AbstractID: 6773 Title: Dose response characteristics of an a-Si flat-panel portal imager

Dose response characteristics for many EPIDs are now well known, more in particular: camera based imagers or liquid ionization chambers. The information can be used to facilitate a number of quality assurance tasks as well as aid in the detection of gross errors during external beam treatment, such as missing or badly oriented wedges or compensators or even to monitor IMRT treatment.

This paper aims to study the dose response characteristics of a flat panel a-Si portal imager (Varian, Palo Alto, CA) for treatment beams of 6 and 15MV at different dose rates from the machine. Central axis measurements were performed to yield pixel value to dose conversion curves. Measurements using stepwedges were done to confirm the obtained values, field size dependence and measurements at different dose rates were performed (e.g. different pulse repetition rates than the one the initial calibration was performed with). Robustness of the calibration curves was estimated by imaging the stepwedge phantom daily.

All pixel to dose response curves were linear with an R=0.988. The wedge data, central axis data and the field size data, all showed linear characteristics when compared to measured or calculated dose data. The change in dose pulse repetition frequency yielded a stepwise dependency. Pixel values at 100 and 200 MU/min were measured to be at the same level and different from 300 and 400 MU/min.

F. Van den Heuvel is partially sponsored by a grant by Varian and the Jackson Foundation for the advancement of military medicine.