

phages in the dermis, and the partial network of interconnected pigmented lines can be explained by the presence of hyperpigmentation of the basal cell layer and incontinentia pigmenti in the upper dermis, related to lichenoid infiltrates. This dermoscopic pattern, which was present in 3 different cases of lichen aureus, is completely different from that of demarcated red lagoons, which are characteristic of hemangiomas,<sup>3,4,7</sup> and reticular whitish striae with red lines and dots surrounding the striae described in lichen planus.<sup>8</sup> We conclude that dermoscopy may be of value for the clinical diagnosis of lichen aureus.

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### Efficacy of the 308-nm Excimer Laser in the Treatment of Mycosis Fungoides

**M**ycosis fungoides (MF) is an epidermotropic cutaneous CD4<sup>+</sup> T-cell lymphoma. The accessibility of the lesions, along with the failures of studies to demonstrate prolonged survival using more aggressive systemic therapy, confirms that topical therapeutic modalities are the treatment of choice for localized MF.<sup>1</sup> The efficacy of phototherapy in the patch stage of MF has been well documented.<sup>2</sup> We conducted an open

prospective study to assess the efficacy of treatment with the 308-nm excimer laser in localized MF.

**Methods.** Five patients with limited patch-stage (n=2) or plaque-stage (n=3) MF confirmed by histologic examination were included in the study (**Table 1**). Skin biopsies were performed before treatment and 1 week after the last session. Only patients with stage 1A disease confirmed by staging workup were included. Patients could not use topical therapy 1 month before or during the study.

Each lesion was treated with a 308-nm excimer laser (TALOS; WaveLight Laser Technology AG, Erlangen, Germany). The initial fluences were 50 mJ/cm<sup>2</sup> less than the calculated minimal erythema dose. Then, the fluences were increased by 100 mJ/cm<sup>2</sup> every 2 sessions. When intense erythema occurred, the session was cancelled and the fluence used at the next treatment corresponded to the highest dose that did not induce adverse effects. No mineral oil was used. Treatment was administered twice weekly (on Tuesdays and Fridays) until clinical clearance or minimal residual activity (improvement >90%) was achieved. Tolerance was evaluated with a visual analog scale.

**Results.** A clinical response was obtained for 4 of the 5 patients, and minimal residual activity was observed in the fifth patient (**Table 2** and **Figure**). Clinical healing was obtained in 11 to 21 sessions (average, 15 sessions), with a cumulative dose ranging from 2.4 to 16.1 J/cm<sup>2</sup> (average dose, 6.5 J/cm<sup>2</sup>).

Posttherapy specimens showed a marked decrease of the inflammatory infiltrate, with loss of epidermotropism and Pautrier microabscesses. Persistence of a chronic inflammatory infiltrate without atypical cells was observed in 3 of the 5 patients (**Table 3**). No clinical recurrence was noted 3 months after the end of the sessions.

**Comment.** Our results show the efficacy of the 308-nm excimer laser in clearing localized patch- and plaque-stage MF. Although the number of subjects is limited, the clinical and histologic healing observed in all 5 patients demonstrates the benefits of this new technique. These results are obtained rapidly, allowing a low rate of cumulative doses. No correlation was found between skin type or duration of disease and response to treatment. More follow-up is needed, but, as in other sources of phototherapy, a prolonged period without recurrences may be expected.

**Table 1. Clinical Characteristics of the Study Patients**

Patient No./ Sex/Age, y	Skin Type	MED	Disease Duration, y	Past Treatments	Localization	Symptoms	Type of Lesion	Stage
1/F/41	II	300	22	PUVA, steroid class 4	Thighs	None	Plaque	T1 N0 M0 B0
2/M/78	II	550	10	Steroid class 4	Back	Pruritus	Patch	T1 N0 M0 B0
3/F/69	II	220	9	PUVA, steroid class 3, mechlorethamine	Buttocks, back	Pruritus	Plaque	T1 N0 M0 B0
4/F/65	III	400	5	Steroid class 4	Face	None	Patch	T1 N0 M0 B0
5/F/73	III	300	25	PUVA, UV-B, steroid class 4	Arms	None	Plaque	T1 N0 M0 B0

Abbreviations: MED, minimal erythema dose; PUVA, psoralen-UV-A.

**Table 2. Response of Mycosis Fungoides Lesions to 308-nm Excimer Laser Treatment**

Patient No.	Start of Clinical Improvement (Dose, J/cm <sup>2</sup> )	Total No. of Sessions	Cumulative Dose, J/cm <sup>2</sup>	Side Effects	Tolerance	Clinical Response	Symptom Improvement
1	8th session (1.7)	17	8	Erythema +	10/10	Clear	X
2	10th session (6.6)	21	16.1	Erythema ++	10/10	Minimal residual activity	Pruritus sedation at 6th session
3	7th session (1.1)	12	2.6	Erythema ++	10/10	Clear	Pruritus sedation at 2nd session
4	3rd session (0.5)	11	2.4	Erythema ++ blister (1 time)	9/10	Clear	X
5	5th session (0.9)	15	3.3	Erythema + blister (1 time)	9/10	Clear	X

Abbreviations: +, slight; ++, severe; X, patients who did not present with pruritus at the beginning of the study (no improvement was seen).



Patient 5. A, Plaque-stage lesion of the face. B, Clinical aspect at 3-month follow-up visit. Note the hair regrowth.

**Table 3. Histologic Results**

Case	Pautrier Microabscesses	Epidermotropism	Inflammatory Infiltrate	Acanthosis	T-Cell Marker Study
Patient 1	Pretreatment	+	Marked superficial dermal mononuclear cells with phenotypically abnormal lymphocytes	+	Predominance of CD4 <sup>+</sup>
	Posttreatment	-	Limited lymphocytic infiltrate without phenotypically abnormal lymphocytes	-	CD4 <sup>+</sup> and CD8 <sup>+</sup>
Patient 2	Pretreatment	+	Moderate superficial dermal mononuclear cells with phenotypically abnormal lymphocytes	+	Predominance of CD4 <sup>+</sup>
	Posttreatment	-	Limited lymphocytic infiltrate without phenotypically abnormal lymphocytes	-	CD4 <sup>+</sup> and CD8 <sup>+</sup>
Patient 3	Pretreatment	+	Marked superficial dermal mononuclear cells with phenotypically abnormal lymphocytes	+	Predominance of CD4 <sup>+</sup>
	Posttreatment	-	None	-	CD4 <sup>+</sup> and CD8 <sup>+</sup>
Patient 4	Pretreatment	+	Moderate superficial dermal mononuclear cells with phenotypically abnormal lymphocytes	+	Predominance of CD4 <sup>+</sup>
	Posttreatment	-	None	-	CD4 <sup>+</sup> and CD8 <sup>+</sup>
Patient 5	Pretreatment	+	Marked superficial dermal mononuclear cells with phenotypically abnormal lymphocytes	+	Predominance of CD4 <sup>+</sup>
	Posttreatment	-	Limited lymphocytic infiltrate without phenotypically abnormal lymphocytes	-	CD4 <sup>+</sup> and CD8 <sup>+</sup>

Abbreviations: +, present; -, absent.

Compared with narrowband UV-B phototherapy, which is usually used when lesions cover more than 10% of skin surface, the 308-nm excimer laser has the ability

to deliver high fluences selectively to the target lesion and to induce a more significant apoptosis on the lymphocytes.<sup>3</sup> The 308-nm excimer laser appears to be an ex-

cellent therapeutic choice for clearing MF that is limited to a few lesions.

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### Modification of a Device and Its Application for Intralesional Cryosurgery of Old Recalcitrant Keloids

Cryosurgery, as monotherapy or in combination with other therapeutic regimens, is an effective procedure to use for the treatment of keloids and hypertrophic scars.<sup>1</sup> The inability of skin surface cryosurgery to freeze beyond 20 mm makes techniques for applying cryosurgery in depth attractive for treating old fibrotic and large keloids. We modified the method introduced by Weshahy<sup>2</sup> and developed a device which consists of a small liquid nitrogen dewar that engages a sterile disposable 20-gauge needle connected by a flexible, long metallic cryoprobe stem (**Figure 1** A). The cryo-

probe stem is attached to the needle with a Luer lock, and its shape is variable so that the dewar can stay upright during freezing. The shape of the needle can also be changed to form an angle, curve, or hook. The needle, which is introduced into the skin after a topical anesthetic is administered, runs through the deepest part of the lesion and appears at the surface on the opposite border. Liquid nitrogen is then sprayed through the needle and exits to the atmosphere. An ice cylinder is formed around the embedded part of the needle within the deeper tissue (**Figure 1** B). The distance of extension of freezing can be clinically estimated by the degree of extension of the whitish ice balls that are formed around the contact points of the needle to the skin surface. Compression of the lesions is accomplished by pulling up the visible parts of the needle.

We evaluated the efficacy of intralesional cryosurgery on recalcitrant keloids (>1 year in duration; range, 1-10 years; median, 4 years) with a vertical diameter of 3 mm or more by conducting a pilot open study with 10 patients (5 men and 5 women; age range, 22-62 years; median age, 31 years): 7 whites with skin phototypes I (n=2), II (n=3), III (n=1), and IV (n=1); 2 African Americans; and 1 Indian. Each patient was treated with a minimum of 3 sessions and a maximum of 6 sessions once a month and followed up for an overall period of 6 months. The keloids were treated until they completely froze. The lesions were photographically documented, and plaster imprints were made before and after each treatment. Scar volume was objectively evaluated by measuring the volume of the imprints using peripheral quantitative computed tomography.

A marked flattening of the lesions (volume reduction, 50%-100%) was achieved in 2 patients (**Figure 2**), and a moderate improvement (volume reduction, <50%) was achieved in 5 patients, while 1 patient showed no change and 2 patients experienced a progression (an increase in volume after treatment). The median keloid volume represented 97.5% of the initial median volume after 1 session, 97.9% after 2 sessions, and 69.9% after 3 sessions of treatment. The duration of the complete freez-

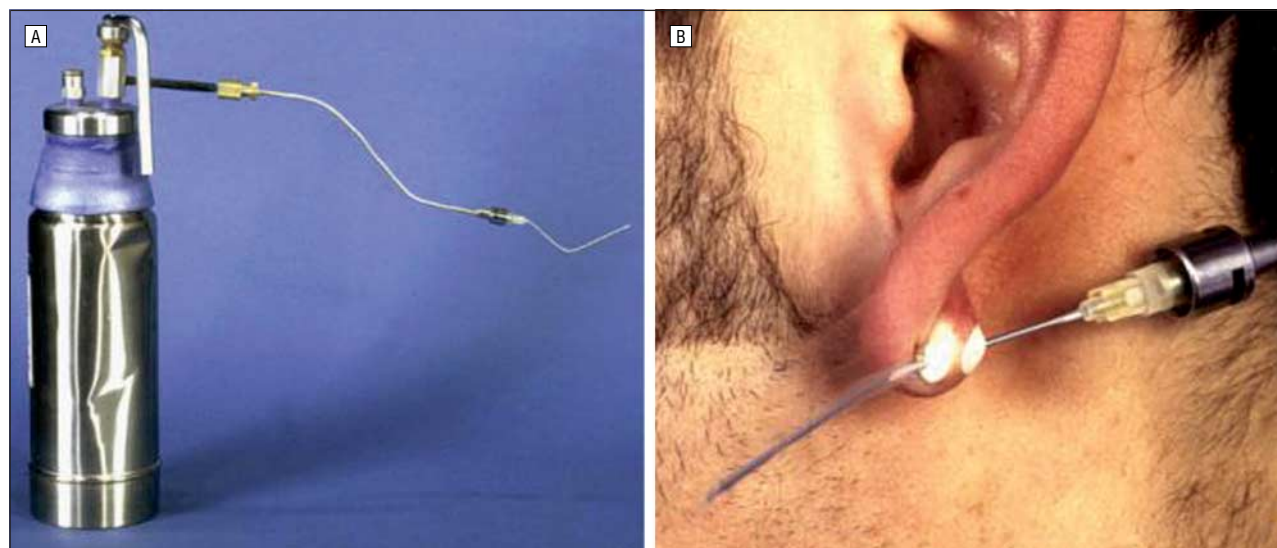


Figure 1. Intralesional cryosurgery. A, The device. B, The procedure. Reprinted from Zouboulis ChC, Orfanos CE. Cryosurgical treatment. In: Harahap M, ed. *Surgical Treatment for Cutaneous Scar Revision.* 2000:185-234, courtesy of Marcel Dekker Inc, New York, NY.