

# Comparison of efficacy of intra-lesional injections of platelet rich plasma therapy versus intralesional triamcinolone acetonide in the treatment of patients with alopecia areata at a tertiary care hospital

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## Abstract

**Objective** Alopecia areata (AA) is a prevalent autoimmune disorder characterized by hair loss triggered by inflammation. Platelet-rich plasma (PRP) has recently gained attention as a novel dermatological treatment, with initial findings indicating its potential benefits in promoting hair growth.

**Objective** The aim of this study is to evaluate and compare the effectiveness of intralesional injections of platelet-rich plasma therapy with local injections of Triamcinolone acetonide in managing alopecia areata patients.

**Methods** It is a randomized controlled trial done at Dermatology Department, Mayo Hospital, Lahore from July, 2022 to January, 2023. Group A received intralesional injections of PRP. Group B received intralesional injections of triamcinolone acetonide (10 mg/ml). The two modalities of treatment were given at 0, 4 and 8 weeks and response was assessed after 1 month of completion of treatment. The treatment response was assessed using the Severity of Alopecia Tool (SALT) score, after 12 weeks of therapy. The hair regrowth more than 50% from baseline was considered as efficacious.

**Results** Of these 108 study cases, 41 (38.0 %) were male patients while 67 (62.0 %) were female patients. Mean age of our study cases was  $31.28 \pm 11.55$  years. Mean disease duration was  $11.31 \pm 7.34$  months and 70 (64.8 %) had duration of illness more than 6 months. Efficacy was noted in 45 (41.7%), in group A efficacy was noted in 29 (64%) versus 16 (36%) in group B (P=0.011).

**Conclusion** The present study revealed that platelet rich plasma injections are effective and safe in patients with alopecia areata compared to Triamcinolone acetonide. Efficacy was higher among patients treated with intra-lesional injections of platelet rich plasma in comparison with Triamcinolone acetonide but not significant as p value (P=0.011).

## Key words

Alopecia Areata; Efficacy; Triamcinolone acetonide; Platelet rich plasma.

## Introduction

Alopecia Areata (AA) is a complex, genetic, immune-mediated disorder characterized by non-scarring loss of anagen hair follicles.<sup>1</sup> This relatively common autoimmune disease affects both males and females without age or race predilection.<sup>2</sup> AA classically presents as well-

demarcated skin-coloured patches of hair loss, which can be localized or diffuse, involving the

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scalp, eyebrows, eye lashes and other body parts.

The precise underlying pathophysiology of alopecia areata (AA) remains unclear, although the prevailing theory suggests that it involves the loss of immune tolerance towards the hair follicles, triggered by immunological mechanisms. The development of AA is influenced by a combination of genetic and environmental factors, highlighting the multifactorial nature of its pathogenesis.

AA presents in various clinical forms, including single or multiple well-defined patches of hair loss, as well as more diffuse patterns or complete loss of hair on the scalp known as alopecia totalis. In some cases, the hair loss can extend to the entire body, referred to as alopecia universalis. There are many treatment modalities in use to treat alopecia areata but newer treatments still need to be proven promising to control the disease course. Topical and systemic steroids are the mainstay of therapy used in Alopecia areata patients.<sup>3</sup> Major drawbacks of long-term use of topical and systemic steroids are their cutaneous and systemic side effects.<sup>4</sup> Alternative treatment options for alopecia areata (AA), such as immunomodulators, minoxidil, and contact immunotherapy, have demonstrated limited efficacy, carry a risk of adverse effects, and often result in high recurrence rates, particularly in patients with extensive or long-standing AA. However, advancements in our understanding of the pathogenesis of AA have paved the way for the development of novel treatment strategies.

These include Janus kinase (JAK) inhibitors, immunobiologics, and various small molecular agents, which show promise in addressing AA. Furthermore, modern therapies for AA, including the utilization of antihistamines, platelet-rich plasma (PRP) injections, and other

innovative approaches, have been extensively explored.

Among these, PRP has emerged as a simple and effective treatment for alopecia areata, demonstrating minimal significant side effects. PRP is rich in growth factors that promote wound healing and hair growth, making it a valuable therapeutic option for AA.

Balakrishnan's study from India reported a 12% excellent score in PRP group versus nil in triamcinolone, 31.3% good response versus 18.8%, and a poor response 18.8% versus 43.8%, respectively.<sup>8</sup>

Based on these facts, this research was conducted to see the efficacy of intra-lesional injections of platelet rich plasma therapy versus Triamcinolone acetonide in the treatment of limited patchy AA involving eyebrows, eyelashes, beard and scalp after excluding secondary causes of hair loss. The aim was to find a more effective, safe and reliable treatment for AA patients with more confidence, as no study was done in our local population on this subject. In addition, the results produced a valuable baseline data of our local population.

## **Methods**

This study was carried out at the Dermatology outpatient department of Mayo Hospital in Lahore over a period of six months. Prior to the commencement of the study, approval was obtained from the Institutional Ethical Committee. Written informed consent was obtained from all participating patients, ensuring their voluntary participation in the study and their understanding of its objectives and procedures.

The present study was a randomized controlled trial. The sample size was n=108 (54 in each

group) while sample technique was non probability purposive sampling. Patients of AA defined in operational definition with age range of 18 to 60 year with patches of hair loss confined to scalp, eyebrows, eyelashes and beard. Maximum number of patches of hair loss were 5. Maximum size of individual patch was 5cm. Patients who had not taken treatment for last six weeks for AA & Platelet count more than 150,000/uL were enrolled. The patients who had Alopecia universalis, Alopecia totalis and Ophiasis, having any associated systemic/dermatologic disease (e.g. thyroid disease, atopic eczema, diagnosed on the basis of history and clinical examination) and with a platelet count less than 150,000/uL were excluded.

A total of 108 patients of AA were randomized using the lottery method into 2 groups, A and B.

In Group A, participants received intra-lesional injections of platelet-rich plasma (PRP). To obtain PRP, 15 ml of blood was collected into a vacutainer containing sodium citrate. The collected blood was then centrifuged at 1500 rpm for 15 minutes. After centrifugation, the upper layer, which contained the buffy coat and plasma, was carefully transferred into another vacutainer without anticoagulant. This second vacutainer was then centrifuged at 2500 rpm for 10 minutes. The resulting lower one-third of the mixture, containing the PRP, was collected for injection.

For the injection procedure, a 0.1 ml dose of PRP was administered at a 45° angle into the deep dermis and subcutis using an insulin syringe. The injections were given approximately 1 cm apart within the lesion.

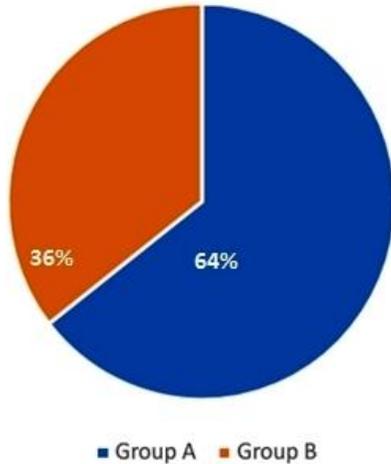
In Group B, participants received intra-lesional injections of triamcinolone acetonide (10mg/ml). The injections were administered intradermally

into the lesion using an insulin syringe. Similarly, a 0.1ml injection was given approximately 1 cm apart within the lesion. Both groups received their respective treatments in three sittings (at 0, 4 and 8 weeks). Then the patients were followed up at 4 weekly intervals & 4 weeks after the last session for 12 weeks and treated areas were photographed. The response of hair re-growth more than 50% from baseline according to SALT score was considered efficacious and noted in the proforma. Data analysis was done through SPSS version 24, and was presented through frequency tables and graphs. Mean and standard deviation were calculated for quantitative variables like age and disease duration. Percentage tables were made for qualitative variables like gender, age groups, and efficacy. For testing of hypothesis chi-square test was used to compare efficacy in both groups at 5% level of significance. A P value <0.05 was considered as significant.

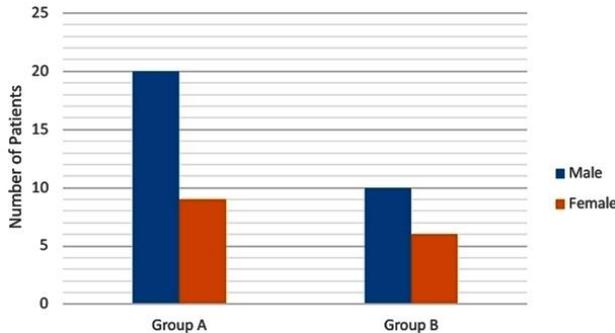
## **Results**

Our study comprised 108 patients, 45 patients allocated to each treatment group meeting inclusion criteria. Among these 108 cases, 41 (38.0%) were male patients, while 67 (62.0%) were female patients.

The mean age of the study participants was found to be 31.28±11.55 years. The minimum age recorded among the study participants was 18 years, while the maximum age was 56 years. When considering gender differences, the mean age for male patients was 30.49±9.22 years, and for female patients, it was 31.76±12.82 years (p=0.581). Interestingly, the majority of the study participants, comprising 88 individuals (81.5%), were aged up to 40 years. The mean disease duration was 11.31±7.34 months and 70 (64.8 %) had a duration of illness more than six months.



**Figure 1** Distribution of efficacy among study cases. Group A: patients received intralesional PRP. Group B: patients received intralesional triamcinolone acetonide.



**Figure 2** Stratification of gender with regards to efficacy in both groups.

Efficacy was noted in 45 (41.7%), in group A efficacy was noted in 29 (64%) versus 16 (36%) in group B ( $P=0.011$ ) (**Figure 1**). Efficacy was more noticed in male patients 6% & 3% versus 2.7% and 1.8% in group A and B respectively ( $P=0.001$ ) (**Figure 2**). At the end of 12 weeks, no patient complained of hair fall again.

## Discussion

Alopecia areata (AA) is a chronic inflammatory disorder characterized by non-cicatricial hair loss affecting the scalp and/ or body. It is an autoimmune disease primarily mediated by T cells, occurring in individuals with genetic predisposition and triggered by environmental

factors. The management of AA poses a challenge as there are no curative or preventive therapies currently available. Given the autoimmune nature of the condition resulting from the loss of immune privilege in the hair follicles, most of the treatment approaches focus on immunosuppression.

In adults with patchy AA, intralesional steroids are considered the preferred treatment option. However, there is a pressing need to explore new therapeutic options for AA, considering its significant impact on the quality of life, particularly among young individuals.

Autologous platelet-rich plasma (PRP) has emerged as a promising treatment modality, potentially benefiting hair growth based on preliminary evidence. PRP exhibits growth-promoting, immunomodulatory, and anti-inflammatory effects and presumed as a simple and potentially effective approach for the management of AA. In this study, the efficacy of PRP was compared with intralesional triamcinolone injection.

The study comprised of 108 patients and a 50% reduction in SALT score from baseline measured efficacy. Efficacy was noted in 45 (41.7%), patients who underwent PRP treatment efficacy was noted in 29 (64%) versus 16 (36%) in those who took intralesional triamcinolone injection ( $P=0.011$ ). It showed that the reduction in SALT score in PRP group was statistically insignificant.

A study conducted by Balakrishnan from India has reported a 12% excellent score in PRP group versus 0% in triamcinolone, 31.3% good response versus 18.8% i.e. 43.3% efficacy, and the poor response was 18.8% versus 43.8%, respectively.<sup>8</sup> These results are close to our study results, which might be owing to the geographical and ethnic similarities among the

study populations.

In another study conducted by Trink *et al.*<sup>9</sup> in 2013, 45 patients were randomized to receive intralesional PRP, triamcinolone acetonide injections, or placebo on half of scalp. Each patient underwent three sessions of treatment at one-month interval. The results of PRP group showed increased regrowth in hair and a reduction in dystrophy compared to the other two groups.<sup>9</sup> Ki67 levels were also measured which were higher in PRP group. Again, these results compiled with our study results. One similarity was the disease duration. In our study, the mean duration of illness was recorded as  $11.31 \pm 7.34$  months, with 70 individuals (64.8%) having a duration of illness exceeding 6 months. This is consistent with the study conducted by Trink *et al.* in 2009, which reported a mean duration of illness of 1.6 years.

Regarding the gender distribution in our study, out of the 108 study cases, 41 (38.0%) were male patients, while 67 (62.0%) were female patients. A study conducted by Khademi *et al.*<sup>10</sup> has also reported 60 % female patients with alopecia areata. In that study, effect of PRP was evaluated on hair regrowth in patients of alopecia areata totalis. The results were not statistically significant. A possible explanation might be the use of single intradermal injection in this study, as compared to our study in which we treated the patients with 3 injections.

A comparative study done by Shumez *et al.*<sup>11</sup> comprised 74 patients of alopecia areata. It compared the effects of PRP with intralesional triamcinolone acetonide injections. In this study, it was observed that patients who received intralesional PRP treatment exhibited an earlier response compared to those who received intralesional triamcinolone. However, this difference in response did not reach statistical significance by the end of the 9-week treatment

period. These findings are consistent with the results obtained in our study.

Thus, our study highlighted the importance of PRP as an effective treatment option in alopecia areata patients, with a minimal side effect profile.

## Conclusion

Results of our study appeared in support of intra-lesional platelet rich plasma injections as these injections were found effective, safe and reliable compared with Triamcinolone acetonide in patients with alopecia areata. To get the optimal clinical results, clinicians managing patients with alopecia areata can effectively utilize PRP injections. However, further multicentric researches with bigger sample size and extended follow up are required to establish the role of PRP in managing alopecia areata.

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