

AbstractID: 11439 Title: Total Electron Therapy calibration with TG-51

Purpose: To determine if slight modifications and assumptions can be made to allow for a TG-51 based absolute dose calibration for a Total Skin Electron (TSE) Therapy program. We show the results of a TG-51 based absolute dose calibration for TSE Therapy which are compared against three other dose calculation methods. **Method and Materials:** A TG-51 calibrated Markus parallel-plate chamber was used for our absolute dose calculation. This chamber was also used to determine the best gantry angles to produce dose uniformity and to determine the percent depth dose for the six dual field electron beams. Full rotation uniformity was analyzed with thermo luminescent dosimeters (TLDs^{*}) and clinical rotation of an anthropomorphic phantom to six different positions (Stanford technique.)

Results: The absolute dose calibration of this TSE program was completed with slight modifications of a standard TG-51 calculation which included extrapolation of the K'_{R50} value to 1.05 ± 0.01 and extended target to skin distance (TSD) of 361cm. Verification measurements were done with TLDs, One-Dose dosimeters, and a TG-21 calibrated parallel-plate. All four systems showed agreement within a maximum difference of 3.5%. The agreement between the TG-21 method and the TG-51 method was 2.3 %.

Conclusion: We do not claim that our TSE absolute calibration is as accurate as a conventional 100 TSD therapy electron beam calibration done with all TG-51 recommended parameters satisfied. We estimate an additional 2% error on the potential absolute dose calculation accuracy of a TG-51 measurement. However, with the high degree of uncertainties involved in TSE therapy, our TSE calibration method offers a reasonably accurate absolute dose calibration involving only a few modifications and estimates and allows for the use of commonly used TG-51 calibrated chambers.