

AbstractID: 4728 Title: Rotational total skin electron irradiation using a commercially available linear accelerator with a high dose rate total body electron mode

Purpose: During the past 25 years, 185 patients have been treated with a rotational total skin electron irradiation (RTSEI) technique in our center. To modernize the technique we recently transferred it from a linac (Varian Clinac-18) with a custom modified beam line to a linac (Varian 21EX) with a commercially available electron mode intended for total skin electron irradiation.

Methods and Materials: The new technique uses a “high dose rate” mode and a “high dose per Monitor Unit” mode in conjunction with a custom-made flattening filter to produce a uniform beam at an extended SSD of 378 cm. The accessory tray holds the custom-made flattening filter and automatically selects the beam energy (6 MeV) and high dose rate (888 MU/min) while moving the collimators to the maximum $40 \times 40 \text{ cm}^2$ field size. Beam parameters are monitored using the record-and-verify (VARIS) system.

Results: Reference dosimetry for the stationary and rotational electron fields was performed to allow delivery of the prescription dose using the linac’s transmission ionization chamber. Patients are treated on a rotating platform with a high dose rate rotational electron beam having a z_{max} at the skin surface, an R_{50} at 15 mm and a bremsstrahlung contamination of the order of 3%. The nominal dose rate to water at z_{max} (surface) for the rotational technique was determined to be 24.1 cGy/1000 MU, and beam delivery is monitored with a secondary Farmer-type ionization chamber located near the patient in the treatment field.

Conclusions: Treatment times with the rotational total skin electron irradiation technique at an SSD of 378 cm for a daily dose of 2.0 Gy are of the order of 9.5 minutes and to date we have treated 15 patients with this technique.