AbstractID: 8132 Title: Practical Approach for Electron Monitor Unit Calculation

Purpose: To propose a practical method of electron monitor unit calculation that can handle most of the clinical cases with a minimal set of measured electron beam data: (a) insert correction factors up to the insert size of 40% of applicator size; (b) virtual source to surface distances of each open applicator. **Method and Materials:** A PTW Markus ion chamber with Plastic Water^{TM} phantom was used to measure the applicator factors, insert correction factors and virtual source to surface distances of eleven different energies (5MeV to 21MeV) for Siemens MD2 and Primus linear accelerators. From these measurements, we found two dosimetric properties of electron beams. First, the output ratio of two inserts is independent of applicator used and second, virtual source to surface distance is a function of field size but is independent of the applicator size and jaw opening. Therefore, insert correction factors and virtual source to surface distances were calculated for most of the clinical cases by extrapolating the minimal set of measured beam data. To calculate the output of elongated electron beam shape, we introduced the elongation correction factor and determined the values by using sector integration method. **Results:** The measured electron output factors of 160 clinical cases were compared to calculated ones and the differences between the measured and calculated values were less than 3%. **Conclusion:** Measuring the electron outputs to cover all the possible clinical cases is not practical in a busy clinic because it involves precious time and labor. By using the proposed method, we can calculate the electron monitor units for most of the clinical cases, including highly elongated fields with accuracy.