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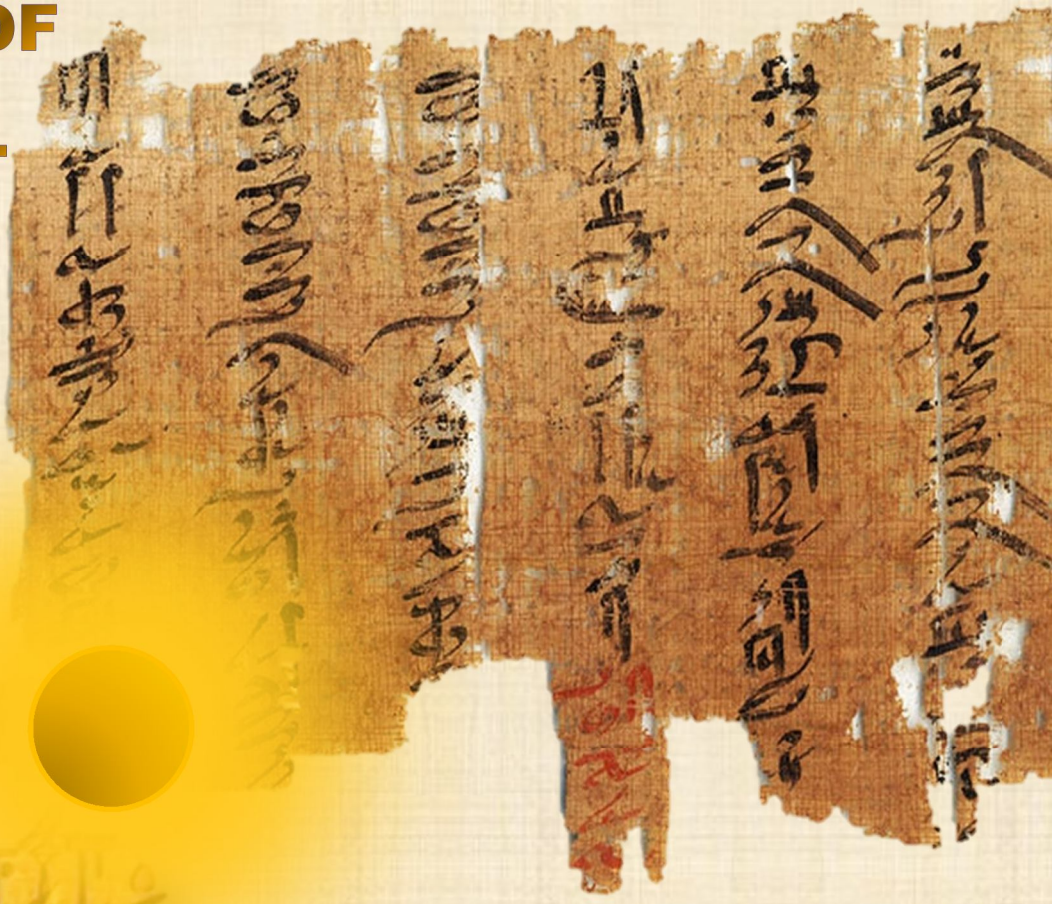

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Original article

Evaluation of The Role of Topical Cetirizine 1% in Treatment of Male Androgenetic Alopecia

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ABSTRACT

Background: Androgenetic alopecia [AGA] one of the common scalp hair loss disorders affecting males. Androgenetic alopecia is characterized by progressive miniaturization of hair follicles in the scalp and gradual transformation of terminal hairs into vellus hairs leading to progressive decrease in hair density. The pattern of loss follows the scale developed by Hamilton and later extended by Norwood.

Aim of Work: Evaluation of the efficacy of topical cetirizine 1% for the treatment of androgenetic alopecia in male patients.

Patients and methods: This case-controlled study included 30 male patients treated by topical cetirizine1%and 30 male patients as a control group treated by placebo for 6 months recruited from dermatology outpatient clinic of Damietta Hospital and Al-Sarou hospital during the period from September 2018 to August 2019. For each patient, the trichoscopic evaluation was performed before the beginning of treatment and after 6 months of treatment.

Results: Treatment with topical cetirizine 1% in male patients with AGA showed that according to number of new up growing hairs, the majority [56.7%] of cases had no new growing hair, 20.0%, 16.7% &6.7% had one, two and three new hair respectively. On the other hands, all control had no new hair after 6 months of treatment.

Conclusion: Topical cetirizine is effective in the treatment of Androgenetic alopecia in men.

Keywords: Alopecia; Androgenetic; Cetirizine; Male; Prostaglandins.

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* Main subject and any subcategories have been classified according to research topic.

INTRODUCTION

Androgenetic alopecia [AGA] is non-scarring pattern hair loss. It is one of the most common disorders in a hair clinic that affects male and female, independent on severity and age[1]. Physically, androgenetic alopecia is characterized by progressive miniaturization of hair follicles in the scalp and gradual transformation of terminal hairs into vellus hairs leading to progressive decrease in hair density[2]. The pattern of loss follows the scale developed by Hamilton,[3] and later extended by Norwood.[4] Hair loss affecting the temples, vertex and mid frontal scalp, while the occipital region usually not affected. This distribution of hair loss could be due to the fact that, hair follicles in the frontal and vertex regions have elevated expression of androgen receptors. On the other hands, androgen-insensitive hair follicles were the predominant in the occipital and temporal regions[5]. One of the useful tools in the diagnosis of androgenetic alopecia is the trichoscopy. The hair diameter diversity more than 20%, which represented vellus transformation, perifollicular pigmentation/ peripilar sign was the commonly used diagnostic change seen in androgenetic alopecia[6].

Prostaglandins especially prostaglandin E [PGE] and PGF2α play an important role in the hair growth, while PGD2 has an inhibitory effect on the hair growth[7]. Therapeutics modalities such as prostaglandin analogs and antagonists act by reversing the androgen mediated inhibition of hair follicle signaling pathways, and considered as future androgenetic alopecia treatment option[8].

Cetirizine hydrochloride is a racemic mixture of equal amounts of R-levocetirizine and S-dextro-cetirizine, which do not undergo inter-conversion and had stable configuration inside the human body. Cetirizine was widely used, safe, selective second-generation histamine [H1] receptor antagonist. Independent of its H1 effects, cetirizine has anti-inflammatory and anti-allergic properties[9]. Inhibition of PGD2 by the use of cetirizine is a new and promising target treatment for androgenetic alopecia. Compared with other commonly used second-generation H1- anti-histamines, cetirizine selectivity has relatively higher and favorable affinity for H1 receptors, which renders it more potent, faster onset and longer duration of action[9]. Several modalities as minoxidil, finasteride and serenoarepens are commonly used for the treatment of AGA, and show some side effects. In this literature, according tohypertrichosis observed in patients treated with PGF2 α analogues, this supported the important role of the prostaglandins in the hair growth.

AIM OF WORK

This study was designed to evaluate the efficacy of topical cetirizine 1% for the treatment of AGA in male patients.

PATIENTS AND METHODS

This case-control trial included 30 male patients and 30 male patients as a control group recruited from dermatology outpatient clinic of Damietta Hospital and Al-Sarou hospital during the period from September 2018 to August 2019.

Written informed consents were obtained from all patients with approval of the Research Ethics Committee. All patients were in good health conditions and with different grades of androgenetic alopecia [we used the Hamilton classification, modified in order to evaluate also the quantity of the hairs in the vertex]. The study [case] group was treated by the application of topical cetirizine 1% [1ml/daily] and the healthy cases were treated by application of placebo [5% cyclo–siliconepentamer at 96°C of ethyl alcohol] per day for 6 months.

Inclusion criteria were: Healthy male aged between 22 and 55 with different grades of andro-genetic alopecia. On contrary, exclusion criteria were: previous therapies for androgenetic alopecia, and systemic diseases. A cetirizine galenic lotion composed of cetirizine 1%, 5% cyclo-silicon-epentamer at 96°C of ethyl alcohol were applied once per day on the scalp. For each patient, the evaluation using trichoscopic was performed before the beginning of treatment and after 6 months of treatment.

Statistical analysis: Patients were included as convenient sample. IBM SPSS software package version 20.0 [Armonk, NY: IBM Corp] was use to statistically analyzed the data Qualitative data were presented as number and percent while quantitative data were presented as range, minimum, maximum, mean, standard deviation, median and interquartile range [IQR]. The Kolmogorov-Smirnov test was used to represent the normal distribution of analyzed data.

Significance was considered at the 5% level. The Chi-square test was used for categorical variablesto compare between different groups. Monte Carlo correction for chi-square was used when more than 20% of the cells have expected count less than five and Student t-test was used normally distributed quantitative data, to compare between two groups.

RESULTS

Both groups were comparable in their age [p=0.483] as the mean age of patients group was 31.83 ± 6.18 [ranged from 22to 43years] verbs 32.97 ± 6.26 [ranged from 23 to 45years] in control group**.** There was non-significantly difference between both groups in grades of severity. The majority of cases had grade III&IV severity [33.3%], while grade V, VI and II were reported in 16.7%, 10.0% and 6.7% respectively. While in control group, the majority of cases had grade III and IV severity [30.0%&26.7 respectively], while grade V was reported in 23.3%, grade VI and II in 6.7% and 13.3% respectively. There was no significant relation between family history and androgenic alopecia [p=0.787]. As the majority of cases [66.7% and 63.3% respectively] in patients and control groups had positive family history of androgenic alopecia [Table 1].

According to number of new up-growing hairs, the majority [56.7%] of cases had no new up-growing hairs, 20.0%, 16.7% &6.7% had 1, 2 &3 new hair respectively. On the other hands, all control had no new hair. So, number of patients without new up-growing hair in control was significantly higher than cases group [p<0.001] [Table 2].

Photographic assessment of cases showed significantly higher number of improvement than control group either mild [33.3% versus 0% respectively], moderate [3.3% versus 0% respectively] and good [6.7% versus 0% respectively] as p<0.001. While cases had no improvement by Photographic assessment in cases were significantly lower than control group [56.7% versus 100% respectively] [Table 3].

According to self-assessment of improvement, cases had no improvement [56.7% versus 86.7 respectively] and worsen [0% and 13.3% respectively] of symptoms in cases were significantly lower than control group. While cases reported mild [23.3% & 0% respectively], moderate [16.7 and 0% respectively] and good improvement [3.3% and 0% respectively] was significantly higher in cases than control [p<0.001] [Table 4].

Table [1]: Comparison between the two studied groups according to family history

Family history	Cases [n = 30]		Control [n = 30]		t	P
	N	%	N	%		
Negative	10	33.3	11	36.7	0.073	0.787
Positive	20	66.7	19	63.3		

χ2: Chi square test. p: p value for comparing between the two studied groups

Table [2]: Comparison between the two studied groups according to number of new up growing hairs**.**

Number of new up growing hairs	Cases [n = 30]		Control [n = 30]		□	MCp
	No	%	No	%		
Zero	17	56.7	30	100.0	16.140	<0.001*
One	6	20.0	0	0.0		
Two	5	16.7	0	0.0		
Three	2	6.7	0	0.0		

*denote significant. χ2: Chi square test. MC: Monte Carlo.p: p value for comparing between the two studied groups.

Table [3]: Comparison between the two studied groups according to photographic assessment**.**

Photographic assessment	Cases [n = 30]		Control [n = 30]		□	MCp
	N	%	N	%		
No improvement	17	56.7	30	100.0	17.238	<0.001*
Mild	10	33.3	0	0.0		
Moderate	1	3.3	0	0.0		
Good	2	6.7	0	0.0		

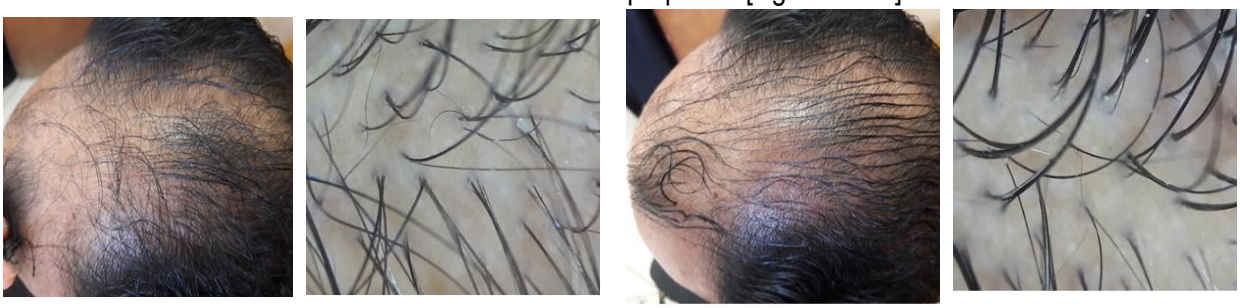
*denote significant. χ2: Chi square test; MC: Monte Carlo. p: p value for comparing between the two studied groups

Table [4]: Comparison between the two studied groups according to patient self- assessment.

Self-assessment	Cases [n = 30]		Control [n = 30]		χ^2	MCp
	No.	%	No.	%		
No improvement	17	56.7	26	86.7	18.676*	<0.001*
Worse	0	0.0	4	13.3		
Mild	7	23.3	0	0.0		
Moderate	5	16.7	0	0.0		
Good	1	3.3	0	0.0		

*denote significant. $\chi 2$: Chi square testMC: Monte Carlo.p: p value for comparing between the two studied groups.

Clinical response in patients before and after 6 months of treatment follow up is demonstrated in the following pictures. Assessment was done with clinical and dermoscopic photos [Figures 1 – 3].

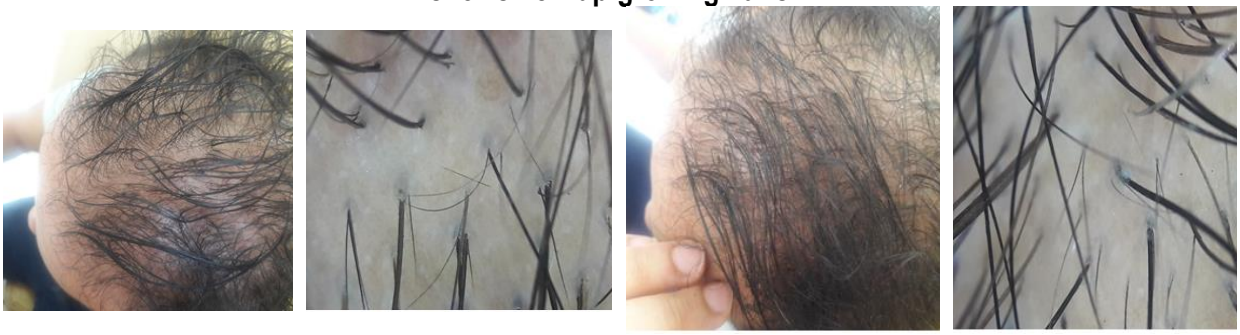


Before **After**

Figure [1]: Comparison between photographic and dermoscopic pictures the dermoscopic picture shows new up-growing hairs.

Before **After**

Figure [2]: Comparison between photographic and dermoscopic picturesthe dermoscopic picture shows new up-growing hairs.



Before **After**

Figure [3]: Comparison between photographic and dermoscopic picturesthedermoscopic picture shows new up-growing hairs

DISCUSSION

In the present study, [66.7%] of patients and [63.3%] of the control group had a positive family history of androgenetic alopecia suggesting the existence of a genetic background for the disease. The treatment response according to number of new up growing hairs and regarding photographic assessment revealed that, there was a statistically significant difference between the two studied groups, suggesting treatment by cetirizine, 1% was significantly effective. Our study was in line with Rossi et al.[10] who evaluated total hair density [D], vellus hair density [VD], terminal hair density [TD] and diameter [d] in response to 1 ml/day of a solution containing cetirizine 1%, their results reported marked increase in D, TD and a decrease in VD. Based on Rossi et al., results, the topical application of cetirizine 1% was associated with significant improvement of androgenetic alopecia without notable side effects which resulted on good patient's compliance.

The possible mechanism of action of cetirizine may be attributed to its anti-inflammatory effects, exerted regardless its H1-effects[9].

More recently, Caro et al. [11] reported a case report on chemotherapy-induced alopecia treated with topical cetirizine. Their treatment plan included a combination of galenic solution, cetirizine 0.5%, oral probiotics and oral vitamin D; and observed progressive improvement of hair density and growth after, 3, 7 and 10 weeks. They suggested that, cetirizine could condition perifollicular micro-environment, and opposes the apoptotic action of chemotherapeutic agents, with preservation of the anagen phase.

The current study revealed a statistically significant difference between the two studied groups according to patient self-assessment. The result was not verified in comparable studies in the literature due to lack of similar studies.

The limitation in our study is that PGD2 inhibitors in AGA is a new treatment option for AGA and more studies are needed to further assess their function. In agreement to our study, cetirizine 1 % has an excellent safety profile with promising effects which could be an excellent option to the patients in the near future. However, more studies are essentially needed to support current evidence.

Conclusion: According to the present results, the usage of topical cetirizine was effective in the treatment of AGA in men after 6 months of treatment as assessed by dermoscopy, photography and patient self-assessment. Cetirizine 1 % has an excellent safety profile with promising effects which could be an excellent option to the patients in the near future. However, more studies are essentially needed to support the current evidence and to better investigate the role of cetirizine in AGA.

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