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Original Article

Efficacy of platelet rich plasma therapy in patients of androgenic alopecia: A myth or fact!

Muhammad Anees, Hira Tariq, Saelah Batool, Nouman Bashir Azam, Iqra Mariam, Zahida Rani*, Shahbaz Aman

Department of Dermatology, SIMS/ Services Hospital, Lahore.
Department of Dermatology, Khawaja Muhammad Safdar Medical College, Sialkot.

Abstract

Objective To evaluate the efficacy of platelet rich plasma in patients of androgenic alopecia attending the dermatology department of a tertiary care hospital in Lahore.

Methods This descriptive case series was conducted at the Department of Dermatology, Services Hospital, Lahore over six months. 77 patients of both genders, aged between 18-45 years who presented with androgenic alopecia were enrolled and treated with injection of platelet rich plasma. Outcome was assessed in terms of improvement in hair quality and thickness by patient self-assessment questionnaire on a linear analogue 2 scale of 5- 26 scores. Treatment was labelled effective if the score was less than 12, four weeks after the completion of all 4 sessions. A written informed consent was taken from each patient. Data was entered and analyzed using SPSS version 21.

Results The mean age of patients was 29.2±9.2 years. Majority (n=51, 66.2%) of the patients were aged under 30 years. There were 52 (67.5%) male and 25 (32.5%) female patients with a male to female ratio of 2.1:1. 31 (40.3%) patients had Grade-II while 38 (49.4%) patients had Grade-III alopecia. Only 8 (10.3%) patients had Grade-IV alopecia. Platelet-rich plasma treatment was effective in 65 (84.4%) patients as per operational definition. There was no statistically significant difference in the frequency of efficacy across various age (p-value=0.972) and gender (p-value=0.944) groups. However, it decreased insignificantly with increasing grade of alopecia; Grade-II vs. Grade-III vs. Grade-IV (87.1% vs. 84.2% vs. 75.0%; p-value=0.701).

Conclusion Platelet-rich plasma therapy was found extremely effective in patients of mild to moderate androgenic alopecia which along with cost-effectiveness, simplicity and safety of procedure advocate its preferred use in future practice.

Key words
Androgenic Alopecia; Platelet Rich Plasma; Efficacy.

Introduction

Androgenic Alopecia (AGA) or commonly seen male patterned hair loss is a frequent cause of psychological morbidity among both men and women. Its aetiopathogenesis is not fully understood, however, the onset and progression mainly depends on hormonal and genetic factors, and especially in males it is mainly dependent on androgen receptor gene. Whether males or females, the disease has a huge impact on psychosocial health of patients, since thick, healthy and youthful hair are a must for an attractive personality.[1] Unluckily, the pharmacological treatment options are few and are frequently associated with side effects. These include minoxidil and finasteride.[2,3] Due to prolonged treatment and unpredictability of results, patients frequently are left with only hair transplant as last resort. However, it is an

Address for correspondence
Dr. Hira Tariq, Assistant Professor,
Department of Dermatology,
SIMS/ Services Hospital, Lahore.
Email: kemcolianhira46@gmail.com

invasive and expensive procedure for many patients.[4]

In 1970, Platelet rich plasma (PRP) was described as plasma containing greater concentration of platelets and growth factors compared to peripheral blood.[5] Since then, PRP has been used in facial rejuvenation, wound healing, sports medicine and rheumatology.[6] More recently, administration of PRP has gained immense popularity among patients of AGA, especially because of its good safety profile.[4] Subsequently, a number of trials have been done to assess the efficacy of the treatment.[7,8] However, not many studies have been done to prove or disprove its benefits, especially in our part of the world.[9,10] Therefore, we planned this study to analyse the pros and cons of PRP therapy in patients of androgenetic alopecia in our population.

Patients and Methods

This descriptive case series was conducted in the outpatient Department of Dermatology, Services Institute of Medical, Sciences/ Services hospital, Lahore. Duration of study was six months from 15th December, 2018 to 15th June, 2019. After getting approval from Institutional Review Board, patients were selected by non-probability consecutive sampling. Patients of both genders and ages between 18 to 45 years, suffering from androgenetic alopecia diagnosed on history and clinical examination were enrolled after written informed consent. Patients excluded from the study were patients taking any topical and/ or systemic treatment for AGA in last 12 weeks. Patients with any evidence of superadded infection, skin disease or keloidal tendency, hematological disorders, diabetes, hepatitis B, C, HIV, malignancy or any other cause of immunosuppression, taking NSAIDS, anticonvulsants or anticoagulants or pregnancy and lactating mothers were also excluded.

After explaining objectives of the study to the patients, demographic information like name, age, gender and duration of the disease were obtained and recorded on a pre-designed proforma.

The extent of baldness was analysed according to Hamilton Norwood scale.[11,12] PRP was obtained by a double spin method. 20ml of blood was taken and after adding sodium citrate as an anticoagulant sample was centrifuged at 2500 rpm (1st soft spin) for 12 minutes. This separated the blood into three layers with lower most layer of RBCs, upper most platelet poor plasma (PPP) layer and intermediate layer containing platelet rich plasma (PRP) and white blood cells (buffy coat layer). Buffy coat and PPP layer was collected by Finn pipette in another plain test tube and was centrifuged at 4000 rpm (2nd hard spin) for 6 minutes subsequently. Platelet rich plasma settled at the bottom of tube (lower third). After proper aseptic measures, 8-10 ml of injection lignocaine plain 2% was injected for appropriate ring block or nerve block according to the area of scalp affected. PRP was collected in 1ml insulin syringe containing 0.1ml of calcium chloride as an activator and was injected at a dose of 0.1ml per $1cm^2$ of the affected area.

After the procedure, patient's scalp was washed with normal saline and he/she was advised to continue regular shampoo. Four sessions were done at 4 weekly intervals. Patients were evaluated in terms of Investigator assessment on a 7-point scale of hair growth four weeks after the completion of all 4 sessions (follow up at 16th week from the first session) comparing with baseline as follows: -3= greatly decreased, -2=moderately decreased, -1=slightly decreased, 0=no change, +1=slightly increased, +2=moderately increased, +3= greatly increased. Scores of +2 and +3 were considered efficacious.

Data were entered and analysed using SPSS version 26. Variables like age, gender, grade of alopecia and efficacy were presented as frequencies and percentages. Data were stratified for age, gender and grade of alopecia to address affect modifiers. Post-stratification, chi-square test was applied taking p≤0.05 as significant.

Results

During the study duration, 77 patients suffering from AGA were included. The age of the patients ranged from 18 years to 45 years with a mean of 29.2±9.2 years. Majority (n=51, 66.2%) of the patients were aged under 30 years. There were 52 (67.5%) male and 25(32.5%) female patients with a male to female ratio of 2.1:1. Almost half of the patients i.e. 38 (49.4%) had Grade-III androgenic alopecia while 31 (40.3%) had Grade-II androgenic alopecia. Only 8 (10.3%) patients had Grade-IV alopecia **(Table 1)**. Platelet-rich plasma treatment was effective in 65 (84.4%) patients **(Figure 1)**. There was no statistically significant difference in the frequency of efficacy across various age (p-value=0.972) and gender (p-value=0.944) groups. However, it decreased insignificantly with increasing grade of alopecia; Grade-II vs. Grade-III vs. Grade-IV (87.1% vs. 84.2% vs. 75.0%; p-value=0.701) **(Table 2)**.

Discussion

Androgenic alopecia is the commonest form of non-cicatricial alopecia seen in men and less commonly in women. It is distinguished by hair with reduced anagen phase and conversion of terminal hair into vellus hair.[13] Autologous PRP promotes regrowth of hair as alpha granules of platelets contain growth factors which act as stem cells and activate bulbs of hair follicles. Although several studies have been done, a standardized protocol or method of evaluation of these studies is lacking.[14]

We analysed results of PRP therapy in 77 patients of both genders and found it to be effective in 84.4% patients of androgenic alopecia based on physician's assessment of post therapy hair growth. Mean age of patients was 29.2±9.2 years. Similar results were documented by Sultana *et al*.[15] who compared results of PRP

Table 1 Baseline characteristics of study group.

Characteristics	*Participants n=77*
Age (years)	29.2±9.2
<30 years	51 (66.2%)
≥30 years	26 (33.8%)
Gender	
Male	52 (67.5%)
Female	25 (32.5%)
Grade of Alopecia	
Grade-II	31 (40.3%)
Grade-III	38 (49.4%)
Grade-IV	8 (10.3%)

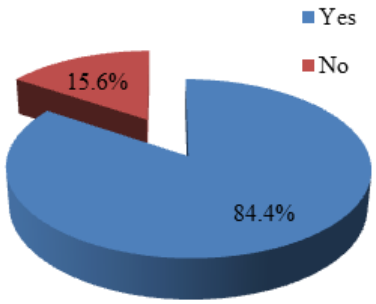

Figure 1 Efficacy of PRP treatment in androgenic alopecia.

Table 2 Stratification of Efficacy of PRP Treatment in Androgenic Alopecia across various Subgroups (n=77).

Subgroup	*n*	*Efficacy n (%)*	*p-value*
Age			
<30 years	51	43 (84.3%)	0.974
≥30 years	26	22 (84.6%)	
Gender			
Male	52	44 (84.6%)	0.942
Female	25	21 (84.0%)	
Grade of alopecia			
Grade-II	31	27 (87.1%)	
Grade-III	38	32 (84.2%)	0.701
Grade-IV	8	6 (75.0%)	

Chi-square test, observed difference was statistically insignificant.

Figure 2 Patients' photograph before and after platelet rich plasma therapy in androgenic alopecia.

and topical minoxidil in androgenic alopecia. However, they assessed efficacy based on hair thickness rather than physician's assessment of improvement. Butt *et al*.[16] studied effect of PRP on 30 patients. They too had similar male to female ratio of patients as we did (2:1). They too found PRP to be efficacious in androgenic alopecia.

Gressenberger *et al*.[4] found no significant improvement in androgenic alopecia after PRP therapy in randomized placebo controlled trial in Austrian population. Studying only male patients and different ethnicity of the population under study may be the reason for this discrepancy in results observed. Iftikhar *et al*.[10] studied the role of PRP in Pakistani population and reported efficacy in 72% of patients. This was quite close to our observation. They, however, observed significant effect of younger age on efficacy, which is contrary to our observation where no significant effect of age was found.

Khatu *et al*.[17] studied effectiveness of PRP in Indian population and concluded significant reduction of hair fall and greater satisfaction among patients of androgenic alopecia. This too is in confirmation with our observation. Only female patients of AGA were studied by Ferrando *et al*.[19] and significant improvement was noted. Muhammad *et al*.[9] compared PRP with combination of PRP and microneedling in Pakistani patients of androgenic alopecia. They found the combination to be more effective than PRP alone. They too found reduction in efficacy with increasing severity of alopecia like we did. Therefore, it can be concluded that PRP may not be very helpful in patients with grade 4 androgenic alopecia.

Limitation of our study includes relying only on physician's assessment of improvement in hair regrowth rather than histopathological confirmation. However, this study may pave the way for larger scale studies on the topic with longer follow up. Combination of PRP with other therapeutic modalities may also be tried by researchers to improve outcome.

Conclusion

We conclude that platelet rich plasma is a promising treatment for androgenic alopecia, a disorder which causes significant psychosocial debility among young adults. It can be combined with other treatment modalities to improve overall results. However, patients with grade 4 alopecia may not benefit as much as patients with less severe hair loss.

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