

Purpose:

To present a method to derive absolute leaf positions from Epid measured MLC QA fields on a Siemens Artiste.

Methods:

The MLC 160 on a Siemens Artiste has a unique leaf end design. This results in a varying attenuation of the beam through the leaf edge, depending on the field position. As flat panel based Epid's show a strong spectral signal dependence, the measured image does not represent the real dosimetric leaf positions. Leaf positions derived from data show a characteristic nonlinear mismatch. As films taken simultaneously, referenced to Epid images by markers seen on both systems, did not show this behavior, the effect is caused by the combination of MLC and Epid. Comparisons between film and Epid gave rise to a calibration method Epid to film. As a result there is a polynomial fit of the fourth grade for both MLC sides which is used to correct the Epid measured leaf positions. To derive the raw positions from the images the MLCSoftEpid, PTW, Germany was used. Data then undergo the correction in an Excel file. The results can be displayed using color coded error limits.

Results:

So far, positions were derived from measurements taken over a 5 month period using nineteen 2cm stripes fields. Evaluations with and without the film based Epid calibration show clearly a much improved measurement accuracy. Corresponding error histograms show a reduction in half width of more than 20% and a systematic shift could also be reduced.

Conclusion:

This correction method is an attempt to eliminate the position errors seen in Epid based MLC QA fields. Although it is not easy to establish the film based calibration measurements, this method might help to get a better understanding of this effect and to advance MLC QA with Epid's.