

AbstractID: 5372 Title: Comparison of the Epson Expression 1680 flatbed and the Vidar VXR-16 Dosimetry PRO™ film scanners for use in IMRT dosimetry using Gafchromic and radiographic film.

Purpose:

We have investigated the consistency of the newly available self-developing Gafchromic® EBT film relative to EDR2 for IMRT dosimetry QA when using flatbed scanner as opposing to the well established Vidar VXR-16.

Method and Materials:

IMRT plans consisting of seven to nine 6 MV beams were calculated using Pinnacle treatment planning system. The patient specific dose distributions were delivered to the phantom containing either EDR2 or EBT film. The films were scanned with both the Vidar and Epson scanners and analyzed using FilmQA™ (3cognition LLC) software. Comparisons between measured and calculated dose distributions are reported as dose difference (DD) (pixels within  $\pm 5\%$ ), distance-to-agreement (DTA) (3 mm), as well as gamma values (dose difference =  $\pm 3\%$ , distance=2 mm).

Results:

Our preliminary analysis of 9 IMRT cases showed that: (i) Vidar and Epson EBT scans differ on average by 7.2% for DD, 6.3% for gamma, and 8.6% for DTA; (ii) same comparison using EDR2 gives 2.2% for DD, 3.1% for gamma, and 2.2% for DTA; (iii) the Epson EBT and EDR2 scans differ on average by 3.4% for DD, 5.0% for gamma, and 2.9% for DTA; (iv) the same comparison between EBT and EDR2 films using Vidar gives 10.3% for DD, 6.8% for gamma, and 5.1% for DTA.

Conclusions:

Tissue equivalence, high spatial resolution, energy independence, and self developing properties make the choice of EBT film for IMRT QA more desirable and cost effective than silver based radiographic film. Much better agreement with calculations can be obtained using EBT with a flatbed scanner. While both scanners give equivalent results with EDR2 films, a flatbed scanner in transmission mode is recommended to achieve optimal results with the EBT films.