

AbstractID: 3184 Title: Replacement of Film and Ion Chamber measurements by Electronic Portal Dosimetry for IMRT QA

Purpose: To evaluate replacing film and ion chamber measurements with EPID portal dosimetry for IMRT QA.

Method and Materials: IMRT plans are generated in commercially available planning software and a prediction for each field is generated for a square solid water phantom (with the gantry set to 0 deg), a bullet phantom and an aSi EPID. Each IMRT field is delivered to the solid water phantom exposing individual radiographic films. A high dose region and critical structure region is identified in the bullet phantom predicted dose distribution. The IMRT fields are delivered to the bullet phantom with an ion chamber at the high dose region, and repeated with the ion chamber at the critical structure region. The IMRT fields are then delivered to the EPID and a dosimetric image is obtained using commercially available software. The dose delivered to the film is analyzed and compared with the prediction. The ion chamber measurements are compared to the prediction in the bullet phantom. The EPID prediction vs. acquired portal dose is analyzed. EPID results are compared to film and ion chamber results to determine if the EPID can be used as a replacement for film and/or the ion chamber measurements.

Results: Preliminary results indicate that the EPID with commercially available portal dosimetry software has a high dosimetric sensitivity, in the range of 1 to 2 cGy, and sub millimeter spatial resolution. This is suitable for film replacement.

Conclusion: The EPID with commercially available portal dosimetry software can be used as a replacement for film given proper calibration of both the imager and software model. Further research is being done in order to determine if the ion chamber measurement can be similarly replaced.

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