

# AbstractID: 5052 Title: Calibration of an aSi Electronic Portal Imaging Device for Dosimetric Evaluation of Intensity Modulated Radiation Therapy

## **Purpose:**

To calibrate an amorphous Silicon (aSi) Electronic Portal Imaging Device (EPID) for dosimetric evaluation of Intensity Modulated Radiation Therapy (IMRT).

## **Methods and Materials:**

This study was performed using a 6 MV photon beam of a Primus linear accelerator with an aSi EPID. A water-filled penta step-phantom of perspex was fabricated for calibrating the EPID. Absolute dosimetry was performed using a calibrated 0.14 cc ion chamber. A polystyrene slab with 21 bores (each separated by 1 cm) to accommodate the ion chamber was used for measuring dose below each step of the phantom. The EPID was calibrated at a source to detector distance of 150 cm.

The calibration procedure involved: i) Acquisition of Electronic Portal Images (EPIs) with the centre of the step-phantom positioned at isocentre for 1, 2 and 3 monitoring unit settings. ii) Measurement of the dose profile below the step-phantom with the ion chamber placed at pre-determined positions on the polystyrene slab iii) Acquisition of an EPI with the centre of the step-phantom at isocentre and the polystyrene slab fixed onto the surface of the flat panel detector. This was used to locate the positions of the ion chamber with respect to the step-phantom. iv) Plotting the calibration graph for pixel values (averaged over ROI of 10 x 12 pixels) and dose.

EPIs of IMRT segments were acquired with the EPID in the 'port-during' mode for each field. All the individually acquired segments were added using codes developed in MATLAB (version 6.5) to get the fluence map.

## **Results:**

The pixel values of the EPIs were found to increase linearly with dose. The fluence maps acquired using the calibrated EPID were verified with the planned fluence maps.

## **Conclusion:**

Therefore it is concluded that EPID could be used as a dosimetric verification tool for IMRT.