

AbstractID: 8583 Title: Dosimetric Characteristics of an Amorphous Silicon Electronic Portal Imaging Device for Dynamic Intensity Modulated Radiation Therapy.

Purpose: To investigate the dosimetric characteristic of an amorphous silicon electronic portal imaging devices (EPIDs) for dosimetric verification of dynamic intensity modulated radiation therapy (IMRT).

Method and materials: The dosimetric characteristic of amorphous silicon EPID (aS500, Varian Medical Systems) studies were dose response, field size response, effect of dead time in frame acquisition, response with leaf speed, response of dose-rate fluctuation, memory effect and long term detector reproducibility. Relative dosimetric measurements using EPID such as open and wedged static fields, IMRT test pattern field and actual fluence from clinical IMRT fields were included.

Results: The results showed that the dosimetric characteristics from EPID were linear with dose and dose rate, and response to MLC leaf speed up to 3.0 cm/s. The reading from EPID and ionization chamber measurements at the field size response were up to 4%. The dead time in frame acquisition was found to be a source of error of up to 20 % in the EPID measured signals. Response with dose-rate fluctuation was within 3.5%. Memory effect was not significant. The long term detector reproducibility was found to be within 2% for dynamic field delivery. The result of relative dosimetry of EPID for IMRT fields was similar to the film measurements; however they were different when compared to CadPlan fluence measurements.

Conclusions: The EPID has potential for use as a dosimetric instrument for IMRT verification.