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Topical Minoxidil Alone and with Topical Lanoprost in Localized Alopecia Areata Treatment: Comparative Study (2019-2020)

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ABSTRACT

Rationale: Therapeutic choicement for patients with alopacia was of limited success, no hundred percent cure rate, and no choice for absolute remission without recrudescence.

Aim: Comparison of topical Lanoprost & Minoxidil versus topical Minoxidil only in treatment of localized alopecia areata.

Methodology: Interventional-controlled single blinded study that was involving (95) alopecia areata patients. That extended from1st day of February 2019 to last week January 2020 In Al-Hussain teaching hospitals in Thi-Qar and Al-Muthana governorates., the patients crossly matched well and divided according to lines of treatment into two groups. ethical consent had been taken after full details explanation of research items and purpose.

Results: Post interventional assessment of the response difference in terms significant statistical differences (p value=0.002, 0.0001) between the two groups. The SALT II when compared before and after treatment was decreasing in both groups but to a significantly better extent in group II

Conclusions: The treatments with 5% minoxidil in a combination with 0.005% latanoprost or 5% minoxidil alone were found to be effective and a better result with minoxidil only. implemented combination in the managements of alopecia areata is of great benefit in reduction of size and duration of treatment.

Keywords: minoxidil, lantoprost, alopecia areata

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INTRODUCTION

Alopecia areata (AA) is defined as a complex of an autoimmune disorder that causes non-scarring loss of hair. It is presents as well circumscribed patches of hair loss (1) that either limited to one or more discrete area, on the scalp or body, or it may involve the whole scalp (alopecia totalis) or the entire body (alopecia universalis). (2,3) The disease had unpredictable behavior with either spontaneous regrowth in 80% of the patient during the beginning of the disease or a rapid recurrences at any period of its course. (3,4)

Worldwide hospital-based studies reported an incidence of alopecia areata to be between 0.57%and 3.8% (5), with lifetime incidence of around 2%.(6)it found in both gender with a slight female :male gender bias, this may be because of females are more concerned about hair loss and its treatment.(7) The disease occur at any age group with an incidence that increased in a linear rate.(1) it is usually diagnosed at 33 years of age .(1)females are mostly present in adolescence with either nail involvement or an autoimmune disorder while male patients may be more likely to be diagnosed in childhood.(3)

More than half of patients of both sex and all age groups had a risk factors for "poor health –related quality of life "which including female sex, age between 20-50 years ,job change ,family stress, hair loss more than 25% and light skin color .(8)

Several comorbid medical conditions were reported with alpacia areata, the incidence of atopy about (11%-38%) (9), thyroid disease such as "thyroid peroxidase antibodies" about (17.7%), especially in female patient with a female: male ratio of 6.7:1 and double that of the general population(10), recently, diabetes mellitus was reported in (11.1%) (9) recent study reported high level of c-peptide and insulin indicating increased insulin resistance in AA patients(11) and lastly alopecia areata associated with several other autoimmune disorders such as SLE ,vitiligo, inflammatory bowel disease, rheumatoid arthritis and psoriasis.(9)

Patient with alopecia areata often had a family history of the disease, and the studies reported that, the disease had multifactorial genetic predisposition through the association with a different type of genes, including cytokine, histocompatibility complex (MHC) genes, immune system regulating gene and several genes expressed in hair follicle.(12)Environmental factors, such as psychosocial stress, viral infections, trauma, also have been thought to be a possible cause for the development of the disease.(4)

It has been found that the therapeutic choices for patients with alopacia was limited success, no hundred percent cure rate, and no choice for absolute remission without recrudescnce. (2,3,13). Therapeutic choices include systemic steroid (local & systemic); topical irritants such as anthralin; topical immunotherapy; topical minoxidil; and systemic immuno suppressants such as methotrexate and cyclosporine (13,14) therapeutic success was different relying on the period of treatment and duration of disease. Alopacia areata usually disfiguring disease, so family, social support psychological therapy is a substantial aspects of disease management.

Aim of the aim of this study was to Comparison of Topical Latanoprost & minoxidil vs Topical minoxidil only in Treatment of Localized Alopecia Areata.

PATIENTS AND METHOD

In two dermatology outpatient departments, Al-Hussein Teaching Hospital in Al-Muthanna and Al-Hussein Teaching Hospital in Thi Qar, that extended from 1st day of February 2019 to last week January 2020 of we went on an interventional study that was controlled single blinded involving (95) AA patients. All of the patients were diagnosed to have AA on clinical and trichoscopical basis. The detailed history taking included age , sex, emotional stress, BCG vaccination, address, vitiligo, diabetes mellitus,

connective tissue disease, inflammatory bowel disease , myasthenia gravis, thyroid disease, and family history of alopecia areata. Each patient was examined to reveal the site of predilection whether in scalp, beard, eye brows, eye lashes , and moustache. Also we were looking for any related nail changes. We used the dermoscope to reveal the exclamation mark, yellow dots, black dots, broken hairs and other related trichoscopical findings. The exclusion criteria were:-

1. Ophiasis and sisiapho.
2. Alopecia totalis and universalis.
3. Pregnancy.
4. Any previous treatment to the disease during the last 2 months.
5. Any suspected allergy or contraindication to topical minoxidil and latanoprost.

Data were described in terms of mean, range and standard deviation. The severity of the disease was assessed according to SALT II which is the Severity of Alopecia Tool. The percentage of surface area of each single patch of hair loss is estimated in relation to the total surface area of the scalp then we get the summation of surface area of loss as a percentage, if there is more than one patch.

The score is estimated at the first presentation then at the end of follow up. The duration of treatment was 4-10 weeks and the patients were examined and photos taken at the middle and the end of treatment and recorded as absent in case of (0-25%) , partial in case of (26-75%) and complete in case of (76-100%) hair regrowth . Data were analyzed statistically using Statistical Package for Social Sciences (SPSS) to attain the significance of results in terms of p value less than 0.05.

Patients were divided into two groups, group 1 got a solution prepared by mixing 60ml of 5% minoxidil solution and 2.5 ml of 0.005% latanoprost solution, and group 2 got 5% minoxidil solution only. Dose of preparation was in both groups was 1 ml to the affected patches twice daily regardless of the affected area.

RESULTS

In addition to the random allocation we further excluded, from a statistical point of view, the bias between the two groups regarding age, gender, and duration of illness. Comparing all these parameters is shown in table (1). We extracted the p value of age matching which was not significant. Also the gender can interfere with the prognosis and outcome of treatment so the gender matching done and revealed a non-significant P value. Matching SALT II before treatment in both groups, to exclude bias, done also and the P value again was not significant as seen in table (2), so is the score after treatment.

Then after intervention we assessed the difference of response in terms of p value between the two groups as shown in table (3). The SALT II when compared before and after treatment was decreasing in both groups but to a significantly better extent in group II as shown in table (3).

Some patients in both groups developed mild pruritic erythema which did not interfere with compliance. No systemic adverse effects reported. No physical changes noticed to therapeutic solutions during or after use.

Table 1: Demography of studied group

Groups Demographic data	Group I (N=50)	Group II (N= 45)	P. value
Age / year			
Range	4 – 45	4 - 45	0.998
Mean ± SD	24.57 ± 12.73	24.68 ± 13.25	
Duration \ months			
Range	1 – 13	1 - 13	0.876
Mean ± SD	3.06 ± 3.15	3.14 ± 3.31	
Gender			
Male (%)	21 (42%)	19 (42.22%)	0.983
Female (%)	29 (58%)	26 (57.78%)	
Total	50 (100%)	45 (100%)	

$P.value \leq 0.05$ *Significant*

Table 2: Statistical difference of studied group (avoiding selection bias)

Groups Demographic data	Group I (N=50)	Group II (N= 45)	P. value
SALT before therapy			
Range	1 – 12	1 - 12	0.99
Mean ± SD	3.59 ± 2.57	3.59 ± 2.77	
SALT after therapy			
Range	0 – 12	0 - 12	0.191
Mean ± SD	2.88 ± 3.27	2.14 ± 1.90	

P.value $\leq$ ***0.05*** *Significant*

Table 3: SALT II comparison of pre and post treatment of the 2 groups

Group	Range SALT	Mean ± SD	P. value
Group I (N=50)			
Before therapy	1 – 12	3.59 ± 2.57	0.02
After therapy	0 – 12	2.87 ± 3.27	
Group II (N=45)			
Before therapy	1 – 12	3.59 ± 2.77	0.0001
After therapy	0 – 12	2.13 ± 1.89	

P.value $\leq$ ***0.05*** *Significant*

DISCUSSION

Minoxidil is used in the treatment of systemic hypertension as a vasoligating drug and also used for the treatment of alopecia as a topical agent (15) while Latanoprost is indicated in the treatment ocular hypertension and open angle glaucoma ,its analogous to prostaglandin F2,this drug reported in the treatment of alopecia due to its side effects noticed in the ocular region, including hypertrichosis ,increased thickening and lengthening of eye lash(16,17).minoxidil and latanoprost acts by mechanism which not fully understood. Minoxidil will stimulating hair follicle, especially those dorm, and prolonging the anagen phase (15) while latanoprost act by stimulating the anagen phase,and increasing the conversion of vellus hair into terminal hair.

Although many therapeutic choices for patient with alopecia areata, but no therapy was effective ,without side effects and cosmetically acceptable. So this study aimed to evaluate the effectivness of minoxidil used isolatedly or in acombination with lantoprost in the treatment of alopecia areata.

95 participants included in the study, all of them finished by 4-10 weeks. Group 1 (50) participants treated topically by lantoprost & minoxidil .Group 2 (45) participants treated by minoxidil only.

As comparing to other treatment modality, it seems to be they are easier for use with relatively less side effects. The study reported some patients in both groups developed mild pruritic erythema which did not interfere with compliance. No systemic adverse effects reported. No physical changes noticed to therapeutic solutions during or after use.

a comparison of the photos taken at the middle and at the end of the treatment was done.

By observing the results obtained before & after treatment , there was significant association between SALT and treatment in both group,these results in accordance with finding reported Bloch *et al.*(18) who concluded that, The treatments with 5% minoxidil alone or in acombination with 0.005% latanoprost was effective in aopacia areata.

regarding the minoxidil, previous Fenton study reported a response with four to six weeks and with less side effects. (19) The mechanism of hair growth stimulated by minoxidil like diazoxide (20) Although these drug are chemically different but they act on blood vessel smooth muscle cells to prevent calcium uptake (21)making them a good vasodilator especially on the arteriole (22) that lead to decreasing heart afterload leading to increased blood flow. A study by Burton et al proposed that good skin blood flow is accountable for hair growth (20) Humphrey proposed high skin blood flow with using of minoxidil. (23)

Topical application of glyceryl trinitrate (act on the vien rather than arteriole) didn't induce hair growth ,proposing that,a dilatation of arteriolar blood vessels instead of venulolar are need for promotion of hair growth.(24) The mechanism of hair growth by minoxidil not related to hormonal androgenic stimulation that's approved by normal blood testosterone level &normal excreted urinary level of steroid (25,26)

Varothai approved that topical application of minoxidil will induce hair growth for both male and female with alopecia areata(27,28) . Goren noticed that 40% of male patient with alopecia areata develop hair growth with 3-6 month of topical minoxidal (29). Virginia demonstrated a dose response relationship when treated two group of patient one with 1% minoxidil and other group with 5% minxidil the response in the first group was 38% versus 81% in the second group.(30)

Although the action of lantoprost is not clearly obvious , but an interventional study reported that ,its exerts its effects through prostaglandin analogues .So the direct use of these analogues may be more effective with prolong effects and abolish the pathomechanisim of AA and therefore a competence drug for alopacia .(31,32)

Coronel noticed that , there was a moderate to total response in 45% of the patients after topical application of lantoprost for eye lash.(31) El-Ashmawy reported that , the addition of lantoprost to the topical betamethasone will increase the efficacy of betamethasone.(32).

This study approved more response with topical minoxidil only than minoxidil &lantoprost in a combination this agreed with Gita study who reported that lantoprost has no efficacy in the treatment of alopecia areata.(33)

Conclusions: The treatments with 5% minoxidil in acombination with 0.005% latanoprost or 5% minoxidil alone were found to be effective and a better result with minoxidil only.

RECOMMENDATION

there is a need for further study to include a wide population to compare with these results and implemented in the managements of alopecia areata.

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