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**Research article**

# INTRALESIONAL PLATELET RICH PLASMA vs INTRALESIONAL TRIAMCINOLONE IN THE TREATMENT OF ALOPECIA AREATA: A COMPARATIVE STUDY

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## ABSTRACT

**Background:** Alopecia areata (AA) is a chronic non-scarring alopecia that involves the scalp and/or body, and is characterized by patchy areas of hair loss without any signs of clinical inflammation. Various therapies have been proposed for their treatment. But none have been shown to alter the course of the disease. Platelet Rich Plasma (PRP) is a volume of autologous plasma that has a high platelet concentration. Growth factors released from platelets may act on stem cells in the bulge area of the follicles, stimulating the development of new follicles and promoting neovascularization. **Aim:** To evaluate and compare the efficacy of intralesional injection of autologous platelet rich plasma with intralesional injection of triamcinolone acetonide (10mg/ml) in the treatment of alopecia areata. **Methodology:** 74 patients with alopecia areata were allocated into 2 groups and treated with triamcinolone and PRP injections. Treatment outcome was measured by taking into account extent and density of regrowth of hair and was expressed as a percentage of overall growth. **Results:** Forty eight patients were treated with triamcinolone injections and 26 patients were treated with PRP injections. Patients treated with PRP had an earlier response at the end of 6 weeks than patients treated with triamcinolone. However, this difference was statistically insignificant. The overall improvement at the end of 9 weeks was 100% for all patients in both groups. **Conclusion:** PRP is a safe, simple, biocompatible and effective procedure for the treatment of alopecia areata with efficacy comparable with triamcinolone.

**Keywords:** Alopecia Areata, Platelet Rich Plasma, Triamcinolone

## INTRODUCTION

Alopecia areata is a chronic, inflammatory disease that involves the hair follicle and sometimes the nails. It is characterized by nonscarring hair loss involving any hair-bearing surface of the body. Alopecia areata is often triggered by psychological stress and has limited treatment options. Corticosteroids are the most popular drugs for the treatment of this disease.[1] But localized atrophy is a common complication, particularly if triamcinolone is used.[2] Alopecia areata does not destroy hair follicles, and the potential for regrowth of hair is retained for many years, and is possibly lifelong.[2] The current therapy for AA is not curative, but rather aimed at controlling or limiting the pathogenic process. Most of the effective therapies for AA are either immunosuppressive or immunomodulatory, which are associated with varying side effects. Intralesional corticosteroids are used frequently in AA[3], although other therapies like topical minoxidil, anthralin, immunotherapy, systemic corticosteroids, cyclosporin and PUVA (Psoralen and Ultra Violet-A Light therapy) are also commonly used with varying success. Platelet-rich plasma (PRP) is an autologous preparation of platelets in concentrated plasma. PRP

has attracted attention in several medical fields because of its ability to promote wound healing.[4] Hence, promoting hair growth by application of a blood extract - Autologous Platelet Rich Plasma is a simple, yet effective procedure in the treatment of alopecia areata with no danger of allergic reactions. The objectives of our study were to evaluate and compare the efficacy of intralesional injection of autologous platelet rich plasma with intralesional injection of triamcinolone acetonide (10mg/ml) in the treatment of alopecia areata.

## MATERIALS AND METHODS

The present study was conducted in Department of Dermatology, Venerology and Leprosy in our hospital from August 2012 to July 2014. Ethical clearance was obtained from the Institutional Ethics Committee before the commencement of the study. Written informed consent was taken from patients before their participation in the study. It is a non-randomized controlled study. In our study, 74 patients were included with the following criteria.

**Inclusion criteria:** Patients with alopecia areata, willing for the procedure, and those who have not taken any form of treatment in the last 6 months.

**Exclusion criteria:** Patients with alopecia other than alopecia areata, patients with active infection at the local site and those with >25 % involvement of scalp or facial hair.

**Procedure:** Detailed history and thorough examination of the patches was done. A global alopecia areata severity score "Severity of Alopecia Tool" (SALT),[5] based on the combination of extent and density of scalp hair loss was determined by two investigators.

Patients were randomly allocated into two groups:

**Group 1:** Triamcinolone acetonide (10 mg/ml) was given intradermally into the lesion. It was administered using a 0.5-inch long 30-gauge needle in multiple 0.1 ml injections approximately 1 cm apart.[6]

**Group 2:** PRP was prepared using a double centrifugation technique. Under aseptic measures, 20 ml of blood was drawn and was centrifuged at 5000 rpm for 15 minutes. The first spin will separate the red blood cells from the plasma containing the platelets. Then the supernatant and the buffy coat were centrifuged again at 2000 rpm for 5 - 10 min. This soft spin produces the PRP. The bottom layer was taken and 10% calcium chloride was added as an activator (0.3 ml for 1 ml of PRP).[7]

Randomly allocated injections were given under aseptic precautions. A total of 3 such sittings were given to each patient at an interval of 3 weeks each with a follow up at 3 months. No other treatment was given during this period. Results were assessed based on the "Assessment of overall improvement" scale. This takes into account extent and density of regrowth of hair and is expressed as a percentage of overall growth. Serial photographs were taken and dermascopic examination was done. The results were analysed using Mann Whitney U test.

## RESULTS

A total of 74 patients were included in the study, of which 48 were treated with triamcinolone injections and 26 were treated with PRP injections. The mean age of the subjects in our study was 25.20 years (SD-11.11). 47.34% of patients were aged between 19 and 30 years, followed by 27.08% of the patients aged less than 18 years, and 21.66% of the patients between 31 and 40 years of age. Males constituted 79.2% of the study population. The male to female ratio was about 4:1. The duration of the disease was between 1 and 6 months in 74.32% of the patients. In the study population, 85.14% of the patients had an insidious onset. 13.51% had associated stress and 8.11% were atopic. The most common area of involvement on the scalp was the occiput (27.27%), and on the face was the moustache region (27.27%). The mean SALT score or percentage of involvement of scalp was 5.945(SD-3.62). The mean SALT score for face was 6.635(SD-3.29). The comparison of overall improvement between groups was non significant at 3$^{rd}$ week (p=0.688)(Fig 3). The percentage of complete resolution (53.8%) was higher in the PRP group than the triamcinolone group (35.4%) at the end of the 6$^{th}$ week (Fig 4). Hence there was comparatively higher percentage of improvement in the PRP group than the triamcinolone group at the end of 6$^{th}$ week. But this difference was statistically insignificant (p=0.597). The overall improvement at 9$^{th}$ week and 3$^{rd}$ month revealed that all the subjects in both groups had achieved complete regrowth of hair (Fig 1&2).

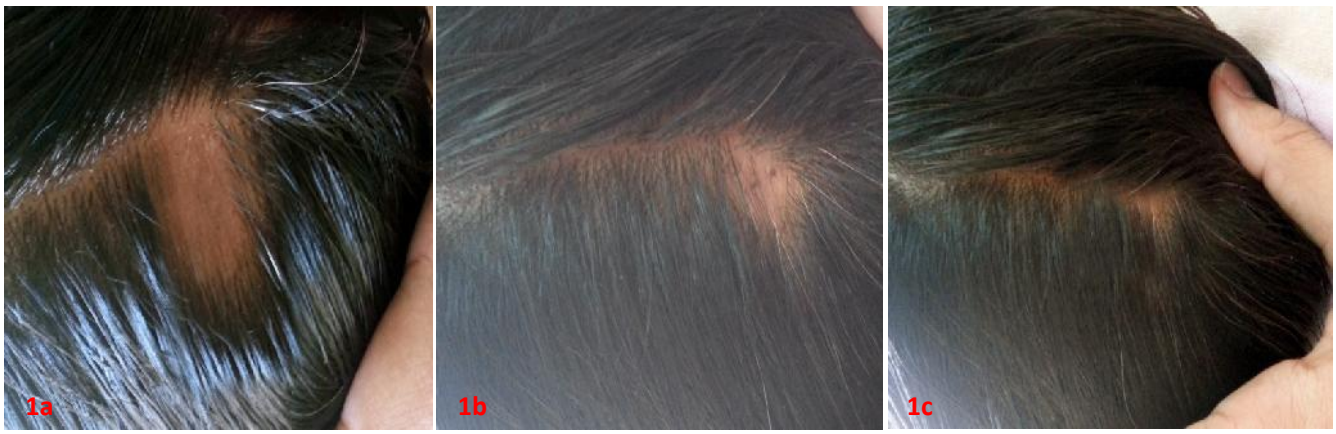



**Fig 1: Alopecia areata before treatment (1a), improvement at 3rd week (1b), improvement at 6th week (1c), with PRP**

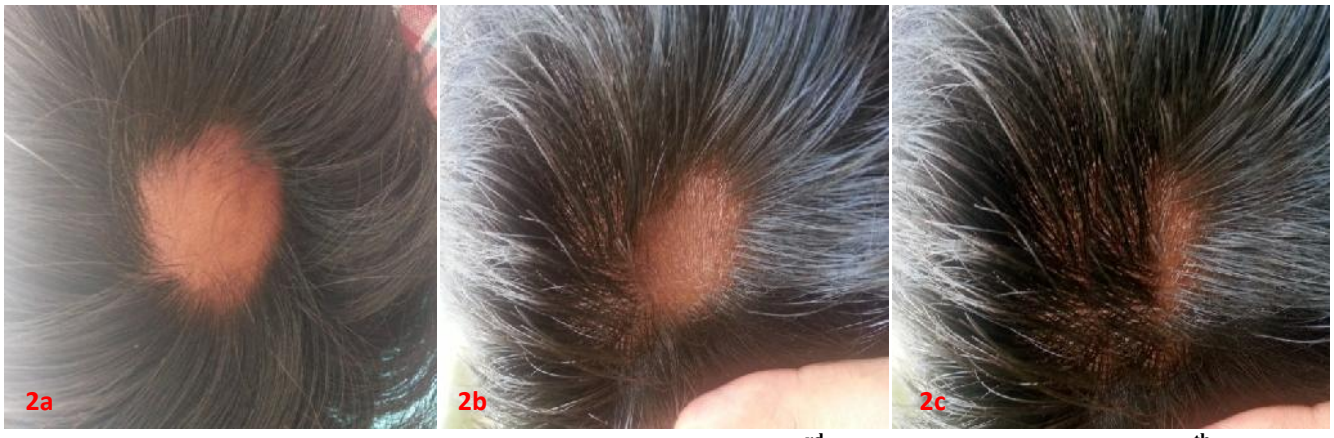
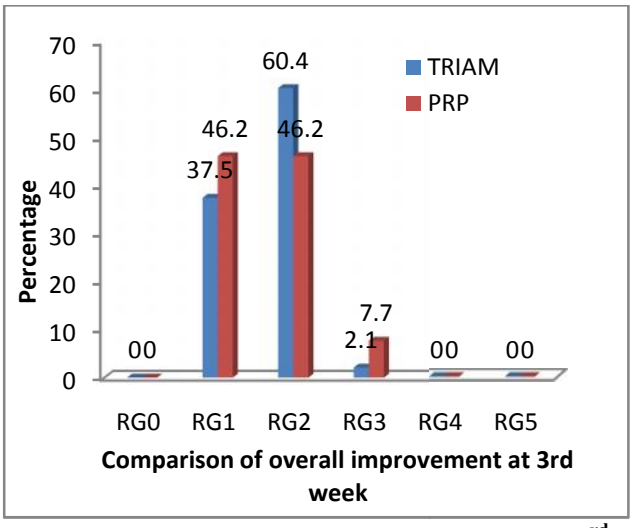



**Fig 2 : Alopecia areata before treatment (2a), improvement at 3rd week (2b), improvement at 6th week (2c), with Triamcinolone**



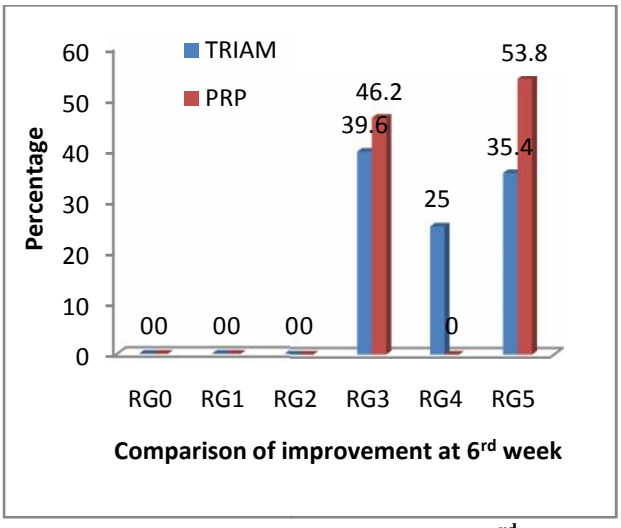




**Fig 3: Comparison of overall improvement at 3rd week** **Fig 4 : Comparison of improvement at 6rd week**

RG – Regrowth of Hair, TRIAM – Triamcinolone, PRP – Platelet Rich Plasma

RG0 - (no change), RG1 - (1-24% regrowth), RG2 - (25-49% regrowth), RG3 - (50-74% regrowth), RG4 - (75-99% regrowth), RG5 - (100% regrowth)

## DISCUSSION

Alopecia areata (AA) is a characterized by rapid and complete loss of hair in one or more patches, usually on the scalp, bearded area, and less commonly, on other hairy areas of the body. It is a common form of alopecia, accounting for about 25% of all the alopecia cases.[8]

Multiple therapies have been proposed for their treatment. These include corticosteroids (topical, intralesional and systemic), minoxidil, anthralin, contact sensitisers, topical tacrolimus, PUVA (Psoralen and Ultra Violet-A Light therapy), cyclosporin A, etanercept, methotrexate, sulfasalazine, etc. But none have been shown to alter the course of the disease.

PRP is a volume of autologous plasma that has a platelet concentration five times more than normal platelet counts.[9,10] PRP enhances wound healing by promoting the healing process by the growth factors present in it.[10] They are platelet derived growth factor, fibroblast growth factor, vascular endothelial growth factor, epidermal growth factor, transforming growth factor.[10,11]

It is hypothesized that growth factors released from platelets may act on stem cells in the bulge area of the follicles, stimulating the development of new follicles and promoting neovascularization.[8]

In addition to its proliferating-inducing effects, PRP is also a potent anti-inflammatory agent, which can suppress cytokine release and thereby limit local tissue inflammation.[12] As AA is characterized by an extensive inflammatory infiltrate, responsible for secretion of a variety of inflammatory cytokines, it is probable that the anti-inflammatory effects of PRP may be of great benefit in this condition.[12]

In spite of these previous studies, the precise mechanism by which PRP promotes hair growth has not been properly studied.

Intralesional corticosteroids are frequently used in treating AA. Steroids with low solubility are commonly used because of their slow absorbtion, thereby minimising systemic effects.[13] By exerting an immunosuppressive effect, corticosteroids can promote regrowth in AA.[14] A study of intralesional corticosteroids showed the time from injection to visible hair growth was 2-4 weeks and subsequent growth occurred at a constant linear rate.[13] Any hair regrowth is seen within 3 months but the therapy should be stopped if there is no cosmetic response by 6 months, as such individuals may lack adequate corticosteroid receptors in their scalp tissue. A disadvantage of intralesional triamcinolone is that it may induce slight transient atrophy and occasional follicular atrophy.[15]

Intralesional corticosteroids are a time tested modality of treatment for AA, in use from 1958.[16] However, they are more suited for smaller, relatively stable patches of alopecia areata.[3] But depigmentation and cutaneous atrophy are well documented complications with intralesional corticosteroids.[17] Allergic reaction[18] and Cushing's syndrome[17] have also been reported secondary to intralesional triamcinolone. However, in our study, adverse effects were not found with intralesional triamcinolone.

In 2013, Trink et al.[12] performed a randomized, double-blind, placebo and active-controlled, half-head study on 45 patients and evaluated the efficacy of PRP in patients with AA. Both triamcinolone and PRP led to increased hair regrowth compared with the untreated side of the scalp. Additionally, patients treated with PRP had significantly increased hair regrowth compared with those treated with triamcinolone. 27% of patients treated with triamcinolone achieved complete remission at 12 months, compared to 60% of patients treated with PRP. No major side effects were observed during treatment. PRP also decreased the percentage of dystrophic hairs and burning or itching sensation. In our study, a small percentage (11.53%) of the patients treated with PRP had regrowth of gray hair. But PRP may still serve as an effective and safer treatment option in AA.

In our study, patients treated with PRP had an earlier response than patients treated with Triamcinolone. However, this difference was statistically insignificant. Also, in our study, the overall improvement at the end of 9 weeks was 100% for all patients in both groups. This may be due to the fact that our study was carried out in a small population, with patches of AA involving less than 25% of the total scalp area.

## CONCLUSION

PRP is a safe, simple, inexpensive and biocompatible procedure. Patients treated with PRP had an earlier response than patients treated with Triamcinolone. Though this difference was statistically insignificant, it pushes the need for further clinical studies enrolling a larger number of patients, using more sophisticated techniques to arrive at a better and a definite conclusion.

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**Conflict of interest:** None

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