

## ORIGINAL ARTICLE

# A 308-nm monochromatic excimer light in the treatment of palmoplantar psoriasis

SP Nisticò,† R Saraceno,† S Stefanescu,‡ S Chimenti\*†

†Department of Dermatology, University of Rome, 'Tor Vergata' Italy

‡Department of Dermatology, Colentina Hospital, Romania

## Keywords

308-nm, MEL, palmoplantar psoriasis (PP)

\*Corresponding author, Department of Dermatology, Policlinico Tor Vergata, Viale Oxford 81, 00133, Rome, Italy.  
tel. + 39 062 090 2739, fax + 39 209 027 42  
E-mail: chimenti@dermatologica.it

Received: 27 October 2004,  
accepted: 5 August 2005

DOI: 10.1111/j.1468-3083.2006.01503.x

## Abstract

**Background** Various reports have shown the efficacy of narrow-band UVB (311–313 nm) and excimer laser (308 nm) in the treatment of psoriasis.

**Objective** To prove the efficacy of light produced by xenon-chloride excimer at 308 nm (monochromatic excimer light, MEL) in the treatment of palmoplantar psoriasis (PP).

**Methods** Fifty-four patients (29 male and 25 female) affected by PP were treated with MEL every 7–14 days. A mean number of 10 sessions was performed with an increase of the dose depending on patient's skin type and response.

**Results** All 54 patients completed the treatment. After 4 months of MEL we observed a complete remission in 31 patients, a partial remission in 13 patients, and a moderate improvement in 10 patients.

**Conclusions** These results suggest that MEL can be considered as a valid therapeutic option for treatment of selected forms of PP.

## Introduction

Psoriasis vulgaris is a chronic inflammatory skin disease affecting 1–2% of the population worldwide, and its characteristics are hyperproliferation of keratinocytes and infiltration of inflammatory cell into the skin. The disease varies in severity depending on inheritance and environmental factors; some patients have mild disease with isolated scaling erythematous plaques on the elbows, knees, or scalp, whereas others can have up to 100% of their cutaneous surface affected.<sup>1</sup>

When psoriasis involves the palms and soles it is referred to as palmoplantar psoriasis (PP). PP lesions may occur along with psoriasis elsewhere on the body or may be the only skin manifestation. Palm and sole involvement can be painful and disabling, as the acral skin lesions can interfere with a variety of functions.<sup>2</sup>

Patients with palm and sole involvement show an increased negative social and psychosocial impact with decrements in quality of life.<sup>3</sup>

This condition is often recalcitrant to therapy. Topical and systemic treatments are often disappointing and

may cause side-effects. Phototherapies such as ultraviolet B (UVB) therapy or psoralen–ultraviolet A (PUVA) have proven to be highly effective in the treatment of psoriasis.<sup>4</sup> Currently, PUVA therapy is considered first-line therapy in the treatment of PP.<sup>5,6</sup> Furthermore, an advance in UVB-based phototherapy has been the introduction of narrow band. Narrow-band phototherapy employs radiations of the UVB spectrum with wavelength between 300 and 313 nm. In this spectrum, the UVB activity is effective and safe, and offers long-term remissions.

The overall efficacy of the light produced by xenon-chloride excimers at 308 nm has been reported in the treatment of psoriasis, especially in stable forms of localized plaque type.<sup>7–14</sup> In particular, excellent results have been recently reported for the treatment of PP.<sup>12,15</sup>

To confirm previous study we performed an open trial in 54 patients affected by PP. The aim of the present study was to investigate the efficacy, side-effect profile and patient tolerability of monochromatic excimer light (MEL) in the treatment of PP.

## Materials and methods

The 'excimer' is an excited dimer, a molecule formed by the combination of two atoms: a noble gas xenon and chloride. The excitation of the molecule emits an ultraviolet photon at 308 nm.

The excimer light (MEL, Excilite TM Deka Medical Lasers, Florence, Italy) is a monochromatic non-coherent light; it releases a power density of 48 mW/cm<sup>2</sup> at the distance of 15 cm from the source and it has a maximum irradiation area of 512 cm<sup>2</sup> that can be reduced with appropriate filters.

In this study, conducted in Dermatology Department of the University of Rome 'Tor Vergata', we treated 54 patients affected by PP on the palm, sole or both (Table 1). Participants included 29 men and 25 women (Fitzpatrick skin types II–IV) with mean age of 48 years and PASI (psoriasis area and severity index) score from 4 to 8; they had psoriasis for an average of 12 years. The whole body was examined for the presence of lesions of psoriasis and those who had an involvement of palms and soles as part of extensive psoriasis (> 30% body surface area), erythroderma or generalized pustular psoriasis were excluded from the study. In a few patients (3/54), a skin biopsy was carried out to confirm the diagnosis. Patients with history of skin cancers or photosensitivity-related disorders were excluded. Patients who had been on systemic medication and phototherapy for less than 8 weeks or had used treatments within the past 4 weeks were excluded. All patients gave their informed consent and avoided application of any topical medication during MEL treatment. Photographs were taken at baseline, upon clearing, if clearing occurred, and after 4 months of treatment.

Prior to the treatment the minimal erythematous dose (MED) was determined on healthy and unexposed skin

**Table 1** Localization and treatment

Site	Number of patients	Number of sessions (mean)
Palms	27/54	10
Soles	19/54	12
Palmoplantar	8/54	12

**Table 2** MED at 308 nm

Phototype	MED
I	4 s 200 m J/cm <sup>2</sup>
II	5 s 250 m J/cm <sup>2</sup>
III	4 s 300–350 m J/cm <sup>2</sup>
IV	7–8 s 350–400 m J/cm <sup>2</sup>

MED, minimal erythematous dose.

on the dorsal area. MED was evaluated after an increasing dosage of light exposure. The doses obtained are presented in Table 2. The initial dose of MEL was calculated according to patient phototype and entity of squamous and erythematous component of the psoriatic lesions. A dosage of twice or three times the MED was used for more infiltrated lesions with a higher squamous components.

Lesions were irradiated protecting the surrounding non-affected skin and petrolatum ointment was applied on the scaly patches prior to irradiation to minimize light reflections.

A mean number of 10 sessions (from 6 to 14) was reported every 7–10 days with an increase of 250–500 mJ/cm<sup>2</sup> at each application depending on patient's phototype and response to previous treatment as evidenced by reduction in size and flattening of lesions, and reduction of erythema and scaling.

Clinical evaluation was performed before every session and PASI score<sup>7</sup> was calculated every 2 weeks. Response rate was defined as completely (an improvement of the PASI between 75% and 100%), partial response (50% and 75%) and a slight improvement (25% and 50%).

## Results

All 54 patients completed the treatment. After four sessions of MEL patients evidenced an improvement of the PASI score. After 4 months we observed a complete remission in 31 patients (57%), a partial remission in 13 patients (24%), and a moderate improvement in 10 patients (19%).

The primary efficacy end point we considered was a ≥ 75% improvement in PASI score (PASI 75). This result was achieved in 30 of the 54 patients after the fourth application, at week 4, and in 44 of the 54 patients, at week 8 (figs 1 and 2).

This benefit was maintained at 16-week follow-up in 46 of the 54 patients, whereas all the patients that completed the treatment maintained the result achieved.

A prolonged erythema (24–48 h) was evidenced in 20 of the 54 patients after the first and second sessions with a mild pruritic sensation.

Formation of vesicles and oedema were observed after three sessions in one patient. These resolved after a local treatment with hydrocortisone 1% ointment for 3 days. These common side-effects were well tolerated.

However, the patients responded to the following sessions and successfully completed the treatment.

## Conclusions

The 308 excimer light and laser treatments appear to offer relapse-free periods for localized psoriasis<sup>7</sup> that are comparable



**fig. 1** A 55-year-old man: palmar psoriasis before treatment.



**fig. 2** Complete remission after eight sessions of MEL.

or better than that offered by standard topical therapy regimens.

Campolmi *et al.* in a recent report showed an improvement ranging from 75% to 100% after 6 weeks of treatment with MEL in 11 patients with PP and no relapse at 16-week follow-up.<sup>15</sup>

Furthermore, Cappugi *et al.* in 2002<sup>12</sup> reported an improvement of PP lesions (flattening of plaques, decreased scaling and erythema) from 50% to 100% after 1–15 sessions of MEL in 81 patients. This study suggested that 308-nm MEL plays an essential role in drastically decreasing cytokine expression in psoriatic skin which is accompanied by clinical remission through a modulation of the local immune response and T-cell depletion and alterations in apoptosis-related molecules.<sup>16</sup>

In our opinion, further data are needed to determine how the MEL remission rate may be maximized in order

to provide patients good long-term control of their disease. In this study we evidenced the benefits of MEL such as a selective use of high doses with a partial or total remission in over 50% of the patients.

We noted an early and fast clinical answer in palm lesions (mean number of sessions was 10). On the other hand sole lesions were resulted more resistant and those needed a major number of applications (mean number of sessions was 13), but the benefit achieved was maintained at 16-week follow-up. Furthermore, we evidenced a reduction of the number of sessions vs. narrow-band UVB and traditional phototherapy.

We observed how the choice of the dose represents the most important feature in the variability of clinical responses. The results we obtained are encouraging although the costs and the small number of centres that provide the treatment are to be considered as limits.

More studies will be necessary to evaluate different therapeutical schemes and to evaluate any long-term side-effects. Also, with the difference between PP and psoriasis in other areas, specific measurements of disease severity in PP will be required for an appropriate analysis of therapy results.

In conclusion, our study considers the use of the MEL as a valid choice in the treatment of selected forms of PP with an overall efficacy even in absence of topical/systemic drugs, although we suggest the chance for combined therapies. MEL represents a novel and useful alternative to existing therapy (e.g. PUVA treatment or oral retinoids) and these results suggest that it is an effective and well-tolerated treatment for PP.

## References

- 1 Lebwol M. Psoriasis. *Lancet* 2003; **361**: 1197–1204.
- 2 Pettey A, Balkrishnan R, Rapp SR *et al.* Patients with palmoplantar psoriasis have more physical disability and discomfort than patients with other forms of psoriasis: implications for clinical practice. *J Am Acad Dermatol* 2003; **49**: 271–275.
- 3 Rapp SR, Ferldaman SR, Exum ML *et al.* Psoriasis causes as much disability as other major medical disease. *J Am Acad Dermatol* 1999; **41**: 401–407.
- 4 Honigsmann H, Szeimis R-M, Knobler R *et al.* Photochemotherapy and photodynamic therapy. In: Freedberg IM, Eisen AZ, Wolff K *et al.*, eds. *Fitzpatrick's Dermatology in General Medicine*. McGraw-Hill, New York, 1999: 2880–2900.
- 5 Stege H, Berneburg M, Ruzicka T *et al.* Creme-PUVA-photochemotherapie. *Hautarzt* 1999; **48**: 991–995.
- 6 Grundmann-Kollmann M, Behrens S, Peter RU *et al.* Treatment of severe recalcitrant dermatoses of the palm and soles with PUVA-bath versus PUVA-cream therapy. *Photodermatol Photoimmunol Photomed* 1999; **15**: 87–89.

- 7 Bonis B, Kemeny L, Dobazy A *et al.* 308 nm UVB excimer laser for psoriasis. *Lancet* 1997; **350**: 1522.
- 8 Asawanonda P, Anderson RR, Chang Y, Taylor CR. 308 nm excimer laser for treatment of psoriasis: a dose–response study. *Arch Dermatol* 2000; **136**: 619.
- 9 Trehan M, Taylor CR. High-dose 308 nm excimer laser for the treatment of psoriasis. *J Am Acad Dermatol* 2002; **46**: 732–737.
- 10 Feldman SR. Remissions of psoriasis with excimer laser treatment. *Dermatol Online J* 2002; **8**: 23.
- 11 Feldman SR, Housman TS, Fitzpatrick RE *et al.* Efficacy of the 308-nm excimer laser for treatment of psoriasis: results of a multicenter study. *J Am Acad Dermatol* 2002 June; **46**: 900–906.
- 12 Campolmi P, Mavilla L, Lotti TM *et al.* 308 nm monochromatic excimer light in psoriasis. Clinical evaluation and study of cytokine levels in the skin. *Int J Immunopathol Pharmacol* 2002; **13**: 14–19.
- 13 Gupta SA, Taneia A, Trehan MA, Taylor CR. A 308 nm excimer laser for the treatment of scalp psoriasis. *Photodermatology* 2002; **18**: 105.
- 14 Gupta SN, Taylor CR. 308-nm excimer laser for the treatment of scalp psoriasis. *Arch Dermatol* 2004; **140**: 518–520.
- 15 Campolmi P, Mavilla L, Lotti TM *et al.* 308 nm monochromatic excimer light for the treatment of palmoplantar psoriasis. *In J Immunopathol Pharmacol* 2002; **13**: 11–13.
- 16 Bianchi B, Campolmi P, Mavilla L *et al.* Monochromatic excimer light (308 nm): an immunohistochemical study of cutaneous T cells and apoptosis-related molecules in psoriasis. *J Eur Acad Dermatol Venereol* 2003; **17**: 408–413.