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Original Article

Comparison of Efficacy of Platelet Rich Plasma with Intralesional Triamcinolone in the treatment of Alopecia Areata

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ABSTRACT

Objective: To compare the efficacy of Intralesional autologous platelet rich plasma with Intralesional Triamcinolone in the treatment of Alopecia Areata.

Study Design: Quasi-experimental study

Place and Duration of Study: Pak-Emirates Military Hospital Rawalpindi, Pakistan from Feb to July 2023.

Methodology: The study included 40 individuals with alopecia areata (AA). After informed consent, they were divided into Group-A (intralesional Triamcinolone (IL-T) injection) and Group-B (intralesional autologous platelet rich plasma (PRP) injection) and each group was treated at 3-week interval till 12 weeks and followed up for 24 weeks. The AA grade was recorded using the SALT scoring system. At every visit, the pre and post treatment period SALT scores were noted and compared.

Results: The study comprised of 32(80.0%) male and 8(20.0%) females. At the beginning of the study and after 03 weeks of treatment, there was no statistically significant difference between the two groups in terms of the SALT Score, suggesting that both interventions had similar effects during the early stages of treatment. At 06 weeks, a statistically significant difference emerged (*p*-value 0.037), indicating that the IL-T treatment in Group-A is associated with a more significant reduction in the SALT Score compared to the PRP treatment in Group-B. After 12 and 24 weeks, the difference between the two groups became highly significant (*p*-value <0.0001), indicating that intralesional Triamcinolone treatment led to a more substantial reduction in the SALT Score compared to PRP.

Conclusion: Intralesional Triamcinolone (IL-T) therapy offers significantly better outcomes in Alopecia areata (AA) than autologous intralesional PRP.

Keywords: Alopecia Areata, Hair Diseases, Intralesional Triamcinolone, Platelets-Rich Plasma, Severity of alopecia tool (SALT)

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INTRODUCTION

Alopecia areata (AA) is a well-known autoimmune dermatological ailment. The symptomatic hallmark of AA is an abrupt onset of either localized or generalized patches of hair loss on scalp, face or body.[1] It afflicts both children and adults with an estimated lifetime prevalence of 2.1 %, affecting millions of patients worldwide, with an equal male and female preponderance. While the exact pathophysiological basis remains debated, it is thought to emanate from a complex set of interactions amongst genetic, environmental, and immunological elements.[1,2]

AA exerts a considerable amount of psycho-social morbidity over the affected patients and the search for an ideal treatment strategy still remains elusive.1 The current treatment modalities are targeted towards suppression of the autoimmune response and stimulation of hair regrowth and maintenance.[2] Intralesional Triamcinolone (IL-T) has been proven to be one of the most effective treatment strategies to combat AA, however, the treatment is not devoid of its fair share of side effects including local skin atrophy, telangiectasia and hypopigmentation.[3] Various national and international studies have employed and reported the beneficial role of PRP in hair rejuvenation.[4,5] The role of PRP employed via different techniques for treatment of Androgenetic alopecia is an apt example of this currently popular treatment strategy being employed across the world in the dermatology clinics 4. PRP with its host of growth factor and cytokine is believed to have a therapeutic effect on hair follicles, helping their regeneration and enhanced growth.[5-9]

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Given the lack of side effects like skin atrophy, PRP may seem like an attractive treatment option both for patients and clinicians. However, before employing or replacing PRP with IL-T for treatment of AA, it is only imperative that the efficacy of these two treatment strategies be cautiously compared and determined. The purpose of this therapeutic trial was to compare the efficacy of intralesional Triamcinolone with that of intralesional PRP in the treatment of alopecia areata as an attempt to check the validity of findings of earlier studies that claimed a comparable efficacy of PRP versus IL-T.[3,4]

METHODOLOGY

This Quasi-experimental study was conducted at the Department of Dermatology in Pak-Emirates Military Hospital Rawalpindi, from February 2023 to July 2023 over a course of six months after due approval by the institutional ethical review (Ethical committee approval number: A/28/219(2)/EC/497/2023). The sample size was calculated by the WHO calculator with a confidence level of 95%, a margin of error of 5% and prevalence of alopecia areata of 2%.[10]The sample size came out to be 31 which was increased to 40 to increase the strength of the study. Informed consent was obtained from each patient before their induction in the study.

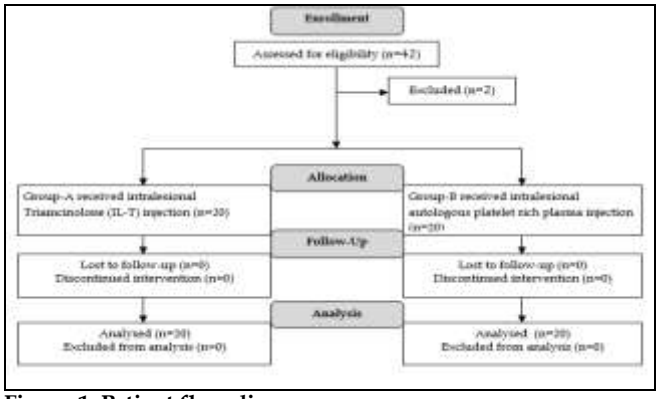

Figure-1: Patient flow diagram

Inclusion Criteria: Patients presenting with AA fit for autologous IL PRP and IL-T therapy and those willing for regular follow-up at the dermatology outpatient department were included in the study.

Exclusion Criteria: Patients with concomitant hair loss other than AA, having disorders pertaining to hematology, thyroid, coagulation, nutrition as well as dermatological disorders that contributed to their hair loss, those who received any hair restoration intervention in the past 06 months, those with any active site infection, uncontrolled diabetes and other factors that deemed them unfit for PRP or IL-T therapy were excluded from the study.

The patients unable to obtain a minimum concentration of platelet count of 1million/mL were also excluded from the study.

The non-probability purposive sampling technique was employed for patient selection and their stratification into two groups i.e. Group-A (Intralesional Triamcinolone at 10mg/ml concentration, injected intra-dermally into the lesion using insulin syringe, 0.1 ml injection 1 cm apart, employing proper aseptic techniques) and Group-B (Intralesional Autologous platelet rich plasma injection, injected intra-dermally and in subcutaneous tissue, into the lesion using insulin syringe, 0.1 ml injection 1 cm apart, employing proper aseptic techniques) was carried out randomly Figure-2.

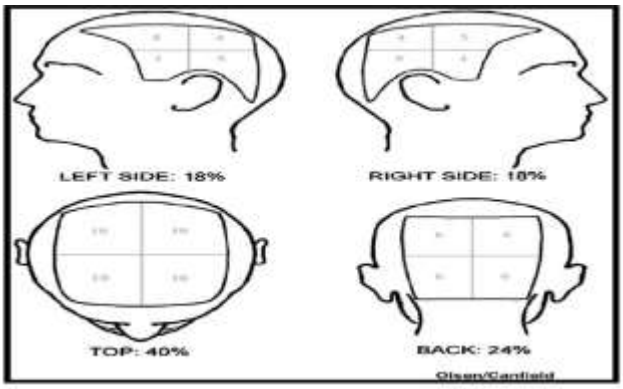

Figure-2: OLSEN/Canfield Tool for Determination of % Scalp Hair Loss12

Autologous PRP preparation was carried out under aseptic measures, with 2 mL of Citrate-Phosphate-Dextrose Solution with Adenine (CPDA) as an anticoagulant mixed with fresh 20 mL venous blood from median cubital venipuncture. The composition of CPDA included Citrate Acid anhydrous 0.299g, Sodium Citric Dehydrate 2.63g, Monobasic Sodium Phosphate (Monohydrate NaH2P04-H20) 0.222g, Dextrose monohydrate 3.19g, Adenine (C5H5N5) 0.0275g, Water for injection added to 100mL (manufacturer by Zhejiang Zhongfa Pharmaceuticals Co. Ltd. Zhejiang China). Following the instructions of the American association of blood bank technical manual.[7] Following withdrawal, the blood was placed in a centrifuge for 15 minutes with soft spin centrifugation (1500 rotation per minute) followed by 10 minutes of hard spin centrifugation

(4000 rotations per minute). This procedure aimed to obtain a platelet count, equal to or more than 10 lacs/ml in 5 mL of PRP, a working definition of PRP by Marx *et al*.[11]

The AA grade was recorded using the SALT scoring system pre-treatment, at every visit, and at the end of the treatment period. For the calculation of SALT score, the scalp is divided into 4 areas, the Vertex which is assigned 40% (0.4) of scalp surface area, the right and left profile of scalp are assigned 18% (0.18) of scalp surface area on each side.[12] The posterior aspect of scalp is given 24% (0.24) of scalp surface area.The percentage of hair loss in any of these areas is multiplied by the percent surface area of the scalp in the respective area. The final SALT score is calculated by adding all of the percentages of hair loss in all the respective scalp areas mentioned above.

The data was analyzed by using Statistical Package for the social sciences (SPSS) version 23.00. Baseline variables were analyzed descriptively using frequencies and percentages for qualitative variables and the mean with SD was calculated for quantitative variables. Mann Whitney U test was applied to compare the medians of SALT scores between Group-A and Group-B at different intervals and $p \leq 0.05$ was taken as statistically significant.

RESULTS

The study comprised a total of 40 patients, out of which, 32 (80.0%) were male with the mean age of 31.31±6.81 years and 8(20.0%) were female with the mean age of 37.88±13.61 years.

The distribution of baseline characteristics including gender, duration of disease, history of atopy, family history of alopecia areata and nail disease is shown in Table-I.

Table-I: Baseline Characteristics of Study Participants (n=40)

Parameter(s)		n(%)
Gender	Male	32(80.0%)
	Female	8(20.0%)
Duration of Disease (months)	≤6 Months	17(42.5%)
	>6 Months	23(57.5%)
History of Atopy	Yes	11(27.5%)
	No	29(72.5%)
Family History of AA	Yes	3(7.5%)
	No	37(92.5%)
Nail Disease	Yes	25(62.5%)
	No	15(37.5%)

The comparison between the two treatment groups, Group-A (Intralesional triamcinolone) and Group-B (Autologous PRP), for the management of Alopecia Areata is shown in Table-II.

Table-II: Comparative Analysis of Platelet Rich Plasma (PRP) and Intralesional Triamcinolone in the Treatment of Alopecia Areata (n=40)

SALT Score	Groups		*p*-value
	Group-A (n=20) (Median, IQR)	Group-B (n=20) (Median, IQR)	
Baseline	6.05 (5.6-7.2)	6.10 (5.7-6.6)	0.799
3 weeks	5.40 (5.0-6.0)	5.70 (5.1-6.2)	0.451
6 weeks	4.20 (3.9-5.0)	5.00 (4.3-5.9)	0.037
9 weeks	3.15 (2.8-4.0)	3.90 (3.5-4.3)	0.003
12 weeks	2.10 (1.8-2.4)	2.80 (2.5-3.1)	<0.001
24 weeks	1.80 (1.5-2.0)	2.75 (2.4-2.9)	<0.001

As mentioned in the table, at the beginning of the study, there was no statistically significant difference between the two groups in terms of the SALT Score, indicating that both groups started with a comparable severity of AA. After 03 weeks of treatment, there was still no significant difference between the two groups, suggesting that both interventions had similar effects during the early stages of treatment. At 06 weeks, a statistically significant difference emerged, indicating that the IL-T treatment in Group A is associated with a more significant reduction in the SALT Score compared to the PRP treatment in Group B. After 12 and 24 weeks, the difference between the two groups became highly significant, indicating that intralesional triamcinolone treatment lead to a more substantial reduction in the SALT Score compared to PRP.

SALT Score difference at 24 weeks with respect to baseline between group A and group B in Alopecia Areata treatment is shown in Table-III.

Table-III: SALT Score Difference at 24 Weeks with Respect to Baseline between Group A and Group B in Alopecia Areata Treatment (n=40)

	Groups		*p*-value
	Group A (n=20)	Group B (n=20)	
Difference in SALT score at 24 weeks with respect to baseline	4.65(3.8-5.2)	3.65(3.0-4.2)	0.001

SALT: Severity of Alopecia Tool

The significant *p*-value (0.001) indicated a statistically significant divergence between the two groups in terms of their SALT score changes after 24 weeks of treatment compared to baseline, favoring IL-

T as a superior treatment entity compared to autologous PRP therapy.

DISCUSSION

Our study reports that while PRP therapy may show a certain level of efficacy, IL-T injections in treating AA may still be more efficacious than the former. The rationale of using PRP for various types alopecia areata lies in the regenerative qualities of platelets, which brings about the release of a host of growth factors and cytokines that in turn contribute to hair follicle stimulation and tissue repair 5. The very same principal has been employed in wound healing and androgenetic alopecia.[4] IL-T injections, on the other hand, exert their therapeutic effects by suppressing the destructive autoimmune response around the hair follicles thus controlling the inflammatory process and causing hair regrowth. With well-known side effects like cutaneous atrophy and hypopigmentation ascribed to IL-T use, the search for alternative and optimal treatment modalities comes only naturally.[3]

Of the 40 patients included in our study, majority were young male in their late twenties and early thirties. Almost 60% of our cohort had a disease duration of more than 06 months while the severity of the disease was mild for the majority of the participants. Likewise, majority of the patients did not report any family history of alopecia areata, atopy or any family history of autoimmune diseases. Around two third of the patients reported nail involvement. In our study, majority of the patients presented with a single patch of AA.

As mentioned before, at the beginning of the study period, there was no statistically significant difference between IL-T and PRP group in terms of difference in the SALT score. Similarly, no significant difference in SALT score was recorded after 03 weeks of treatment, suggesting that both interventions had similar effects during the early stages of treatment. These findings are consistent with a Pakistani study conducted in 2022 by Khan FA *et al* who reported that administering IL-T is far more effective than PRP in treatment of AA however the latter may be an appropriate alternative as it doesn't bring about untoward side effects like skin atrophy.[13] Similar findings were reported by Kapoor et al. who described a higher reduction in SALT score in the IL-T group compared to autologous PRP group.[14]

Our findings, however, are in contradiction to a study by Balakrishnan *et al.* in 2020 and Altaf H et al. in 2023 3,15. Both the studies reported a higher reduction in SALT scores in patients who were administered PRP treatment, compared to IL-T. While the observation by Balakrishnan reported a statistically significant fall in SALT score compared to IL-T group after further few sessions of PRP treatment, the results of local study Altaf H fell short of finding any statically significant difference between the two therapeutic modalities. A systemic review conducted in 2022 observed that six studies reported higher efficacy of intralesional corticosteroids in six studies compared to five contrasting studies that reported a higher efficacy of PRP had superior efficacy as monotherapy. The author however also commented that while PRP may be a promising treatment for AA in those having side effects with IL-T treatment, the clinical application of PRP still remains to be standardized and it cannot be advised as first line treatment for immune mediated alopecia including AA, due to paucity of high-quality evidence.[16]

While the early local studies have reported a significant role of PRP in treatment of AA, like a study by Sohrab et al. the comparison with IL-T in the local research arena has been sparsely conducted.[17-20] According to our observations, the positive effect exerted by PRP in AA treatment may be short reaching. This is evident from observation that at 06 weeks, the IL-T treatment in Group-A was associated with a more significant reduction in the SALT Score compared to the PRP treatment in Group-B. This difference further grew after 12 and 24 weeks interval and became statistically significant, indicating that intralesional Triamcinolone treatment lead to a more substantial reduction in the SALT Score compared to PRP. This can be explained by hypothesizing that the growth factors and cytokines may not survive in scalp tissue long enough to exert their beneficial effects while IL-T may be exerting far reaching positive effected by suppressing the local immune response causing AA. This hypothesis further identifies the need of multi-arm studies where PRP may be combined with IL-T in treatment of AA to see its efficacy compared to each treatment modality administered alone.

LIMITATION OF STUDY

The limitations of our study include not recording the incidence of cutaneous atrophy in IL-T arm. Other limitations included it being a non-blinded study with a small sample size, a short duration of follow-up and the possibility of presence of inter-observer variability during the calculation of SALT score.

CONCLUSION

While Platelet-Rich Plasma (PRP) therapy may represent as a promising therapeutic option for patients with alopecia areata suffering from untoward side effects like skin atrophy, Intralesional Triamcinolone therapy still offers far better outcomes especially when the individual shows a lower incidence of adverse events. Autologous intralesional PRP and IL-T may both demonstrate a better efficacy profile in promoting the hair regrowth in AA, especially when combined. Individualized treatment plans tailored according to the patient preferences or needs and disease characteristics are important for an optimal therapeutic outcome in alopecia areata.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

MAK & MA: Data acquisition, data analysis, critical review, approval of the final version to be published.

AUB & NA: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

AM & ATUD: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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