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Original Research Article

Comparative Evaluation Between the Efficacy of Intralesional Injection of Platelet Rich Plasma and Topical Administration of Triamcinolone Acetonide in the Treatment of Recalcitrant Oral Lichen Planus: A Quasi-Experimental Study

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Conflict of interest: Nil

Abstract

Introduction: Oral lichen planus (OLP) is a chronic inflammatory mucocutaneous disorder often resistant to conventional therapy. Refractory cases pose a therapeutic challenge, prompting investigation into novel treatments such as intralesional platelet-rich plasma (PRP) and topical corticosteroids like triamcinolone acetonide.

Aims: This study aims to compare the therapeutic efficacy of intralesional PRP and topical 0.1% Triamcinolone Acetonide in managing recalcitrant Oral Lichen Planus. It focuses on assessing clinical and histopathological healing, anti-inflammatory effects, and the potential of PRP as a safe and effective alternative to corticosteroids.

Materials & Methods: This quasi-experimental, comparative interventional study was conducted for a period of 1 year 6 months (October, 2022 to March, 2024). in the Department of Oral Pathology at Dr. R. Ahmed Dental College & Hospital, Kolkata, West Bengal, involving 35 participants aged 25–70 years who were clinically and histopathologically diagnosed with Oral Lichen Planus (OLP). Participants were assigned to receive either weekly intralesional PRP injections or twice-daily topical 0.1% Triamcinolone Acetonide for 8 weeks.

Result: In this study, both PRP and Triamcinolone groups showed clinical and histopathological improvement in patients with Oral Lichen Planus. The most notable finding was a significant reduction in pain intensity (VAS) in the PRP group compared to the Triamcinolone group ($p = 0.046$). Improvements in Thongprasom clinical scores and histopathology were observed in both groups, but these differences between the two treatments were not statistically significant ($p = 0.403$ and $p = 0.404$, respectively).

Conclusion: In conclusion, both PRP and Triamcinolone improved clinical and histopathological outcomes in Oral Lichen Planus. PRP provided significantly greater pain relief, suggesting it as a promising alternative or adjunct to corticosteroid therapy.

Keywords: Oral Lichen Planus (OLP), Platelet-Rich Plasma (PRP), Triamcinolone Acetonide, Pain Relief (VAS), Clinical Improvement (Thongprasom Score), Histopathological Response.

Introduction

Oral Lichen Planus (OLP) is a chronic, immune-mediated mucocutaneous disorder characterized by T-cell–mediated degeneration of the basal cell layer of oral epithelium. Management of recalcitrant OLP—defined as lesions unresponsive to conventional therapy—remains challenging. Among contemporary therapeutic options, intralesional injection of Platelet-Rich Plasma (PRP) and topical or intralesional administration of Triamcinolone Acetonide (TA) have been widely evaluated for efficacy and safety. PRP, an autologous concentration of platelets suspended in plasma, contains various growth factors such as platelet-derived growth factor, vascular endothelial

growth factor, and transforming growth factor-β that promote angiogenesis, fibroblast proliferation, and tissue repair [1,2]. In contrast, TA, a potent corticosteroid, suppresses inflammatory cytokines, decreases vascular permeability, and inhibits T-cell activation, thereby reducing the mucosal inflammation characteristic of OLP [3,4].

Several clinical and quasi-experimental studies have compared the two modalities. El-Sayed Attia et al. [1] and El-Shinnawi [5] reported marked symptomatic improvement and reduction in lesion size after four to six weekly intralesional PRP injections in patients with erosive OLP, with no adverse effects. Ahuja et al. [2] conducted a pilot randomized clinical trial in which 20 patients received either intralesional PRP or TA injections. Both groups demonstrated statistically significant improvement in pain scores and clinical resolution; complete remission occurred in 80 % of the PRP group and 70 % of the TA group, though the difference was not significant. D'Angelo et al. [6] compared injectable platelet-rich fibrin (i-PRF) with intralesional TA in a split-mouth design and found a 91 % pain reduction with TA versus 68.5 % with PRF ($p > 0.05$), indicating comparable clinical outcomes.

Topical TA continues to be a mainstay of OLP management. Vivek et al. [4] demonstrated that 0.1 % TA paste produced substantial symptomatic relief in erosive lesions, comparable to other topical immunomodulators. However, chronic corticosteroid use may lead to mucosal thinning, candidiasis, and delayed epithelial healing [7]. PRP, being autologous and biocompatible, offers a favourable safety profile with minimal reported complications [1, 5]. Meta-analytical evidence supports these findings, showing no significant difference in pain or lesion size reduction between intralesional PRP and corticosteroids (pooled effect size for pain = −0.34; 95 % CI = −0.94 to 0.27) [8].

Regarding long-term remission, preliminary reports suggest PRP may induce more durable healing through regeneration of mucosal tissue and modulation of inflammatory mediators, though robust longitudinal data remain limited [2,9]. Additionally, PRP treatment avoids steroid-related side effects and may be preferable in patients contraindicated for corticosteroid use or those with steroid-resistant lesions [10]. Nonetheless, logistical considerations—including the need for venipuncture, centrifugation equipment, and higher cost—limit PRP's routine use, whereas TA remains easily accessible, cost-effective, and widely familiar to clinicians.

The present study aims to comparatively evaluate the therapeutic efficacy of intralesional Platelet-Rich Plasma (PRP) and topical 0.1 % Triamcinolone Acetonide (TA), an intermediate-acting glucocorticoid, in the management of recalcitrant Oral Lichen Planus (OLP). Specifically, it seeks to assess and compare the healing potential and tissue response of both modalities, clinically and histopathologically. The study will observe the regenerative and anti-inflammatory effects of PRP in resistant OLP lesions, determine the healing capacity of topical TA, and analyze differences in their mechanisms of action. Furthermore, it aims to explore the feasibility of PRP as a future treatment alternative to corticosteroids, focusing on its safety, efficacy, and potential to promote mucosal regeneration in chronic, non-responsive OLP cases.

Materials & Methods

Study Design: Quasi-experimental, comparative interventional study.

Study Setting: Department of Oral Pathology, Dr. R. Ahmed Dental College & Hospital, Kolkata, West Bengal.

Study Duration: The study was conducted for a period of 1 year 6 months (October, 2022 to March, 2024).

Study Population

- Total of 35 participants clinically and histopathologically diagnosed with Oral Lichen Planus (OLP).
- All participants attended the OPD of the Department of Oral Pathology.

Age Range: Participants aged between 25–70 years.

Inclusion Criteria

- Clinically and histopathologically confirmed cases of OLP.
- Recalcitrant cases not responding to conventional therapy.
- Willingness to give written informed consent.
- Willingness to attend regular follow-ups.
- No contraindications to PRP or Triamcinolone Acetonide.

Exclusion Criteria

- Patients with bleeding disorders or platelet dysfunction.
- Uncontrolled systemic diseases (e.g., diabetes, hypertension).
- Pregnant or lactating women.
- Patients on systemic corticosteroids or immunosuppressants.
- Patients unwilling to participate or attend follow-ups.

Grouping of Participants

- **Group 1 (PRP Group):** Treated with intralesional injection of autologous Platelet-Rich Plasma at weekly intervals for 8 weeks.
- **Group 2 (Triamcinolone Group):** Treated with topical application of 0.1 % Triamcinolone Acetonide twice daily for 8 weeks.

Statistical Analysis: For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analyzed using SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism (version 5). Numerical variables were summarized using means and standard deviations, while Data were entered into Excel and analyzed using SPSS and GraphPad Prism. Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages.

Two-sample t-tests were used to compare independent groups, while paired t-tests accounted for correlations in paired data. Chi-square tests (including Fisher's exact test for small sample sizes) were used for categorical data comparisons. P-values ≤ 0.05 were considered statistically significant.

Result

Table 1: Comparison of Baseline Demographic Characteristics Between the PRP and Triamcinolone Treatment Groups

Characteristic	Category	PRP (n, %)	Triamcinolone (n, %)	Total (n, %)	P-value
Age (years)	<30	1 (5.9%)	1 (5.6%)	2 (5.7%)	0.465
	31–40	1 (5.9%)	5 (27.8%)	6 (17.1%)	
	41–50	9 (52.9%)	6 (33.3%)	15 (42.9%)	
	51–60	2 (11.8%)	3 (16.7%)	5 (14.3%)	
	61–70	4 (23.5%)	3 (16.7%)	7 (20.0%)	
	Mean	49.88 ± 10.58	47.33 ± 12.15	0.514	
Gender	Female	11 (64.7%)	7 (38.9%)	18 (51.4%)	0.127
	Male	6 (35.3%)	11 (61.1%)	17 (48.6%)	

Table 2: Distribution of Visual Analogue Scale (VAS) Pain Scores in PRP and Triamcinolone Groups Pre- and Post-Treatment

VAS Score		PRP (n, %)	Triamcinolone (n, %)	Total (n, %)	P-value
Pre-treatment	Score 4	1 (5.9%)	0 (0.0%)	1 (2.9%)	0.236
	Score 5	1 (5.9%)	3 (16.7%)	4 (11.4%)	
	Score 6	4 (23.5%)	7 (38.9%)	11 (31.4%)	
	Score 7	6 (35.3%)	7 (38.9%)	13 (37.1%)	
	Score 8	5 (29.4%)	1 (5.6%)	6 (17.1%)	
Post-treatment	Score 2	3 (17.6%)	0 (0.0%)	3 (8.6%)	0.046
	Score 3	1 (5.9%)	0 (0.0%)	1 (2.9%)	
	Score 4	3 (17.6%)	10 (55.6%)	13 (37.1%)	
	Score 5	4 (23.5%)	6 (33.3%)	10 (28.6%)	
	Score 6	5 (29.4%)	1 (5.6%)	6 (17.1%)	
	Score 7	0 (0.0%)	1 (5.6%)	1 (2.9%)	
	Score 8	1 (5.9%)	0 (0.0%)	1 (2.9%)	

Table 3: Distribution of Thongprasom Clinical Scores in PRP and Triamcinolone Groups Pre- and Post-Treatment

Thongprasom Score		PRP (n, %)	Triamcinolone (n, %)	Total (n, %)	P-value
Pre-treatment	Score3	9 (52.9%)	12 (66.7%)	21 (60.0%)	0.586
	Score4	4 (23.5%)	4 (22.2%)	8 (22.9%)	
	Score5	4 (23.5%)	2 (11.1%)	6 (17.1%)	
Post-treatment	Score1	3 (17.6%)	7 (38.9%)	10 (28.6%)	0.403
	Score2	7 (41.2%)	5 (27.8%)	12 (34.3%)	
	Score3	4 (23.5%)	5 (27.8%)	9 (25.7%)	
	Score4	2 (11.8%)	0 (0.0%)	2 (5.7%)	
	Score5	1 (5.9%)	1 (5.6%)	2 (5.7%)	

Table 4: Distribution of H/P Scores and Treatment Outcomes

	H/P Score	PRP (n, %)	Triamcinolone (n, %)	Total (n, %)	P-value
Pre-treatment	Score1	3 (17.6%)	6 (33.3%)	9 (25.7%)	0.435
	Score2	9 (52.9%)	6 (33.3%)	15 (42.9%)	
	Score3	5 (29.4%)	6 (33.3%)	11 (31.4%)	
Post-treatment	Improved	9 (52.9%)	7 (38.9%)	16 (45.7%)	0.404
	Not improved	8 (47.1%)	11 (61.1%)	19 (54.3%)	

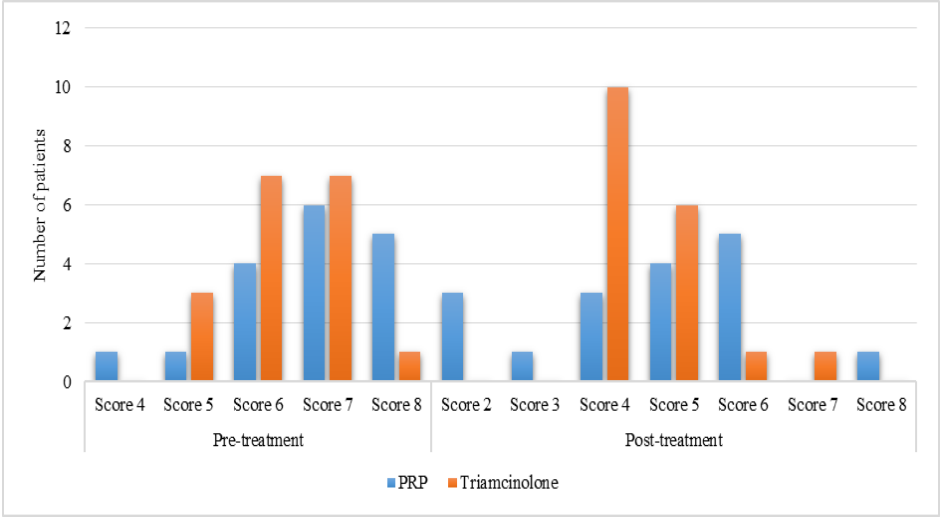

Figure 1: Distribution of Visual Analogue Scale (VAS) Pain Scores in PRP and Triamcinolone Groups Pre- and Post-Treatment

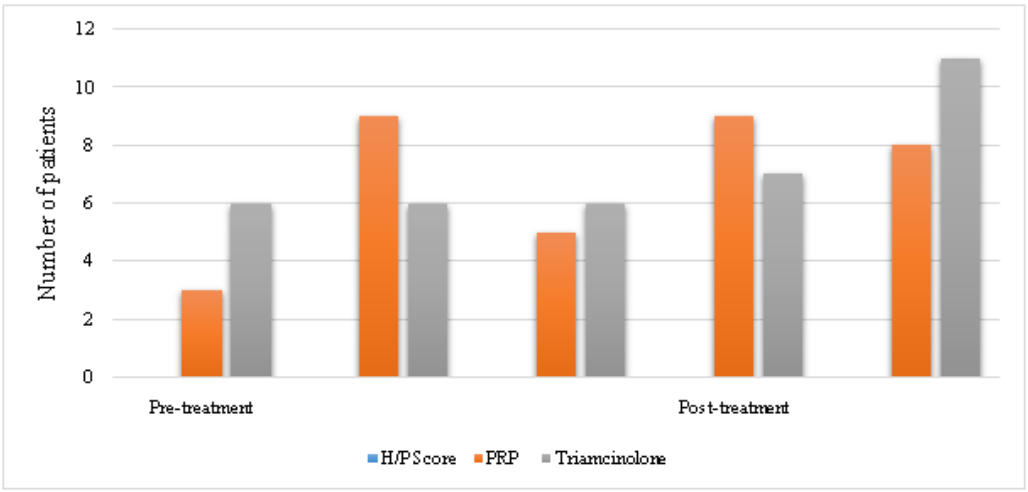

Figure 2: Histopathological Scores and Treatment Response

A total of 35 patients were included in the study, with 17 in the PRP group and 18 in the Triamcinolone group. The baseline demographic characteristics of the participants are presented in Table 1. There were no statistically significant differences between the two groups in terms of age or gender distribution ($p > 0.05$), indicating that the groups were comparable at baseline. The mean age was 49.88 ± 10.58 years in the PRP group and 47.33 ± 12.15 years in the Triamcinolone group.

The changes in pain intensity, assessed by the Visual Analogue Scale (VAS), are summarized in Table 2. Before treatment, both groups showed similar distributions of VAS scores ($p = 0.236$). After treatment, there was a significant improvement in pain scores, with a greater proportion of patients showing lower VAS scores in the PRP group compared to the Triamcinolone group ($p = 0.046$).

Table 3 presents the Thongprasom clinical scores before and after treatment. Both groups demonstrated clinical improvement after therapy, as indicated by a shift toward lower scores; however, the difference between the PRP and Triamcinolone groups was not statistically significant ($p = 0.403$).

Histopathological (H/P) findings are shown in Table 4. Before treatment, the distribution of H/P scores was similar between the groups (p = 0.435). Following treatment, 52.9% of patients in the PRP group and 38.9% in the Triamcinolone group showed histopathological improvement, though the difference was not statistically significant (p = 0.404).

Discussion

In our study of 35 patients (17 PRP, 18 triamcinolone) both treatment arms showed clinically meaningful improvement, but PRP produced a significantly greater reduction in pain (VAS) while differences in Thongprasom clinical scores and histopathological response favoured PRP numerically without reaching statistical significance. These results are consistent with a number of prior reports that found superior analgesic or symptomatic benefit with platelet-rich plasma compared with intralesional corticosteroids, suggesting a stronger or more durable effect of PRP on pain pathways and local tissue healing [11–14]. Several of those studies also reported that subjective pain measures tended to show earlier and larger gains than composite clinical indices, which mirrors our finding of a significant VAS change alongside non-significant between-group differences in Thongprasom scores [11,12,15].

With respect to objective clinical grading and tissue-level change, the literature is mixed. Some investigators documented greater reductions in lesion size or improvements on validated clinical scales after PRP, but these gains were often small and did not reach significance in underpowered series—similar to our pattern of numerical improvement without statistical significance for Thongprasom scoring [16–18]. Histopathological improvement after PRP has been reported in a few studies, supporting the hypothesis that PRP promotes epithelial repair and reduces inflammatory infiltrates; however, other authors found no clear histologic advantage over steroids at short follow-up intervals, emphasizing heterogeneity in biopsy timing, scoring systems, and PRP preparation methods [18–20].

Taken together, the collective evidence—including our study—suggests that PRP may offer superior symptomatic (pain) relief compared with triamcinolone, while differences in standardized clinical scores and histopathology are less consistent and likely influenced by sample size, PRP concentration/preparation, dosing schedules, lesion chronicity, and follow-up duration.

Our study's small sample and limited follow-up mirror the limitations noted in several of the cited series, underlining the need for larger, adequately powered randomized trials with standardized PRP protocols and uniform outcome definitions to clarify whether the symptomatic advantage of PRP translates into durable clinical and histologic superiority. [11–20]

Conclusion

We conclude that, our study demonstrates that intralesional PRP and triamcinolone are both effective in the management of recalcitrant oral lichen planus. PRP was associated with a significantly greater reduction in pain intensity, as measured by VAS, suggesting superior symptomatic relief. Although both groups showed improvement in clinical (Thongprasom) scores and histopathological parameters, the differences between PRP and triamcinolone were not statistically significant. These findings indicate that while PRP may offer enhanced pain control, its advantage in objective clinical and histological outcomes remains less clear.

Overall, PRP represents a promising therapeutic option, particularly for patients with persistent pain, and further large-scale studies are warranted to confirm its long-term efficacy and potential superiority over conventional corticosteroid therapy.

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