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Original Research Article

Comparative trichoscopic analysis of efficacy of combination therapy versus monotherapy of platelet rich plasma and topical minoxidil in the treatment of androgenetic alopecia

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ABSTRACT

Background: Hair is a pivotal facet of physical visage and cultural identity. Since time immemorial hair has been considered as a sign of vitality, beauty and health. Hair loss complaint is encountered by at least 50% of men and women in their lives. Androgenetic Alopecia is one of the most common causes of hair loss among youth which often leads to psychological stress. This underscores the need for early detection and treatment of androgenetic alopecia. Hence a comparative trichoscopic analysis of the efficacy of combination therapy vs monotherapy of platelet rich plasma (PRP) and topical minoxidil in the treatment of androgenetic alopecia was done.
Methods: Sixty untreated cases of androgenetic alopecia were enrolled in this randomized prospective interventional study. Patients were randomly allotted into three groups. Group I (PRP with minoxidil), Group II (Minoxidil), Group III (PRP). Patients were assessed by trichoscopic evaluation, clinical photographs, physician assessment and patient self-assessment at the end of three months and six months of treatment.
Results: Among group 1 (PRP+Minoxidil), a total of 55% of patients had improvement in the grade of alopecia while in group 2 (Minoxidil), 25% of patients had improvement in the grade and 40% of patients had improvement in group 3(PRP). By trichoscopic analysis, 58.6% of patients had improvement in group 1, 36.5% of patients had improvement in group 2 and 44.025% of patients improved in group 3.
Conclusions: Combination therapy with both PRP+Minoxidil shows significant results when compared to individual therapies which was confirmed by trichoscopic analysis.

Keywords: Androgenetic alopecia, PRP, Minoxidil, Trichoscopy

INTRODUCTION

Hair loss is a major concern to an individual as it often affects the quality of life. Hair loss complaint is encountered by at least 50% men and women in their lives.

Androgenic Alopecia (AGA) is a genetically determined, androgen dependent condition resulting in progressive decline in hair fibre production by scalp follicles and their eventual miniaturization.[1] It is a common cause of hair loss in both sexes, higher incidence being in men.[2] A study of 1005 subjects in India has showed a 58% prevalence of AGA in males aged 30-50 years.[3] Hair thinning is noticed in a characteristic pattern, presenting as Fronto-temporal recession and vertex thinning in males and mid line partition widening in females.[4]

Trichoscopy, a simple, noninvasive technique that aids not only in diagnosis of androgenetic alopecia but also in assessing the disease activity and treatment tolerance.

Despite the high prevalence of AGA, there are only few FDA approved therapeutic options. Minoxidil and finasteride are the FDA approved medical treatments for AGA.[5] Other treatments include platelet rich plasma (PRP) therapy, low level laser therapy, micro needling, scalp micropigmentation, prostaglandin analogues, and hair supplements such as vitamins, amino acids.[6]

The ultimate therapeutic option remains surgery which is unaffordable by majority of patients. Surgical modalities require maintenance treatments with other modalities.

The present study aids in determining the treatment modality with better outcome which is more acceptable to the patients.

METHODS

After obtaining clearance from the institutional Ethics committee, sixty patients of androgenetic alopecia attending the outpatient clinic of Dermatology Department of Katuri Medical College Guntur, Andhra Pradesh, India were included in this randomised prospective interventional study over a period of 18 months from September 2022 to Dec 2023. Written consent was obtained from the patients prior to the study.

Inclusion criteria

Inclusion criteria of the study were age 18-50 years; patient with AGA grade I-IV of modified Hamilton-Norwood or grade I-II of Ludwig scale; platelet count more than or equal to 1.5 lakhs/µl; person who has not taken medical treatment for AGA in any form 6 months prior.

Exclusion criteria

Exclusion criteria of the study were dermatological diseases of scalp; patient taking systemic medications for treatment of AGA; pregnancy or lactation; patients with tendency to form keloids; patients with platelet disorders or on anticoagulation therapy; patients with unrealistic expectations.

Procedure

The diagnosis of androgenetic alopecia was done after a detailed history and clinical examination and exclusion of other causes of hairloss.

Dermoscopic evaluation, hair pull test were done prior to treatment and grading of type of baldness was done according to Hamilton-Norwood scale in males and Ludwig scale in females. Improvement was assessed on the basis of clinical photography and trichoscopy at the end of 3 months and 6 months of treatment. Randomized prospective interventional study of treatment approach was done with Dermlite DL200 hybrid dermoscope based on 4 cardinal features of androgenetic alopecia like hair shaft thickness, perifollicular pigmentation, single hair follicular units and yellow dots.

Complete blood count, Anti -HBsAg and anti HCV antibody, ELISA for HIV and other investigations as per requirement were done.

Enrolled patients were randomly allotted into three groups. Group I (PRP with minoxidil): Topical 5% Minoxidil 1ml application twice daily with monthly intradermal PRP injections over scalp for 6 months.

Group II (Minoxidil) Topical 5% Minoxidil 1ml application twice daily over dry scalp for 6 months.

Group III (PRP) Monthly intradermal PRP injections over scalp for 6 months.

All patients received information regarding the limitations and side effects of above treatment modalities

PRP procedure

A total of 18 ml whole blood was obtained from medial cubital vein under strict aseptic conditions and mixed with 2 ml of 3.8% sodium citrate containing vacutainer tubes (blue). The vacutainers were centrifuged in digital 8R Dermafuge laboratory centrifuge. The first spin was a soft spin rotated at 1800 revolutions per minute for 12 minutes which separated the blood into three layers, red blood cells form the bottom layer, the intermediate buffy coat and the topmost plasma layer. The plasma along with buffy coat was collected and transferred to vacutainer without anticoagulant (red). The second spin or hard spin was done at 3000 revolutions per minute for 10 minutes which allows platelets to settle at the bottom of the tube. The upper two-third containing platelet poor plasma was discarded and lower one-third platelet rich plasma was loaded in insulin syringes. A total of 3-4ml of platelet rich plasma was obtained. Topical anaesthetic cream (2.5%lidocaine+2.5%prilocaine) was applied over scalp 45 minutes before administering PRP. The scalp area was cleaned with alcohol and 0.05 to 0.1 ml of PRP was administered intradermally as interfollicular injections in a retrograde fashion.

Assessment of treatment

The patients were followed up at each month of treatment, at three months and then at the end of six months of treatment. Patients were assessed by trichoscopy, patient self-assessment and physician assessment, global photography.

Statistical analysis

The data obtained were analysed by IBM SPSS V20 software. Data were presented as means, standard deviation and percentages. The association between

categorical variables were assessed by Chi-square test and $p<0.05$ was considered significant.

RESULTS

Out of total 60 patients of androgenetic alopecia, 52 (86.6%) patients were males and 8 (13.3%) patients were females. The age distribution of patients was between 18 - 38 years. Age distribution of the patients included in the study were depicted in Table 1. 45% of patients included in the study were engineers, 23% were doing business, 15% were teachers, 13 % were student and remaining were chefs, home makers etc. as depicted in Figure 1.

Table 1: Age distribution of patients.

Age (in years)	No. of patients	Percentage
18-20	5	8.3
21-30	49	81.6
31-40	6	10
Total	60	100
Mean±SD	25.2±4.08	

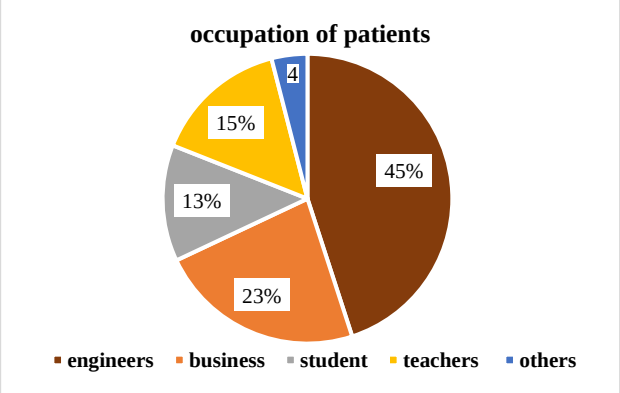

Figure 1: Occupation of patients included in the study.

Comparison of staging of androgenetic alopecia within each group

Group I (PRP+Minoxidil)

Among group 1 (PRP + Minoxidil), a total of 11 (55%) patients had improvement of grade which was noted best at 6 months of treatment as given in Table 2.

Among males, two patients had improvement from grade 4 to grade 3.

Five patients had improvement from grade 3 to grade 2. Three patients had improvement from grade 2 to grade 1. Trichoscopic findings pre and post treatment are indicated in Table 5. Among females, one patient had improvement from grade 2 Ludwig to grade 1 Ludwig. At 3 months of follow up post treatment, no significant change in grade of AGA was noted.

Table 2: Hamilton Norwood and Ludwig staging pre and post treatment with PRP and minoxidil for 6 months.

Stage of treatment	Pre treatment	After 6 months
Stage 1 Hamilton Norwood	1	4
Stage 2 Hamilton Norwood	7	11
Stage 3 Hamilton Norwood	8	3
Stage 4 Hamilton Norwood	3	1
Stage 1 ludwig	0	1
Stage 2 ludwig	1	0

Group II (Minoxidil)

Among group II (Minoxidil), 5 (25%) patients had improvement of grade which was best noted at 6 months of treatment as shown in Table 3.

Table 3: Hamilton Norwood and Ludwig staging pre and post treatment with Minoxidil 5% for 6 months.

Stage of treatment	Pre treatment	After treatment
Stage 1 Hamilton Norwood	2	5
Stage 2 Hamilton Norwood	9	7
Stage 3 Hamilton Norwood	6	5
Stage 4 Hamilton Norwood	0	0
Stage 1 Ludwig	1	2
Stage 2 Ludwig	2	1

Among males, one patient had improvement from grade 3 to grade 2. Three patients had improvement from grade 2 to grade 1.

Among females, one patient had improvement from grade 2 Ludwig to grade 1 Ludwig. Trichoscopic findings pre and post treatment are indicated in Table 3.

At three months follow up post treatment, 3 patients had progression of grade on stopping minoxidil treatment.

Group III (PRP)

Among group 3 (PRP), eight (40%) patients had improvement which was best noted at 6 months of treatment as shown in Table 4.

Among males, one patient had improvement from grade 4 to grade 3, three patients had improvement from grade 3 to grade 2, three patients had improvement from grade 2 to grade 1.

Among females, one patient had improvement from grade 2 Ludwig to grade 1 Ludwig. Trichoscopic findings pre and post treatment are indicated in Table 5.

Table 4: Hamilton Norwood and Ludwig staging pre and post treatment with PRP for 6 months.

Stage of treatment	Pre treatment	After treatment
Stage 1 Hamilton Norwood	1	4
Stage 2 Hamilton Norwood	9	9
Stage 3 Hamilton Norwood	5	3
Stage 4 Hamilton Norwood	1	0
Stage 1 Ludwig	2	3
Stage 2 Ludwig	2	1

Table 5: comparative analysis of trichoscopic improvement of androgenetic alopecia in each group after 6 months.

Trichoscopic finding		Hair shaft diameter variability >20%	Single hair follicular units	Perifollicular pigmentation	Yellow dots
Group 1	Before treatment	18	10	6	5
	After treatment	6	5	2	2
	Improvement in (%)	66.70	50	66.70	60
Group 2	Before treatment	17	8	9	7
	After treatment	11	6	4	5
	Improvement in (%)	35.20	25	55.50	28.50
Group 3	Before treatment	18	7	6	3
	After treatment	9	4	3	2
	Improvement in (%)	50	42.80	50	33.30
P value		0.0004	0.0006	0.051	0.0006

Figure 2 (A-F): Comparison of clinical pics of different treatment modalities before and after treatment.

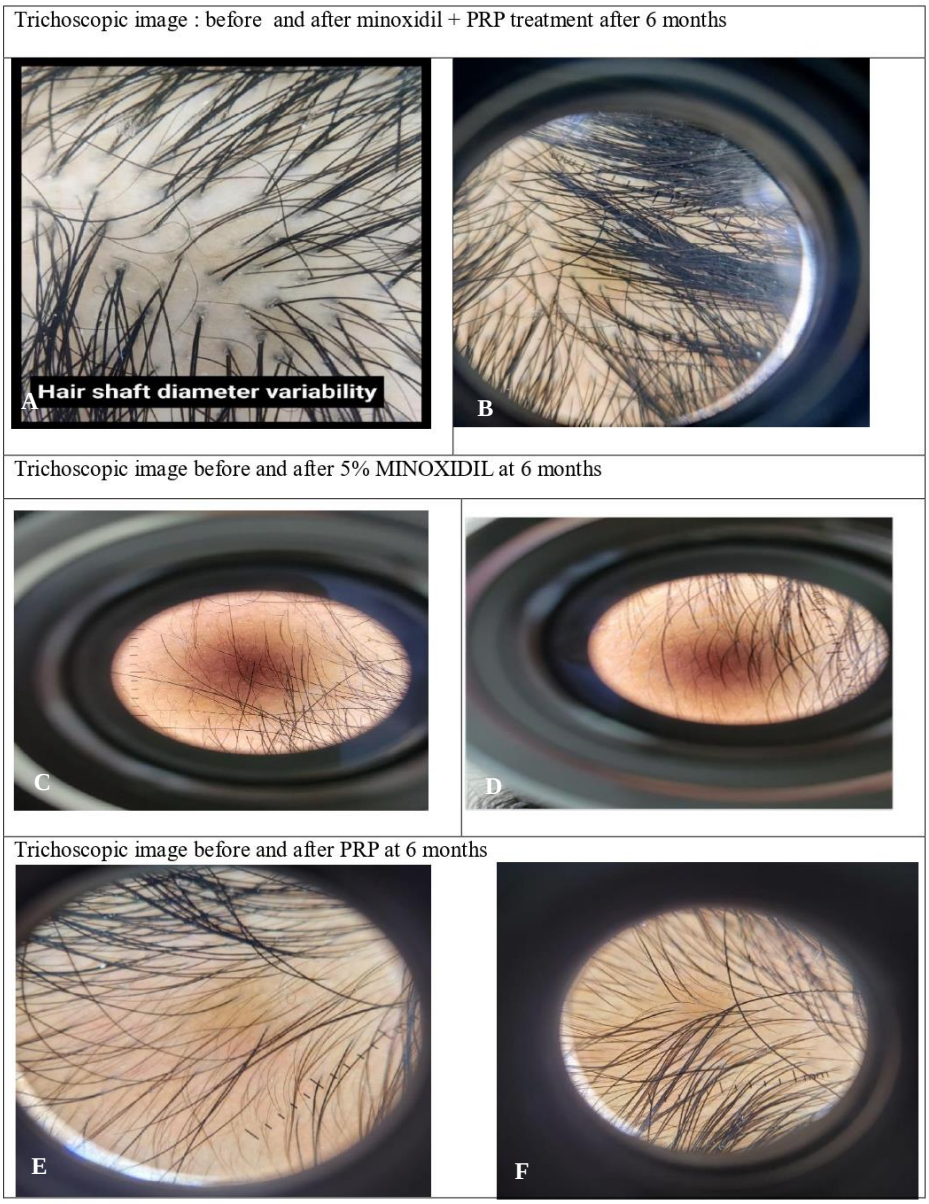

Figure 3 (A-F): Comparison of trichoscopic image of different treatment modalities before and after treatment.

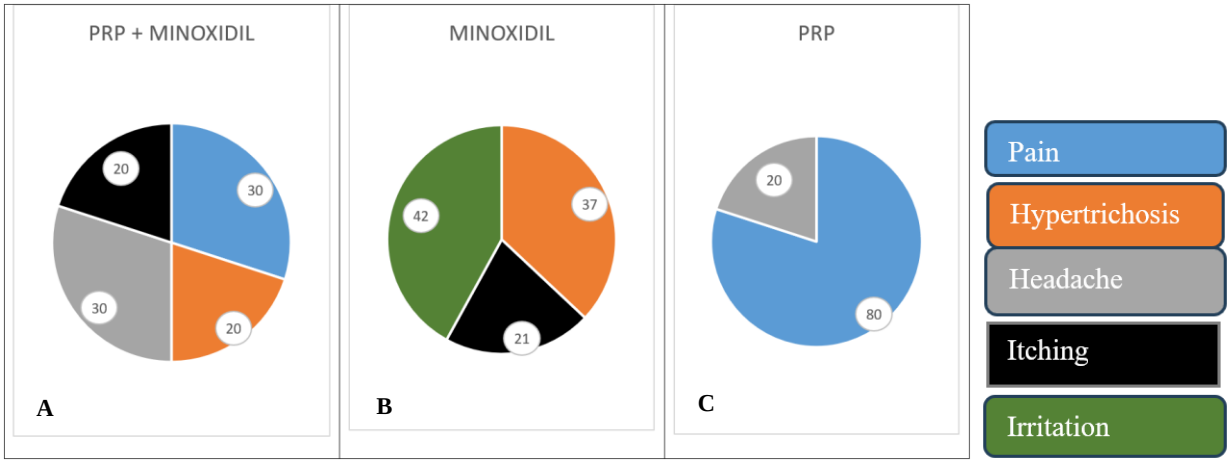

Figure 4 (A-C): Adverse effect of treatment modalities after 6 months.

At 3 months of follow up post treatment, no significant change in grade of AGA was noted.

Pretreatment and post treatment comparison based on grading of alopecia after 6 months

According to Hamilton Norwood and Ludwig staging, 55% of patients had improvement in the grade of alopecia in group 1 while 25% and 40% of patients had improvement in group 2 and 3 respectively with a significant p value of 0.0001.

Trichoscopic comparison of improvement of androgenetic alopecia (after 6 months)

Hair shaft diameter examination has demonstrated an improvement of 66.70% in group 1, followed by group 3 (50%) and then group 2 (35.20%) with a significant p value of 0.0004. The other parameters like single hair follicular unit and yellow dots also followed a similar pattern of improvement with a significant p value as shown in Table 5.

Physician scale of assessment

17 (85%) patients of Group 1(PRP+Minoxidil) had >50% improvement followed by Group 3 (PRP) in which 14 patients (70%) and 11 patients (55%) from Group 2 (Minoxidil) had >50% improvement.

Patients' self assessment

Among group 1(PRP+Minoxidil) patients, 18 patients (90%) reported improvement. 14 patients (70%) among group 3 (PRP) and 10 patients (50%) among group 2 (Minoxidil) reported improvement.

Age group and treatment response correlation

Among the 49 patients in the age group of 21-30 years, 20 patients had improvement in the stage of AGA, among the six patients of 31-40 years age group, 1 patient improved and among five patients in the age group of 18-20 years, three patients had improvement in the stage of AGA.

When compared to 31-40 year age group, the 18-20 year age group and 21-30 year age group responded better.

Family history and treatment response correlation

Among 37 patients with positive family history, 21 patients had improved, 15 patients had no change and 2 patients had progression of severity of AGA with treatment.

Out of 23 patients with negative family history, 14 patients had improved, 9 patients had no change and 1 patient had progression of the disease with treatment.

No significant differences noted between patients with positive or negative family history.

Adverse effects

Out of 10 (50%) patients with side effects among group I (PRP + Minoxidil), the most common side effect reported was headache and pain due to PRP followed by itching, irritation, and hypertrichosis due to minoxidil.

Out of 13 patients with side effects among group II (Minoxidil), the most common side effect reported was irritation followed by itching and hypertrichosis.

Out of 10(50%) patients with side effects among Group III (PRP), pain was the main complaint followed by headache as depicted in Figure 4.

DISCUSSION

In the present era where beauty beholds social wellbeing, androgenetic alopecia stands a major cause of low-self esteem in the individuals. It is a chronic, progressive miniaturization of terminal hairs to vellus hairs resulting in balding of the individuals.[7]

Trichoscopy is an efficient non-invasive technique that helps in effective evaluation of severity and efficacy of treatment of androgenetic alopecia.[8]

PRP is an effective treatment which serves as an adjuvant in treating androgenetic alopecia.[9] When used as a combination therapy with 5% minoxidil, yields superior results than monotherapy.[9] The combination therapy gave promising results in terms of hair density, rate of hair fall and overall patient satisfaction in both men and women.[10]

Statistically significant difference in the improvement between the three groups with a $p<0.05$ by applying Chi-square test was noted in the present study. The result was similar to the study conducted by Khatu et al, Gkini et al and Elena et al.[10-12]

Trichoscopic findings have also confirmed the above findings with a $p<0.05$ as shown in Table 5.

Family history present in 60% of patients in this study is a telltale of genetic basis of the disease; yet doesn't appear to affect treatment response.

The study's main limitation lay in its small sample size, underscoring the need for further research with larger cohorts to thoroughly examine the efficacy of various combination therapies involving PRP and minoxidil for treating androgenetic alopecia.

In this study better results were noted after 6 months of treatment. Treatment period of at least 6 months is necessary to achieve better therapeutic results which requires patient compliance and follow up. Hence,

dermatologists must emphasize regarding course of disease, and need for adherence to treatment to acquire better results.

CONCLUSION

Androgenetic alopecia has become a major cause for progressive hair loss. It can have profound and debilitating consequences on an individual's emotional wellbeing and quality of life. Hence determining the safe and effective treatment modality is the need of the hour. Trichoscopy, a noninvasive tool aids not only in diagnosis but also in assessing response to treatment.

From the present study including 60 cases of androgenetic alopecia, minoxidil and PRP combination therapy yielded better results and patient satisfaction than monotherapy, which was confirmed by pre and post trichoscopic evaluation. As better response was obtained in patients of younger age group and shorter duration of the disease, early intervention is suggested.

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REFERENCES

1. Kaliyadan F, Nambiar A, Vijayaraghavan S. Androgenetic alopecia: An update. Indian J Dermatol Venereol Leprol. 2013;79:613-25.
2. Salman KE, Altunay IK, Kucukunal NA, Cerman AA. Frequency, severity and related factors of androgenetic alopecia in dermatology outpatient clinic: hospital-based cross-sectional study in Turkey. An Bras Dermatol. 2017;92(1):35-40.
3. Shankar DK, Chakravarthi M, Shilpakar R. Male androgenetic alopecia: Population-based study in 1,005 subjects. Int J Trichol. 2009;1:131-3.
4. Sperling LC, Sinclair RD, El Shabrawi-Caelen L. Alopecia. Bolognia textbook of Dermatotology. 4th edition. 2012;1(69):1166.
5. Devjani S, Ezemma O, Kelley KJ, Stratton E, Senna M. Androgenetic Alopecia: Therapy Update. Drugs. 2023;83(8):701-15.
6. Bouhanna P. Androgenetic Alopecia: Combining Medical and Surgical Treatments. Dermatol Surg. 2003;29(11):1130-4.
7. Messenger AG, Sinclair RD, Farrant P, De Berker DAR. Acquired disorders of hair. Rooks Textbook Dermatol. 9th edition. 2016: 2278.
8. Ankad B, Jaju PA, Khare S. Trichoscopy. IADVL Textbook of Dermatology. 5th edition. 2016;2. 48:1662.
9. Verma K, Tegta GR, Verma G, Gupta M, Negi A, Sharma R. A Study to Compare the Efficacy of Platelet-rich Plasma and Minoxidil Therapy for the Treatment of Androgenetic Alopecia. Int J Trichol. 2019;11(2):68-79.
10. Elena EP, Irina OS. Combination therapy with platelet-rich plasma and minoxidil leads to better clinical results than monotherapy with these methods in men with androgenetic alopecia. Int J Trichol. 2022;14(1): 1-7.
11. Khatu SS, More YE, Gokhale NR, Chavhan DC, Bendsure N. Platelet-rich plasma in Androgenic alopecia: Myth or an effective tool. J Cutan Aesthet Surg. 2014;7:107-10.
12. Gkini MA, Kouskoukis AE, Tripsianis G, Rigopoulos D, Kouskoukis K. Study of platelet-rich plasma injections in the treatment of androgenetic alopecia through one- year period. J Cutan Aesthet Surg. 2014;7:213-9.

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