



PROSPECTIVE COMPARATIVE STUDY ON THE EFFICACIOUSNESS OF PLATELET RICH PLASMA VS. CORTICOSTEROID INJECTION IN THE TREATMENT OF CHRONIC PLANTAR FASCIITIS

Orthopaedics

Dr. K.hari Krishna Reddy

Professor, Dept Of Orthopaedics, Narayana Medical College & Hospital, Nellore, A.p

Dr. A. Sandeep Kumar

Assistant Professor, Dept Of Orthopaedics, Narayana Medical College & Hospital, Nellore, A.p

Dr. K.Saran kumar reddy

Post Graduate, Dept Of Orthopaedics, Narayana Medical College & Hospital, Nellore, A.p

ABSTRACT

Chronic plantar fasciitis (CPF) represents a substantial cause of heel discomfort, adversely affecting the daily functioning and overall quality of life of afflicted individuals. Characterized by persistent pain emanating from the plantar fascia, CPF's pathophysiology involves microtears, degeneration, and inflammation, often attributed to repetitive stress and overuse. The condition not only presents a clinical challenge but also contributes significantly to patient morbidity through restricted mobility and prolonged discomfort. Traditional management strategies, including physical therapy, orthotic support, and anti-inflammatory medication, occasionally fall short in providing long-term relief, necessitating the exploration of alternative therapeutic approaches such as platelet-rich plasma (PRP) and corticosteroid injections. This comparative study aims to assess the efficacy of PRP against corticosteroid injections in mitigating pain and enhancing functional outcomes in CPF patients over a six-month period. By employing a randomized control design, the investigation provides insights into the therapeutic potential of PRP, which promotes tissue regeneration and healing, versus the primarily anti-inflammatory action of corticosteroids. Preliminary results suggest that PRP injections may offer a more sustainable reduction in pain and improvement in functionality, proposing a shift towards regenerative treatments in managing chronic plantar fasciitis.

KEYWORDS

Heel pain, plantar fasciitis, corticosteroids, platelet-rich plasma.

INTRODUCTION:

CPF affects approximately 10% of the population, presenting as persistent pain at the heel's plantar surface. It is particularly prevalent among athletes, overweight individuals, and those with occupations requiring extended periods of standing. The pathophysiology involves microtears, degeneration, and inflammation of the plantar fascia, likely due to repetitive stress and overuse (3). This condition results in significant morbidity, including limitations in walking, standing, and significant impacts on work and life quality.

Despite various treatments, including physiotherapy, orthotics, and nonsteroidal anti-inflammatory drugs (NSAIDs), some cases remain resistant, leading to the exploration of PRP and corticosteroid injections as therapeutic options (1). This study aims to compare these treatments' effectiveness in managing CPF pain and improving functionality.

MATERIALS AND METHODS:

The study was a prospective, comparative, non-randomized clinical trial undertaken in the Orthopaedics Department at Narayana medical college and hospital, after receiving ethical clearance. 100 patients with a diagnosis of chronic plantar fasciitis participated over an 18-month period from May 2022 to October 2023. The Visual Analogue Scale (VAS) for pain was utilized as the primary outcome measure.

Inclusion And Exclusion Criteria:

Included were patients between 25-75 years old, diagnosed with chronic plantar fasciitis, exhibiting symptoms for more than three months, and not responding to oral medication over the same duration. Exclusion criteria included nerve-related symptoms, generalized inflammatory arthritis, systemic diseases, hemoglobin levels below 8.0 g/dl, local infection, history of calcaneus fracture, or prior surgery in the heel area.

Sampling and intervention:

Based on calculated sample size requirements and the study's predefined error margins, 50 patients were assigned to each treatment group (PRP and corticosteroid). Pre-treatment procedures included blood sugar assessments and patient counseling. Treatments were administered under sterile conditions, with PRP prepared from patient-derived blood and corticosteroids directly injected at the point of maximum pain.

For PRP preparation, blood was drawn from the cubital vein into two to three EDTA tubes under aseptic condition. Vacutainer was centrifuged at 2000 rpm for 15 min. Following centrifugation three layers were identified, of which, the bottom layer consisted of red blood cells, the intermediate layer of white blood cells, and upper layer of plasma, platelets, and some white blood cells. The concentrate in the upper layer was carefully collected. The collected volume ranged from 1 to 1.25ml in each vacutainer. Approximately, 1ml of the upper layer of the sample that underwent the first spin step was collected and transferred to one empty 6ml tube. This tube was centrifuged again for 10 min at speed of 3000 rpm (second spin). The upper half of the plasma volume, platelet poor plasma (PPP), was removed. The remaining volume of PRP was used for injection. The injection was given at the site of maximal tenderness (figure 1) using peppering manoeuvre with 20-gauge-needle after initial instillation of local anaesthesia (1ml of 2% plain xylocaine).



Fig 1: Picture showing infiltration of PRP injection at the most tender point under a sterile precaution.

Corticosteroid Group

In the corticosteroid group, the patients received 2ml (80mg) Triamcinolone along with 0.5ml of plain 2% xylocaine using 20G wide bore needle into the point of maximum tenderness (figure 2). After injection, all patients were allowed to immediately walk with or without weight-bearing support and activities such as running or jumping are avoided for at least 4 weeks after the last injection.



Fig 2: Picture showing infiltration of CORTICOSTEROID injection at the most tender point under a sterile precaution

Data collection and statistical analysis:

A structured form was used for data collection, capturing demographic and clinical information. Pain assessments using the VAS scale were conducted pre-treatment, and at 3 weeks, 6 weeks, 3 months, and 6 months post-treatment. Procedure-related complications were also documented. At baseline, mean VAS scores were closely matched between the groups (corticosteroid: 8.22 ± 1.12 , PRP: 8.52 ± 1.08 ; $p=0.21$). Subsequent assessments at 3 weeks, 6 weeks, 3 months, and 6 months post-injection showed a trend towards greater pain reduction in the PRP group, with significant differences emerging at the 3-month (PRP: 3.57 ± 0.81 vs. corticosteroid: 4.04 ± 0.82 ; $p<0.05$) and 6-month follow-ups (PRP: 1.77 ± 0.67 vs. corticosteroid: 2.14 ± 0.57 ; $p<0.01$). Statistical analyses, including descriptive statistics, chi-square tests, and student t-tests, were performed using SPSS software, with p-values < 0.05 indicating significance (figure 3).

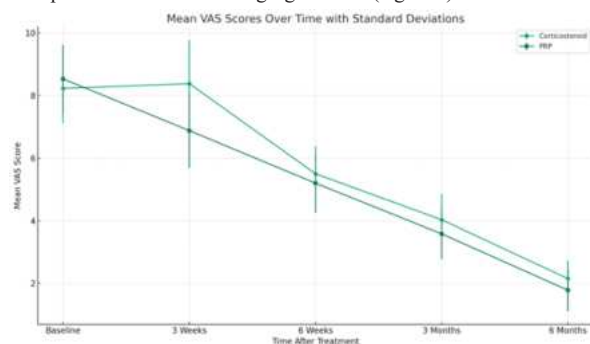


Figure 3: Change in VAS in corticosteroid and PRP group patients

RESULTS:

This investigation revealed a notable improvement in pain and functional outcomes in the PRP group, especially significant at the 3- and 6-month intervals post-injection. While both treatments proved effective, PRP injections demonstrated a more substantial and lasting effect on reducing symptoms of chronic plantar fasciitis.

DISCUSSION:

The comparative study between platelet-rich plasma (PRP) and corticosteroid injections for treating chronic plantar fasciitis (CPF) revealed PRP's superior long-term efficacy. PRP, leveraging the body's own healing mechanisms, promotes tissue regeneration, addressing both inflammation and underlying tissue damage characteristic of CPF. In contrast, corticosteroids mainly provide temporary relief through anti-inflammatory action without contributing to tissue repair. Statistical analyses, employing repeated measures ANOVA and post-

hoc tests, indicated a significant reduction in pain levels (VAS scores) over time in the PRP group compared to the corticosteroid group, particularly noted at 3 and 6 months post-treatment. Despite promising findings, limitations such as small sample size and short follow-up period warrant further investigation. Future research should focus on long-term outcomes, optimizing PRP treatment protocols, and exploring emerging therapies targeting CPF's pathophysiology. This study suggests PRP injections as a preferable treatment modality for CPF, offering a more comprehensive approach by promoting healing and improving functionality over an extended period.

CONCLUSION:

The study conclusively found that PRP injections surpass corticosteroid injections in treating chronic plantar fasciitis, offering significant pain relief and functional improvement. These results advocate for the broader application of PRP therapy in managing this condition, emphasizing the need for further research to explore long-term outcomes and refine treatment protocols.

REFERENCES

- Gupta, S., Subramanya, S., Deepak, C. D., & Dasari, A. (2023). A comparative study on efficacy of platelet rich plasma vs corticosteroid injection in treatment of chronic planter fasciitis. *GLOBAL JOURNAL FOR RESEARCH ANALYSIS. A Comparative Study on Efficacy of Platelet Rich Plasma vs Corticosteroid Injection in Treatment of Chronic Planter Fasciitis*
- Kemp, J., Olson, M., Tao, M., & Burcal, C. (2021). Platelet-Rich Plasma versus Corticosteroid Injection for the Treatment of Lateral Epicondylitis: A Systematic Review of Systematic Reviews. *International Journal of Sports Physical Therapy*, 16, 597-605. Platelet-Rich Plasma versus Corticosteroid Injection for the Treatment of Lateral Epicondylitis: A Systematic Review of Systematic Reviews
- Bansal, H., Leon, J., Pont, J. L., Wilson, D. A., Bansal, A., Agarwal, D., & Preoteasa, I. (2021). Platelet-rich plasma (PRP) in osteoarthritis (OA) knee: Correct dose critical for long term clinical efficacy. *Scientific Reports*, 11. Platelet-rich plasma (PRP) in osteoarthritis (OA) knee: Correct dose critical for long term clinical efficacy
- Everts, P., Onishi, K., Jayaram, P., Lana, J. F., & Mautner, K. (2020). Platelet-Rich Plasma: New Performance Understandings and Therapeutic Considerations in 2020. *International Journal of Molecular Sciences*, 21. Platelet-Rich Plasma: New Performance Understandings and Therapeutic Considerations in 2020
- Collins, T., Alexander, D. P., & Barkatali, B. (2021). Platelet-rich plasma: a narrative review. *EFORT Open Reviews*, 6, 225-235. Platelet-rich plasma: a narrative review