Efficacy of textile photodynamic therapy for mycosis fungoides

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Key words: conventional photodynamic therapy; CTCL; cutaneous T-cell lymphoma; dermaroller; methyl aminolevulinate; microneedling; mycosis fungoides; textile photodynamic therapy.

INTRODUCTION

Conventional photodynamic therapy (cPDT) is a useful treatment option in many neoplastic and non-neoplastic skin conditions.[1] Multiple studies have shown the efficacy of cPDT in the treatment of early-stage mycosis fungoides (MF),[2] which is the most frequent type of cutaneous lymphoma. It has been shown to have an approximately 50% response rate in some studies.[3-5] However, this treatment has some limitations. It is often painful, which can sometimes lead to treatment discontinuation. Barrachin et al[6] published a retrospective study of 24 patients with early-stage MF treated with cPDT; the average pain scale was score 5 in 33% of the patients (based on a visual analog scale score of 0-10). Moreover, some skin regions are difficult to treat (inner thighs, intergluteal fold, neck, and genitals) because of the lamp's characteristics (a stiff, voluminous, and poorly maneuverable device). Additionally, a nonplanar lesion can lead to a nonhomogeneous illumination.[7]

On the other hand, textile photodynamic therapy (tPDT) is a new technique of illumination based on a textile flexible light source. It has multiple advantages: the light source is flexible allowing a homogenous illumination of curved surfaces and the treatment is well tolerated.[8] It has been described as a noninferior treatment for actinic keratosis compared with cPDT (AKTILITE, Galderma) and has a significantly lower pain score.[9] Indeed, the mean pain level (using a visual analog scale) reported was of 0.4 during the first treatment session and 0.2 during the second session compared with a level of 5 during treatment with cPDT (for both treatment sessions).[8]

Abbreviations used:

cPDT:	Conventional photodynamic therapy
MF:	Mycosis fungoides
tPDT:	Textile photodynamic therapy

We report 2 patients treated by tPDT for early-stage MF showing excellent tolerance during illuminations and good clinical outcomes.

CASE 1

An 18-year-old man presented 3 lesions of follicular MF located on the right side of his cheek and neck and the left side of the supraclavicular region, with no prior treatment. Diagnosis was established by routine histopathology and immunohistochemistry of skin biopsy samples by a trained pathologist. Histology showed a dense lymphoid pilotropic infiltrate with an important exocytosis, follicular mucin deposits, and positive CD3 and negative CD8 stains (Fig 1). Molecular biology was compatible with follicular MF. On clinical examination, no abnormal lymph nodes were found and body surface area involvement was estimated at 1.5%. The MF was stage 1A. The patient was treated with 6 sessions of tPDT, using a protocol involving tPDT

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Funding sources: None.

IRB approval status: Reviewed and approved by the University of Lille Hospital (1189).

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JAAD Case Reports 2023;32:11-4.

2352-5126

https://doi.org/10.1016/j.jdcr.2022.11.009

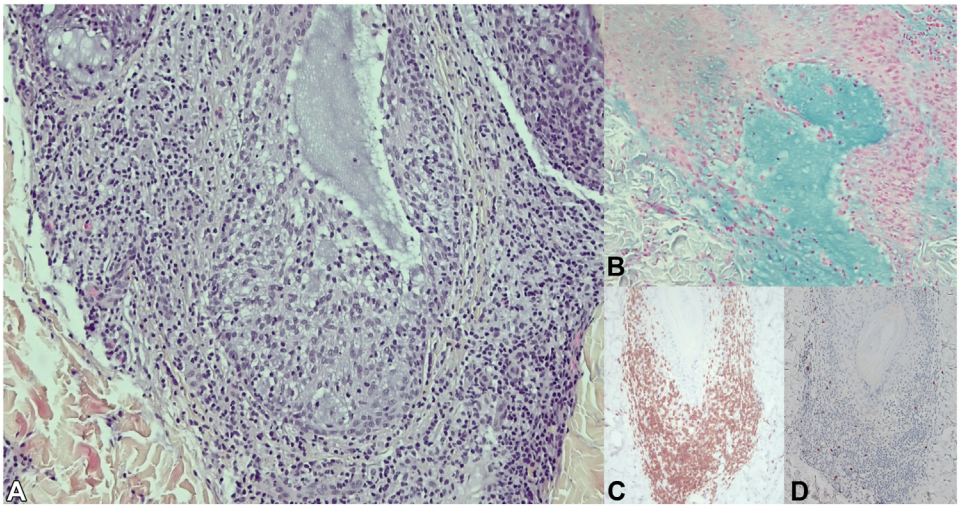

Fig 1. Skin biopsy sample of patient 1 confirming the diagnosis of follicular mycosis fungoides. **A,** dense pilotropic lymphoid infiltrates and **(B)** mucin deposits. **C,** Positivity for CD3 staining. **D,** Negativity for CD8 staining.

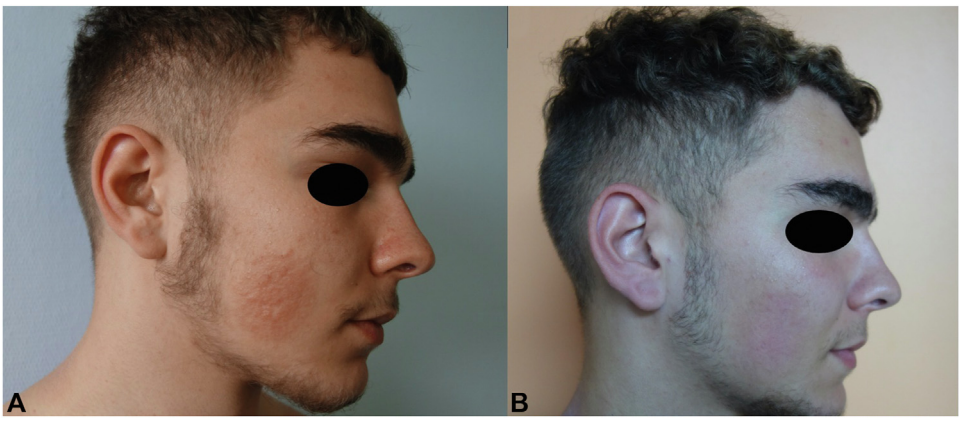

Fig 2. Mycosis fungoides in patient 1 at **(A)** baseline, with pink plaque on the cheek with follicular accentuation, and **(B)** after the fifth treatment.

illuminations of each MF skin lesion every month for a total of 6 months using methyl aminolevulinate as a photosensitizer. We performed a microneedle abrasion of the skin lesions to enhance targeted drug penetration.[10] We then immediately applied methyl aminolevulinate 160 mg/g of cream under a light-occlusive dressing for 30 minutes and proceeded to perform illumination (FLUXMEDICARE, Texinov) for 2.5 hours at a light dose of 12 J/cm^2. The tolerance was excellent with an average pain scale score of 1.5 varying from 0 to 3. During follow-up, all the treated lesions had a significant reduction in size, infiltration, and associated symptoms, such as pruritus (Fig 2). For example, the lesion on his left supraclavicular region measured 3.6 × 3.9 cm during his first illumination and 1.8 × 1.6 cm at his last illumination.

However, a couple of months after the treatment, the patient showed progression of the skin lesions. This suggests that the number of tPDT sessions were insufficient for this patient to achieve a durable response. Following a relapse of his localized skin lesions, we initiated a topical treatment of chlormethine and corticosteroids.

CASE 2

A 73-year-old man presented 2 skin lesions of follicular MF located on the right side of the temple and right wrist, confirmed by histopathology and immunohistochemistry. The skin biopsy samples showed a dense follicular lymphocytic infiltrate with comedones, but without mucin deposits. Immunophenotyping results revealed positive stains for CD3 with a partial loss of CD7 (Fig 3). Molecular biology was compatible with follicular MF. He had been previously unsuccessfully treated with topical corticosteroids and tacrolimus. His body surface area

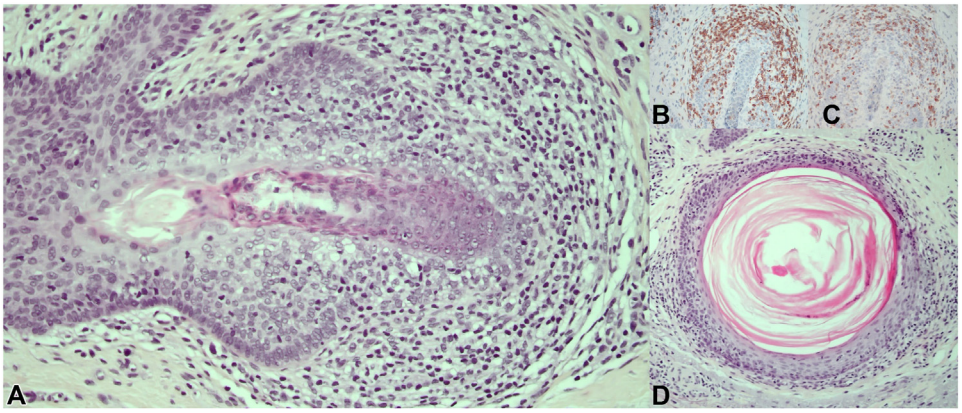

Fig 3. Skin biopsy sample of patient 2 confirming the diagnosis of follicular mycosis fungoides. **A,** Dense pilotropic infiltrates without deposition of mucin with **(B)** CD3 expression, **(C)** partial loss of CD7, and **(D)** comedones.

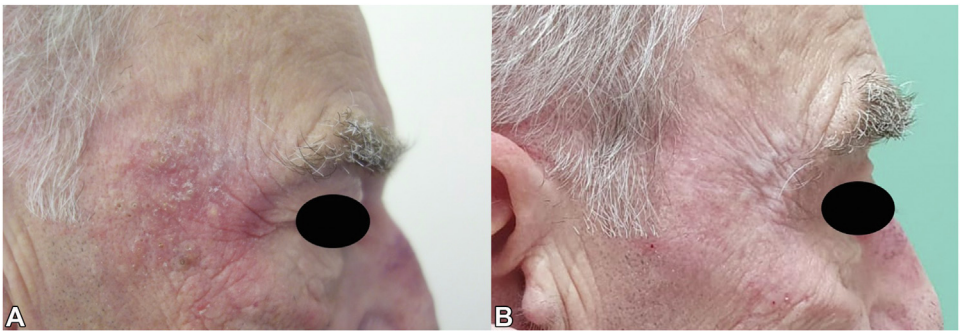

Fig 4. Mycosis fungoides in patient 2 at **(A)** baseline and **(B)** 3 months after the third treatment.

involvement was 1% and he had no lymphadenopathy by physical examination, consistent with stage IA disease. Three sessions of tPDT were performed on each follicular MF skin lesion. The protocol used was based on illuminations of each MF skin lesion with tPDT every month. A total of 6 sessions were initially scheduled. However, the patient only completed 3 sessions due to an unrelated medical event. The illumination protocol was identical to the case of patient 1. The illuminations were well tolerated with an average pain scale score of 1.5. The patient was evaluated 3 months after the last illumination (Figs 1 and 4). The lesions showed partial response to treatment with a decrease in size, lesion infiltration, and associated symptoms.

DISCUSSION

The decision to treat these 2 patients with tPDT was on the basis of the anatomic location of the lesions on the face (cheek and temple). In contrast, cPDT might have resulted in poor tolerance and nonhomogeneous illuminations. These 2 observations highlight the positive clinical outcome of tPDT in the treatment of early-stage MF and associated symptoms, without disease progression during treatment and an excellent tolerance with an average pain scale score of 1.5 for both patients. No treatment discontinuation was observed. Additionally, the technique proved to be easy to use and allowed a close patient follow-up.

Additionally, we used a microneedle abrasion of the MF skin lesions to create abrasions of the stratum corneum and increase the penetration of methyl aminolevulinate, assuming that it would boost efficacy of treatment.[10]

In the treatment of early-stage MF, tPDT appears to be an interesting alternative to cPDT. It has many advantages, especially the low pain scores, which allowed us to perform multiple treatment sessions with good patient adherence to treatment. Additional studies on larger series are necessary to confirm the efficacy of the treatment.

Conflicts of interest

None disclosed.

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