Purpose:

This study examines the feasibility of patient dosimetric verification of intensity modulated radiotherapy (IMRT) treatment plans using an amorphous silicon (a-Si) electronic portal imaging device (EPID).

Methods:

Patient specific IMRT treatment plans are created and exported to a linear accelerator for dosimetric verification. An a-Si EPID device mounted on the accelerator is positioned at 110 cm SDD and configured to operate in integrated image acquisition mode. Planar EPID images transverse to the beam direction are acquired for each treatment angle of an IMRT plan by direct irradiation of an a-Si EPID. Using software developed in-house these images are then transformed into fluence distributions for importation into a commercial treatment planning system. After import, the fluence distributions are then used to calculate dose distributions and compared with planned dose distributions.

Results:

Planar dose profile gamma analysis (3%, 3 mm) of two 6 MV prostate IMRT plans displays a 99% passing rate. Isocenter point of interest (POI) dose comparisons for 2 liver, 1 abdomen and 2 prostate treatment plans range between 2.8-4.2%.

Conclusions:

IMRT dosimetric verification of planar dose profiles using an a-Si EPID is feasible. POI dose comparisons indicate that our model might benefit by further refinements.

Funding Support, Disclosures, and Conflict of Interest:

Research sponsored by a grant from Oncology Data Systems, Inc, Oklahoma City, OK