

AbstractID: 14236 Title: Dosimetric Verification of IMRT Fields Using GafChromic® EBT-2 Film

Purpose:

Film based dosimetry often has advantages over detector based dosimetry when measurements with high spatial resolution are needed. We present comparisons of dosimetric verification measurements using GafChromic® EBT-2 film with IBA Dosimetry® I'mRT MatriXX with MultiCube.

Methods and Materials:

Dosimetric measurements of IMRT treatment fields for 5 patients were performed using GafChromic® EBT-2 film and compared to measurements performed using IBA Dosimetry® MatriXX. The measurement results from both systems were analyzed using IBA Dosimetry® OmniPro-I'mRT software. GafChromic® films (8"x10") were scanned both pre- and post-irradiation using an Epson® 10000XL flatbed scanner. The pre-irradiation films were used for background subtraction in the OmniPro software. The films were placed in a solid water phantom for irradiation. The MatriXX system uses a 32x32 array of 0.08 cc ion chambers with a center to center spacing of approximately 0.76 cm to measure absolute dose distributions within a solid phantom. Verification plans were created in Pinnacle treatment planning software for both the MatriXX and solid water phantoms. The results were analyzed by comparison of the measured central axis dose, gamma analysis (3 % and 3mm agreement), and evaluation of dose profiles and isodose distributions.

Results:

Better agreement with the planned central axis dose is seen for the measurements with the MatriXX system over those measured with GafChromic® EBT-2 film. However, the film-based measurements show improved agreement in the dose profiles and isodose distributions. These improvements result in better gamma analysis agreement, increasing the average gamma from 97.39% to 99.49%.

Conclusion:

GafChromic® EBT-2 can effectively be used for film-based dosimetry and may provide superior results for small fields, areas with steep gradients, or beam delivery geometries where detector based measurements are limited. Some dosimetry software, such as IBA Dosimetry® OmniPro-I'mRT, may allow users to analyze GafChromic® EBT-2 film without purchasing additional software.