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Original Article

To assess the outcome of microneedling in the treatment of androgenetic alopecia

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Abstract

Objective To assess the outcome of microneedling in the treatment of androgenetic alopecia.

Methods A total of 90 cases meeting inclusion criteria were enrolled from dermatology OPD of Jinnah Hospital Lahore. After informed consent basic demographic details were obtained. Disease was classified according to the Hamilton Norwood scale and only patients with stage ||| and above were included. Microneedling was done with the help of dermapen R (Dr. Pen A7). The procedure was repeated after every 4 weeks (5 sessions) for six months. Final assessment was done one month after the last session.

Results Total of 90 patients, 51.1% (n=46) in the age group of 20-35 years and 48.9% (n=44) in the age group of 36-50 years. The mean age was 35.46±4.594 years. Distribution of duration of alopecia was 4.44±1.255 years. Disease staging of the patients showed that 6.7% (n=6) had Norwood Hamilton III, 28.9% (n=26) IV, 41.4% (n=37) V, and 23.3% (n=21) had VI stages of the disease. A total of 46 patients (51.1%) showed more than 50% improvement.

Conclusion In the current study, it was found that 51.1% (n=46) showed >50% improvement after 5 sessions of microneedling which were performed after every 4 weeks.

Key words
Androgenetic alopecia (AGA); Microneedling; Hamilton Norwood scale.

Introduction

Androgenetic alopecia (AGA) defines as a gradual reduction in hair follicle size without scaring, typically occurring in genetically predisposed men and women in a specific pattern.[1] This condition leads to a progressive reduction in hair density and may occasionally be accompanied bytelogen effluvium.[2] A study reported that the prevalence of androgenetic alopecia in men was 67.1% and 23.9% in women.[3] In males, hair loss commonly affects the temporal and vertex areas while leaving the occipital region untouched leading to the recognizable "horseshoe" pattern. The occurrence and frequency of AGA vary depending on age and ethnicity.[4] Despite its widespread prevalence, the available therapeutic choices for AGA are rare.[1]

FDA approved only two medications for the treatment of androgenetic alopecia which are minoxidil and finastride.[5] Effectiveness of both conventional treatments in androgenetic alopecia, aims to prevent hair loss as well as stimulates new hair growth, ranges between 30% and 60%.[6] Hence there is a demand for supplementary and innovative treatment modalities to achieve quicker and more favourable results.[2] Microneedling is a technique in which multiple small needles are used to

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induce physical trauma which in return increases the production of collagen and other healing factors. It has a role in many dermatological problems like acne scarring, rosacea, skin pigmentation, rejuvenation of skin, and alopecia. Microneedling has demonstrated beneficial effects in the management of AGA.[7] However, there is ongoing debate regarding the effective microneedling protocol.[7] A case series has reported significant improvement in scalp density with microneedling, suggesting its potential to enhance treatment outcomes.[6] Another study reported that the mean change in total hair count was 23.4±5.1 after 24 weeks. According to the patient's assessment of hair growth in the 24th week, 50% of cases had improvement of 50-100% in hair growth.[8]

Androgenic alopecia is a distressing disease and no satisfactory 100 percent treatment is available so far. The current study was designed to see the outcome of microneedling, which is minimally invasive and low cost in the treatment of AGA in our local population. No local study has been done so far and there is also scarcity at the international level. Hence, this study aims to fill this gap in the literature. Microneedling will be a useful, minimally invasive, readily available modality of treatment for patients of AGA.

Methods

An experimental study was performed in Dermatology department of Jinnah Hospital Lahore from 01-09-2021 to 01-03-2022. A total of 90 males were enrolled between the ages 20-50 years having disease Stage Norwood Hamilton III-Vl of AGA. Patients with any other concurrent hair disease as determined by history and examination, disease duration >10 years, or patients on any topical and/or systemic therapy for alopecia in the past three months were excluded.

Informed consent was obtained and data was collected and entered on a pre-designed structured proforma. Basic demographic details of all cases, such as name, age, contact details, and address were taken. All patients were asked to wash their hair on the night before the treatment. A target area of 3 cm^2 of the most prominent bald area was taken. Hair count was done with a dermatoscope and the same area was marked on a transparency sheet with a permanent marker. A high pixel camera was used to take pictures of the scalp in a standard format at baseline as well as at 6 months. Local area was cleaned with alcohol pads before treatment and topical anesthetic cream was applied on scalp 1 hour before procedure. The depth of microneedles was 1.5mm. Repeated passes were done till the therapeutic end point of erythema and pinpoint bleeding appeared. Patients were instructed not to wash their hair for 24 hours after the treatment. Patients were advised to cut their hair regularly to keep the same length throughout the treatment. Outcome was recorded as per operational definition. This was done with the help of dermapen R (Dr.pen A7). The procedure was done after every 4 weeks (5 sessions) for six months. The depth of the needles was 1.5mm. Final assessment was done one month after the last session.

Results

Age distribution of the patients showed that out of 90 patients, 51.1% (n=46) were in age group of 20-35 years and 48.9% (n=44) were in age group of 36-50 years. Mean age was calculated as 35.46±4.594 years. Mean duration of alopecia was 4.44±1.255 years. Disease staging of the patients showed that 6.7 % (n=6) had III, 28.9% (n=26) IV, 41.4% (n=37) V and 23.3% (n=21) had VI stage of the disease. Regarding the outcome of microneedling, 51.1% (n=46) of patients showed more than 50% response **(Table 1)**. The data was stratified for age, duration of alopecia, and disease stage.

Table 1

Efficacy		*Age*		*Duration*		*Disease stage*			
		20 -35 years	*36-50years*	*2-4years*	*> 4 years*	*III*	*IV*	*V*	*IV*
>50%	46 (51.1%)	22.2%	28.9%	27.8%	23.3%	3.3%	13.3%	25.6%	8.9%
<50%	44 (48.9%)	28.9%	20.0%	20%	28.9%	3.3%	15.6%	15.6%	14.4%

Discussion

Androgenetic alopecia has impact on 30% of men under the age group of 30 and almost 50% of men over the age of 50.[9] This condition has a notable psycho-social impact.[10] Consequently, there has been an increasing demand of different treatments which not only stimulates new hair growth but also prevent existing hair loss and improve thickness as well as density.

Microneedling represents an innovative and secure approach to treat androgenetic alopecia. It triggers hair regrowth by stimulating the production of both platelet-derived growth factors as well as epidermal growth factors, which are boosted the platelet activation and skin wound healing process.[11-13]

In the current study, out of 90 patients, 51.1% (n=46) were in the age group of 20-35 years and 48.9% (n=44) were in the age group of 36-50 years. Mean age was 35.46±4.594 years. Mean duration of alopecia was 4.44±1.255 years. Disease staging of the patients showed that 6.7% (n=6) had Norwood Hamilton III, 28.9 % (n=26) IV, 41.4% (n=37) V, and 23.3% (n=21) had VI stage of the disease. Outcome of microneedling in the treatment of androgenetic alopecia was 51.1% (n=46).

In the study done by *Puri et.al* 20 patients with AGA were inducted. They reported excellent response in 75% of cases in the minoxidil group with microneedling and 90% in hair vitamin with the microneedling group. They included patients up to sixty years of age and 60% of their cases were in the 41-60 years age bracket while results were obtained after only 4 sessions. The reason for a superior result may be attributed to microneedling, which is used along with minoxidil and hair multivitamins. Another factor can be less gap i.e. of 3 weeks between sessions while in our study sessions were conducted monthly. Hamilton Norwood staging and duration of alopecia were not taken into account and may be the major confounding factors.[14]

In the research conducted by *Rachita et al*., four men with androgenetic alopecia on minoxidil solution and finasteride for 2-5 years were subjected to a microneedling procedure along with the ongoing therapy.[6] Mean age in their study is 33 years which is closer to our mean age of 35 years. Approximately 75% of their patients were in grade V Hamilton Norwood staging or above. They had superior results as two-thirds of cases reported >75% improvement. This may be attributed to weekly microneedling for a month followed by fortnightly sessions for 6 months, so the patients received a greater number of sessions in addition to minoxidil and finasteride.

In the research conducted by *Dhurat et al.* total of 100 patients with diagnosis of mild to moderate androgenetic alopecia were taken. Half of the cases were subjected to weekly microneedling for 12 weeks with minoxidil twice a day. In this study >82% of patients reported more than 50% improvement, which is much higher than our study (51%). Even though the patients have the same ethnic origin, the duration of hair loss is also similar i.e. 4 years in our study and 4.5 years in the pilot study. The depth of microneedling is also 1.5mm in both studies. The rationale for a better response in this study might be the enrollment of patients with mild to moderate AGA (III & IV) whereas

our study had majority of patients with grade V and VI Hamilton Norwood stage. Mean age in this study is 28 years which means younger patients were treated whereas in our study it was 35 years. Weekly sessions of microneedling with twice daily application of minoxidil may be another logic behind better results in this study.[18]

Research conducted by *Lewis*[19] *Jeong et al.*[20] and *Kim et al.*[21] explored effects of repeated microneedling stimulation on hair growth. Their studies demonstrated enhanced expression of genes related to hair growth stimulation. Additionally *Kim et al.*[21] also noted earlier and faster hair re-growth with the more shiny texture of the hair in the microneedling group. The authors proposed that microneedling therapy is beneficial for treatment of hair loss that does not respond well to Minoxidil therapy.

The strength of our study is that we followed strict inclusion and exclusion criteria and the sample size was also reasonably good. We followed the patient even 1 month after treatment. Though our study is limited with less number of sessions from the above discussion it is evident that microneedling is an effective monotherapy for the treatment of androgenetic alopecia

Conclusion

In the current study, we assessed that microneedling is an effective monotherapy for the treatment of androgenetic alopecia. More than 50% of patients showed favorable outcomes (>50% response from baseline) after 6 sessions 1 month apart.

Declaration of patient consent The authors certify that they have obtained all appropriate patient consent.

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Conflict of interest Authors declared no conflict of interest.

Author's contribution

SK: Substantial contribution to study design, acquisition of data, manuscript writing, has given final approval of the version to be published.

SQ, RZ: Substantial contribution to acquisition of data, manuscript writing, has given final approval of the version to be published.

BB, LMM: Substantial contribution to analysis and interpretation of data, critical review, has given final approval of the version to be published.

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