AbstractID: 10463 Title: Modeling 6 MeV Electron Beam from Medical Linear Accelerator Using Monte Carlo Simulation

Purpose: To determine the initial electron beam parameters those are mean energy and its full width at half maximum of 6 MeV electron beam from Varian Clinac 2100C and to calculate output factors. **Method and Materials:** Measurements of the central-axis and off-axis dose distributions were made using diode detector in a 3D water phantom. The output factors were measured in a 2D water phantom using ROOS chamber. In simulation, the EGSnrc code was used to simulate the linac treatment head and calculated dose distribution. The parameters selection procedure was to adjusting the initial electron beam parameter until the simulated data agree with measured data. After the appropriate initial beam parameters are achieved, these parameters were used to calculated output factors and compared to the measured data. **Results:** The appropriate mean energy and its full width at half maximum are 7.2 MeV and 4.0 mm. For the output factors, it was found that the difference between the measured and the calculated data were within ±2% in most of the investigated field sizes except for the field sizes of 6x6 and 9.5x4.2 cm^2. The percent difference for field sizes 6x6 and 9.5x4.2 cm^2 are 2.05% and 2.68% respectively. The error may be due to the inaccuracy in model of scattering foil and cutout. **Conclusions:** The results have shown that the Monte Carlo simulation can be used to calculate electron beam data accurately at the 2% level in the most cases for a limited set of data (energy, field size, SSD). In order to apply this model to fully calculated dose distribution for electron mode, further investigation is required in a wide range of configurations such as high energy and irregular field size.