

Comparative Study of Platelet Rich Plasma Versus Corticosteroid Injection in Chronic Plantar Fasciitis

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Abstract

Background: Chronic plantar fasciitis is one of the most common causes of heel pain and often results in significant pain and functional limitation. Although corticosteroid injection provides rapid pain relief, its effect is often short-lived and may be associated with recurrence and complications. Platelet-rich plasma (PRP), a regenerative biological treatment, has emerged as a promising alternative for promoting tissue healing and long-term symptom relief.

Aims & Objectives: To compare the efficacy of platelet-rich plasma (PRP) injection with corticosteroid injection in patients with chronic plantar fasciitis at 1, 2, and 6 months following treatment.

Materials and Methods: This prospective observational comparative study was conducted in the Department of Orthopaedics, Adesh Institute of Medical Sciences and Research (AIMSR), Bathinda. A total of 50 patients with chronic plantar fasciitis were included and divided into two groups: Group I received PRP injection, while Group II received corticosteroid injection. Patients were evaluated using the Visual Analog Scale (VAS) for pain and the American Orthopaedic Foot and Ankle Society (AOFAS) score for functional outcome at baseline and at 1, 2, and 6 months after injection. Treatment-related complications were also recorded.

Results: Both PRP and corticosteroid injections were effective in reducing pain and improving functional outcome. Corticosteroid injection demonstrated better early improvement, whereas PRP showed superior long-term reduction in VAS scores and higher AOFAS scores at 6 months. The PRP group also exhibited fewer treatment-related complications and a lower recurrence rate than the corticosteroid group.

Conclusion: Both treatment modalities were effective for the management of chronic plantar fasciitis. However, PRP provided superior long-term pain relief, better functional recovery, and a more favorable safety profile compared with corticosteroid injection, making it a valuable treatment option for patients with chronic plantar fasciitis.

Keywords: Chronic plantar fasciitis, platelet-rich plasma, corticosteroid injection, Visual Analog Scale, American Orthopaedic Foot and Ankle Society score, heel pain.

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Introduction

Plantar fasciitis, a common cause of plantar heel pain (PHP), is characterized by inflammation of the plantar fascia. It accounts for approximately 11–15% of foot-related complaints in adults.^[1] In India, the condition impacts nearly 10% of the population, with a higher prevalence among females, particularly in middle-aged individuals between 40 and 60 years of age.^[2,3]

The etiology of plantar fasciitis is multifactorial, with intrinsic risk factors such as obesity, flat or high-arched feet, weak plantar flexor muscles, and

limited ankle dorsiflexion playing significant roles. Extrinsic factors, including prolonged standing, walking on hard surfaces, walking barefoot, and improper footwear, further exacerbate the condition.

^{4,5} Clinically, patients present with pain localized to the medial heel, particularly after periods of inactivity. The pain often improves with activity during the day but worsens later in the evening. Approximately 30% of cases involve bilateral symptoms. Physical examination typically reveals tenderness over the medial calcaneal tuberosity,

with pain exacerbated by dorsiflexion or standing on the toes.⁶

Clinical diagnosis is made based on the patient's medical history and palpable discomfort at the plantar fascia insertion point (on the medial process of the calcaneal tubercle).⁷ Some patients respond well to conservative treatment for plantar fasciitis, which includes strapping, orthoses, cold packs, night splinting, stretching, non-steroidal anti-inflammatory drugs, and shoe changes. Treatment options for situations that are resistant include injectable therapy, extracorporeal shock wave therapy (ESWT), and in certain cases, surgical release of the plantar fascia's origin.⁸ An essential component of early treatment is corticosteroid injection. Nevertheless, there is mixed information about the efficacy of steroid injection. A cutting-edge new treatment called platelet rich plasma (PRP) therapy reduces pain by promoting the long-term repair of musculoskeletal disorders.⁹ Platelet rich plasma (PRP) injections have shown encouraging results recently in treating degeneration and injuries to the muscles and tendons.¹⁰

Therefore, the present study is designed to compare the effectiveness and safety of platelet-rich plasma versus corticosteroid injection in patients with chronic plantar fasciitis by evaluating pain relief, functional improvement, and treatment-related complications. The findings are expected to provide evidence regarding the optimal injectable therapy for improving clinical outcomes and quality of life in patients with chronic plantar fasciitis.

Materials and Methods

The present study was conducted as a prospective observational comparative study in the Department of Orthopaedics, Adesh Institute of Medical Sciences and Research (AIMSR), Bathinda, after obtaining approval from the Institutional Ethics Committee. A total of 50 patients diagnosed with chronic plantar fasciitis who fulfilled the inclusion and exclusion criteria and provided written informed consent were included in the study.

Inclusion Criteria: Patients aged 18 years or older with clinically diagnosed chronic plantar fasciitis who had persistent heel pain despite conservative treatment and who provided written informed consent were included in the study.

Exclusion Criteria: Patients who did not provide informed consent, patients with diabetes mellitus, patients younger than 18 years of age, patients with a history of previous surgery for heel pain, and patients with associated Achilles tendon pathology were excluded from the study.

The enrolled patients were divided into two groups. Group I comprised patients who received platelet-rich plasma (PRP) injection, whereas Group II comprised patients who received corticosteroid

injection. The sample size was calculated using OpenEpi Version 3.0 for comparison of two means with a 95% confidence interval and the desired statistical power.

In the corticosteroid group, 2 mL of methylprednisolone (80 mg) was mixed with 1 mL of 2% lignocaine and loaded into a sterile 5 mL syringe. The prepared solution was injected into the most tender point on the medial aspect of the heel under strict aseptic precautions.

In the PRP group, approximately 20 mL of autologous venous blood was withdrawn from the antecubital vein under aseptic conditions. Platelet-rich plasma was prepared by centrifugation according to the institutional protocol and was injected into the most tender point on the medial aspect of the heel using an aseptic technique.

Following the intervention, all patients were advised regarding activity modification, stretching exercises, and other standard post-procedure care according to departmental protocol. The patients were followed up at 1 month, 2 months, and 6 months after the injection. At each follow-up visit, clinical assessment was performed. Pain intensity was evaluated using the Visual Analog Scale (VAS), while functional outcome was assessed using the American Orthopaedic Foot and Ankle Society (AOFAS) score. Any treatment-related complications or adverse events were recorded and compared between the two groups.

Results

The majority of patients belonged to the 31–45 years age group 22 (44.0%), followed by the 46–60 years age group 20 (40.0%). Only 3 (6.0%) patients belonged to the 18–30 years age group, while 5 (10.0%) patients were aged more than 60 years. The mean age of patients was 46.8 ± 10.4 years in the PRP group and 47.2 ± 10.8 years in the corticosteroid group, indicating comparable baseline characteristics. (Table 1)

Out of 50 patients, 23 (46.0%) were males and 27 (54.0%) were females. The PRP group comprised 12 (48.0%) males and 13 (52.0%) females, whereas the corticosteroid group comprised 11 (44.0%) males and 14 (56.0%) females. The difference in gender distribution between the two groups was statistically insignificant ($p = 0.77$) (Table 2)

The baseline VAS scores were comparable between the two groups ($p = 0.081$). Both groups demonstrated progressive reduction in pain following treatment. The PRP group showed lower VAS scores than the corticosteroid group at 1 month (4.72 ± 0.50 vs. 5.30 ± 0.85) and 6 months (2.15 ± 0.70 vs. 3.80 ± 0.84). The difference was statistically significant at 1 month and 6 months, whereas the difference at 2 months was not statistically significant ($p = 0.138$). (Table 3)

The baseline AOFAS scores were comparable between the two groups ($p = 0.330$). At 1 month, the corticosteroid group demonstrated significantly higher AOFAS scores than the PRP group (86.00 ± 2.23 vs. 80.76 ± 1.75 ; $p < 0.001$). However, at 2 months and 6 months, the PRP group demonstrated significantly higher AOFAS scores than the corticosteroid group (86.36 ± 2.21 vs. 78.63 ± 2.47 and 90.60 ± 1.47 vs. 75.13 ± 2.01 , respectively; $p < 0.001$), indicating better long-term functional outcomes with PRP.(Table 4)

Post-injection pain occurred in 2 (8.0%) patients in the PRP group and 1 (4.0%) patient in the corticosteroid group. Skin depigmentation, plantar fascia rupture, and heel fat pad atrophy were observed only in the corticosteroid group. Recurrence of symptoms was more common in the corticosteroid group 5 (20.0%) than in the PRP group 1 (4.0%), suggesting a lower recurrence rate following PRP injection.(Table 5)

Table 1: Age-wise Distribution of Patients

Age Group (Years)	PRP Group (n=25)	Steroid Group (n=25)	Total (n=50)
18–30	1 (4.0%)	2 (8.0%)	3 (6.0%)
31–45	12 (48.0%)	10 (40.0%)	22 (44.0%)
46–60	9 (36.0%)	11 (44.0%)	20 (40.0%)
>60	3 (12.0%)	2 (8.0%)	5 (10.0%)
Total	25 (100%)	25 (100%)	50 (100%)
Mean Age	46.8 $\pm$ 10.4	47.2 $\pm$ 10.8	

Table 2: Gender-wise Distribution of Patients

Gender	PRP Group (n=25)	Steroid Group (n=25)	Total (n=50)	p-value
Male	12 (48.0%)	11 (44.0%)	23 (46.0%)	0.77
Female	13 (52.0%)	14 (56.0%)	27 (54.0%)	
Total	25 (100%)	25 (100%)	50 (100%)	

Table 3: Comparison of Visual Analog Scale (VAS) Score

Follow-up	PRP Group (Mean $\pm$ SD)	Corticosteroid Group (Mean $\pm$ SD)	p-value
Baseline	8.12 $\pm$ 0.45	8.30 $\pm$ 0.56	0.081
1 Month	4.72 $\pm$ 0.50	5.30 $\pm$ 0.85	0.004
2 Months	3.65 $\pm$ 0.52	4.05 $\pm$ 1.18	0.138
6 Months	2.15 $\pm$ 0.70	3.80 $\pm$ 0.84	0.003

Table 4: Comparison of American Orthopaedic Foot and Ankle Society (AOFAS) Score

Follow-up	PRP Group (Mean $\pm$ SD)	Corticosteroid Group (Mean $\pm$ SD)	p-value
Baseline	54.06 $\pm$ 3.29	54.86 $\pm$ 3.01	0.330
1 Month	80.76 $\pm$ 1.75	86.00 $\pm$ 2.23	<0.001
2 Months	86.36 $\pm$ 2.21	78.63 $\pm$ 2.47	<0.001
6 Months	90.60 $\pm$ 1.47	75.13 $\pm$ 2.01	<0.001

Table 5: Comparison of Treatment-related Complications

Complication	PRP Group (n=25)	Corticosteroid Group (n=25)	Total (n=50)	p-value
Post-injection pain	2 (8.0%)	1 (4.0%)	3 (6.0%)	0.551
Infection	0 (0.0%)	0 (0.0%)	0 (0.0%)	–
Skin depigmentation	0 (0.0%)	2 (8.0%)	2 (4.0%)	0.149
Plantar fascia rupture	0 (0.0%)	1 (4.0%)	1 (2.0%)	0.312
Heel fat pad atrophy	0 (0.0%)	1 (4.0%)	1 (2.0%)	0.312
Recurrence of symptoms	1 (4.0%)	5 (20.0%)	6 (12.0%)	0.081

Discussion

The mean age of patients in the present study was 46.8 ± 10.4 years in the PRP group and 47.2 ± 10.8 years in the corticosteroid group, with the majority of patients belonging to the 31–45 years age group. Similar findings were reported by Shetty et al., who observed mean ages of 34.0 ± 9.15 years and 39.2 ± 9.35 years in the PRP and corticosteroid groups,

respectively. Females slightly outnumbered males in the present study, which was comparable to the findings of Monto et al.¹¹

Both treatment groups demonstrated significant improvement in pain and functional outcome following injection. The PRP group showed greater reduction in VAS scores at long-term follow-up, which is consistent with the findings of Mahindra et

al.¹², who reported lower final VAS scores in the PRP group than in the corticosteroid group. Sathyendra KG et al.¹³ also observed sustained reduction in pain with PRP, whereas pain scores increased after 12 weeks in the corticosteroid group, suggesting a decline in its therapeutic effect over time.

Functional outcome assessed using the AOFAS score improved significantly in both groups. Although corticosteroid injection produced better early functional improvement, the PRP group demonstrated superior AOFAS scores at 2 months and 6 months, which is in agreement with the observations of Mahindra et al¹².

The incidence of treatment-related complications was lower in the PRP group, with fewer recurrences and no major adverse events, whereas complications such as skin depigmentation, heel fat pad atrophy, and plantar fascia rupture were observed only in the corticosteroid group. Overall, the findings of the present study suggest that although corticosteroid injection provides better short-term relief, platelet-rich plasma offers superior long-term pain relief, improved functional recovery, and a better safety profile in patients with chronic plantar fasciitis.

Conclusion

Both platelet-rich plasma (PRP) and corticosteroid injections were effective in reducing pain and improving functional outcome in patients with chronic plantar fasciitis. Corticosteroid injection provided better short-term improvement, whereas PRP demonstrated superior long-term pain relief, greater functional recovery, and a lower incidence of recurrence and treatment-related complications. Therefore, PRP may be considered a safe and effective treatment option for chronic plantar fasciitis, particularly in patients requiring sustained clinical improvement.

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