ORIGINAL ARTICLE

COMPARATIVE STUDY BETWEEN INTRALESIONAL INJECTION OF PLATELET RICH PLASMA AND INTRA LESIONAL TRIAMCINOLONE FOR THE TREATMENT OF ALOPECIA AREATA

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Background: Alopecia areata is an autoimmune disorder of patchy non scarring hair loss. Steroids, either Intralesional, e.g, triamcinolone or potent topical, e.g, clobetasol are the first line treatment. Platelet rich plasma is an autologous concentrated plasma with growth factors which enhances regeneration of hair follicles. It is simple and effective treatment with no major side effects. Objective was to compare the efficacy of intralesional injection of platelet rich plasma and triamcinolone in patients of alopecia areata. It was a randomized controlled trial (open-labelled), conducted at the Dermatology Department, Combined Military Hospital Abbottabad from 1st May to 31st December 2021. **Methods:** Sixty clinically diagnosed patients of alopecia areata of the scalp were enrolled in the study. They were divided into two groups, A and B. Random numbers table was used to allocate 30 patients into each group. Group A patients were given an intralesional injection of triamcinolone while intralesional platelet rich plasma was given to Group B. Both treatments were repeated at one-month intervals for four months. In the study, Chi-square tests were used to compare effectiveness. It was considered significant when the *p*-value turned out to be $\leq$0.05. **Results:** There was significant difference in complete response rate between intralesional injection of steroid and intralesional injection of platelet rich plasma. Platelet rich plasma was less effective (p =0.05). Local corticosteroid injection was significantly more effective than platelet rich plasma (p<0.05). **Conclusion:** Intralesional injection of steroid is an effective and considerable treatment for alopecia areata. This study also proposes intralesional injection of platelet rich plasma as an alternative therapy for alopecia areata as it is not associated with serious local side effects.

Keywords: Alopecia Areata; Platelet rich plasma; Triamcinolone

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INTRODUCTION

Alopecia areata is an autoimmune condition that leads to patches of non-scarring hair loss. The condition is characterized by round patches of hair loss that are sharply demarcated. Patients of all age groups, sexes, and ethnicities are affected. Approximately 2% of the global population is involved with this condition. Alopecia areata tends to recur.[1]

Among the essential characteristics of hair follicles is their relative immunity, which is mediated mainly by suppressing surface molecules that present antigens to CD8 T lymphocytes. The loss of this privilege is a major contributing factor to alopecia areata.[2] Environmental triggers like illness, hormones, toxins, or any combination of them are also responsible.[3]

Clinical patterns in alopecia areata are usually very distinct. Usually, alopecia is seen as patchy alopecia on the scalp, completely balding on the scalp (Alopecia Totalis), or completely hairless on the body (Alopecia Universalis). Poor prognosis is usually associated with alopecia totalis and alopecia universalis. As initially described by Ikeda, there are four main groups of alopecia areata. Ikeda type I with no disease association Ikeda type II associated with atopic Ikeda III associated with prehypertension Ikeda type IV associated with autoimmune endocrinopathy.[4]

There are four categories by which the National Alopecia Areata Foundation Guidelines Committee organizes the severity of alopecia areata: None (S0) 1 percent to 24 percent (S1), 25 percent to 49 percent (S2), 50 percent to 74 percent (S3) 75 to 99 percent (S4) and 100%.[5] The SALT SCORE is a global severity score that includes hair percentage. According to the scalp's surface area, it is divided into four sections. Top of scalp contributes 40% posterior of scalp 24% right side of scalp 18% and Left side of scalp 18%.[6]

Different treatments are used to hinder the disease progression including intralesional, topical

and systemic corticosteroids. Phototherapy, contact immunotherapy, immune-modulatory agents, antibiotics, minoxidil, interferons, dapsone, tacrolimus and platelet rich plasma.

The aim of the study was to compare intralesional injections of platelet-rich plasma (PRP) and intralesional injections of triamcinolone in the treatment of alopecia areata to achieve the best treatment response with the fewest side effects. The platelets in PRP are derived from an autologous plasma preparation. Hair follicle regeneration is accelerated by the presence of growth factors and cytokines. The number of PRP sessions required to treat and maintain hair growth is not standardized or recommended, even though PRP is relatively safe and potentially effective. PRP is an effective therapy, especially for pigmented alopecia areata. It is usually effective after 3 to 4 sessions performed after 4 or 6 weeks.

Alopecia areata is commonly treated with intralesional corticosteroids. A definitive determination of optimal intralesional steroid concentration has yet to be made.

Hind M. Almohanna *et al*., conducted a study in prince sultan Military Medical city, in this study few randomized and non-randomized clinical trials as well as case reports and series comparing PRP with different treatment modalities for alopecia areata were discussed. However, it was concluded that there is initial supporting evidence to use PRP for the treatment of AA; but the lack of standardized protocol precludes any recommendations for the number of PRP sessions required to treat AA. PRP is relatively safe and potentially effective for the regrowth of pigmented hairs in AA. Further large-scale studies are needed to evaluate the efficacy of the PRP procedure as monotherapy and whether it is superior over current therapeutic modalities for alopecia areata.

MATERIAL AND METHODS

A randomized controlled trial in the Dermatology Department of Combined Military Hospital, Abbottabad, was carried out from 1st May to 31st December 2021. The sample size was determined by using the WHO sample size calculator with a level of significance of 5%. For the anticipated population proportion P1, the probability was 22.8%, and for the anticipated population proportion P2, it was 55.4%. The calculated sample size was 60 (30 in each group). A non-probability consecutive sampling technique was used.

Patients with mild to moderate alopecia areata of both sexes were included in the study. Their age limit was ranging from 14 to 25 years. Before participating in the study patients were off the treatment for about three months, i.e., from February 2021.

Alopecia areata is defined as three or fewer patches of alopecia with a diameter of at least 3 cm. Moderate alopecia areata is the presence of more than three patches or patches greater than 3cm diameter without alopecia totalis or alopecia universalis.[7]

Exclusion criteria included coagulation system disorders, unstable hemodynamic, sepsis, any systemic illness, pregnancy and lactation in order to avoid haematological compromise.

RESULTS

In Group A ages of patients ranged from 15–25 years (20.13±4.93), whereas in Group (B, the ages ranged from 16–25 years (19.96±4.99).

In Group A, 13 (43%) of the patients were male, and 17 (57%) were female, whereas in Group B, 12 (40%) of the patients were male, and 18 (60%) of the patients were female. Severity score of patients in both groups is summarized in Table-1 Clinically mild to moderate alopecia areata was equally distributed among patients of both groups.

Photographs were taken before and after 4,8,12, and 16 weeks of treatment in order to assess treatment response and to compare efficacy between intralesional injection of triamcinolone and platelet rich plasma. In each follow-up, the percentage of hair regrowth was assessed by using SALT SCORE. Efficacy among two groups revealed that 27 (90%) patients of Group A had effective treatment response (p<0.05) while 3 (10%) of patients didn't show marked improvement. In Group B 22 (73%) showed effective response (p=0.05) while 8 (27%) patients didn't show significant improvement to the treatment.

Table-1: Severity score

Severity score	Group A	Group B
1-2 (mild)	16 (53%)	15 (50%)
3-4 (moderate)	14 (47%)	15 (50%)
Total	30 (100%)	30 (100%)
Mean and SD	3±2.83	3±2.37

Table-2: Stratification of efficacy with respect to severity score

Severity score	Efficacy	Group A	Group B	*p-value
1-2 (mild)	Effective	15	11	0.1224
	Not effective	1	4	
Total		16	15	
3-4 (moderate)	Effective	12	11	0.4108
	Not effective	2	4	
Total		14	15	

DISCUSSION

Alopecia areata is one of the most typical causes of hair loss. It is characterized by sharply demarcated round patches of non-scarring hair loss commonly

seen on the scalp and elsewhere. Conventional treatments of alopecia areata include intralesional and systemic steroid. Platelet rich plasma is an emerging treatment modality for alopecia areata.

In this study, intralesional injection of triamcinolone was compared with intralesional injection of platelet rich plasma. The response to treatment was determined based on the regrowth of hair at 4, 8, 12 and 16 weeks. The response to the local steroid injection group was significantly better than the group treated with platelet rich plasma (p<0.05). The average time for onset of hair growth after treatment with intralesional steroid injection was significantly shorter than in the group treated with platelet rich plasma (p=0.001). The efficiency of intralesional steroid injection in alopecia areata treatment, based on the average or total hair regrowth, was 90% (p<0.05) and significantly better than comparing with platelet rich plasma 73% (p=0.05).

According to Brittany E. Yee *et al*., hair regrowth rates at 5 and 10 mg concentrations are comparable. A lower rate of hair regrowth (62.3%) was observed when less than 5 mg/mL of intralesional triamcinolone acetonide was administered for treating focal alopecia areata. If the risk-benefit ratio is favourable, a 5 mg/mL concentration may prove effective for patients with focal alopecia areata. A randomized study may be required to determine the lowest effective concentration of intralesional corticosteroids based on the risk of adverse effects, including the incidence of skin atrophy with higher concentrations of corticosteroids. Interestingly, M Abdel Rahim *et al*. concluded in their study that FCO2 lasers produce a more significant improvement compared to ILCs three months after the last session.

A descriptive study of 10 patients concluded that intralesional corticosteroid injection is a safe and effectiveness treatment of extensive AA and several review studies suggest the intralesional steroid injection as an effective and almost safe treatment of AA.[8,9]

In a retrospective study of 153 patients with AA treated by cryotherapy, positive therapeutic responses were in 68.6% of patients. This study suggests that cryotherapy can be the first line of treatment in mild form of AA especially in children due to less of pain and side effects.[10]

In our study, local corticosteroid injection efficiency was 90% and complications of that were pain and atrophy while significant complications were not observed.

Trink *et al*, conducted a randomized, double-blind, placebo-, and active-controlled, half-head parallel-group study to evaluate the efficacy and safety of PRP on AA. A total of 45 subjects were randomized to one of three groups: PRP, triamcinolone acetonide (TAC, 2.5 mg/cm3), or placebo. Three treatments with a 1-month interval were administered. All subjects were evaluated at baseline, 2 months, 6 months, and 12 months. The results of the study revealed that intralesional TAC and PRP resulted in significant hair regrowth in AA lesions compared with placebo or to baseline. Results were sustained at a 1-year follow-up. PRP and TAC decreased the number of dystrophic hairs as evaluated by dermoscopic findings and also minimized the itching or burning sensation of treatment. Nonetheless, PRP revealed significantly better dermoscopy results than having intralesional TAC. This study supports the use of PRP in AA to stimulate hair regrowth, especially of pigmented hairs, with a lower chance of relapse. Of note, the method of centrifugation that has been used in this study produced a platelet count that was, on average, 3.5 times higher than whole blood. No adverse effects were noted with PRP, TAC, or placebo administration.[11]

El Taieb *et al*, conducted a randomized controlled study to investigate the efficacy of PRP in treating AA. A total of 90 patients with patchy AA and/or AT and/or AU were included with ages between 10 and 40 years, with no therapy for at least 3 months before the study. Patients were randomized into three groups, each of which included 30 patients. The first group was treated with topical minoxidil 5% twice daily (six pubs per time) as a monotherapy. The second group was treated with three PRP treatment sessions every 4 weeks. The third group received topical panthenol cream twice daily as a placebo. Digital photography and dermoscopic examination were done before treatment and monthly after treatment for 3 months. For PRP preparation, 10 ml of blood was drawn from each patient and placed in two test tubes as 5 ml each. The collected blood was centrifuged at 3,000 rpm. for 10 minutes, and blood was separated into an inferior red phase and superior plasma supernatant phase. The PRP fraction was separated and suspended with calcium gluconate. The total volume of collected PRP was about 4 ml. Significant hair regrowth was noticed in patchy AA (70%) and AU (30%) after three sessions of PRP; however, AT did not respond to PRP. PRP led to significant, fully pigmented hair growth in AA lesions. Short vellus hair and yellow dots were significantly decreased after PRP treatment. Minoxidil group showed improvement of patchy AA (81%) more than AT and/ or AU. Only 30% of patients in the control group experienced a significant hair growth of patchy AA type. Although both PRP and minoxidil 5% showed a significant increase in hair growth, subjects treated with PRP exhibited a significant decrease in short vellus hair, unlike patients treated with minoxidil and control who showed a significant increase in short vellus hair. Participants who underwent PRP treatments had better

and an earlier response than participants treated with minoxidil 5% in terms of hair regrowth, reduction of short vellus hair, broken hairs, and yellow dots.[12]

Steroids are convectional treatment modality for alopecia areata but is effective in treating different subtypes of alopecia areata and is associated with low risk of side effects if used in lowest effective dose. PRP is a newer modality comparatively have safer profile mostly effective for pigmented and patchy hair loss. Large scale studies are needed to compare its effectiveness and superiority over current modalities.

The limitation of the current study was a relatively shorter duration. Depending on the chronic nature of the condition, large randomized multicenter trials with follow-up over a more extended period are required to confirm the efficacy of different therapeutic options further and thus reduce the psychological and social burden of one of the most distressing conditions a person can suffer with, ultimately improving the quality of life for the whole person. Treatment should be tailored to meet the needs of each patient, based on age, medical history, and drug tolerance.

In our study, Platelet rich plasma was effective in 73% of patients. Side effects reported were temporary and tolerable pain during the procedure and mild headache that usually recovered with acetaminophen.

CONCLUSION

Based on the study findings, PRP can be used as a replacement of intralesional corticosteroids for the treatment of alopecia areata with no major side effects.

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AUTHORS' CONTRIBUTION

FA: Literature search, data collection, write-up. MH: Literature search, conceptualization of study design. BM: Data collection, data analysis, data interpretation. MS: Literature search, write-up, proof reading. SA, SUH, NA: Proof reading, write-up.

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