

Thermoluminescent dosimetry in rotary-dual technique of the total skin electron irradiation^{*}

T. PIOTROWSKI¹, D. FUNDOWICZ², M. PAWLACZYK³, J. MALICKI¹

¹Department of Medical Physics, e-mail: piotrowski@wco.pl, and ²Department of Radiotherapy, Greatpoland Cancer Center, 61–866 Poznan, Poland; ³Department of Dermatology, University of Medical Sciences, 60–355 Poznan, Poland

Received September 30, 2002

The aim of the study was to discuss the results of thermoluminescent dosimetry (TLD) in rotary-dual technique of the total skin electron irradiation (TSEI RD), to confirm beam calibration and monitor unit calculations and to provide data for making clinical decisions.

Between May 2001 and April 2002, in 3 cases of mycosis fungoides, 736 dosimetric checks were performed in 34 points at the skin. CaF₂:Mn TLD-400 cubes (1/8"x1/8"x0.015") were used for *in vivo* dosimetry. Doses were computed and analyzed for all locations.

Percent of described dose and SD for the following localizations from 34 points were: anterior abdomen (reference point) 100 ± 6%, upper back 100 ± 8%, right calf 98 ± 10%, left foot (mid dorsum) 97 ± 8%, posterior neck 93 ± 6%, right hand (mid dorsum) 78 ± 10%, hand fingers 57 ± 10%, top of right shoulder 56 ± 14%, left groin 35 ± 20%, perineum 22 ± 17%. The correlations between patient's height and measured doses were sufficient for the following localizations: scalp (top rear), occiput, elbows, hand fingers and hands (mid dorsum). The correlations between obesity index and measured doses were sufficient for the following localizations: shoulders and lateral neck, groins, and perineum.

Dosimetric checks at the reference point confirm that our beam calibration technique and monitor unit calculation are accurate. TLD shows that for some parts of the skin such as shoulder, hands and perineum boost fields were required. The correlations with obesity index and height for several sites suggest that boost fields must be customized for each patient.

Key words: Mycosis fungoides, TSEI, TL dosimetry.

Superficial lesions covering large areas of the skin, as it is observed in mycosis fungoides (MF), can be treated with the total skin electron irradiation (TSEI), although some controversies regarding the role of TSEI in the treatment of MF still exist. Certain patients with the early stage of MF can be treated with this method alone [10, 13]. Many clinicians combine TSEI with chemotherapy and other alternative treatments [4, 12, 15]. TSEI has also been valuable for palliative treatment [9]. All modern TSEI techniques based on multiple electron fields have used irradiation of the whole patient's skin [1, 8, 17, 18, 20]. The most common is the Stanford technique based on six dual electron fields [11]. Full specifications for this technique were described in AAPM Report no 23 [1]. The rotating method described

by PODGORSK et al [20] and modified by KUMAR et al [17] are also often used. Third popular method is a reclined patient-position technique described by GERBI et al [8]. Since year 2000 we developed the rotary-dual method as a combination of the Stanford and rotating techniques. For each MF patient treated in our institution thermoluminescent (TLD) *in vivo* dosimetry was performed.

TLD *in vivo* dosimetry is important for MF treatment process and it is a routine procedure for many institutions that provide TSEI therapy. TLD measurements during TSEI irradiation are important for two reasons: determination of the dose distribution to the patient's skin and verification that the prescribed dose to the patient's skin is accurate [1]. Moreover dosimetric reports are a useful tool for physicians making clinical decision how to prepare additional boost field [1].

The purpose of this paper is to discuss the results of ther-

^{*}Supported by the grant KBN 6 PO5B 054 21.