

A study on the efficacy of microneedling with minoxidil solution versus microneedling with hair multivitamin solution for the treatment of androgenetic alopecia



Sunil Kumar¹, Rajesh G², Srinivas K³

^{1,3}Associate Professor, ²Professor, Department of Dermatology, Akash Institute of Medical Sciences and Research Centre, Bengaluru, Karnataka, India

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ABSTRACT

Background: Androgenetic alopecia (AA) is one of the common cosmetic concerns. It affects more than 50% of adults. AA alopecia is a benign condition and it affects the psychology of patients. Microneedling (MN) – minimally invasive procedure. Minoxidil is an antihypertensive and causes vasodilation. **Aims and Objectives:** The present study was aimed to compare the efficacy of MN with minoxidil solution versus MN with hair multivitamin solution of male androgenetic alopecia. **Materials and Methods:** The study was conducted in the Department of Dermatology, Akash Institute of Medical Sciences and Research Centre, Devanahalli, Bengaluru, Karnataka, India. After following inclusion and exclusion criteria, 50 subjects were involved. Subjects were divided into two groups, 25 in each group. Group I, MN with dermaroller having needle length of 1.5 mm was done and minoxidil solution was applied over the scalp and the again MN was done. Group II, MN was done and hair multivitamin solution was used. MN was done for every 3 weeks and a total of nine sessions were done. From the last session, all the study subjects were followed for 6 months. Baseline investigations were done. Side effects such as pain, bruising, and folliculitis were recorded and monitored. Response of the patients to the treatment (hair growth) was assessed by physician global assessment scores. Visual analog scale score was done to assess the subjective improvement of the patients. **Results:** In this study, 50 male androgenetic alopecia patients were involved. In this, 21 (42%) were in the age group of 20–40 years and 29 (58%) were in the 41–60 years of age group. In Group I, excellent response was seen in 19 (76%), very good response in 4 (16%), good response in 2 (8%) patients, and none of the patients showed average response. In Group II, excellent response was seen in 10 (40%), very good response in 4 (16%), good response in 6 (24%) patients, and average response in 5 (20%). Following side effects were observed in the study subjects, pain in 6 (24%), bruising 4 (16%), and folliculitis 2 (8%). **Conclusion:** MN is safe and cost-effective procedure, which causes stimulation of hair follicles and improves hair growth.

Key words: Androgenetic alopecia; Dermaroller; Hair regrowth; Microneedling

INTRODUCTION

Androgenetic Alopecia (AA) is one of the common cosmetic concerns. It affects more than 50% of adults.¹ AA alopecia is a benign condition and it affect the psychology of patients.² AA involves hormonal and genetic factors.³ The hair loss

disorders are categorized as scarring and non-scarring alopecias, However, the treatments dependent on the diagnosis of the patients during dermatological evaluation.⁴

Microneedling (MN) – minimally invasive procedure, induction of percutaneous wounds with 0.25–5.00 mm

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Address for Correspondence:

Dr. Sunil Kumar, Associate Professor, Department of Dermatology, Akash Institute of Medical Sciences and Research Centre, Bengaluru, Karnataka, India. **Mobile:** +91-9972454393. **E-mail:** sunilkims@yahoo.co.in

medical grade needles. Orentreich in 1995 first described the this for the use of wrinkles and atrophic scars.⁵ MN promote wound healing responses, angiogenesis, reverses fibrosis resulted by acute injury and skin aging by secreting platelet-derived growth factor (PDGF), and vascular endothelial growth factor (VEGF). MN has been shown to up-regulate Wnt/b-catenin pathway and increases growth factors and capillaries. This stimulates regeneration of hair follicle stem cells and blood supply to hair follicles; hence, increasing the hair growth.⁶ At present, MN has been found to useful in promoting hair growth in combination with other hair growth promoting agents such as minoxidil, platelet plasma, and topical corticosteroids.⁷ Therefore, MN is an effective therapy for the treatment of androgenetic alopecia.⁸

Minoxidil is an antihypertensive and causes vasodilation. It prevents hair loss/hair growth in androgenetic alopecia patients.^{9,10} Minoxidil is a potassium channel opener and causes hyperpolarization of cell membranes. By increasing the diameter of blood vessels of scalp, it permits more oxygen, blood, and nutrient to the follicle, which finally leads to new hair growth.^{11,12} Hair multivitamin solution composed with ingredients such as biotin and d-panthenol and it provides nutrients to nourish the hair structure and increases follicle strength and repairs dry scalp.¹⁰

Aims and objectives

The present study was aimed to compare the efficacy of MN with minoxidil solution versus MN with hair multivitamin solution of male androgenetic alopecia.

MATERIALS AND METHODS

The study was conducted in the Department of Dermatology, Akash Institute of Medical Sciences and Research Centre, Devanahalli, Bengaluru, Karnataka, India. After obtaining the Institutional Ethics Committee approval (AIMSRC/BLR/IEC/151/2021, dated: January 05, 2021) and informed consent from the study subjects, 50 subjects were involved in this study. Age of the study subjects was from 20 to 60 years. Non-responsive patients to the routine therapies and patients not on treatment of past 6 months were included in the study. Patients on oral finasteride, diabetes mellitus, hypertension, or any other systemic disease were excluded from the study.

The study subjects were divided into two groups, 25 in each group. Group I, MN with dermaroller having needle length of 1.5 mm was done and minoxidil solution was applied over the scalp and the again MN was done. Group II, MN was done and hair multivitamin solution was used. MN was done for every 3 weeks and a total of nine sessions were done. From the last session, all the study subjects were followed for 6 months.

Procedure

The scalp was cleaned, topical minoxidil solution was applied on the scalp and a dermaroller (1.5 mm length) was rolled over the scalp in all the directions till erythema appeared, which was taken as end point. Baseline investigations were done for all the study subjects in the beginning and at the end of last session. Side effects such as pain, bruising, and folliculitis were recorded and monitored. Response of the patients to the treatment (hair growth) was assessed by physician global assessment score as follows:

- Excellent response – >75%
- Very Good response – 50–74%
- Excellent response – 25–49%
- Excellent response – <25%.

Visual analog scale score from 1 to 10 was done to assess the subjective improvement of the patients as follows:

- Average response – 1–4
- Good response – 5–7
- Very Good response – 8–10.

RESULTS

The present study was aimed to compare the efficacy of MN with minoxidil solution versus MN with hair multivitamin solution of male androgenetic alopecia by involving 50 patients. In this study, a total of 50 male androgenetic alopecia patients were involved. In this, 21 (42%) were in the age group of 20–40 years and 29 (58%) were in the 41–60 years of age group (Table 1).

In Group I, excellent response was seen in 19 (76%), very good response in 4 (16%), good response in 2 (8%) patients, and none of the patients showed average response. In Group II, excellent response was seen in 10 (40%), very good response in 4 (16%), good response in 6 (24%) patients, and average response in 5 (20%) (Table 2, Figures 1 and 2).

Following side effects were observed in the study subjects, pain in 6 (24%), bruising 4 (16%), and folliculitis 2 (8%) (Table 3).

DISCUSSION

The present study compared the efficacy of MN with minoxidil solution versus MN with hair multivitamin solution of male androgenetic alopecia. In this, 21 (42%) patients were in the age group of 20–40 years and 29 (58%) were in the 41–60 years of age.

In Group I (minoxidil group), excellent response was seen in 19 (76%), very good response in 4 (16%), good response

Table 1: Age distribution of study subjects	
Age distribution	Number
20–40	21 (42)
41–60	29 (58)

Table 2: Response of the patients after five sessions of microneedling		
Response after treatment	Group I (n, %)	Group II (n, %)
Excellent	19 (76%)	10 (40)
Very Good	4 (16)	4 (16)
Good	2 (8)	6 (24)
Average	-	5 (20)
Total	25 (100)	25 (100)

Table 3: Side effects of patients after microneedling	
Side effect	Number (%)
Pain	6 (24)
Bruising	4 (16)
Folliculitis	2 (8)

in 2 (8%) patients, and none of the patients showed average response. In Group II (multivitamin group), excellent response was seen in 10 (40%), very good response in 4 (16%), good response in 6 (24%) patients, and average response in 5 (20%). This suggests that Group I shows better response than Group II.

In a study conducted by Dhurat and Mathapati conducted a study in four male androgenetic alopecia patients on minoxidil solution and finasteride since 2–5 years were subjected to MN procedure along with the ongoing therapy. The response was seen after 8–10 sessions.¹³ Similarly, another study conducted on 60 patients with androgenetic alopecia, of which 30 were treated with minoxidil 2% solution and remaining 30 were treated with intradermal injection of minoxidil 2% by point-to-point technique. The use of mesotherapy showed more significant improvement compared with the topical minoxidil.¹⁴

English et al., conducted a systematic review on 22 clinical studies. They reported that MN as an adjunct therapy, improved hair parameters as well as a range of hair loss types, hair loss severities, needling devices, needling depths of 0.50–2.50 mm, and session frequencies from once weekly to once monthly – with no serious adverse events reported.¹⁵ Pedroso et al., presented a case series and reported that the association of MN with photobiomodulation is a promising alternative for the treatment of male androgenetic alopecia.¹⁶ Dhurat et al., conducted a study on 100 patients of androgenetic alopecia. They reported that MN is a safe and a promising tool in hair stimulation and also is useful to treat hair loss refractory to Minoxidil therapy.¹⁷



Figure 1: Before and after treatment of a 32-year-old male patient with minoxidil solution



Figure 2: Before and after treatment of a 33-year-old male patient with hair multivitamin solution

In a study conducted by Kumar et al., conducted a study to compare the efficacy of MN along with topical minoxidil and topical minoxidil alone in the treatment of Androgenetic alopecia (AGA) in men. The study reported that MN and topical minoxidil combined treatment was better than topical minoxidil alone with regard to increase in the hair count and patient satisfaction.¹⁸ Similarly, another study by Jia et al., reported that combination of the length of 1.5 mm MN and 5% minoxidil in the treatment of androgenetic alopecia (AGA) showed efficacy with high safety.¹⁹

MN leads to stem cells activation in hair follicle. Microchannels, formed by minoxidil, stimulate cytokines and growth factors, which increases the action of minoxidil on hair follicles.²⁰

However, mechanisms of hair regrowth induced by MN include:²¹

1. Increased secretion of PDGF, epidermal growth factors through platelet activation, and skin wound regeneration mechanism
2. Stem cells activation in the hair bulge area under wound healing conditions, caused by a dermaroller
3. Increased expression of hair growth related genes VEGF, B catenin, Wnt3a, and Wnt10b.

Limitations of the study

The present study has some limitations. The sample size was small.

CONCLUSION

The present study results conclude that excellent response was seen in Group I (minoxidil) patients than Group II. Pain is the common side effect observed in this study. MN is safe and cost-effective procedure, which causes stimulation of hair follicles and improves hair growth.

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Authors Contributions:

SK- Concept and design of the study and prepared first draft of manuscript; **RG**- Interpreted the results, reviewed the literature, and manuscript preparation; and **Sr K**- Concept, coordination, statistical analysis and interpretation, preparation of manuscript, and revision of the manuscript.

Work attributed to:

Akash Institute of Medical Sciences and Research Centre, Devanahalli, Bengaluru - 562 110, Karnataka, India.

Orcid ID:

Dr. Sunil Kumar - <https://orcid.org/0000-0001-8754-3101>
 Dr. Rajesh G - <https://orcid.org/0000-0002-5472-6208>
 Dr. Srinivas K - <https://orcid.org/0000-0001-5965-8227>

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