

AbstractID: 3556 Title: Commissioning of a Mobetron Electron Linear Accelerator

Purpose:

The purpose of this paper is to describe the commissioning of our Mobetron electron linear accelerator and share the experience gained during the commissioning process.

Method and Materials:

The Mobetron is a relatively lightweight and mobile linear accelerator that has been developed for use in an operating room suite for delivering intra-operative radiation therapy. This accelerator is capable of delivering a therapeutic beam of electrons with nominal energies of 4, 6, 9 or 12 MeV. The Mobetron comes with a variety of circular cones, ranging in field size from 3 to 10 cm diameter, in 0.5 cm increments, and 3 different angles, flat, 15 and 30 degrees. For each energy and cone, the percent depth dose (PDD), isodose distribution and output factor were measured. These measurements were performed in a water phantom. A dose per MU calibration was performed for each energy, using the 10 cm flat cone, according to the TG-51 protocol. The stability of this output was monitored as a function of time. Finally, dose values were measured at various locations around the Mobetron during operation in order to determine shielding requirements and warm-up procedures.

Results:

PDDs and isodose distributions for the various cone sizes, cone angles and beam energies are presented. Additionally, plots of output factors as a function of field size for the 3 different sets of cones and beam energies are provided. Lastly, the doses at different locations around the Mobetron are shown and the impacts of these doses on shielding and warm-up procedures are discussed.

Conclusions:

The commissioning is complete. PDDs and isodose distributions measured for the Mobetron were similar to those measured for the linac used previously. Due to the machines' design, we found the output did vary with time, by as much as 3% over a period of about 10 days.