

Effective treatment of scalp psoriasis using the excimer (308 nm) laser

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Background: Psoriasis of the scalp can be a major therapeutic challenge as response to topical medication is often inadequate. The excimer laser has potential for providing local phototherapy as its high irradiance makes treatment at this site a practical option.

Objectives: To analyze retrospectively results of treating scalp psoriasis with the excimer (308 nm) laser.

Methods: Thirty-five patients were treated and all had failed intensive topical therapy. Manual separation of hair was used to provide access to the treatment site. Starting doses ranged from 300 mJ/cm² (type I) to 1000 mJ/cm² (type IV) with treatment twice weekly.

Results: All patients improved. Seventeen/35 (49%) of patients cleared >95% (mean: 21 treatments; range: 6–52) and 16/35 (45%) cleared 50–95%. Phototoxicity in the form of erythema and blistering occurred in all patients, particularly around the ears and nape of neck.

Conclusion: The excimer laser is a successful approach to treatment of psoriasis of the scalp being a simple treatment that can be performed in a short period of time and which has a high rate of effectiveness.

Key words: laser; psoriasis; scalp.

Persistence of psoriasis on the scalp can be a major problem in patients treated with phototherapy and psoralen and ultraviolet A (PUVA) therapy. In patients with hair at the psoriatic site, an insufficient number of photons penetrate to produce local clearance of disease during whole-body treatment. Intensive use of topical therapy combined with a possible systemic effect of UV therapy often produces improvement of psoriasis on the scalp but effective control is unusual. In addition, some patients have marked psoriasis on the scalp and minimal or no disease elsewhere and they present a therapeutic challenge.

The excimer laser provides a very high irradiance of narrowband (308 nm) UV radiation so that treatment time for a given area of skin is very short. This therapeutic advantage, combined with some type of mechanical (manual) separation of the hair, appears to effectively treat scalp psoriasis. This report details our findings and describes our present techniques.

Materials and methods

Patients

To date, 35 patients have been treated, 10 males and 25 females. Age ranged from 8–81 years of age. All

had failed intensive topical therapy. The patient characteristics are given in Table 1.

The laser and dosimetry

The excimer laser (Xtrac[®], Photomedex, Montgomeryville, PA) delivers 308 nm radiation through a liquid light guide with a beam cross-section of 3.24 (18 mm × 18 mm). The irradiance is 750 mW/cm² and the maximum output is over 4000 mJ/pulse. The laser can be used in a pulsed mode where a set dose is delivered for each pulse or a continuous mode where the dose delivered to skin depends on the operator moving the handpiece. The laser was used in the pulsed mode for the present study and the details of the dosimetry are given in Table 2. The starting doses were selected as being suberythemogenic for each of the skin types based on determinations of the minimal erythema doses in previously treated patients. The dose was increased at each treatment if erythema had not been induced by the previous treatment.

Skin conditioning and target area preparation

In our clinical experience, it is essential to remove as much scale as possible before commencing treatment, and to ensure the patient continues to use descaling agents, particularly on the evening before a laser treatment. A descaler is used on all patients with

Table 1. Patient characteristics

Skin types
I: 4
II: 28
III: 2
IV: 1
% Scalp involvement
20–50: 11
50–75: 8
75–100: 16
Whole-body treatment
Narrowband therapy: 18
PUVA therapy: 11
None: 6

Table 2. Dosimetry

Starting dose according to skin type
I: 300 mJ/cm ²
II: 400–600 mJ/cm ²
III: 800 mJ/cm ²
IV: 1000 mJ/cm ²
Increments: 10–20% as tolerated
Highest dose: 4000 mJ/cm ² in skin type IV
Time to perform treatment: 10–15 min
Treatment frequency:
Clearance phase: BIW (twice weekly)
Maintenance phase: QW (weekly)

significant scaling. In a few patients with very thick hair, some thinning and trimming of hair is advised.

Technique

Initially, a prototype blower device was used for separating the hair with air flow funneled around the handpiece of the laser. This arrangement obscured the view of the treatment site and in most patients did not provide good separation of the hair. In an effort to promote ease of treatment, we used a manual approach for separation of the hair. Our current technique utilizes this manual technique using one hand to separate the hair while holding the handpiece in the other hand, as shown in Fig. 1 and outlined in Table 3.

Response rate

All patients have improved on treatment in terms of symptoms such as discomfort and pruritus and in area of scalp involvement. The improvement of disease extent is summarized in Table 4.

For most of the patients who cleared completely or almost completely, treatment was stopped; some went on to maintenance treatment; and four have had a major relapse requiring a second course of treatment. The time to relapse in these patients ranged from 1 to 6 months. The longest remission is 30 months.



Fig. 1. (A) Technique for manual separation of hair.

Table 3. Treatment technique

1. Provide goggles for patient and nurse, wear gloves and use good lighting
2. Determine location of psoriasis, draw diagram in chart if necessary to identify site
3. Determine response to previous treatments checking for tenderness, erythema and/or exudate from blistering
4. Manually part hair to enable contact of handpiece to site of psoriasis. Treat in a pattern, for example left to right or side to back and avoid overlapping laser pulses
5. Use caution around ears and nape of neck where there is minimal hair
6. When scalp is almost clear and scaling is minimal, determine if other areas are pruritic and treat if necessary
7. Clean handpiece tip

Table 4. Improvement of extent of disease

Patients >95% clear = 17/35 (49%)
Patients 50–95% clear = 16/35 (45%)
Patients <50% clear = 2/35 (5%)
Treatments to clear = 21 (mean) 6–52 (range)

Most patients who have cleared more than 50% of the area involved but less than 95% are still on treatment but four have stopped for various non-clinical reasons: moved out of town, stopped for summer, change of insurance.

Adverse effects

The only adverse effect has been phototoxicity in the form of erythema and blistering. This has occurred in all patients at some time with a mean number of four episodes per patient and a range of one to 15 episodes per patient. The most commonly affected sites are around the ears and the nape of the neck. Sites of phototoxicity were not treated at the next treatment and recovery was rapid with symptomatic treatment.

Discussion

The excimer laser is now an established treatment for mild to moderate psoriasis. Essentially it is a form of narrowband ultraviolet B (UVB) phototherapy delivering 308 nm radiation but its high output makes it technically possible to treat individual areas of psoriasis in short periods of time. Furthermore, when used in a supraerythemogenic mode involving exposure of plaques to several multiples of the minimal erythema dose rapid clearance can be achieved followed by prolonged remissions (1). This finding has been confirmed in a multicenter study in over a 100 patients (2).

Psoriasis on the scalp persists as a problem in patients treated with UV therapy, who have hair at this site because of lack of penetration of photons. Except in the occasional patient who is willing to shave their head, adjunctive topical therapy is the only option and this often gives less than satisfactory results. A previous study (3) has reported successful treatment of scalp psoriasis using an excimer laser in tandem with a hair blower and we sought to build on that observation by incorporating a blower device to deliver airflow around the handpiece. We found this cumbersome to use, that it obscured visualization of the target area and in patients with stiff hair it did not achieve good separation of the hair. In contrast, simple manual separation of the hair using one hand provided good visualization of the psoriasis and permits rapid treatment so that a whole scalp can be treated in less than 15 min.

Excimer laser treatment of psoriasis on glabrous skin is often treated with erythemogenic doses and this is usually well tolerated despite some discomfort from the erythema and blistering. However, this does not apply to the haired scalp as we found patients object strongly to this problem and discomfort of discharge and exudate in their hair. For this reason, we used a suberythemogenic schedule although erythemas were common at the margins of the scalp where hair is thinner. Clearly there is a marked difference in the erythema threshold of glabrous and nonglabrous skin

and care must be exercised at the scalp margins. It is interesting to note there was no difference in frequency of erythema in patients received PUVA therapy, who were having this treatment before or after the scalp treatment as compared with other patients, even though 311 nm fluorescent sources can activate psoralen (4).

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