CASE REPORT

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A Case of Aleukemic Monocytic Leukemia Cutis Treated with Total Body Electron Therapy

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A 39-year-old man with aleukemic monocytic leukemia cutis was treated with total skin electron therapy. The patient was irradiated twice a week for five weeks using three overlapping beams (SSD 145 cm) in a four-field technique with 4 MeV electrons. After delivery of 20 Gy, the nodular lesions disappeared. The patient tolerated the treatment well and showed no serious side effects.

Key words: aleukemic leukemia cutis, monocytic leukemia, total skin electron therapy

Introduction

Aleukemic leukemia cutis is a rare disease that is characterized by leukemic cells infiltrating the skin prior to overt leukemia.[1] We report a case of monocytic leukemia cutis treated with total skin electron therapy.

Case Report and Methods

A 39-year-old man was admitted to the hospital because of a two-month history of multiple pruritic eruptions. On admission, physical examination showed generalized red papules and nodules, excluding the palms, soles, and scalp, without lymphadenopathy or organomegaly. The peripheral blood examination showed hemoglobin 16.0 g/dl, WBC 8,200/μl (68% neutrophils, 29% lymphocytes, 2% monocytes, 1% eosinophils), and platelets $28.9 \times 10^4/\mu$l. Bone marrow smear of the sternum indicated normocellularity with 21.5% of cells consisting of immature monocytes. Iliac bone marrow smear showed no immature monocytes.

Histoenzymatic and electron microscopic study of the skin lesions revealed that the skin-infiltrating malignant cells were of monocytic origin. The patient was diagnosed as having aleukemic leukemia cutis because the peripheral blood showed a normal blood count and no leukemic cells. The patient was initially treated with combined chemotherapy consisting of cyclophoshamide, adriamycin, vincristine, and prednisolone (VEPA); behenyol-araC (BHAC), daunomycin, and 6-mercaptpurine plus prednisolone (BHAC-DMP); or VP-16. Although the skin lesions were diminished in size, regrowth of nodules was observed during chemotherapy.

Total skin electron therapy was adopted secondarily to control resistant skin lesions.

A Varian linear accelerator (model Clinac 18) was used to generate the electron beam. The energy of the electron beams was degraded from 6 MeV to 4 MeV by an 8 mm-thick acryl sheet. X-ray contamination was estimated to be about 2.3%, 5 cm below the treatment plane.

The four-field technique, using the longitudinal axis of the patient was employed on a specially manufactured bed that was inclined 30° to the horizontal plane during each irradiation. The SSD measured 145 cm and irradiation was carried out with three overlapping beams separated by 60 cm (Fig. 1.). The patient was irradiated twice a week with 2 Gy to a total dose of 20 Gy in five weeks. During irradiation, the eyes were protected with a lead shield of 4 mm in thickness and 3 cm in diameter.

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RESULTS

Vertical beam profiles at the treatment plane are shown in Fig. 2. Dose uniformity over the treatment field was obtained. Composite isodose curves for a cross-section of the middle abdomen with four-field irradiation are shown in Fig. 3. The 80% depth dose curve was found at 1.1 cm in the anterior and posterior regions, and slight underdoses were observed in four areas where irradiation was received tangentially.

Disappearance of skin nodules replaced by pigmentation was obtained after delivery of 20 Gy. The patient subsequently received an additional 20 Gy to the orbital regions (shielded areas) and supraclavicular regions (shaded areas).

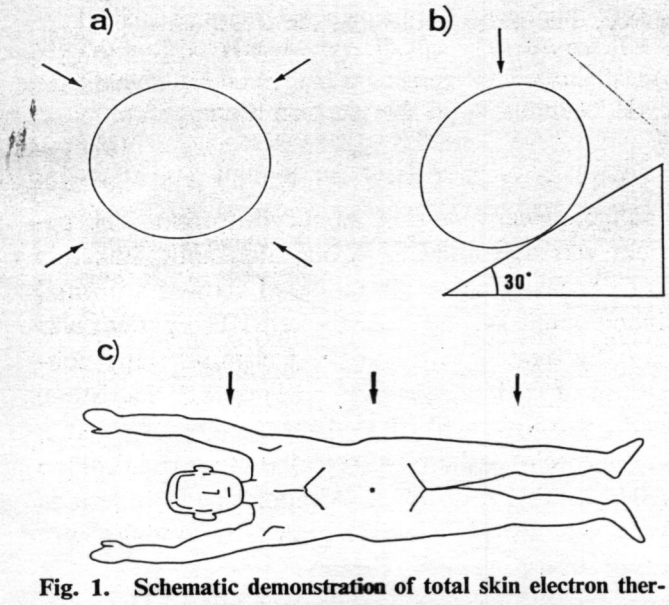

Fig. 1. Schematic demonstration of total skin electron therapy: a) four fields around the longitudinal axis of the patient, b) single irradiation in a 30 degree oblique position, and c) three overlapping fields along the longitudinal axis.

Side effects were transient edema, increased pruritus on the forearms, and temporary hair loss. Serious toxicity such as bone marrow suppression was not observed.

DISCUSSION

It is well known that monocytic leukemia has a tendency to invade extramedullary sites.[2] However, monocytic leukemic infiltration in the skin rarely occurs without evidence of leukemic cells in the peripheral blood.[3] Systemic chemotherapy has been the main treatment for monocytic leukemia cutis; nevertheless, previous studies have reported discouraging results.[4,5] In our case, the cutaneous lesions showed resistance to combined chemotherapy and aggravated itching; therefore, radiation therapy was adopted and proved highly effective for the skin lesions.

Total skin electron therapy is commonly used in the treatment of generalized superficial malignancies like mycosis fungoides.[6,7] Various techniques have been demonstrated to obtain a sufficiently uniform dose over the entire length of the body surface. In institutes where a long SSD can be taken, a single stationary field is used.[8] The most common technique is a combination of two beams angled 10° to 20° above and below a horizontal line.[9] Further Sewchand *et al.* reported that the pendulum-arc technique was superior to that using dual-angled beams because the dose was distributed more uniformly, irrespective of patient height.[10] In contrast, Koga *et al.* employed a technique using three overlapping beams at short SSD.[11] From the technique described above, we chose that of three overlapping beams because the patient could recline during the procedure and we were able to carry out the treat-

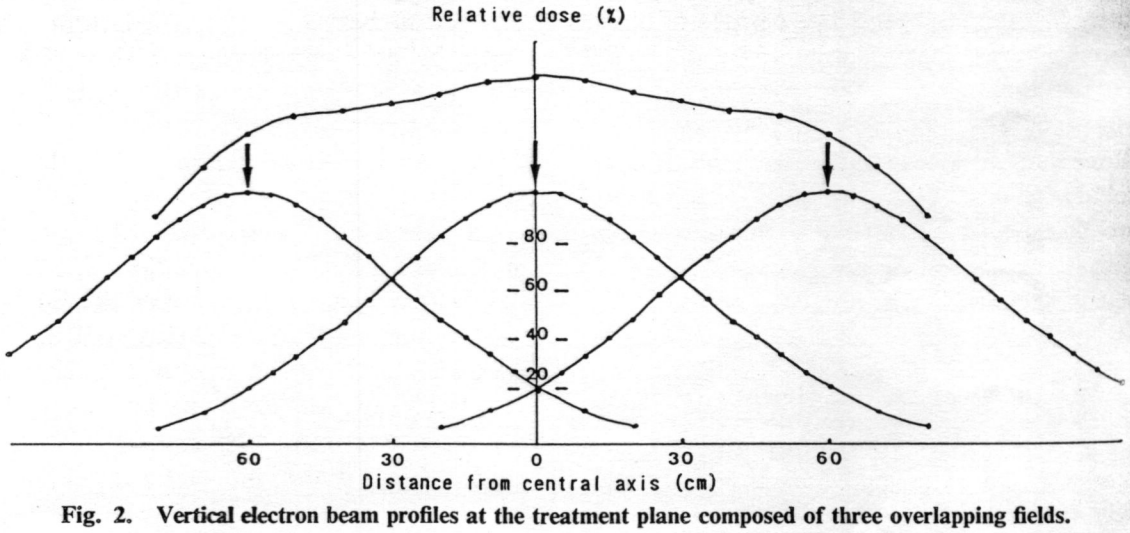

Fig. 2. Vertical electron beam profiles at the treatment plane composed of three overlapping fields.

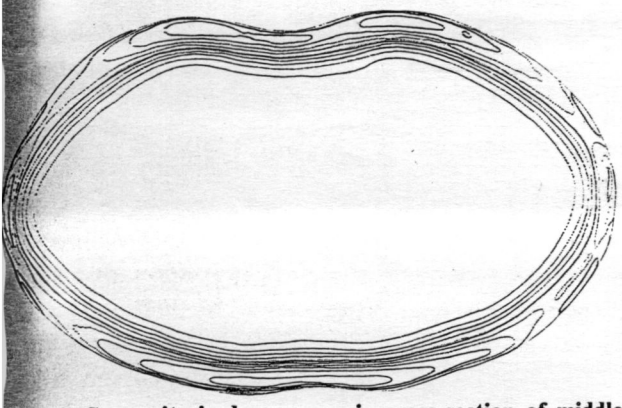

Fig. 3. Composite isodose curves in cross-section of middle abdomen with four-field irradiation (a phantom study). Each center beam makes an angle of 30 degrees to the horizon.

nent in a shorter time despite the increased number of portals.

In this method as Fig. 1 shows, the dose falls off gradually from the central axis. However, vertical dose distribution was within a uniformity of ±10% in the affected areas since hands and feet were free of skin lesions.

In the pertinent literature, the usual angle to the horizontal plane was set at 45° when the four-field technique was combined.[11] Our method used 30° because it is the largest angle at which a patient on an inclined bed can easily maintain a lying position. Although depth-dose data obtained by Rando phantom study indicated underdosed areas tangential to the irradiated beams, skin lesions corresponding to these areas also disappeared. The recommended doses for controlling leukemia cutis vary from 19 to 40 Gy and once a week to four times a week, with fractional doses of 110 to 400 cGy.[5,12] We consider that the total dose should be determined during radiation therapy by carefully observing the response of cutaneous lesions, because successive chemotherapy would be combined with a view to the high incidence of overt leukemia. In this case, a total dose of 20 Gy was well tolerated without systemic side effects. The side effects included only transient edema, increased pruritus in the forearms, and temporary hair loss. Blister formation, nail injury, and arthralgia, previously described elsewhere,[13] were not observed in this case.

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