

Treatment of Plaque Psoriasis by 308 nm Excimer Light in Egyptian Patients

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ABSTRACT

Introduction: Psoriasis is a chronic skin condition that demonstrates a high burden and an impaired quality of life. The role of excimer light therapy and its modes of action are not completely understood in the treatment of psoriasis.

Aim: To evaluate the clinical efficacy and safety of Monochromatic Excimer Light (MEL) in the treatment of psoriasis.

Materials and Methods: Ninety Egyptian psoriasis patients with plaque-type psoriasis were treated with MEL twice a week, for a total of 24 sessions or until complete improvement. The Psoriasis Severity Index (PSI) was assessed for each patient.

Results: At the final visit, 96/360 (26.67%) patches of psoriasis showed complete clearance, 75/360 (20.83%) patches achieved more than 75% improvement, 132/360 (36.67%) patches

achieved 51-75% improvement and 57/360 (15.83%) patches achieved 26-50% improvement. The best result occurred on the trunk followed by lower limbs, upper limbs, palms and soles than the scalp. There was inverse statistical correlation between the percentage of improvement and skin phototype and no correlation with patient's age, sex or duration of disease. Side effects reported were erythema in 45 patches, post inflammatory hyperpigmentation in 102 patches, perilesional skin was covered by protective sheet, so no side effect occurred. No recurrence was observed six months after treatment.

Conclusion: The clinical data indicate that 308 nm excimer light is safe and effective in the treatment of psoriasis and the outcome of treatment is affected by skin phototype and site of the disease. Post inflammatory hyperpigmentation was the most common side effect.

Keywords: Mono chromatic excimer light, Plaque psoriasis, Phototherapy

INTRODUCTION

Psoriasis is a common, chronic, relapsing/remitting systemic disease characterised by skin lesions including red, scaly patches, papules, and plaques, which usually itch [1-9]. Topical agents are typically used for mild disease, phototherapy for moderate disease, and systemic agents for severe disease [2].

Monochromatic Excimer Light (MEL) is a type of ultra violet lamp, which uses combination of noble gases, including argon, krypton, xenon and halogen [10]. Appropriate electrical stimulation and high pressure create a pseudo-molecule MEL, which exerts activity of laser light with UV range [11]. In dermatological fields, MEL is new UV-B rays which are used in treatments of psoriasis, vitiligo, alopecia areata, atopic dermatitis and patch-stage of mycosis fungoides [12,13].

The aim of this study was to evaluate the clinical efficacy and safety of MEL in the treatment of psoriasis.

MATERIALS AND METHODS

A prospective monocentric study with MEL machine (Excilite-μ, Deka, Florence, Italy) was conducted in the Department of Dermatology, Al Azhar University Hospital, Assiut, Egypt from April 2014 to July 2016. The study was approved by the Institutional Ethics Committee of Faculty of Medicine, AL-Azhar University. All participants were informed about the nature of the study, and written informed consent was obtained. Ninety consecutive psoriasis patients (54 males and 36 females), age range from 4 to 58 years were recruited from the phototherapy unit. Patients were with skin phototype III, IV and V (according to Fitzpatrick classification I-VI) [14]. Patients were classified according to psoriasis affection as: scalp (n=45 patches), upper limb (n=114 patches), palms and soles (n=12 patches), trunk (n=75 patches), lower limb (n=114 patches). Exclusion criteria were pregnancy, personal history of skin cancer or radiotherapy on

the area treated, topical or systemic treatment four weeks before inclusion and phototherapy 12 weeks before inclusion.

Psoriasis history, medical history, treatment(s) received for psoriasis and other treatments were recorded for each patient. All patients were treated by MEL, two sittings per week.

PSI was calculated before and after treatment which was derived from the standard Psoriasis Area and Severity Index (PASI) by omitting the area, thus assigning a score of 0-4 (0=none; 1=mild; 2=significant; 3=moderate; 4=severe) for erythema, induration and desquamation [2].

Treatment Protocols

As all patients were of skin phototype III, IV and V, the minimal erythema dose was not calculated and the initial dose was determined according to the phototype of the patient. Patients with phototype III were treated with initial dose of 300 mJ/cm², patients with phototype IV were treated with initial dose of 350 mJ/cm² and patients with phototype V were treated with initial dose of 400 mJ/cm² and the treatment was administered two times/week on non consecutive days for three months or until clearing occurred. The subsequent doses were multiplied every two sessions during the whole treatment period.

During treatment, the affected parts were only exposed, the eyes were protected by UV-blocking goggles and the normal skin around lesions was covered by protection sheets to avoid hyperpigmentation. All the patients were asked to use sunscreens during daytime. Photographs of the patients were taken before treatment and at the end of the study.

Assessment of treatment efficacy took place on the basis of clinical examination and photographic evaluation in a blind manner at the baseline and final visit. Improvement was graded as follows: poor improvement (up to 25%); moderate (26-50%); good (51-75%); and excellent (76-100%).

STATISTICAL ANALYSIS

The results of the current study were analysed using a statistical computer package (SPSS version 21). The mean and standard deviation values for percentage of improvement were tested by Fisher-exact test. Correlations between variables were analysed using Spearman's rank correlation coefficient (r) and one-way ANOVA post-hoc test (F). A p -value <0.05 was considered to be statistically significant.

RESULTS

A total of 90 patients were enrolled in the study. The mean age of the patients was 38.33 ± 20.26 years, family history of psoriasis was obtained in 39 (43%) patients. The duration of psoriasis showed a wide range (1-30 years) with a mean duration of 5.73 ± 5.65 years, 114 patches were located on the lower limbs, 12 patches on the palms and soles, 75 patches on the trunk, and 114 patches on the upper limbs and 45 patches on the scalp.

From 360 treated patches, 96 (26.67%) patches showed complete clearance, 75/360 (20.83%) showed more than 75% improvement, 132/360 (36.67%) showed 51-75% improvement and 57 patches (15.83%) showed 26-50% improvement. There was variation to the response of MEL at different body sites; the best response was on the trunk followed by lower limbs, upper limbs, palms and soles than the scalp as shown in [Table/Fig-1,2].

There was no significant statistical correlation between the percentage of improvement of psoriasis patches treated with MEL and patient's age, sex or duration of disease, while there is significant correlation with skin phototype and site of the lesion [Table/Fig-3,4].

	Site of disease				
	Trunk (n=75)	Lower limb (n=114)	Upper limb (n=114)	Acral (n=12)	Scalp (n=45)
Excellent	57 (76%)	48 (42.11%)	45 (39.47%)	6 (50%)	15 (33.33%)
Good	18 (24%)	48 (42.11%)	54 (47.37%)	0%	12 (26.67%)
Moderate	0%	18 (15.78%)	15 (13.16%)	6 (50%)	18 (40%)
Poor	0%	0%	0%	0%	0%
Improvement*	93.3 ± 11.04	70.04 ± 17.7	67.9 ± 22.6	66 ± 18.8	62 ± 22.7

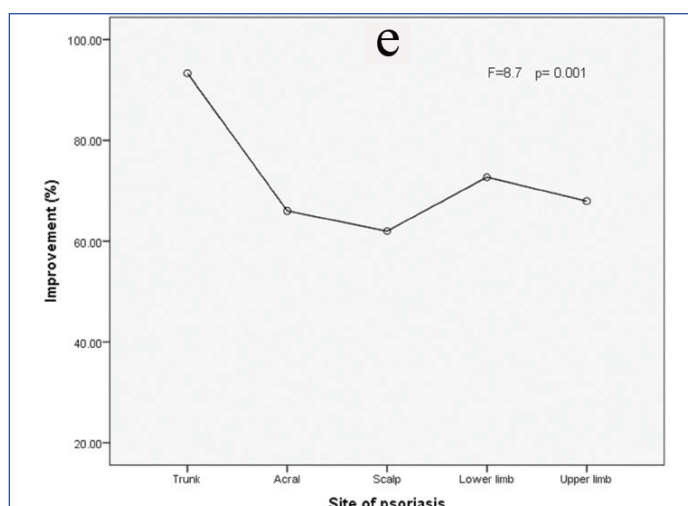
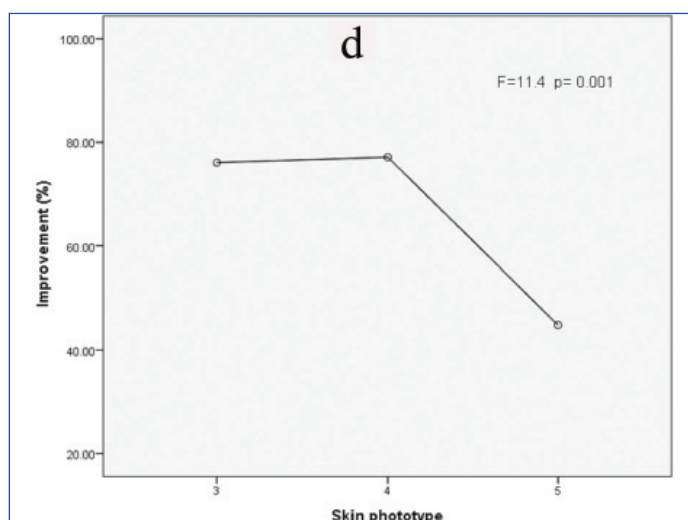
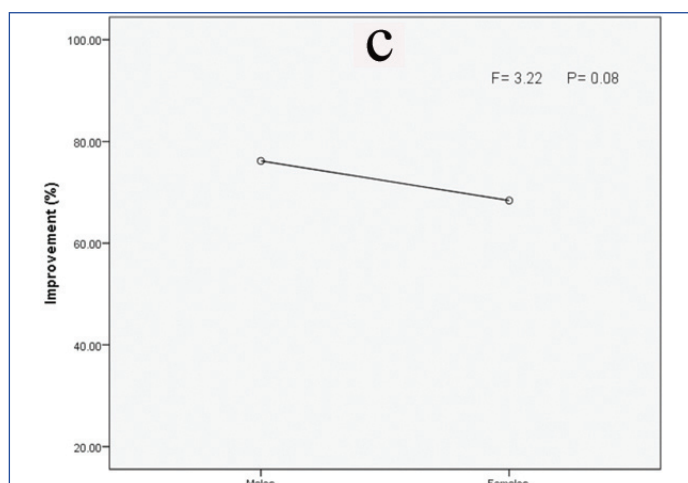
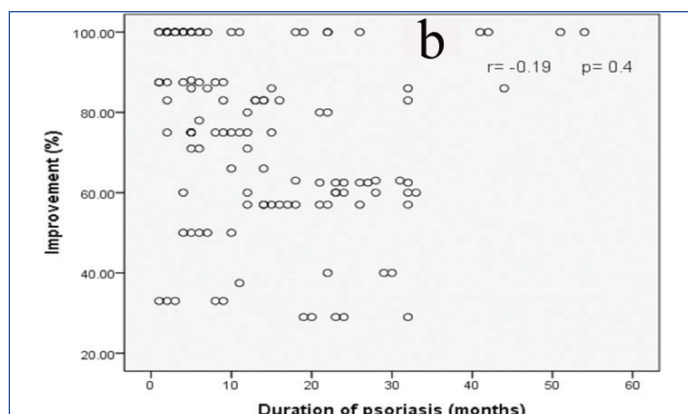
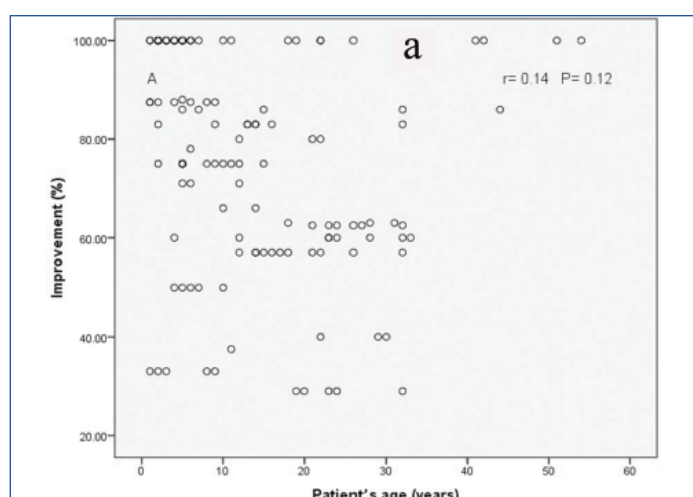
[Table/Fig-1]: Evaluation of treatment outcome.

Values are expressed as mean \pm SD *Significant $p=0.001$

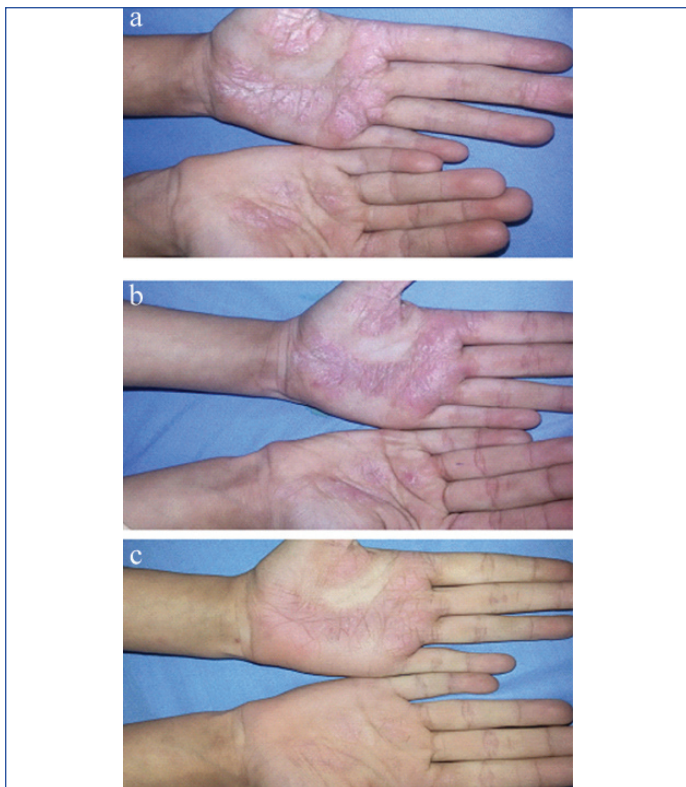
	Site of disease				
	Trunk N=75	Lower limbs N=114	Upper limbs N=114	Palms N=12	Scalp N=45
PSI before treatment	7.16 ± 1.25	6.89 ± 1.23	8.08 ± 1.32	$8 \pm .82$	7.67 ± 1.29
PSI after treatment	$0.48 \pm 0.82^*$	$2.05 \pm 1.16^*$	$2.68 \pm 1.8^*$	$2.75 \pm 1.5^*$	2.23^*

[Table/Fig-2]: This table shows mean \pm PSI score before and after treatment by 308 nm xenon chloride excimer lamp in relation to site of disease.

*Significant $p<0.05$



[Table/Fig-3]: Correlation between percentage of improvement of psoriasis with other parameters: a) patient's age; b) duration of psoriasis; c) sex of the patients; d) skin phototype; e) site of the disease.



[Table/Fig-4]: Female patient nine-year-old showing plaque psoriasis on the palms: (a) before treatment; (b) after 8 treatment sessions; (c) after 24 treatment sessions

As regards side effects, 45 patches (12.5%) showed erythema followed by post inflammatory hyperpigmentation and 102 patches (28.3%) showed hyperpigmentation only. None of the treatment patches showed recurrence in the follow up period (six months). The mean joules needed for initial and complete improvement of psoriasis by 308 nm xenon chloride excimer lamp in relation to site [Table/Fig-5].

Site	Mean dose need for initial improvement	Mean dose need for complete improvement
Lower limbs	2.96±2.76	25.83±11.1
Upper limbs	2.57±1.57	19.02±5.88
Trunk	0.76±0.22	16.22±7.26
Scalp	5.8±4.92	32.05±4.97
Palms	4±0.7	30.8±1.89

[Table/Fig-5]: Mean joules needed for initial and complete improvement of psoriasis by 308 nm xenon chloride excimer lamp in relation to site.

DISCUSSION

In the present study we treated 90 patients with 360 patches of psoriasis by MEL two times per week for three months or until clearing occurred with good results (improvement >50% was seen in 84.17%) without recurrence in the following six months after treatment. Certain anatomic sites responded better than others, the best response was achieved with lesions located on the trunk, followed by lower limb, upper limb, hands/feet and scalp.

Previous studies reported that MEL is effective in the treatment of psoriasis. In a study by Niwa Y et al., seven patients (six men and one woman) with plaque-type psoriasis were treated with 308 nm excimer light at 7-14 days interval [14]. The PSI was calculated for individual plaques in order to assess the effectiveness of the therapy. A 74.9% mean improvement in the PSI was observed after 10 treatment sessions. Fumimori T et al., studied the effect of excimer light in 34 Japanese palmoplantar pustulosis patients [15]. Five patients showed a disease response score of 1 (post-treatment PASI decreased to 25% or less of pretreatment PASI), 10 patients showed a score of 2 (25.1-50%), 13 patients a score of 3 (50.1-75%), and six a score of 4 (75.1% or more). Goldinger

SM et al., demonstrated that the mean reduction in PASI score was 5.5 after 12 treatments three times weekly using 200 mJ/cm² as the initial UV dose that was increased by 100 mJ/cm² at each session [16].

Although, 308 nm excimer light is simpler and cheaper compared to laser systems, it has an efficacy that is similar to that of laser irradiation, because it delivers the precise wavelength and intensity of light [14].

In a study by Kollner K et al., fifteen patients with plaque psoriasis were enrolled into the study [17]. Three psoriatic plaques were selected in each patient to be treated with 308 nm excimer laser, 308 nm excimer lamp or 311 nm NB-UVB three times per week for 10 weeks or until clearing occurred. After 10 weeks, complete remission was seen in 4/15 patients after laser therapy, in 3/15 patients after treatment with the 308 nm lamp and in 7/15 patients after 311 nm phototherapy.

In the present study, the outcome of treatment with MEL was affected by skin phototype and site of the treated lesion, whereas there was no statistical correlation between the treatment outcome and patient's age, sex or duration of disease. The most common side effects were hyperpigmentation followed by erythema, none of the patients required discontinuation of therapy.

Niwa Y et al., demonstrated that erythema corresponding to radiation spots was observed during the treatment course in four cases [14]. Moreover, occasionally, irradiated areas were observed to develop hyperpigmentation which disappeared naturally. In a study by Kollner K et al., side-effects were seen more often after laser treatment than MEL or 311 nm phototherapy [17].

LIMITATION

This study evaluated, darker-skinned individuals and not the individuals with higher numerical Fitzpatrick skin type. Further research with larger sample size is necessary to evaluate the importance of different skin types in achieving repigmentation.

CONCLUSION

In conclusion, our study showed that MEL is an effective and safe treatment method for plaque psoriasis and its effect largely depend on the anatomical site of the lesion and skin phototype of the patients.

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