AbstractID: 6407 Title: Analysis of a novel method of IMRT QA using EPID-acquired QA planes

Purpose:
To assess the efficacy and quantify the accuracy of a novel method for IMRT QA in which the measured dose plane is derived from an EPID image.

Method and Materials:
aSi EPID data was acquired and converted using a novel method based on a machine-specific beam model to estimate QA dose planes from mega voltage (MV) EPID images. Dose planes were calculated in a homogeneous, water-equivalent QA phantom using the model and an acquired MV EPID image with no additional build-up required on the EPID.

Specific parameters, such as field size output dependency, dose redistribution kernel, potential off-axis corrections and absolute dose calibration, were measured to create the model that is based on the raw EPID files.

QA dose planes were compared to ion chamber measurements, MapCHECK® measurements, and planar fluences generated by ADAC Pinnacle3® TPS. MapCHECK® and ion chamber (IC) measurements were taken at multiple depths at a source to detector distance (SDD) of 100cm. Dose planes in homogenous media were estimated using EPID images acquired at a distance of 140cm SDD. Data was collected for both 6 MV and 10 MV energies to determine the accuracy of the model for these two energies.

Results:
Preliminary sample analysis demonstrates that the dose planes estimated by the model using EPID images of complex IMRT fields result in >98% pass rate of all point measurements from MapCHECK®, employing a 3% dose or a 2mm distance to agreement criterion. Agreement between MapCHECK® and IC measurements were within 1%.

Conclusion:
This novel method shows promise as a tool for IMRT QA with reasonable accuracy. Setup, acquisition and analysis can be performed in a more time efficient manner than is possible with current methods of IMRT QA.

Conflict of Interest:
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