (International Specialty Products), for routine IMRT QA.

Method and Materials:
EBT films were evaluated for clinical use in IMRT QA by comparing their performance to the widely used Kodak EDR2 film. As a clinical test, one hybrid phantom plan, consisting of seven IMRT fields, was calculated on a commercial treatment planning system with prescription levels of one to five Gray. The plans were delivered to EBT and EDR2 films loaded in a Bluebox film phantom. The films were digitized on Vidar VXR-12 film scanner and analyzed using the RIT film dosimetry system. The percentage of pixels (exceedence) with plan/film dose difference above 5% tolerance level was used as a metric for film comparison. The symmetry and flatness for the same dose range were also determined for both types of films.

Results:
For EBT films, flatness and symmetry in two orthogonal directions improved as dose increased. Correlation between the plan and EBT film improved with increased dose, as indicated by a decrease in the exceedence (%): 22.9(1Gy), 11.9(2Gy), 11.2(3Gy), 6.6(4Gy), 4.1(5Gy). EDR2 films exhibited a different trend: 12.7(1Gy), 7.7(2Gy), 12.6(3Gy), 13.4(4Gy), 26(5Gy). Delivery time increased from 6 minutes for 1Gy plan to 9.5 minutes for 4Gy plan using dose rate of 600MU/min.

Conclusion:
At higher doses, EBT films show results comparable to, or improved over, EDR2 films. They demonstrate improved flatness and symmetry and IMRT QA results with increased dose. The additional 3.5 minutes necessary to deliver 4Gy to EBT film in order to achieve better results than with the EDR2 film is more than compensated by the convenience of using Gafchromic film. Further improvement of the digitization procedure and increase of the signal-to-noise ratio of EBT film should allow even lower dose for routine IMRT QA.