



A COMPARATIVE STUDY OF SINGLE AUTOLOGOUS PLATELET-RICH PLASMA INJECTION VERSUS SINGLE STEROID INJECTION IN THE MANAGEMENT OF CHRONIC PLANTAR FASCIITIS

Orthopaedics

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ABSTRACT

Background: Plantar fasciitis (PF) is a common cause of chronic heel pain that significantly impairs quality of life. This prospective, comparative study aimed to evaluate the efficacy and safety of a single autologous platelet-rich plasma (PRP) injection versus a single steroid injection in patients with recalcitrant PF. **Methods:** A total of 70 participants with chronic PF (symptoms > 3 months) who had failed conservative management were enrolled from the Department of Orthopaedics at Sri Siddhartha Medical College Hospital between March 2023 and March 2025. Participants were randomly assigned to two groups: Group A received a single PRP injection, and Group B received a single steroid injection. Pain was assessed using the Visual Analog Scale (VAS) and functional outcomes were measured with the American Orthopaedic Foot and Ankle Society (AOFAS) score at baseline, and at 1, 3, and 6 months post-injection. **Result:** At baseline, both groups were comparable in age, gender, symptom duration, VAS (PRP: 7.9 ± 0.8 ; Steroid: 8.0 ± 0.9), and AOFAS scores (PRP: 55.0 ± 6.0 ; Steroid: 54.2 ± 5.5). At 6 months, the PRP group demonstrated a significantly greater reduction in mean VAS score to 2.1 compared to the steroid group's 3.0 ($p=0.001$). Similarly, the mean AOFAS score in the PRP group increased to 88.3, significantly higher than the steroid group's 81.4 ($p<0.001$). Both treatments were well-tolerated, with minor complications like post-injection pain and swelling. **Conclusion:** a single PRP injection offers superior and more sustained pain relief and functional improvement compared to a single steroid injection for chronic plantar fasciitis.

KEYWORDS

Plantar fasciitis, Platelet-rich Plasma, Corticosteroid, AOFAS, VAS

INTRODUCTION

Plantar fasciitis (PF) is a prevalent musculoskeletal disorder characterized by chronic heel pain, affecting a significant proportion of the population. It is caused by degenerative changes and microtrauma to the plantar fascia, a thick band of tissue running along the bottom of the foot. While conservative treatments such as rest, stretching, and nonsteroidal anti-inflammatory drugs (NSAIDs) are effective for many patients, a substantial number develop chronic, recalcitrant symptoms that require more advanced interventions.(1)

Corticosteroid injections have long been a common therapeutic option due to their potent anti-inflammatory effects, which can provide rapid pain relief. However, their efficacy is often temporary, and repeated injections are associated with potential side effects, including fat pad atrophy and plantar fascia rupture.(2)

Derived from the patient's own blood, PRP contains a high concentration of growth factors that promote tissue healing, angiogenesis, and collagen synthesis, addressing the underlying degenerative pathology rather than just the symptoms. This regenerative approach is particularly appealing for chronic conditions where tissue repair is a key therapeutic goal.(3)

MATERIALS AND METHODS

Aim and Objective

This study aims to directly compare the efficacy and safety of a single autologous PRP injection with a single steroid injection in the treatment of chronic PF. The primary objective is to assess the improvement in pain status and quality of life using the Visual Analog Scale (VAS) and functional outcome using the American Orthopaedic Foot and Ankle Society (AOFAS) score.

Study Design and Setting

This was a prospective, comparative study conducted at the Department of Orthopaedics at Sri Siddhartha Medical College Hospital from March 2023 to March 2025. The study protocol was approved by the Institutional Ethics Committee, and all participants provided written informed consent.

Participants

Seventy participants (age 20–60 years) with a clinical diagnosis of PF and symptoms lasting more than three months, who had failed at least six weeks of conservative treatment, were enrolled. Patients with bilateral heel pain, systemic inflammatory disorders, a history of heel and ankle surgery, or bleeding disorders were excluded.

Study Groups

Participants were randomly assigned into two groups:

- Group A (PRP Group): Received a single injection of autologous PRP.
- Group B (Steroid Group): Received a single injection of a corticosteroid preparation.

Procedure

For Group A, 32 mL of venous blood was collected from each participant and processed using a two-stage centrifugation protocol to obtain a concentrated PRP solution. For Group B, a solution of 40 mg methylprednisolone and 1 mL of 2% lignocaine was prepared.

In both groups, the injection was administered under sterile conditions at the site of maximal tenderness on the plantar fascia insertion using a standardized technique. Following the procedure, participants were advised to rest and perform gentle stretching exercises. They were instructed to avoid NSAIDs for one week.

Outcome Measures

The primary outcome was pain relief, assessed using the Visual Analog Scale (VAS), a 10-point scale from 0 (no pain) to 10 (worst pain imaginable). The secondary outcome was functional improvement, evaluated using the AOFAS score, a composite measure of pain, function, and alignment. Both scores were recorded at baseline, 1 month, 3 months, and 6 months post-injection.

Statistical Analysis

Data analysis was performed using standard statistical software. Descriptive statistics included mean, standard deviation, and percentages. A Student's t-test was used for between-group comparisons of mean scores, and a Chi-square test was used for categorical data. A p-value of < 0.05 was considered statistically significant.

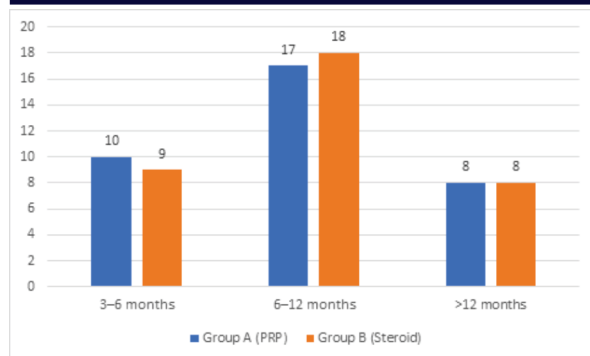
RESULTS

Baseline Characteristics

The majority of participants were aged 41–50 years, with a balanced gender distribution (PRP: 51.4% male; Steroid: 54.3% male). There was no significant difference in the side of foot involvement or duration of symptoms between the groups. Mean baseline VAS scores (PRP: 7.9 ± 0.8 ; Steroid: 8.0 ± 0.9) and AOFAS scores (PRP: 55.0 ± 6.0 ; Steroid: 54.2 ± 5.5) were also comparable ($p>0.05$).

Duration of Symptoms

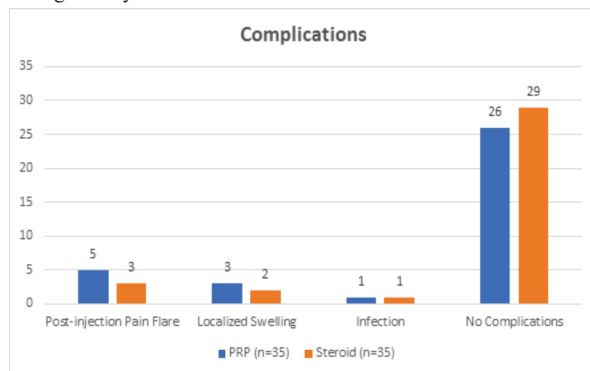
Approximately half of the participants had symptoms lasting between 6 and 12 months, reflecting a moderately chronic profile of plantar fasciitis. There was an even distribution of chronicity between the two groups.



Graph 1: Duration of Symptoms

Complications

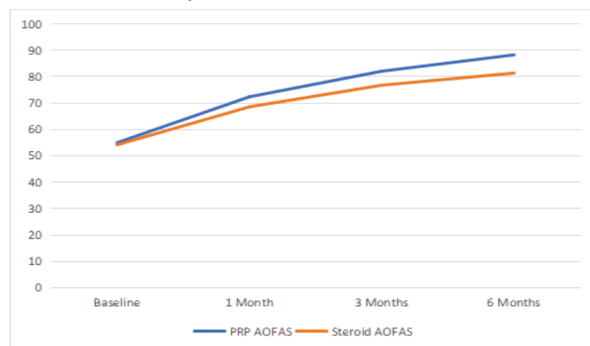
Adverse events were relatively minor in both groups. The overall incidence of complications was modest, indicating that both therapies were generally safe and well-tolerated.



Graph 2 Complications

AOFAS Score at Each Follow-Up

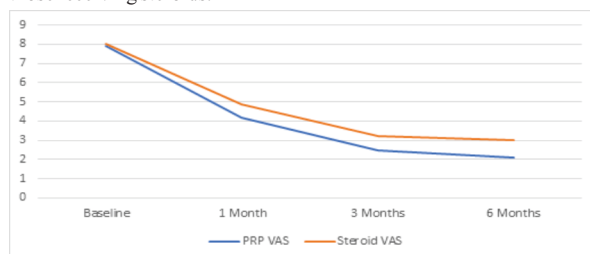
The graph below show functional outcomes (AOFAS) from baseline to 6 months. The PRP group consistently showed higher scores at each follow-up point, indicative of improved mobility and less pain interference with daily activities.



Graph 3: AOFAS Score at Each Follow-Up

VAS Score at Each Follow-Up

The Graph below depicts changes in VAS, a measure of pain intensity, across the same time points. As the graph illustrates, this pattern persisted, where PRP users maintained a notably low VAS compared to those receiving steroids.



Graph 4: VAS Score at Each Follow-Up

DISCUSSION

This study provides compelling evidence that a single PRP injection offers a more effective and durable treatment for chronic plantar fasciitis compared to a single steroid injection. Our findings consistently demonstrate that PRP leads to greater pain reduction and functional improvement over a 6-month period, supporting the hypothesis that its regenerative properties provide sustained benefits beyond the symptomatic relief offered by corticosteroids.

The superior efficacy of PRP in this study is likely due to its unique mechanism of action. By delivering a concentrated cocktail of growth factors—such as PDGF, VEGF, and TGF- β —PRP actively promotes tissue repair and regeneration (4). This regenerative effect helps address the underlying degenerative pathology of PF, leading to long-term structural and functional improvements. In contrast, corticosteroids primarily act as potent anti-inflammatories, providing rapid but often temporary relief without addressing the core tissue damage (5).

Our results are consistent with several other comparative studies. Upadhyay and Damor (2018) reported similar superior outcomes for PRP over corticosteroids (6), as did Christhudasen et al. (2024), who found greater reductions in both VAS and AOFAS scores in the PRP group (7). The findings of Shafaat et al. (2020) and Jain et al. (2018) also align with our conclusion, reinforcing the superior long-term efficacy of PRP in managing chronic PF symptoms (8, 9).

The favorable safety profile observed in our study, with no major complications reported in either group, further strengthens the case for PRP as a viable treatment option. The slightly higher incidence of minor, transient post-injection discomfort in the PRP group is likely a result of the inflammatory healing cascade initiated by the growth factors, a process that ultimately contributes to the treatment's long-term success.

In light of these findings, PRP injections should be considered a preferred treatment modality for patients with chronic PF, particularly those who have not responded to conservative care or are seeking a more sustainable, long-term solution.

CONCLUSION

A single autologous PRP injection offers superior and more sustained pain relief and functional improvement compared to a single corticosteroid injection in the management of chronic plantar fasciitis. The favorable safety profiles of both treatments, coupled with the enhanced efficacy of PRP, support its integration into clinical practice as a preferred treatment modality.

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