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EFFICACY OF TOPICAL LATANOPROST SOLUTION VERSUS NARROW BAND ULTRAVIOLET B RAYS IN TREATMENT OF VITILIGO

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ABSTRACT

Background: Vitiligo is considered one of the most common disorder of acquired depigmentation, which is associated with significant morbidity. Although several interventions are available, no definite cure has yet been developed. Therefore, alternative treatments have been developed. **Aim:** The purpose of this study was to evaluate the efficacy of topical latanoprost versus Narrowband Ultraviolet B therapy (NB-UVB) in treatment of vitiligo. **Materials and Methods:** This was clinical trial (Prospective) involved 80 patients with a diagnosis of stable symmetrical non-segmental vitiligo referred to clinic of dermatology, Tishreen University Hospital, Lattakia, during one-year period (2022-2023). One side of the body was randomly treated with application of latanoprost, while the other side was exposed to NB-UVB and final outcome was compared between two methods. **Results:** Out of 80 patients, 25 (31.3%) were male and 55 (68.8%) were female, with mean age of the patients was 16.1±7.92 years. Acrofacial (51.3%) and common vitiligo (42.5%) represented the most frequent types of the disease, and the most common sites of vitiligo involvement were face (37.5%) followed by hand and feet (21.3%). Excellent- very good response in repigmentation occurred in 73.8% of the patients in latanoprost group versus 70% in NB-UVB. Regarding of side effects, hair growth on the face was reported in 13.8% of the patients in latanoprost group and first –degree burn in 10% in the other group. Periocular region responded better to treatment than those in other body parts in two groups without any association between improvement and the following variables: gender, family history of vitiligo, duration of disease, and type of disease ($p>0.05$). **Conclusion:** The current study showed that latanoprost lead to favorable results in patients with stable non-segmental vitiligo .Except of hair growth on the face after the procedure, significant complications didn't occur in most patients.

KEYWORDS: latanoprost, Narrowband Ultraviolet B (NB-UVB), outcome, stable, vitiligo.

INTRODUCTION

Vitiligo is defined as an acquired, pigmentary anomaly of the skin that characterized by depigmented patches surrounded by normal border which result from destruction of the normal melanocytes.[1,2,3,4] It is a common skin disease that affects between 0-5-1% of the world population and occurs equally in males and females.[5,6] The exact cause of vitiligo remains unclear and there are various supposed mechanisms which include: genetics, autoimmune, psychological factors, oxidative stress, biochemical factors and viral infections.[7,8,9,10,11] The diagnosis of vitiligo is generally made clinically based upon the distinct clinical features which might be facilitated by the use of a Wood's lamp.[12,13] Vitiligo imposes a cosmetic burden on patients, impairing their quality of life and self-esteem. There are many treatment modalities for vitiligo with variable response which depends on clinical characteristics of the affected sites, extent of disease and presence of associated autoimmune diseases.[14,15,16]

Narrow‑band ultraviolet B (NB‑UVB) therapy has emerged as one of the safest and most effective therapy for vitiligo compared to earlier phototherapeutic modalities, psoralen plus ultraviolet A (PUVA). It was first used in treatment of vitiligo by Westerhof and Nieuweboer‑Krobotova in 1997, and the light source is the TL‑01 lamp which emitting wavelengths between 310 and 315 nm.[17,18,19] Latanoprost is considered one of the PGF2 α analogues which is applied topically to the eye for treatment of ocular hypertension by lowering intraocular pressure. It has been investigated for treatment of vitiligo since its adverse effects of periocular and iridal pigmentation. There is limited comparison of the effects of latanoprost in treatment vitiligo.[20,21,22] Thus, this study was conducted to: 1-

compare the effectiveness of latanoprost versus NB-UVB for the treatment of non-segmental symmetrical vitiligo. 2- assessment the side effects of the treatment by latanoprost. 3- to determine if there is any correlation between improvement and characteristics of vitiligo.

PATIENTS AND METHODS

This is Prospective Clinical trial study of 80 patients with proven diagnosis of vitiligo were held in dermatology clinic at Tishreen University Hospital in Lattakia-Syria during the period from April 2022 to April 2023. Inclusion criteria were patients with symmetrical non-segmental vitiligo, stable for at least 3 months, with discontinuation previous treatment for at least one month. Exclusion criteria were patients with one of the following: segmental vitiligo, non- symmetrical / non-segmental vitiligo, pregnancy or lactation, presence of contraindication for NB-UVB (sensitivity to sunlight such as xeroderma pigmentosa, lupus erythematosus, and porphyria) and latanoprost (asthma and hypertension). Patients were classified according to Fitzpatrick skin phototype, and preoperative and postoperative photographs taken at their first visit, 1.5 months, 3 months and at the end of 3 months after the last session.

All patients were received treatment with latanoprost on one side (group 1) and NB-UVB on the other side (group 2). The clinical improvement and changes were evaluated by the dermatologist before treatment and at three months after the start of the treatment based on the scale: no pigmentation:0%, poor= 1-25%, good= 26-50%, very good= 51-75%, excellent= 76-100%.

Definition

The Fitzpatrick skin phototype system is used to categorize skin types in people of all skin colors. The classification depends on the amount of melanin pigment in the skin. Patients are categorized from fair skin types (type I) to very dark skin types (VI) based on constitutive skin color and response to sunlight and UV radiation.

Ethical consideration: After discussing the study with the patients, all of them gave a complete and clear informed consent to participate in the study. This study was performed in accordance with the Declaration of Helsinki and approval for the study was obtained from the institutional ethics committee.

Statistical Analysis

Statistical analysis was performed by using IBM SPSS version20. Basic Descriptive statistics included means, standard deviations (SD), median, Frequency and percentages. To examine the relationships and comparisons between the two groups, chi-square test was used or Fisher exact test if it need. All the tests were considered significant at a 5% type I error rate($p<0.05$), β:20%, and power of the study:80%.

RESULTS

The study included 80 patients with symmetrical non-segmental vitiligo. As table one shows, ages range from 3 to 68 years with mean age 16.1±7.92 years, 25 patients (31.3%) were males and 55 were females (68.8%) with sex ratio of F:M (2.2:1). According to Fitzpatrick skin type scale, III represented the most frequent type (66.3%) followed by IV (18.8%) and II (15%). Duration of disease ranged from 1 month to 20 years, and patients were divided into three groups according the duration of vitiligo: <1 year (28.8%),1-5 year (48.8%), and >5 year (22.5%) with presence of family history of disease in 8 cases (10%).

Table 1: Demographic characteristics of the study population.

Variables	Result
Age(years)	3-68(16.1±7.92)
Gender	
Male	25(31.3 %)
Female	55(68.8 %)
Fitzpatrick skin phototype	
II	12(15%)
III	53(66.3%)
IV	15(18.8%)
Duration of disease(year)	
<1	23(28.8%)
1-5	39(48.8%)
>5	18(22.5%)
Family history of vitiligo	
Present	8(10%)
Absent	72(90%)

As shown in table (2), acrofacial vitiligo represented the most frequent type in 41 cases (51.3%) followed by vulgaris (42.5%) and focal (6.2%). Face was the most affected side of body in 30 cases(37.5%) with periocular involvement in 12 cases (15%), followed by foot and hand (21.3%), breast (11.3%), legs (10%), genital region (6.3%), elbow (3.8%), wrist (2.5%), and neck (2.5%).

Table 2: Distribution of the study population according to the characteristics of vitiligo.

Variables	Result
Classification of vitiligo	
Acrofacial	41(51.3%)
Vulgaris	34(42.5%)
Focal	5(6.2%)
Location of disease	
✓ Face	30(37.5%)
▪ Periocular	12(15%)
▪ Perioral	5(6.3%)
▪ Chin	4(5%)
▪ Eyebrow	4(5%)
▪ Temporal region	3(3.8%)
▪ Nasolabial fold	2(2.5%)
✓ Foot and hand	17(21.3%)
✓ Breast	9(11.3%)
✓ Legs	8(10%)
✓ Genital region	5(6.3%)
✓ Elbow	3(3.8%)
✓ Wrist	2(2.5%)
✓ Neck	2(2.5%)
✓ Others	4(1.3% for each case)

In group I, the number of the patients that presented with no pigmentation, poor, good, very good and excellent were 5, 16, 15, 18 and 26 respectively. In group 2, the numbers were 3, 21, 16, 20, and 20 respectively, without significant difference between two groups p>0.05. 11 patients (13.8%) in latanoprost group experienced from hair growth on face, whereas 8 patients(10%) developed first –degree burn,p:0.06.

Table 3: Changes in pigmentation after treatment in the two groups and side effects.

Variable	Group I latanoprost	Group II NB-UVB	P value
Improvement grade			
No pigmentation	5(6.3%)	3(3.8%)	0.7
Poor	16(20%)	21(26.3%)	
Good	15(18.8%)	16(20%)	
Very good	18(22.5%)	20(25%)	
Excellent	26(32.5%)	20(25%)	
Side effects			
hair growth	11(13.8%)	0(0%)	0.06
first –degree burn	0(0%)	8(10%)	

As shown in table (4), there were no significant association between improvement of pigmentation and the following variables in treatment groups: gender, skin phototype, family history, duration of disease, and classification of vitiligo(p>0.05). In latanoprost group, very good to excellent improvement was detected as follow; (gender;19% of males versus 36% of females, p:o.7**), (**skin phototype; 5 in II, 39% in III**,** and 39% in IV, p:0.7), (family history: 7.5% in presence of family history versus 47.5% in absence, p:0.2), (duration of disease: 16.3% in patients with duration of disease shorter than one year versus 14% in patients with disease duration longer than 5 years, p:0.7), and (classification of vitiligo: 28% in vulgaris**,** 22.5% in acrofacial, and 5% in focal, p:0.1). In group II, very good to excellent improvement was detected as follow; (gender;15% of males versus 35% of females, p:o.9), (skin phototype; 5 in II, 35% in III**,** and 10% in IV, p:0.4), (family history: 5% in presence of family history versus 45% in absence, p:0.1), (duration of disease: 14% in patients with duration of disease shorter than one year versus 14% in patients with disease duration longer than 5 years, p:0.8), and (classification of vitiligo: 26% in vulgaris**,** 18.8% in acrofacial, and 5% in focal, p:0.1). Improvement to treatment was observed significantly in periocular region in both treatment groups.

Table 4: Distribution of response to the treatment according to the various variables.

	Group I latanoprost					Group II NB-UVB				
	No pigmentation	poor	Good	Very good	Excellent	No pigmentation	poor	Good	Very good	Excellent
Gender Male Female	2(2.5%) 3(3.8%)	5(6.3%) 11(13.8%)	3(3.8%) 12(15%)	5(6.3%) 13(16.3%)	10(12.5%) 16(20%)	1(1.3%) 2(2.5%)	7(8.8%) 14(17.5%)	5(6.3%) 11(13.8%)	6(7.5%) 14(17.5%)	6(7.5%) 14(17.5%)
P value	0.7					0.9				
skin phototype II III IV	1(1.3%) 4(5%) 0(0%)	4(5%) 10(12.5%) 2(2.5%)	3(3.8%) 8(10%) 4(5%)	2(2.5%) 12(15%) 4(5%)	2(2.5%) 19(23.8%) 5(6.3%)	0(0%) 3(3.8%) 0(0%)	6(7.5%) 13(16.3%) 2(2.5%)	2(2.5%) 9(11.3%) 5(6.3%)	2(2.5%) 14(17.5%) 4(5%)	2(2.5%) 14(17.5%) 4(5%)
P value	0.7					0.4				
Family history Present Absent	0(0%) 5(6.3%)	0(0%) 16(20%)	2(2.5%) 13(16%)	4(5%) 14(17.5%)	2(2.5%) 24(30%)	0(0%) 3(3.8%)	0(0%) 21(26.3%)	4(5%) 12(15%)	2(2.5%) 18(22.5%)	2(2.5%) 18(22.5%)
P value	0.2					0.1				
Duration of disease <1 1-5 >5	2(2.5%) 1(1.3%) 2(2.5%)	5(6.3%) 9(11.3%) 2(2.5%)	3(3.8%) 9(11.3%) 3(3.8%)	4(5%) 8(10%) 6(7.5%)	9(11.3%) 12(15%) 5(6.3%)	1(1.3%) 2(2.5%) 0(0%)	8(10%) 9(11.3%) 4(5%)	3(3.8%) 10(12.5%) 3(3.8%)	5(6.3%) 10(12.5%) 5(6.3%)	6(7.5%) 8(10%) 6(7.5%)
P value	0.7					0.8				
Classification Vulgaris Acrofacial Focal	1(1.3%) 4(5%) 0(0%)	3(3.8%) 13(16.3%) 0(0%)	8(10%) 6(7.5%) 1(1.3%)	11(13.8%) 6(7.5%) 1(1.3%)	11(13.8%) 12(15%) 3(3.8%)	0(0%) 3(3.8%) 0(0%)	5(6.3%) 16(20%) 0(0%)	8(10%) 7(8.8%) 1(1.3%)	11(13.8%) 7(8.8%) 2(2.5%)	10(12.5%) 8(10%) 2(2.5%)
P value	0.1					0.1				

DISCUSSION

To date, a variety of treatment methods for vitiligo have been proposed. However, most of them cannot achieve satisfactory treatment effect. The current study of 80 patients affected with non-segmental symmetrical vitiligo showed presence of significant predominance of female, which might be explained by seeking medical attention early enough in females compared to males and increased frequency of associated autoimmune diseases in females. III represented the most frequent type of skin phototype (approximately two-third of patients) and acrofacial was the most frequent type. Family history of vitiligo was found in 10% which might be explained by genetic basis of vitiligo. In addition to, most common site affected were face, foot and hand in which vitiligo occurs mostly in areas that are exposed to the sun. The response rate to latanoprost after 3 months of the last session was very good to excellent in 73.8%, comparable to NB-UVB group (70%) with excellent results for periocular region. Side effects were hair growth on face with one case of recurrence in latanoprost group versus development of first –degree burn in NB-UVB group. These changes might be explained by presence of EP1/ EP3 and FP receptors to PGE2 and PGF2 on melanocytes and keratinocytes which induce dendricity in human melanocytes.[23,24] In addition to, latanoprost leads to increasing levels of endogenous PGE2 that induces melanin formation.[24] There are limited studies that compared the effects in treatment, and absence of local studies prompt us to do this study.

Anbar et al(2014) demonstrated in a study conducted in Egypt included 22 patients with bi-lateral symmetrical vitiligo(mean age 15.5±11.5 years, majority of the patients were females, with presence of family history in 9.1%) that response rate to latanoprost was comparable to NB-UVB without significant difference and excellent response with complete re-pigmentation were detected in approximately half of the patients in latanoprost group especially in face with duration of disease shorter than one year. Recurrence was detected in 25% of the patients who treated with latanoprost.

Ibrahim et al(2019) demonstrated in a study conducted in Egypt included 27 patients with stable symmetrical vitiligo(mean age 16.1±7.92years, 68.8% of the patients were females, with presence of family history in 22.3%) that response to treatment was significantly better in combination group(latanoprost with NB-UVB versus NB-UVB alone) with occurrence of recurrence in 11.1% in combination group.

Dailami et al(2019) demonstrated in a study conducted in Iran included 31 patients with eyelid vitiligo that application of latanoprost gel led to significant improvement in pigmentation compared to placebo.

CONCLUSION

We can conclude that latanoprost can be used an effective and safe promising topical treatment for vitiligo.

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