

A Modified Rotational Hemi-body Electron Therapy Technique

We have developed a rotational technique to treat patients with mycosis fungoides confined to upper-half of the body. The patient sits in a chair attached to a platform that rotates at 1 rpm. A 40x40cm², 6MeV electron beam was used at a nominal distance of 3m. To prevent self-shielding in the underarm area, the patient's arms were raised upright and supported by a rotating horizontal bar. Patient's eyes were protected with eye shields. To reduce bremsstrahlung radiation, the gantry was rotated to 96° (6° off horizontal), directing the beam central axis above the patient's head. Dose rate, depth dose distribution, and beam profiles were measured, using a parallel plate chamber, film and TLDs in polystyrene and humanoid phantoms. Beam energy at patient's skin was 4.5 MeV. The maximum dose was at skin surface, with the 90% and 10% doses at 10mm and 25mm respectively. X-ray contamination was 4%, in agreement with published data. Dose uniformity throughout most of the treatment area, excluding scalp, was within ± 7%. The dose to scalp varied ±15-20% of the prescribed dose, which was judged clinically acceptable. Indeed, a complete response in the patient's condition was observed. The use of rotational technique simplifies patient setup, resulting in shorter treatment times relative to fixed field methods. At a measured dose rate of 15 cGy/min on patients' skin, delivery of customary 100 cGy/tx takes approximately 7minutes. This technique also eliminates field junctions, thereby improving dose uniformity.