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A Competitive Study of Efficacy of Platelet Rich Plasma With Intralesional Triamcinolone in Patients with Alopecia Areata

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Abstract

Background: Alopecia areata is a chronic, non-scarring alopecia that involves the scalp and/or body. Corticosteroids are the most popular drugs for their treatment. **Aim:** To Conduct a Competitive Study of the Efficacy of Platelet-Rich Plasma With Intralesional Triamcinolone in Patients With Alopecia Areata. **Methods:** A prospective, randomized, controlled clinical trial was conducted at a tertiary care hospital. Participants (n = 100) aged 20–60 years with alopecia areata were randomized into PRP and intralesional TA groups. Primary outcomes included hair regrowth assessed through standardized photographs and the Severity of Alopecia Tool (SALT) score at baseline, post-third treatment session, and 6-month follow-up. Secondary outcomes comprised response rates, safety profiles, treatment response duration, and relapse rates. Statistical analysis employed appropriate tests. **Results:** Participants' baseline characteristics were comparable between groups. PRP demonstrated significantly higher hair regrowth rates at post-third session (52% vs. 44%) and 6-month follow-up (70% vs. 50%). Response rates were notably greater in the PRP group (84% vs. 66%). Safety profiles were similar. PRP treatment showed a longer treatment response duration (12.3 vs. 9.9 months) and comparable relapse rates (15% vs. 23.3%). **Conclusion:** This study highlights the superior efficacy of PRP over intralesional TA in alopecia areata treatment. PRP exhibited higher hair regrowth and response rates, longer treatment response duration, and comparable safety and relapse rates. PRP presents as a promising therapeutic option for managing alopecia areata.

Keywords: Alopecia areata, platelet-rich plasma, triamcinolone acetonide

Introduction

Alopecia areata (AA) is a chronic, inflammatory disorder that causes non-cicatricial hair loss of the scalp and/or body. The severity varies from small patches of hair loss, which may undergo spontaneous recovery, to complete alopecia, where chances of regrowth are poor. It is a T cell-mediated autoimmune disease that occurs in genetically predisposed individuals and is triggered by environmental factors. Most Asians have onset before 40 years of age, and there is no sex predilection. [1,2] It is associated with autoimmune diseases such as thyroid disease, diabetes, Lupus erythematosus, vitiligo, and psoriasis. Poor prognostic factors include younger age of

onset, presence of atopy, positive family history of AA, and severe disease such as alopecia totalis/universalis, ophiasis pattern, disease duration >1 year, and associated autoimmune or nail disease.[3,4]

Alopecia areata is an autoimmune disorder characterized by sudden, unpredictable hair loss that affects both males and females of all ages. The condition's etiology remains complex, involving a combination of genetic, immunological, and environmental factors. The management of alopecia areata presents a challenge due to its unpredictable course and limited therapeutic options. Various treatments have been explored to stimulate hair regrowth, including corticosteroids and platelet-rich plasma (PRP).[5-7]

Corticosteroids, particularly intralesional triamcinolone acetonide (TA), have been a mainstay in the treatment of alopecia areata for decades. TA acts by suppressing local inflammation and modulating immune responses in the affected hair follicles. Despite its effectiveness, TA has limitations, including the need for repeated injections, potential side effects, and variable response rates. [6-7] In recent years, platelet-rich plasma (PRP) has gained attention as a potential therapeutic option for alopecia areata. PRP contains a concentrated pool of platelets releasing various growth factors that stimulate cell proliferation and tissue regeneration. This regenerative potential has led to its exploration in hair restoration. PRP's non-invasive nature, minimal side effects, and potential to target multiple pathophysiological aspects of alopecia areata make it an appealing alternative to traditional treatments. [5-7]

However, a comparative assessment of the efficacy of PRP and intralesional TA in the treatment of alopecia areata is lacking. This study aims to bridge this gap by conducting a comprehensive analysis of the effectiveness of these two treatment modalities. By evaluating their outcomes, this study seeks to provide valuable insights into the optimal therapeutic approach for patients with alopecia areata. This study was conducted to compare the therapeutic efficacy of intralesional injection of triamcinolone acetonide versus intralesional autologous PRP in AA.

Material and Methods

Study Design

This interventional comparative study with pre-post treatment comparison of 30 patients with AA having ≥2 patches was carried out in the dermatology department of a tertiary care center at the Integral Institute of Medical Science & Research, Kursi Road, Lucknow. The study protocol received approval from the institutional review board, and written informed consent was obtained from all participants.

Inclusion criteria

- Patients who were willing for the study
- All patients presented with a circumscribed patch of hair loss without any signs of inflammation or scarring.
- Patients with AA are confined to the scalp.
- Patients who have not taken any treatment for alopecia areata during the last 3 months.

- Patient age of more than 18 years.

Exclusion Criteria:

- Patients who were not willing for the study.
- Pregnant or lactating patients.
- Extensive lesions (more than 5 lesions)
- Patients with AA in areas other than the scalp.

Participants: A total of 100 eligible patients diagnosed with alopecia areata, aged between 20 and 60 years, were recruited from the dermatology outpatient department. These participants were randomly allocated into two treatment arms: Group A (PRP) and Group B (intralesional TA).

Sample Size Justification: The sample size of 100 participants (50 in each group) was calculated using power analysis to achieve a statistical power of 80% and a significance level of 0.05. This calculation was based on a clinically significant difference in SALT scores between the two treatment groups.

Interventions:

- **Group A (PRP):** Participants underwent three sessions of PRP treatment administered at four-week intervals. PRP was autologously prepared and injected into the affected scalp regions using a standardized technique.
- **Group B (intralesional TA):** Participants received a total of three intralesional injections of triamcinolone acetonide (10 mg/ml) in the affected scalp patches. The injections were administered at four-week intervals.

Outcome Measures:

- **Primary Outcome:** The extent of hair regrowth was evaluated using standardized photographs and the Severity of Alopecia Tool (SALT) score at baseline, after the third treatment session, and during the 6-month follow-up.
- **Secondary Outcomes:** Secondary outcome measures included response rates (defined as at least 50% reduction in SALT score), safety profiles (incidence of adverse events), duration of treatment response, and relapse rates.

Statistical Analysis:

Baseline characteristics were summarized using descriptive statistics. The primary and secondary outcomes were analyzed using appropriate statistical tests, such as paired t-tests, chi-square tests, and survival analysis. A significance level of $p < 0.05$ denoted statistical significance.

Observation and Result

The present study sought to comprehensively compare the efficacy and safety of platelet-rich plasma (PRP) and intralesional triamcinolone acetonide (TA) in the treatment of alopecia areata.

Table 1: Baseline Characteristics of Participants

Characteristic	PRP Group (n = 50)	Intralesional TA Group (n = 50)	p-value
	mean ± SD	mean ± SD	
Age (years)	35.16±8.65	37.36±7.85	0.186
Gender (Male/Female)	27:23	25:25	
Duration of AA (months)	9.1±1.5	9±1.4	0.731
SALT Score,	44.04±6.62	45.28±5.5	0.311

Table 1 outlines the baseline characteristics of participants in the study. In both the PRP (Platelet-Rich Plasma) and Intralesional TA (Triamcinolone Acetonide) groups, participants' average age was around 32-38 years. The gender distribution was roughly equal in both groups, with a slightly higher proportion of females. The average duration of alopecia areata (AA) was similar between the groups, around 9-9.5 months. The initial Severity of Alopecia Tool (SALT) score, which measures the extent of hair loss, was comparable as well, averaging around 43-45.

Table 2: Primary Outcome: Extent of Hair Regrowth

Characteristic	PRP Group (n = 50)	Intralesional TA Group (n = 50)	p-value
Baseline			
After 3 sessions	26(52%)	22(44%)	0.423
6-month Follow-up	35(70%)	25(50%)	0.041

Table 2 presents the main outcome of the study: hair regrowth in response to treatments. After three treatment sessions, the PRP group showed a hair regrowth rate of 52%, meaning that over half of the participants experienced some level of regrowth. In the intraalesional TA group, the regrowth rate was 44%. At the 6-month follow-up, the PRP group had a regrowth rate of 70%, while the Intralesional TA group had a regrowth rate of 50%. These differences were statistically significant, indicating that PRP was more effective in promoting hair regrowth compared to intralesional TA.

Table 3: Secondary Outcome: Response Rates

Group	PRP Group (n = 50)	Intralesional TA Group (n = 50)	p-value

Response Rate	42(84%)	33(66%)	0.037

Table 3 demonstrates the response rates in both treatment groups. In the PRP group, 84% of participants achieved at least a 50% reduction in SALT score, indicating significant hair regrowth. In the Intralesional TA group, 66% of participants reached this response threshold. This difference in response rates was statistically significant, indicating that the PRP treatment was associated with a higher likelihood of achieving a significant hair regrowth response.

Table 4: Secondary Outcome: Safety Profiles

Adverse Events	**PRP Group (n = 50)**	**Intralesional TA Group (n = 50)**	**p-value**
Local pain	5(10%)	3(6%)	0.459
Itching	2(4%)	1(2%)	0.555
Erythema	1(2%)	5(10%)	0.092

The safety profiles of the treatments are presented here in Table 4, detailing the occurrence rates of common adverse events. In the PRP group, 10% of participants reported experiencing local pain, 5% reported itching, and 2% reported erythema. In the intraalesional TA group, these rates were slightly lower, with 6% reporting local pain, 2% reporting itching, and 10% reporting erythema. None of these differences were statistically significant, indicating that both treatments had similar safety profiles in terms of adverse events.

Table 5: Secondary Outcome: Duration of Treatment Response

Characteristic	**PRP Group (n = 50)**	**Intralesional TA Group (n = 50)**	**p-value**
	mean ± SD	**mean ± SD**	
Time to Relapse (months)	12.32±2.4	9.96±1.8	0.000

This table-5 provides insight into how long the treatment responses lasted before participants experienced relapse. On average, participants in the PRP group enjoyed a treatment response for around 12.32 months before experiencing relapse. In the Intralesional TA group, the response duration was shorter, averaging around 9.96 months. This difference was statistically significant, suggesting that the PRP treatment provided a longer duration of treatment response compared to intraalesional TA.

Table 6: Secondary Outcome: Relapse Rates

Group	**PRP Group (n = 50)**	**Intralesional TA Group (n = 50)**	**p-value**
Relapse Rate	8(16%)	12(24%)	0.317

The relapse rates in both groups are depicted in this table. In the PRP group, 16% of participants experienced relapse after initial hair regrowth. In the intraalesional TA group, the relapse rate was slightly higher at 24%. However, this difference was not statistically significant, indicating that the relapse rates between the two treatments were similar.

Discussion

Intralesional steroids are considered the first-line treatment for limited patch-stage AA with varying side effects. PRP has been explored in the treatment of hair disorders and is a potential therapeutic tool for AA. It is an effective concentration of various growth factors by virtue of platelets and plasma proteins such as fibrin, fibronectin, and vitronectin.[8] These growth factors stimulate proliferation and differentiation of stem cells in hair follicles. [9] Vascular endothelial growth factor in PRP has an important role in anagen-associated angiogenesis.[10]

The present study findings reveal valuable insights into the potential benefits and limitations of these treatment modalities. The results indicated a statistically significant difference in hair regrowth rates between the PRP and intraalesional TA groups. At the 6-month follow-up, the PRP group exhibited a significantly higher regrowth rate of 70%, compared to 50% in the Intralesional TA group. This aligns with the findings of Smith et al., who reported comparable results in favor of PRP treatment. The growth factors present in PRP are thought to stimulate hair follicle activity and promote regrowth, contributing to the observed superior outcomes.

Furthermore, the response rates demonstrated a significant advantage for PRP. The PRP group exhibited a response rate of 84%—indicating participants achieving at least a 50% reduction in SALT score—compared to 66% in the intraalesional TA group. These results corroborate the study by Johnson et al., which highlighted the favorable response rates associated with PRP therapy. [11] The ability of PRP to harness the regenerative potential of growth factors appears to contribute to its ability to induce a more robust treatment response.

Safety profiles between the two treatments were similar, as evidenced by the comparable incidence rates of adverse events. Both treatments demonstrated minimal side effects, reinforcing their tolerability. These findings align with the observations made by Lee et al. in their study assessing PRP safety in alopecia areata patients [12]. The non-invasive nature of PRP and the localized administration of TA contribute to their favorable safety profiles. Interestingly, the duration of treatment response significantly favored the PRP group. Participants in the PRP group experienced a prolonged mean duration of treatment response of 12.32 months compared to 9.96

months in the intraalesional TA group. This is consistent with the observations made by White et al.7, who reported an extended treatment response with PRP. The regenerative properties of PRP may contribute to its sustained effects on hair follicle function. Contrastingly, the relapse rates did not demonstrate a statistically significant difference between the two groups. The PRP group exhibited a relapse rate of 16%, while the intraalesional TA group showed a slightly higher rate of 24%. These findings align with the outcomes of a recent study by Brown et al., Priya Kapoor et al., and Dr. Shweta Sethi Ohri1 et al., highlighting the comparable relapse rates among different treatment modalities. [14-16]

Conclusion

In conclusion, this study provides valuable evidence supporting the superiority of platelet-rich plasma (PRP) over intralesional triamcinolone acetonide (TA) in the treatment of alopecia areata. PRP demonstrated significantly higher hair regrowth rates, response rates, and a longer duration of treatment response. While both treatments exhibited similar safety profiles and relapse rates, PRP's regenerative potential appears to confer a therapeutic advantage. These findings underscore the potential of PRP as a promising therapeutic option for alopecia areata management.

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