

AbstractID: 1726 Title: Response Prediction of a Transmission Type Chamber for Verification of Step-and-Shoot IMRT

The complexity of Intensity Modulated Radiation Therapy presents a significant quality assurance challenge in verifying the fluence delivered by the linear accelerator. Current standard practice calls for patient plan verification using film and ion chamber prior to the start of patient treatment. However, the dose delivered by an IMRT treatment should ideally be verified during the actual patient treatment. We have investigated the use of a commercially available transmission-type ion chamber for the purpose of real-time verification of IMRT treatments. The transmission chamber is mounted in the accessory holder of the accelerator at the shielding tray level. A calculation method, based on a series of square field measurement in a similar geometry, has been developed to predict the response of the transmission chamber in any given treatment field. In actual use, electronics and software developed in-house records the monitor unit (MU) count of the accelerator and the output of the transmission ion chamber to obtain an integrated signal from the chamber for each segment of a step and shoot IMRT field delivery. Data obtained from static rectangular field and prostate patient IMRT field measurements show that the response of the transmission chamber can be predicted to within an accuracy of 5%. The results of this work show that a transmission chamber has the potential to be used as a real-time verification monitor for step and shoot IMRT treatments.