

## AbstractID: 4941 Title: Clinical Experience in Using EPID for Quantitative Verification of IMRT Dose Distributions

**Purpose:** The purpose of this work is to investigate the advantages of using an electronic portal imaging device (EPID) as part of our clinical IMRT QA procedure. We present our experience with the quantitative verification of the planar dose distribution for patient-specific IMRT treatment plans.

**Method and Materials:** Our treatment machines which are used for IMRT delivery are equipped with amorphous silicon EPIDs. The planning system used for routine IMRT treatment planning calculates planar dose at a predefined source to plane distance (SPD) as part of the EPID-based QA process. For quantitative analysis, dosimetric calibration of the EPID was required, in addition to the standard imager calibrations of the PortalVision imaging device. Basic dosimetric characteristics of the system were initially evaluated using fields with known dosimetry. Absolute dose calibration produces results comparable to ion chamber measurements. The patient IMRT QA fields were delivered prior to treatment and recorded. We have selected 100 cases from our routine IMRT case load for analysis using this procedure.

**Results:** The verification of dose distributions was performed using portal dosimetry in Vision, after beam delivery. The overlay of the acquired and the calculated planar doses as isodose lines provided a useful qualitative evaluation. For further quantitative analysis, the gamma relative evaluation (GRE) was used on each field for every patient. The GRE scores were normally greater than 0.99 for prostate patients and greater than 0.98 for Head and Neck cases or large pelvic fields.

**Conclusion:** Planar dose verification is an important part of the IMRT QA procedure. With the aid of portal dosimetry using EPID, the QA of an IMRT plan can be performed in 30 minutes, saving considerable time compared to film dosimetry. With proper dosimetric calibration, quantitative analysis further ensures excellent quality assurance of IMRT planning and delivery.