ORIGINAL ARTICLE

Anatomical variation and the effect of excimer laser in treatment of vitiligo

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ABSTRACT

The aim of this work was to evaluate the efficacy of excimer laser in treatment of vitiligo at various anatomical locations. In the present study we treated 77 patches of vitiligo by 308 xenon chloride excimer laser 2 times per week for 10-35 sessions with mean 23.22 ± 6.16, repigmentation noted was 75-100% in 19.4% of the patients. Certain anatomic sites responded better than others, the best response was achieved with lesions located on the face, neck and trunk, followed by upper limbs, lower limbs, hands and feet. The majority of lesions on the hands, digits, feet, toes showed <25% repigmentation, the repigmented color matched well with the normal skin, giving a good cosmetic appearance. None of the patients required discontinuation of therapy due to side effect. Erythema occurred in 38% of patients while hyper pigmentation occurred in 20%, however these side effects were transient and well tolerated. There was no significant correlation between degree of improvement and patient`s age, sex or type of vitiligo and there was positive correlation between degree of improvement and site of the disease. We concluded from our study that excimer laser is effective and safe in treatment of localized vitiligo, and it gives better results on face and proximal parts of the body.

KEY WORDS: Excimer laser, vitiligo.

INTRODUCTION

Vitiligo is an acquired progressive multifactorial depigmenting disorder characterized by the appearance of circumscribed white macules in the skin due to chronic progressive loss of functional melanocytes in the epidermis.[1]

Vitiligo affects 1-2% of the population worldwide with no predilection for gender or race, and usually starts in childhood or young adulthood. Manifestations begin before 20 years of age in 50% of the cases, while in 25% the onset is before 14 years of age.[2]

Traditional therapies include topical or systemic corticosteroids, PUVA (topical or oral psoralen followed by UVA irradiation), and narrow-band 311-nm UVB (NB-UVB) phototherapy.[3]

The excimer laser is a well-tolerated, effective treatment that induces quicker repigmentation than other forms of vitiligo therapy.[4]

The excimer laser spares normal unaffected skin from carcinogenic UV radiation exposure. The laser light intensity is much greater than conventional NB-UVB phototherapy and its energy is emitted in nanoseconds (rather than minutes). It is suggested that the increased efficacy in inducing T-cell apoptosis allows for greater clinical efficacy of the laser than other conventional light therapies.[5] The face, neck, and to a lesser extent, the trunk, are more sensitive, or responsive, to laser treatment than more resistant areas which have been identified as the acral areas of the extremities and bony prominences.[6]

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PATIENTS AND METHODS

This study was carried out in Dermatology Department of Kobri-El koba military hospital. The study group included 50 patients (28 males, 22 females), aged from 6 to 65 years, diagnosed as vitiligo by clinical examination, and by Wood's light examination. All patients were subjected to complete history taking, which included: age, sex, age of onset of vitiligo, family history, course and duration of vitiligo. Thorough general and local examination included: type of vitiligo, distribution and photosensitivity. Photograph of the lesions were taken using camera 10MP Olympus C-420 digital SLR camera.

All patients were treated by 308nm xenon chloride excimer laser twice per week. Exclusion criteria included ophthalmic diseases, Patients sensitive to phototherapy, history of skin cancer and patient with psychological problems. Patients were classified according to type of vitiligo as vitiligo vulgaris (n=1 patient), segmental (6 patients), focal (n= 25 patients) and acrofacial (n=18 patients).

Treatment protocols

As all patients were of skin type III and IV, the minimal erythema dose was not calculated and the initial dose of 200 mJ/cm^2 was used in all patients and the treatment was administered two times/ week on non-consecutive days.

The subsequent dose was determined as follows: 100 mJ/cm^2 increment if there was no erythema after the initial treatment, 50 mJ/cm^2 increment if there was erythema lasting for less than 24 hours and no increment if there was erythema lasting for 24 hr or more. If symptomatic erythema (burning, pain) or blistering developed treatment was stopped until resolution, and then the dose was decreased by 50 mJ/cm^2.[7]

During treatment, the affected parts were only exposed, the eyes were protected by UV-blocking goggles. If significant depigmentation was present on the eyelids, and if patients insisted on treating these areas, the patients were advised to keep their eyes closed during treatment, all the patients were asked to use sunscreens during daytime.

The maximum period of treatment was 35 sessions. All the patients were examined at five sessions intervals and lesion photographs were taken at baseline and thereafter to document the pattern and extent of regimentation.

Equipment used

We used a Q-Quantum 308-nm xenon chloride excimer laser (Italy).

Follow-up included

Comparing the patients before and after therapy to evaluate the clinical response including degree and type of pigmentation. Site of complete improvement and possible side effects.

Statistical analysis

The results of the study were analyzed using a statistical computer package (SPSS version 17.0). The mean and standard deviation values were calculated for % of improvement. Correlations between variables were analyzed using spearman's rank correlation coefficient (r). P-values less than 0.05 were considered significant.

RESULTS

A total of 50 patients were enrolled in the study. The mean age of the patients was 24.2 ± 16.1, The age of onset of vitiligo ranged from 8-66 years with a mean of 23.84 ± 15.3 years. The male to female ratio was 1.2:1, 44% of the patients were

females and 56% were males, no family history of vitiligo was obtained in the patients. Classification of the patient according to pattern of vitiligo was as follows: 18 acrofacial, 25 focal, 6 segmental and 1 vitiligo vulgaris. The duration of vitiligo showed a range, (6 months-3years) with a mean duration of 1.39 ± .79 as shown in table 1.

As regards to the site of patches, there were 33 patches on the face and neck, 11 patches on the upper limbs, 8 patches on the trunk, 13 patches on the lower limbs and 17 patches on the hands and feet .

Table 1 Characteristic of studied population

	No.	%
Age of patients		
Mean ± SD (Range)	24.2 ± 16.1 (8 - 66)	
Age of onset		
Mean ± SD (Range)	23.84 ± 15.3 (7 - 65)	
Sex		
Male	28	56.0
Female	22	44.0
Skin phototype		
Type III	27	54.0
Type IV	23	46.0
Duration of vitiligo		
Mean ±SD (Range)	1.39 ± 0.79 (0.5 - 3)	
Type of vitiligo		
Vulgaris	1	2.0
Acrofaial	18	36.0
Segmental	6	12.0\
Focal	25	50.0
Number of sessions		
Mean±SD (Range)	23.22 ± 6.16(10-35)	

Out of total 77 patches, 22 (28.5%) showed percentage of pigmentation from 0 >25%, 25 (32.6%) showed percentage of pigmentation 25>50%, 15 (19.4%) showed percentage of pigmentation 50>75%, while 15 (19.4%) showed percentage of pigmentation ≥75% (Table 2).

The best result was on the face and neck followed by trunk, the upper limbs, the lower limbs, then the hands and feet with Mean ±SD % of improvement were (65.45±7.88, 53.12±2.86, 50.9±3.16, 23.12±3.35 and 19.12±9.43 respectively) (Table 3).

From 50 patients, no side effects were noticed in 21 patients (42%), 19 patients (38%) showed erythema and 10 patients showed hyperpigmintation (20%). There was significant statistical correlation between the site of vitiligo and percentage of improvement of vitiligo patches treated with 308nm xenon chloride excimer laser) ($p<0.05$), while no significant correlation with patients age, type of vitiligo, duration of the disease or skin phototype ($p > 0.05$).

Table 2 Degree of pigmentation in vitiligo patches treated with 308 nm xenon chloride excimer laser (n=77)

Degree of pigmentation (%)	No.	%
Poor (0-25%)	22	28.5
Good (25 > 50%)	25	32.6
Very good (50 >75%)	15	19.4
Excellent (≥ 75 %)	15	19.4

Table 3 Mean ± SD % of pigmentation of vitiligo patches treated by 308 nm xenon chloride excimer laser in relation to site of disease

	Site of disease				
	Face/ neck n=33	**Abdomen/ back/ chest n =8**	**Upper limb n =11**	**Lower limb n =8**	**Hands/ Feet n =17**
Mean ± SD	65.45± 27.88	53.12± 20.86	50.91± 32.16	23.12± 30.35	19.12± 29.43
Range	10 – 100	25 – 90	0 – 90	0 – 75	0 – 75
P-value	0.000*				

Fig. 1 Female patient 9 years old showing vitiliginous patches on the face and neck. (A) Before treatment (B) Three months after treatment.

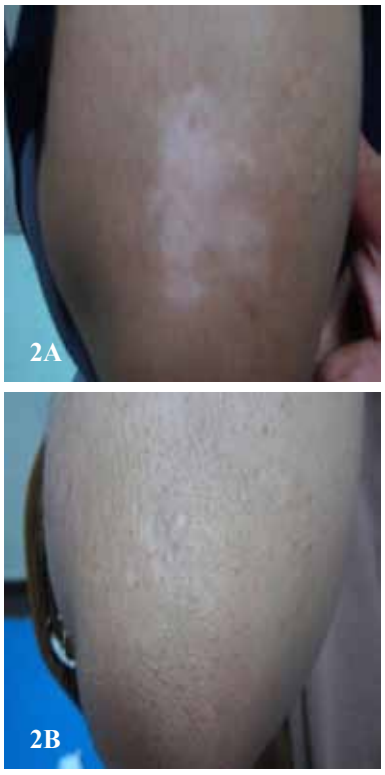

Fig. 2 Female patient 35 years old showing vitiliginous patch on the elbow. (A) Before treatment (B) Three months after treatment.

Fig. 3 Male patient 18 years old showing vitiliginous patch on the forehead (A) Before treatment (B) Three months after treatment .

Fig. 4 Female patient 8 years old showing vitiliginous patch on the face. (A) Before treatment. (B) Two months after treatment.

DISCUSSION

In this study, classification of the patient according to the type of vitiligo showed that 50% had focal, 18% had acrofacial, 12% had segmental and 2% had vitiligo vulgaris. Although vitiligo vulgaris was the commonest pattern in previous studies.[8-16] This explained that eximer laser applied mainly in stable localized lesions due to small areas can be covered by each pulse.

In our study the duration of vitiligo showed a range (6 months-3years) with a mean duration of 1.39± 0.79, while the age group of the patients ranged 8-66 years old. In a study by Majid[17] the duration of vitiligo ranged from one year to 14 years with a mean of 2.4 years, the age of patients ranged from 13 to 36 years with a mean of 23.63±8.38 years.

In the present study we treated 77 patches of vitiligo by 308 xenon chloride excimer laser 2 times per week for 10-35 sessions with mean number of sessions 23.22 ± 6.16, regimentation was 75-100% in 19.4% of the patients, 50-75% in 19.4% of the patients, 25-50% in 32.6% of the patients, <25% in 28.5 % of the patients. In a study on the effect of eximer laser in vitiligo by Cho, et al.[18] they reported that 17 patients (56.7%) with 20 patches achieved an acceptable degree (>50%) of repigmentation at the end of the treatment, with five patches (12.5%) achieved >75% of repigmentation. In study of Zhang, et al;[19] 27/44 patches (61.4%) achieved more than 75% repigmentation, 4/44 lesions (9.1%) showed 51-75% repigmentation, 10/44 (22.7%) showed 26-50% repigmentation and 3/44 (6.8%) showed 1-25% repigmentation.

In a study done by Esposito, et al.[20] 7 out of 24 patients showed greater than 75% repigmentation, six patients showed repigmentation between 25 and 75% and six patients showed less than 25% repigmentation. In 5 patients no signs of repigmentation were noted.

Certain anatomic sites responded better than others, the best response was achieved in lesions located on the face, neck, trunk, followed by upper limb, lower limb, hands and feet, the majority of lesions on the hands, digits, feet, toes showed <25% repigmentation, the repigmented color matched well with the normal skin, giving a good cosmetic appearance. Similar findings were reported by other authors, they explained that by better response in the face was due to frequent exposure to sun, trunk and extensors of upper limb, lower limb are hairy areas, lesions on hands, digits, feet, toes are resistant to repigmention as they are non hairy areas.[18,19,20]

Side effects are generally well-tolerated, and are usually due to phototoxicity, e.g., erythema, hyperpigmentation, erosions, and blisters.[5]

Regarding the side effects in the present study none of the patients required discontinuation of therapy. Erythema occurred in 38% of patients while hyper pigmentation occurred in 20%. However these side effects were transient and well tolerated no erosions or blistering occurred in any of the patients.

Patients with Fitzpatrick skin type 1 may be prone to frequent blistering, especially with the usage of supra-erythmogenic laser therapy. Subsequent conservative dosing, may not achieve any more benefit than general UVB phototherapy regimens.[21]

In the present study, no significant correlation was seen between age of the patient, sex, duration of the disease, type of vitiligo or skin phototype and therapeutic outcome. The results of correlation were in agreement with previous studies.[22,23,19]

We concluded from this study that the 308-nm ex-

cimer laser is an effective and safe device for the treatment of vitiligo.

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