Original Article

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Dermatology Section

Comparative Efficacy of Intralesional Platelet-rich Plasma Plus Methotrexate, Methotrexate Monotherapy, and Conventional Topical Therapy in Localised Chronic Plaque Psoriasis: A Randomised Controlled Trial

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ABSTRACT

Introduction: Psoriasis is associated with a significant negative impact on patients' physical and mental health. Patients are at a higher risk of developing cardiovascular disorders, which are in turn associated with a range of psychological impairments. Combinational modality of treatment and intralesional routes of drug delivery may ehhance the treatment outcomes and reduce systemic toxicity and hepatic adverse effects in psoriasis patients.

Aim: To compare the clinical efficacy of intralesional Platelet-Rich Plasma (PRP) combined with methotrexate, intralesional methotrexate monotherapy and conventional topical therapy in the treatment of chronic plaque psoriasis and to determine the post-treatment recurrence rate.

Materials and Methods: This randomised controlled trial was conducted in the Department of Dermatology at a Tertiary Care Centre, Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai, Tamil Nadu, India from November 2019 to April 2021. A total of 66 patients with localised chronic plaque psoriasis were enrolled into the study and randomised into three groups. Group A patients were treated with a single dose of intralesional PRP followed by intralesional methotrexate for four weeks, and this regimen was repeated every month for four months or untill complete resolution of lesions. Group B patients were treated with methotrexate monotherapy. Group C patients were treated with conventional topical treatment with corticosteroids and emollients. After completion of treatment, patients were followed-up for three months and digital photographs, Psoriasis Area Severity Index (PASI) score, clinical effectiveness, relapse and adverse effects were recorded. Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) version 23.0 and a p-value<0.05 was considered statistically significant.

Results: Group A demonstrated the greatest reduction in mean PASI score, followed by group C (topical therapy), whereas group B (methotrexate alone) showed comparatively lesser improvement. The overall improvement rate in group A was 72.7%, indicating a significantly better therapeutic response compared with groups B and C (p<0.05). Adverse effects were more frequently reported in group A.

Conclusion: In the present study, a significant proportion of participants showed clinical improvement with both intralesional PRP combined with methotrexate and topical corticosteroids therapy with emollients. Intralesional methotrexate monotherapy as a single treatment modality in psoriasis was less effective compared with the other groups. Earlier presentation in the course of the disease, was associated with a better treatment response

Keywords: Combinational therapy, Emollients, Idiosyncrasy, Immunosuppressant, Inflammatory dermatosis, Intralesional methotrexate, Recurrence

INTRODUCTION

Psoriasis is a chronic inflammatory, non communicable disease that predominantly involves skin, nails, and joints, and is associated with systemic manifestations in many organs [1]. The World Health Organisation noted that the reported prevalence of psoriasis worldwide ranges between 0.09% to 11.43%, making psoriasis a serious global health problem with at least 100 million individuals affected worldwide [2]. Psoriasis, an inflammatory dermatosis, is marked by elevated levels of active phosphorylated NFκB, which is the key regulatory element in the inflammatory pathway, apoptosis, and cellular proliferation and differentiation [3,4]. Psoriasis is associated with a significant negative impact on the patient's physical and mental health [5]. Psoriatic patients are at a higher risk of developing cardiovascular disorders, which are associated with multitude of psychological impairments and also have an increased rate of suicidal ideation [6].

The management of psoriasis has witnessed an immediate need for new treatment modalities as up to 50% of patients are not content with the present therapy [7]. The common systemic agents such as methotrexate, acitretin, and cyclosporine are associated with end-organ toxicities and treatment-related side-effects. Biological agents have the drawback of added cost to the care and iatrogenic immunosuppression [8]. Combinational modality of treatment and intralesional route of drug delivery may potentiate the treatment outcomes and diminish the systemic toxicity [9].

Intralesional methotrexate produces a higher concentration of the drug at the site of action, while avoiding the complications of systemic therapy and provides an effective and safe method of treating psoriasis [10,11]. Autologous Platelet Rich Plasma (PRP) has been a breakthrough in stimulation and acceleration of soft tissue healing and is used as treatment for several ailments with promising results. Hepatocyte Growth Factor (HGF) is known to function as an anti- inflammatory agent, and its action is primarily mediated by the disruption of transcription factor NFκB signalling, which is a crucial regulator of inflammation in psoriasis [12,13]. Hence, PRP might be effective as an adjuvant anti-inflammatory agent and, due to its

autologous nature, would provide a risk-free combination modality to manage psoriatic lesions [14].

Although a wide array of therapeutic options is available, ranging from topical therapy to biologicals, the comparative analysis between the topical and intralesional therapies for psoriasis is scant in the literature [10]. Hence, the present study was conducted to compare the efficacy of intralesional PRP with methotrexate, intralesional methotrexate monotherapy and topical therapy with an insight into the treatment efficacy without systemic administration.

MATERIALS AND METHODS

A randomised controlled trial was conducted in the Department of Dermatology, Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai, Tamil Nadu, India, from November 2019 to April 2021. The trial was registered prospectively in the Clinical Trials Registry – India (CTRI/2020/03/024068) on 19 March 2020. Institutional Ethics Committee approval was obtained (EC Reg. No: 13112019).

Sample size: Sample size was calculated based on the prevalence of improvement in PRP with methotrexate (62.5%) and methotrexate monotherapy (12.5%) [10]. A two-sided alpha error of 5% (α=0.05) and a power of 80% (β=0.20) with significance of 0.05 were considered for sample calculation. Based on the predicted prevalence and a 5% margin of error, the required sample size is 65-70.

Inclusion criteria: Patients older than 18 years attending the Dermatology Outpatient Department (OPD) during the study period with localised, stable plaque psoriasis of at least six months duration, involving less than 10% of the body surface area and a maximum PASI score of 10 at the time of screening were included.

Exclusion criteria: Patients with a known allergic response to methotrexate; those who had received any other psoriasis treatment before enrollment; patients with a history of renal or hepatic impairment, allergic skin disorders, or blood dyscrasias; patients with acute febrile illness or clinical signs of inflammation or infection; those with Hepatitis B or C infection, Human Immunodeficiency Virus (HIV) infection, pustular or erythrodermic psoriasis; and pregnant women were excluded.

Study Procedure

In the PASI scoring system, four sites, including the head (h), upper limb (u), trunk (t) and lower limbs (l), are separately scored on three parameters: Erythema (E), Induration (I) and Scaling (D). And each one of these parameters is graded on a severity scale of 0-4 (where 0 stands for nil; 1 is mild; 2 is moderate; 3 is severe; and 4 is considered very severe). The area-wise percentage involvement of the involved sites is calculated as follows: 1=less than 10% involvement; 2=10-29%; 3=30-49%; 4=50-69%; 5=70-89%; and 6=more than 90%. The severity grading of the three symptoms is multiplied by the numerical value of the areas involved and by the various percentages of the four body areas. These values are then added to obtain the PASI. The final formula for PASI score is: PASI=0.1 (Eh+Ih+Dh) Ah+0.2 (Eu+Iu+Du) Au+0.3 (Et+It+Dt) At+0.4 (El+Il+Dl) Al. The maximum score of the PASI is 72. PASI 75 means a 75% reduction in baseline PASI score [15].

A total of 66 patients with localised chronic plaque psoriasis were enrolled into the study after obtaining informed consent and randomised into three groups as group A, B and C with 22 patients in each group by a simple randomisation method (computer-generated random numbers). Meanwhile, basic demographic details including age, gender, site and duration of the lesions, substance abuse, co-morbidities and detailed clinical history were taken. General examination, systemic examination and dermatological examination were done. Investigations, including complete haemogram, liver function test, renal function test, lipid profile, urine routine, random blood sugar, Integrated Counselling and Testing Centre (ICTC), Venereal Disease Research Laboratory Test (VDRL) and urine pregnancy test were done.

- Group A comprised patients who were treated with single dose of 3 mL (each containing 1×109 platelet/mL) of PRP intralesionally in their first sitting and subsequently followed with intralesional methotrexate of 7.5-25 mg/m^2/week for four weeks and it was repeated every month for four months or till resolution of lesions (Skin plaque has returned to a state that is clinically indistinguishable from, or very nearly normal compared to, non lesional skin) [16].
- Group B comprised patients who were treated with intralesional methotrexate of 7.5-25 mg/m^2/week for four months.
- Group C comprised patients who were treated with conventional topical treatment, such as emollients and immunosuppressants, for four months.

Liquid paraffin and compound benzoic acid ointment combination was prescribed in the morning. Topical steroids on weekday nights and topical calcineurin inhibitors on weekend nights were prescribed. The drugs prescribed were mentioned below:

1. 0.1% betamethasone dipropionate ointment – Tamil Nadu Government supply, Super formulations Pvt., Ltd.,
2. Compound benzoic acid ointment – 3% Salicylic acid, 6% Benzoic Acid – Tamil Nadu Government supply, Century Pharma labs India Pvt., Ltd.,
3. 0.1% Tacrolimus ointment – Tamil Nadu Government supply
4. Liquid paraffin- Tamil Nadu Government supply, Johnson and Smith Co

After completion of treatment of four months of treatment, the patients were further followed-up for one month, and digital photographs, PASI score and adverse events (if any) were recorded at weeks 0,4,8,12,16 and 20. Clinical effectiveness, relapse and remission were noted [Table/Fig-1].

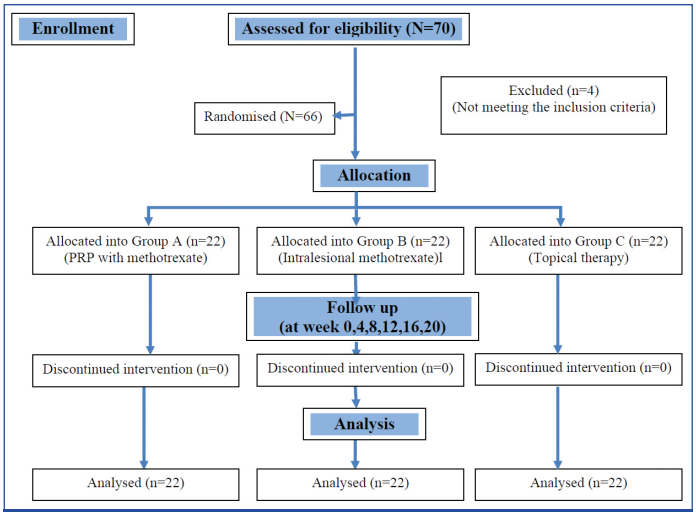
STATISTICAL ANALYSIS

The collected data were entered in the Microsoft Excel sheets and analysed using SPSS software version 21.0. Descriptive statistics were expressed as proportions with 95% confidence interval. Inferential statistics for proportions were done by the Chi-square test. Repeated measures Analysis of Variance (ANOVA) for finding the significance of change within and between the groups were perdormed.

RESULTS

General characteristics of study population: The patients in the present study were most commonly in the age group of 51-60 years, which includes 23 (34.8%) patients. The second most common age group is 41-50 years, with 20 (30%) patients. The mean age in the present study was 50.6 years [Table/Fig-2].

The distribution of gender among all three groups was statistically similar. The mean duration of the disease was 27.6 months. Among the participants in group A, 14 patients (63.3%) had lesions in the lower limb, 4 (18.2%) in the upper limb, 2 (9.1%) in the trunk and 2 (9.1%) had lesions in the palmoplantar region. Among those in group B, 16 patients (72.7%) had lesions in the lower limb, 3 (13.6%) in the upper limb, 2 (9.1%) in the trunk and one patient (4.5%) with palmoplantar involvement. Among those in group C, 12 patients (54.5%) had lesions in the lower limb, 6 (27.3%) in the upper limb, and 4 (18.2%) in the trunk. The distribution of the site of lesion was found to be similar in all three groups, with p>0.05. In the present study, 7 (10.6%) of the subjects had diabetes, 4 (6%) of the subjects had hypertension, and 2 (3%) of the subjects were asthmatics. A total of 5 (7%) participants were smokers, 3 (4.5%) participants were alcoholics, and 2 (3%) of them were both smokers and alcoholics [Table/Fig-3]. The mean PASI score at the pre-treatment level in group A was 3.41±1.14, in group B was 3.35±0.93, and in group C was 3.46±1.05.



[Table/Fig-1]: Consolidated Standards of Reporting Trials (CONSORT) flow diagram of the trial.

Age (in years)	Group A n (%)	Group B n (%)	Group C n (%)
21-30	-	2 (9)	1 (4.5)
31-40	6 (27.2)	3 (13.6)	2 (9)
41-50	6 (27.2)	6 (27.2)	8 (36.3)
51-60	7 (31.8)	7 (31.8)	9 (40.9)
>60	3 (13.6)	4 (18.1)	2 (9)
Mean±SD	48	53.27	51.91
Standard deviation	10.15	14.54	8.74
p-value	0.290		

[Table/Fig-2]: Comparison of age distribution and mean age between the three groups.

Characteristics	Group A n (%)	Group B n (%)	Group C n (%)	χ^2	p-value
Gender					
Male	11 (50)	15 (68.2)	9 (40.9)	3.406	0.182
Female	11 (50)	7 (31.8)	13 (59.1)		
Site of the lesion					
Lower limb	14 (63.3)	16 (72.7)	12 (54.5)	7.648	0.469
Upper limb	4 (18.2)	3 (13.6)	6 (27.3)		
Trunk	2 (9.1)	1 (4.5)	4 (18.2)		
Palmoplantar	2 (9.1)	1 (4.5)	-		
Lower limb and trunk	-	1 (4.5)	-		
Co-morbidities					
Diabetes mellitus	2 (9.1)	2 (9.1)	3 (13.6)	4.823	0.567
Hypertension	1 (4.5)	2 (9.1)	1 (4.5)		
Asthma	2 (9.1)	-	-		
Nil	17 (77.3)	18 (81.8)	18 (81.8)		
Substance abuse					
Smoking	1 (4.5)	2 (9.1)	2 (9.1)	1.543	0.957
Alcoholism	1 (4.5)	1 (4.5)	1 (4.5)		
Both	-	1 (4.5)	1 (4.5)		
Nil	20 (90.9)	18 (81.8)	18 (81.8)		

[Table/Fig-3]: Characteristics of demographic profile in the three groups of the study (N=66).

Analysis of treatment response after the first month of treatment: Out of 22 participants in the PRP group, 3 (13.6%) had shown improvement, and 19 (86.4%) maintained their pre-treatment stage after 1st month. Among the 22 participants in the Methotrexate group, only one (4.5%) had shown improvement, and among those in the topical group, 3 (13.6%) had shown improvement at the end of 1st month. There was no significant improvement in all three groups, and the distribution of results in all three groups was statistically similar after one month of treatment with a p-value>0.05 [Table/Fig-4].

Results at the end of 1st month	Group A n (%)	Group B n (%)	Group C n (%)	χ^2	p-value
Improved	3 (13.6)	1 (4.5)	3 (13.6)	1.278	0.528
No change	19 (86.4)	21 (95.5)	19 (86.4)		

[Table/Fig-4]: Distribution of results between the groups at the end of first month.

Analysis of treatment response after the second month of treatment: Among the participants in group A, 11 (50%) had shown improvement after the second month. Among the participants in group B, 6 (27.3%) had shown improvement, and among those in the topical therapy group, 7 (31.8%) had shown improvement at the end of the 2nd month. The distribution of results in all three groups was statistically similar, with a p-value>0.05. Across all three groups, the total number of patients showing improvement increased by the end of the second month of management. Among the three groups, group A participants who were treated with PRP in combination with methotrexate showed a higher proportion of improvement [Table/Fig-5].

Results at the end of 2nd month	Group A n (%)	Group B n (%)	Group C n (%)	χ^2	p-value
Improved	11 (50)	6 (27.3)	7 (31.8)	2.75	0.253
No change	11 (50)	16 (72.7)	15 (68.2)		

[Table/Fig-5]: Distribution of results between the groups at the end of the second month.

Analysis of treatment response after the third month of treatment: The patients were analysed after completion of three months of treatment in all three groups. Among the participants in group A, 16 (72.7%) had shown improvement after the 3rd month. Out of the total 22 participants who were treated with intralesional methotrexate alone, 7 (31.8%) had shown improvement, and among those in the topical management group, 9 (40.9%) had shown improvement at the end of 3rd month [Table/Fig-6]. The proportion of participants showing improvement was greater in the PRP group than in the other groups. The above difference was found to be statistically significant with a p-value <0.05.

Results at the end of 3rd month	Group A n (%)	Group B n (%)	Group C n (%)	χ^2	p-value
Improved	16 (72.7)	7 (31.8)	9 (40.9)	8.129	0.017
No change	6 (27.3)	15 (68.2)	13 (59.1)		

[Table/Fig-6]: Distribution of results between the groups at the end of third month.

Analysis of treatment response after the fourth month of treatment and one month of follow-up: There was no change in the total number of patients showing improvement after the 4th month of treatment compared to the third month in all three groups. But among the participants in group C, 13 (59.1%) had shown improvement after the 4th month of treatment completion and one month further follow-up [Table/Fig-7].

Results at the end of 4th month and 1 month follow-up	Group A n (%)	Group B n (%)	Group C n (%)	χ^2	p-value
Improved	16 (72.7)	7 (31.8)	13 (59.1)	7.700	0.021
No change	6 (27.3)	15 (68.2)	9 (40.9)		

[Table/Fig-7]: Distribution of results between the groups after fourth month of treatment and one month follow-up.

The common side-effects observed in this study in group A were pain at the time of injection, which is seen in 31.8% of patients, followed by irritation during and after injection, which is seen in 4.5% of patients. In group B, patients had similar complaints of pain

and irritation during and after treatment. Among the participants in group C, 9.1% had reported depigmentation. The proportion of participants with adverse events, especially pain, was higher in the group A participants treated group than in the rest of the groups. The above difference was found to be statistically significant with p <0.05 [Table/Fig-8].

Adverse events	Group A n (%)	Group B n (%)	Group C n (%)	χ^2	p-value
Pain	7 (31.8)	3 (13.6)	0	13.47	0.036
Irritation	1 (4.5)	1 (4.5)	0		
Depigmentation	0	0	2 (9.1)		
Nil	14 (63.6)	18 (81.8)	20 (90.9)		

[Table/Fig-8]: Distribution of adverse events between the three arms of the trial.

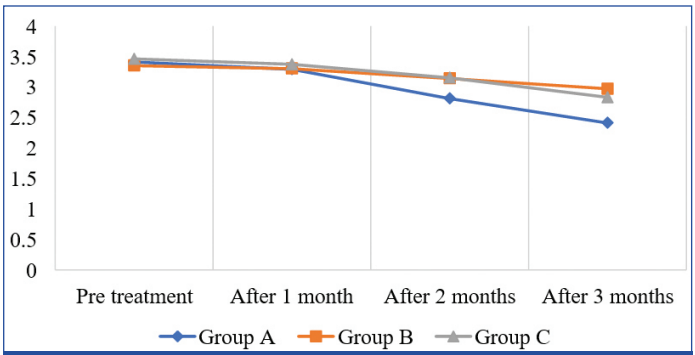
Recurrence rates at one month post-treatment were: Group A 9.1%, Group B (methotrexate alone) 13.6%, and Group C 22.7%. Among those treated with methotrexate alone, 13.6% had recurrence; in group C, 22.7% did.

The mean PASI at the pre treatment level in groups A, B and C were 3.41±1.14, 3.35±0.93 and 3.46±1.05, respectively. In all three groups, there was a decrease in the mean PASI magnitude at each follow-up visit in the 1st, 2nd, and 3rd months. The mean PASI at the end of the third month in group A was 2.41±0.97, that of group B was 2.97±1.01, and that of group C was 2.83±1.01. The final PASI score was lower in group A, followed by group C, and group B had the highest [Table/Fig-9].

Timeline	Group A Mean±SD	Group B Mean±SD	Group C Mean±SD
Pre treatment	3.41±1.14	3.35±0.93	3.46±1.05
After 1 month	3.29±1.10	3.30±0.91	3.37±1.15
After 2 months	2.81±1.09	3.14±1.01	3.15±1.08
After 3 months	2.41±0.97	2.97±1.01	2.83±1.01
After 4 months	2.41±0.97	2.97±1.01	2.83±1.01
After 5 months	2.41±0.97	2.97±1.01	2.68±0.99

[Table/Fig-9]: Change in mean PASI over the time line in all three arms of the study.

In the present study, all three treatment modalities demonstrated a progressive reduction in PASI score over time, with an increasing number of patients showing clinical improvement from the first to the third month of the therapy. Group A exhibited the greatest reduction in mean PASI score, followed by group C, while group B showed comparatively lesser improvement [Table/Fig-10].



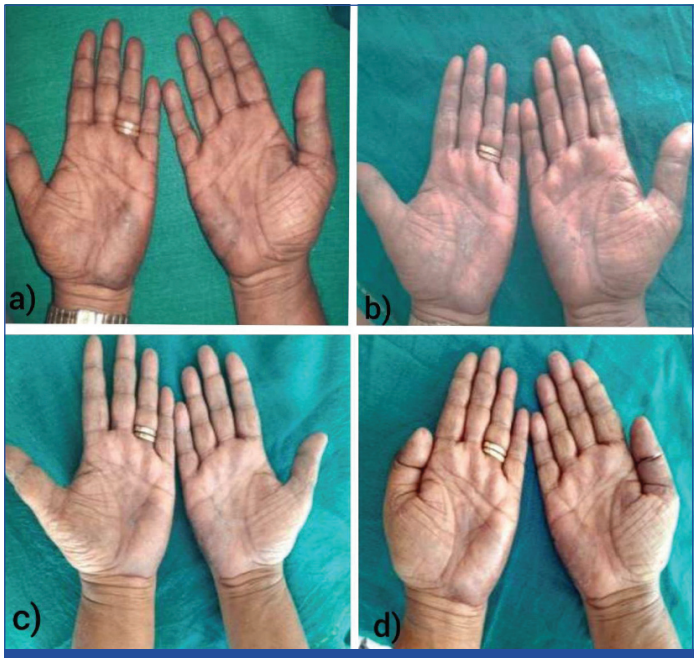
[Table/Fig-10]: Line diagram showing change in mean PASI over the timeline.

Within all three groups, there was a statistically significant reduction in the PASI score (p-value <0.05). There was no statistically significant difference in reduction when the three groups were compared with each other [Table/Fig-11].

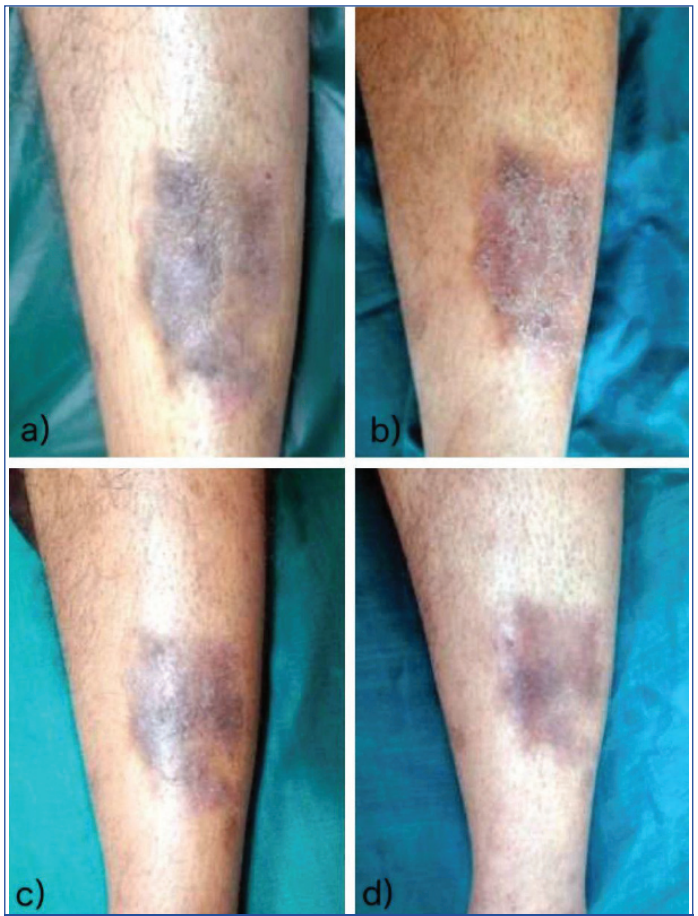
A representative image of a patient showing improvement in the patient's hand from baseline to week 16 following PRP with methotrexate treatment is shown in [Table/Fig-12]. A representative image of a patient showing improvement in the patient's leg from baseline to week 16 following intralesional methotrexate treatment is shown [Table/Fig-13]. A representative image of a patient showing improvement in the patient's ankle from baseline to week 16 following topical treatment is shown [Table/Fig-14].

Condition	F-value	p-value
Within each group	3.554	0.013
Between the groups	0.348	0.707

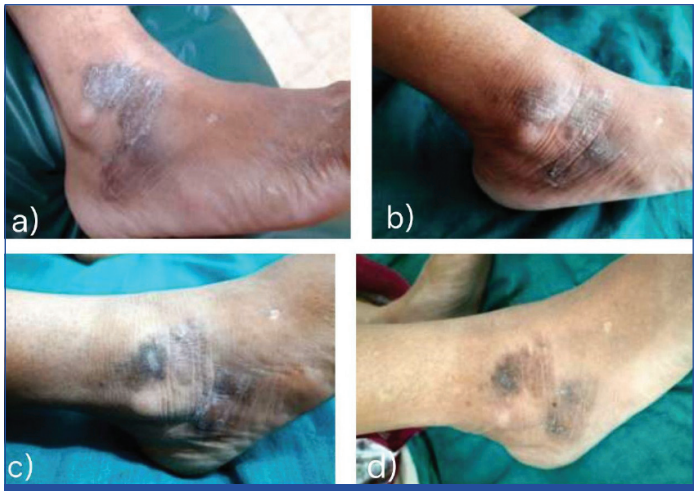
[Table/Fig-11]: Repeated measures ANOVA for finding the significance of change within and between the groups.



[Table/Fig-12]: Group A- intralesional PRP in combination with intralesional methotrexate. a) Before treatment; b) week 8; c) week 12; d) week 16.



[Table/Fig-13]: Group B- intralesional methotrexate monotherapy: a) Before treatment; b) week 8; c) week 12; d) week 16.



[Table/Fig-14]: Group C: Topical therapy: a) Before treatment; b) week 8; c) week 12; d) week 16.

DISCUSSION

The mean duration of the disease was 27.6 months. When the patients present in the early stage of the disease, the treatment response is better. In our study, there was significant improvement noted both with PRP in combination with methotrexate and topical corticosteroids therapy with emollients. But the magnitude of improvement was higher in patients treated with PRP in combination with intralesional methotrexate.

At the end of the first month of treatment, none of the groups showed significant improvement p>0.05. It implies that one month of treatment was not adequate in all three groups. So, patients should not be evaluated for the efficacy of treatment response for any modality at the end of the first month and need longer periods of treatment. This emphasises the need for counselling the patients regarding their expectations and the realistic response. This aids in improving patient compliance and prevents unrealistic expectations from the patient's outlook, and thus, prevents them from going into depression.

There was a statistically significant difference in the proportion of patients showing an improvement in group A when compared to group B at the end of the third month of treatment. So, intralesional methotrexate monotherapy as a single modality of treatment in patients with psoriasis is comparatively lower in improvement when compared to PRP with intralesional monotherapy. This study shows that minimal treatment response of *Psoriasis vulgaris* to a particular modality of treatment in a specific patient can be made out at the end of two months of treatment at least, and in some patients, it still needs some more time. So, the patients have to be counselled regarding the minimal duration to appreciate treatment response, varying responses with different modalities of management and inter-individual variability of responses. Similarly, the topical corticosteroid therapy group showed significant improvement at the third month compared to intralesional methotrexate monotherapy.

The occurrence of adverse effects profile was also statistically similar between the PRP with intralesional methotrexate group and the intralesional methotrexate monotherapy group. The improvement percentage is 72.7% in group A, which is significantly higher than in groups B and C (p<0.05).

At the end of the study, all patients in the combinational therapy group achieved PASI 50, and 12.5% of the study population achieved PASI 90. None of the patients in the monotherapy group attained PASI 50; they showed some improvement in the range of 35-40% compared to the baseline PASI.

In a prospective study, Chakravdhanula U et al., (2016) examined the effectiveness of combining PRP with Methotrexate in treating chronic plaque psoriasis. By week 16, all patients in the combination therapy group achieved a 50% reduction in their PASI score, with 10 out of 16 (62.5%) achieving a 75% reduction and two out of 16 (12.5%) achieving a 90% reduction. In contrast, none of the patients in the monotherapy group achieved a 50% reduction in their PASI score [10].

The findings of Kauhl W et al., (2021) revealed a significant decrease in the average lesion size, from 8.2 cm^2 to 0.3 cm^2 (p<0.001) and remarkably, 80% of patients treated for plaque psoriasis achieved complete remission after 12 weeks of treatment [17]. Baseline PASI scores were comparable across all three groups and showed a significant reduction over time within each group (p<0.05). By the third month, group A showed the greatest improvement (lowest PASI), followed by group C and group B, with no significant difference between groups. Anwar M et al., showed that the PRP with methotrexate treatment used is highly effective overall (82.19%), even in moderate-to-severe psoriasis, and that efficacy is independent of patient demographics and disease characteristics. This study evaluates overall efficacy in moderate to severe psoriasis without any comparative groups, but the present study evaluates comparative efficacy across treatments [18].

Mohammed ES et al., study further substantiates these findings by showing that PRP is significantly more effective than placebo, with additional evidence of histopathological improvement and reduction in inflammatory markers such as IL-17. Collectively, these findings indicate that PRP not only improves clinical outcomes but also exerts disease-modifying effects at the tissue and molecular level, making it a promising therapeutic option in psoriasis management [19].

The current management of plaque psoriasis involves oral medications, topical treatments, phototherapy and biologics. However, these treatment options can lead to significant financial expenses and adverse effects for patients. Clinical evidence strongly supports the efficacy of PRP in treating plaque psoriasis by reducing dermatological symptoms, ultimately leading to cost reduction and enhanced quality of life for patients with plaque psoriasis.

Limitation(s)

In the present study, there were certain limitations. Although the drugs were given intralesionally, they can act systemically and may affect the disease process. So the improvement cannot be attributed to a single drug. The follow-up was done only for a limited time; hence, it can be extended to at least 6-12 months to establish the treatment response. Long-term recurrence beyond one month could not be assessed.

CONCLUSION(S)

In the present study, all three treatment modalities showed a progressive reduction in PASI scores over time, with an increasing number of patients demonstrating clinical improvement from the first to the third month of therapy. Although no statistically significant difference was observed between the groups during the first and second months, a significantly greater proportion of patients in group A (PRP in combination with methotrexate) showed improvement by the end of the third month compared to the other groups. Furthermore, group A exhibited the greatest reduction in mean PASI score, followed by group C (topical therapy), while group B (methotrexate alone) showed comparatively lesser improvement. Adverse effects were more frequently reported in group A, particularly pain during injection. In conclusion, PRP combined with methotrexate appears to be a greater numerical improvement in achieving clinical improvement in psoriasis compared to methotrexate alone or topical therapy, albeit with a higher incidence of mild adverse effects.

REFERENCES

[1] Glickman S. Lepra, psora, psoriasis. Journal of the American Academy of Dermatology. 1986;14(5 Pt 1):863-66. Doi: 10.1016/s0190-9622(86)70101-1.
[2] World Health Organisation. Global report on psoriasis. Geneva: WHO; 2016.

[3] Goldminz AM, Au SC, Kim N, Gottlieb AB, Lizzul PF. NF-κB: An essential transcription factor in psoriasis. Journal of Dermatological Science. 2013;69(2):89-94. Doi: 10.1016/j.jdermsci.2012.11.002.
[4] Daisuke T. NF-kappaB links keratinocytes and lymphocytes in the pathogenesis of psoriasis. Recent patents on inflammation and allergy Drug Discovery. 2009;3(1):40-48. Doi: 10.2174/187221309787158399.
[5] Rapp SR, Feldman SR, Exum ML, Fleischer AB, Reboussin DM. Psoriasis causes as much disability as other major medical diseases. J Am Acad Dermatol. 1999;41(3 Pt 1):401-07. Doi: 10.1016/s0190-9622(99)70112-x
[6] Fortune DG, Richards HL, Kirby B, Bowcock S, Main CJ, Griffiths CEM. A cognitive-behavioural symptom management programme as an adjunct in psoriasis therapy. Br J Dermatol. 2002;146(3):458-65. Doi: 10.1046/j.1365-2133.2002.04622.x.
[7] Jankowiak B, Krajewska-Kulak E, Van Damme-Ostapowicz K, Wronska I, Lukaszuk C, Niczyporuk W, et al. The need for health education among patients with psoriasis. Dermatol Nurs. 2004;16(5):439-44.
[8] Christophers E, Griffiths CE, Gaitanis G, van de Kerkhof P. The unmet treatment need for moderate to severe psoriasis: Results of a survey and chart review. J Eur Acad Dermatol Venereol. 2006;20(8):921-25. Doi: 10.1111/j.1468-3083.2006.01667.x.
[9] Afra TP, Razmi TM, Dogra S. Apremilast in psoriasis and beyond: Big hopes on a small molecule. Indian Dermatol Online J. 2019;10(1):1-12. Doi: 10.4103/idoj.IDOJ_437_1.
[10] Chakravdhanula U, Anbarasu K, Verma VK, Beevi SS. Clinical efficacy of platelet rich plasma in combination with methotrexate in chronic plaque psoriatic patients. Dermatol Ther. 2016;29(6):446-50. Doi: 10.1111/dth.12388. Epub 2016 Jul 15. PMID: 27418241.
[11] Naldi L, Griffiths CE. Traditional therapies in the management of moderate to severe chronic plaque psoriasis: An assessment of the benefits and risks. Br J Dermatol. 2005;152(4):597-615. Doi: 10.1111/j.1365-2133.2005.06563.
[12] Zhang J, Middleton KK, Fu FH, Im H-J, Wang JH-C. HGF mediates the Anti-inflammatory Effects of PRP on Injured Tendons. PLoS ONE. 2013;8(6):e67303. Doi: 10.1371/journal.pone.0067303.
[13] Gong R. Multi-target anti-inflammatory action of hepatocyte growth factor. Curr OpinInvestig Drugs. 2008;9:1163-70.
[14] Bendinelli P, Matteucci E, Dogliotti G, Corsi MM, Banfi G, Maroni P, et al. Molecular basis of anti-inflammatory action of platelet-rich plasma on human chondrocytes: Mechanisms of NF-κB inhibition via HGF. J Cell Physiol. 2010;225(3):757-66. Doi: 10.1002/jcp.22274.
[15] Manchanda Y, De A, Das S, Chakraborty D. Disease assessment in psoriasis. Indian J Dermatol. 2023;68(3):278-81. Doi: 10.4103/ijd.ijd_420_23.
[16] Suárez-Fariñas M, Fuentes-Duculan J, Lowes MA, Krueger JG. Resolved psoriasis lesions retain expression of a subset of disease-related genes. J Invest Dermatol. 2011;131(2):391-400. Doi: 10.1038/jid.2010.280.
[17] Kauhl W, Pototschnig H, Paasch U. Can platelet-rich plasma reduce the burden of inflammatory skin diseases such as psoriasis and atopic dermatitis? Cureus. 2021;13(10):e18472. Published 2021 Oct 4. Doi:10.7759/cureus.1847.
[18] Anwar M, Siddiqui S, Shahzad A, Rasheed T, Anwar M. Efficacy of intralesional injection of platlet rich plasma in combination with methoterexate in chronic plaque psoriasis. Journal of Pakistan Association of Dermatologists. 2022;32(2):233-38. Doi:10.66344/jpad.32.2.2022.1854.
[19] Mohammed ES, Atwa MA, Mansour SF, Ismail NA: Interleukin 17 expression in psoriatic skin lesions before and after treatment with platelet rich plasma (PrP). Med J Cairo Univ. 2018;86:1447-56. Doi: 10.21608/MJCU.2018.5634.

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