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A Study on Optimal Frequency and Duration of PRP in Androgenic Alopecia

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Abstract

Background: Platelet-rich plasma (PRP) therapy has emerged as a promising treatment for androgenetic alopecia (AA), addressing the need for effective hair restoration with minimal invasiveness. However, questions remain regarding the optimal frequency and duration of PRP treatment. ***Objective:*** This study aimed to assess the impact of PRP therapy on hair density and diameter in AGA patients, considering variations in treatment response across different AGA grades and alopecia durations. ***Method:*** A 6-month open-labeled pilot study was conducted on 30 male participants with AGA Grades III-VII. PRP was administered every 15 days for six sessions, and hair parameters were evaluated using trichoscan. ***Results:*** The study demonstrated a significant increase in both hair diameter and density over six months of platelet-rich plasma (PRP) therapy for androgenetic alopecia (AGA). Initially, the mean hair diameter was 0.055 mm, rising to 0.075 mm by the study's end, with a substantial increase of 0.021 mm at six months, equating to a 39.85% improvement. Similarly, hair density increased notably from 6.13 to 8.43 hairs per 10 mm², with the most significant rise at the six-month mark, showing a mean increase of 2.3 hairs per 10 mm², reflecting a 39.73% enhancement. All AGA grades experienced increased hair diameter and density, with Grade 5 showing the highest diameter increase (0.03 mm), and Grade 4A exhibiting the highest density increase (3.0 hairs per 10 mm²). Statistical analysis confirmed significant improvements across all grades ($p = 0.0446$ for diameter; $p = 0.0196$ for density). Additionally, patients with alopecia durations up to five years experienced the highest improvements in both diameter (0.026 mm) and density (2.68 hairs per 10 mm²), while longer durations showed lower enhancements ($p = 0.0485$ for diameter; $p = 0.0096$ for density). ***Conclusion:*** PRP therapy demonstrated efficacy across all AGA grades and durations, suggesting its potential as a promising treatment option for AGA. Further research is needed to validate these findings and establish PRP therapy as a standard AGA treatment.

Keywords: Androgenetic alopecia (AA), Platelet-rich plasma (PRP), Hair restoration.

INTRODUCTION

Platelet-rich plasma (PRP) therapy has emerged as a promising treatment modality for androgenetic alopecia (AGA), offering a minimally invasive approach to hair restoration. AGA, characterized by progressive hair thinning and loss, affects millions worldwide, impacting individuals' self-esteem and quality of life. While PRP has demonstrated efficacy in stimulating hair growth and improving hair density, questions persist regarding the optimal frequency and duration of treatment to achieve optimal outcomes [1-3].

The frequency of PRP treatments in AGA management varies widely across studies, ranging from monthly to quarterly sessions. Some researchers advocate for a more intensive treatment regimen, suggesting monthly sessions for the initial three to four months followed by maintenance treatments every three to six months thereafter [4-6]. This approach aims to capitalize on the initial growth-promoting effects of PRP while sustaining long-term benefits. However, others propose a less frequent schedule, with treatments administered every three to six months from the outset, emphasizing the need for individualized therapy tailored to patients' unique characteristics and treatment responses.

Similarly, determining the ideal duration of PRP therapy poses challenges, with studies reporting treatment durations ranging from three to 12 months or more. Short-term studies typically evaluate outcomes over three to six months, capturing initial responses to treatment, while longer-term investigations assess sustained efficacy and durability of results. The duration of treatment may also be influenced by factors such as disease severity, treatment response, and patient

preferences, highlighting the importance of personalized treatment plans.

Optimizing the frequency and duration of PRP therapy requires a comprehensive understanding of the underlying pathophysiology of AGA and the mechanisms of action of PRP. PRP exerts its effects through the release of growth factors and cytokines, which promote hair follicle regeneration, prolong the anagen phase of the hair growth cycle, and inhibit follicular miniaturization. Therefore, treatment regimens should be designed to capitalize on these mechanisms while minimizing treatment burden and patient discomfort.

OBJECTIVE

In this study main goal is to evaluate the optimal frequency and duration of PRP therapy in androgenic alopecia.

METHODOLOGY

This study aimed to evaluate the impact of platelet-rich plasma (PRP) therapy on the management of androgenetic alopecia, specifically focusing on improvements in hair density and diameter, while also assessing response variations across different grades of the condition.

Conducted as an open-labeled pilot study within the Department of Dermatology, Venereology, and Leprosy at Tertiary Hospital, the research received approval from the Institute Ethics Committee. A convenience sample of 30 men aged 20–50 years, presenting with androgenetic alopecia Grade III-VII according to the Hamilton-Norwood classification, was recruited for the study. Exclusions comprised individuals with alternative forms of alopecia, ongoing treatment for androgenetic alopecia, bleeding disorders, or active local infections.

Following written informed consent, each participant underwent a detailed medical history assessment and clinical examination. Hair density and diameter were quantified using the CapilliCARE hair and scalp analysis system (trichoscan), while blood tests were conducted to rule out metabolic alopecia causes.

PRP was prepared via the double spin method and administered after scalp activation through microneedling. Six treatment sessions were scheduled for each patient at 15-day intervals. Hair density and diameter assessments were focused on a specific area near the vertex, approximately 10 cm from the glabella. Digital photographs were captured before treatment initiation and periodically thereafter to monitor changes.

By employing this comprehensive approach, the study aimed to provide insights into the effectiveness of PRP therapy in addressing androgenetic alopecia, shedding light on its potential as a viable treatment option. The utilization of standardized methodologies and rigorous evaluation protocols underscores the scientific rigor of the investigation, offering valuable contributions to the field of dermatology and hair restoration research.

RESULTS

The results revealed a progressive increase in hair diameter over the course of the study period. At the pre-treatment stage, the mean hair diameter was 0.055 ± 0.015 mm, which significantly increased to 0.075 ± 0.019 mm by the end of the 6-month follow-up period. This increase was particularly notable at the 6-month mark, with a mean increase in hair diameter of 0.021 ± 0.008 mm. Overall, the percentage change in hair diameter showed a substantial improvement, reaching 39.85 ± 17.21% over the study duration.

Table 1: Change in the diameter of hair as measured by trichoscan

Follow-up	Hair diameter (in mm) (mean±SD)
Hair diameter (in mm) at	
Pre-treatment stage	0.055±0.015
3 months	0.072±0.017
4 months	0.073±0.018
5 months	0.075±0.019
6 months	0.075±0.019
Increase in hair diameter at (months)	
3	0.017±0.005
4	0.02±0.008
5	0.02±0.008
6	0.021±0.008
Percentage change	39.85±17.21
SD: Standard deviation	

At the pretreatment stage, the mean hair density was 6.13 ± 1.72 hairs per 10 mm², which notably increased to 8.43 ± 2.06 hairs per 10 mm² by the end of the 6-month follow-up period. The most substantial increase in hair density was observed at the 6-month mark, with a mean increase of 2.3 ± 0.99 hairs per 10

mm². Overall, the percentage change in hair density demonstrated a significant enhancement, reaching 39.73 ± 16.54% over the study duration.

Table 2: Change in the density of hair as measured by trichoscan

Follow-up	Hair density (in/10 mm2) (mean±SD)
Hair diameter (in mm) at	
Pretreatment	6.13±1.72
3 months	7.67±1.88
4 months	7.97±1.78
5 months	8.2±1.95
6 months	8.43±2.06
Increase in hair diameter at (months)	
3	1.53±0.68
4	1.83±0.79
5	2.07±0.78
6	2.3±0.99
Percentage change	39.73±16.54
SD: Standard deviation	

Over the 6-month period, all grades experienced an increase in hair diameter and density compared to baseline. Grade 5 exhibited the highest increase in hair diameter (0.03 ± 0.01 mm), while Grade 4A demonstrated the highest increase in hair density (3.0 ± 1.41 hairs per 10 mm²). The statistical analysis revealed significant improvements in both hair diameter (p = 0.0446) and hair density (p = 0.0196) across all AGA grades.

Table 3: Efficacy of platelet-rich plasma with respect to grade of androgenetic alopecia

Androgenetic alopecia grade	6 months increase in (mean±SD)	
	Hair diameter (in mm)	Hair density (in/10 mm2)
3	0.025±0.007	3.0±0
3V	0.023±0.006	3.67±1.53
4	0.025±0.007	3.5±0.71
4A	0.02±0	3.0±1.41
5	0.03±0.01	2.33±0.58
5A	0.023±0.008	1.86±0.69
6	0.015±0.007	1.73±0.47
P	0.0446 (significant)	0.0196 (significant)
SD: Standard deviation		

Both hair diameter (0.026 ± 0.008 mm) and hair density (2.68 ± 1.0 hairs per 10 mm²). Conversely, those with alopecia durations of 6-10 years and over 10 years showed lower improvements in hair characteristics. Statistical analysis revealed significant improvements in both hair diameter (p = 0.0485) and hair density (p = 0.0096) across different durations of alopecia.

Table 4: Efficacy of platelet-rich plasma with respect to duration of alopecia

Duration of alopecia	6 months increase in (mean±SD)	
	Hair diameter (in mm)	Hair density (in/10 mm^2)
Upto 5 years	0.026±0.008	2.68±1.0
6-10 years	0.018±0.008	1.6±0.52
>10 years	0.01±0	2.0±0
P	0.0485 (significant)	0.0096 (significant)
SD: Standard deviation		

Figure 1: Pre- and post-treatment (at 6 months) photograph of patient 1

Figure 2: Pre- and post-treatment (at 6 months) photograph of patient 2

DISCUSSION

The study demonstrated a progressive increase in both hair diameter and density over the 6-month treatment period, indicating the efficacy of platelet-rich plasma (PRP) therapy in the management of androgenetic alopecia (AGA). The mean hair diameter significantly improved from 0.055 ± 0.015 mm at baseline to 0.075 ± 0.019 mm at the 6-month follow-up, with a substantial percentage change of 39.85 ± 17.21%. Similarly, the mean hair density notably increased from 6.13 ± 1.72 hairs per 10 mm² at baseline to 8.43 ± 2.06 hairs per 10 mm² at the end of the study, demonstrating a significant enhancement of 39.73 ± 16.54%.

Furthermore, the study evaluated the efficacy of PRP therapy across different grades of AGA, revealing significant improvements in both hair diameter and density across all grades. Grade 5 AGA showed the highest increase in hair diameter (0.03 ± 0.01 mm), while Grade 4A exhibited the highest increase in hair density (3.0 ± 1.41 hairs per 10 mm²). Statistical analysis confirmed significant improvements in hair diameter ($p = 0.0446$) and hair density ($p = 0.0196$) across all AGA grades.

Additionally, the study investigated the association between the duration of alopecia and treatment outcomes, indicating that patients with alopecia duration of up to 5 years experienced the highest improvements in both hair diameter (0.026 ± 0.008 mm) and hair density (2.68 ± 1.0 hairs per 10 mm²). Conversely, patients with longer durations of alopecia (>10 years) showed lower improvements in hair characteristics. Statistical analysis revealed significant improvements in both hair diameter ($p = 0.0485$) and hair

density (p = 0.0096) across different durations of alopecia.

These findings are consistent with previous studies demonstrating the efficacy of PRP therapy in improving hair parameters in AGA patients [8-9]. However, it is noteworthy that our study observed significant improvements even in patients with longer durations of alopecia, highlighting the potential benefits of PRP therapy across a wide range of patients with AGA. Further research with larger sample sizes and longer follow-up periods is warranted to validate these findings and establish PRP therapy as a standard treatment option for AGA.

CONCLUSION

In conclusion, platelet-rich plasma (PRP) therapy demonstrated significant efficacy in improving both hair diameter and density in patients with androgenetic alopecia (AGA). Over the 6-month study period, there was a progressive increase in hair diameter, with a notable improvement from 0.055 mm to 0.075 mm. Similarly, hair density showed a significant enhancement from 6.13 to 8.43 hairs per 10 mm^2. The improvements were consistent across different grades of AGA and durations of alopecia. These findings underscore the potential of PRP therapy as a promising treatment option for AGA, offering hope to patients seeking effective hair restoration solutions.

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