

A Comparative Study between Single Dose Intralesional Corticosteroid and PRP Injection in Chronic Plantar Fasciitis - A Long Term Follow-Up Study

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Abstract: *Background:* Corticosteroids exerts its anti-inflammatory effect by lipocortin-1 synthesis. Lipocortin-1 inhibits phospholipase A2 thereby preventing the formation of prostaglandins and leukotrienes which are primary mediators of inflammation. It also inhibits various inflammatory events like white blood cell migration, chemo taxis, phagocytosis. Platelet rich plasma (PRP) is defined as a volume of the plasma fraction of autologous blood having a platelet concentration above baseline. Platelets contain bioactive proteins responsible for attracting macrophages, mesenchymal stem cells, and osteoblasts which not only promote removal of necrotic tissue, but also enhance tissue regeneration injection is used to introduce platelets into tissue to stimulate a supra-physiologic release of growth factors in an attempt to start healing in chronic injuries and reduce pain. Treatment options for plantar fasciitis range from simple analgesics to plantar fascia release surgeries. The beneficial effects by local corticosteroid injection were known for long time. PRP injection was proposed for chronic plantar fasciitis due to their high growth factor composition. *Patients and methods:* The present study was conducted in Department of Orthopaedics at GSL Medical College and general hospital from December 2020 to may 2022. In this series, fifty patients having chronic plantar fasciitis were treated with corticosteroid and PRP injection. The results were evaluated prospectively to compare the efficacy of both the procedures. First group of twenty five patients received an injection of corticosteroid and the second group of twenty five patients received an injection of PRP. Following random selection, patients were chosen after they met the study's inclusion criteria. The patients were followed at 3, 6 and 12 months post-injection and the pain and activity level noted. The outcome was based on our scoring system based on the pain status and the activity level at the end of 3 months, 6 months and 12 months. *Results:* Both groups initially performed well. The patients were followed up at 3, 6, and 12 months interval and were analyzed with the scoring systems (American Orthopedic Foot and Ankle Society [AOFAS], visual analog scale (VAS). The average preinjection mean AOFAS score at 3 months after treatment in the steroid group was 45.10 and improved to 85.10 and in the PRP group was 40.05 and improved to 92.10. However, the steroid group scores degraded with a drop in the AOFAS rating to 72.40 at 6 months and 60.30 at 12 months after treatment. In contrast, the PRP group scores remained high with AOFAS scores of 88.50 at 6 months and 85.20 at 12 months after treatment. The average preinjection VAS score at 3 months after treatment in the steroid group was 8.6 improved to 3.2 and in the PRP group was 8.8 and improved to 2.8. However, the steroid group VAS scores degraded to 6.2 at 12 months, the PRP group VAS score was 4.2 at 12 months, which is better than steroid group. *Conclusion:* PRP showed superior results compared to corticosteroid group in VAS and AOFAS scores in long term follow up.

Keywords: PRP, plantar fasciitis, corticosteroid

1. Introduction

Plantar fasciitis is a condition where the plantar fascia becomes irritated from repetitive overuse or overstretching¹. In persistent plantar fasciitis, inflammation, and ageing goes simultaneously. It is one of the most prevalent chronic tendinopathies affecting people. It normally affects both men and women between the ages of 40 and 70, however it affects women more than men¹. 10% of the general population has plantar fasciitis, and 33% of instances are bilateral.

Corticosteroids exert its anti-inflammatory effect by lipocortin-1 synthesis. Lipocortin-1 inhibits phospholipase A2 thereby preventing the formation of prostaglandins and leukotrienes which are primary mediators of inflammation. It also inhibits various inflammatory events like white blood cell migration, chemo taxis, phagocytosis. Corticosteroids are known to inhibit proliferation of fibroblasts and to decrease the synthesis of ground substances^{2,3}.

PRP was proved to improve the early neotendon properties⁴ and improve tissue healing by enhancing cellular chemotaxis, proliferation and differentiation, removal of tissue debris, angiogenesis, and the laying down of extracellular matrix⁵. PRP contains various growth factors like PDGF (platelet derived growth factor), TGF (transforming growth factor), VEGF (vascular endothelial growth factor), EGF (epidermal growth factor), FGF (fibroblast growth factor)

The active secretion of growth factors by platelets begins within 10 min after activation with 10% calcium chloride with more than 95% of the pre-synthesized growth factors secreted within 1 hour.⁶

As plantar fasciitis is inflammatory condition along with degeneration in chronic cases, PRP can be used to heal the pathology and relieve symptoms. Local corticosteroid reduces the inflammation in plantar fasciitis and provides

relief from pain. Whether or not, corticosteroids alter the long-term pathology of chronic inflammation; many patients experience acute symptomatic improvement^{7,8}.

2. Objectives:

To compare efficacy of local corticosteroid and PRP treatment in chronic plantar fasciitis patients.

3. Materials and Methods

A Hospital based prospective study was conducted among 50 patients (30– 70 years) who presented with plantar fasciitis to the out – patient department of Orthopaedics at GSL Medical College, Rajahmundry, for a period of 18 months. (december 2020 to may 2022)

3.1 Inclusion Criteria

- 1) Unilateral heel pain > 6 weeks
- 2) Has taken conservative treatment with oral analgesics, foot wear modification and physiotherapy modalities for > 4 weeks, with no improvement
- 3) Not undergone previous local injections in the heel
- 4) Accepting for further treatment after the study period if pain persists
- 5) Willing for follow-up
- 6) Normotensive, Normoglycaemic patients.

3.2 Exclusion Criteria

- 1) Bilateral heel pain
- 2) Has undergone previous local injections
- 3) Not willing for follow-up
- 4) Patients with other medical illnesses

Ethical clearance from Institutional Ethical Committee of GSL Medical College, was obtained before initiating the study. Prior to the commencement of the study, informed consent was taken from the study participants after explaining the purpose of the study in vernacular language in an understandable manner.

4. Data Collection

All the patients who presented to the orthopaedic OPD and satisfied the inclusion criteria were considered for the study. A total of 50 cases of plantar fasciitis came to Orthopaedic OPD during the study period. First group of 25 cases were treated with local corticosteroid injection. Second group of 25 cases were treated with PRP injection.

5. Procedure

5.1 Initial Assessment

Patients were assessed clinically; a thorough history and clinical examination was carried out. The subjective symptoms and objective signs were recorded in a predesigned proforma. This was followed by routine investigations as well as an X-ray of the ankle with foot and other causes that cause heel pain. Once the diagnosis of

plantar fasciitis was established, corticosteroid injection was given in first group and PRP injection was given to the patients in second group. The patients were followed up for a period of one year. Assessment of pain was done using Visual Analogue Scale (VAS) scores and assessment of functional outcome was done using AOFAS scores. Before treatment, scores were recorded and follow up done at 3rd month, 6th month and 12th month based on the above scoring systems.

5.2 Procedure for Corticosteroid Injection

Under aseptic conditions, 1ml of triamcinolone acetonide⁹ (40mg) was mixed with 2 ml of 2% lignocaine was injected into most tender point of heel from medial or lateral aspect of heel. No activity restriction was advised. Patients were followed up at 3, 6 and 12 months. The outcomes of VAS and AOFAS scores were compared with previous visits at each follow up.

5.3 Procedure for PRP Injection

Under aseptic conditions, 2ml of PRP was injected into most tender point of heel and needle was partially withdrawn and multiple punctures were made in the surrounding tissue (peppering technique). . Patients were followed up at 3, 6 and 12 months. The outcomes of VAS and AOFAS scores were compared with previous visits at each follow up

6. Statistical Analysis

Data collection and analysis was done using Microsoft Excel 2007 and SPSS version 2.0. Results were expressed as percentages for categorical variables.

Continuous variables were expressed as mean and standard deviation. Paired ‘t’ test was applied to compare the mean scores at every follow – up. A ‘P’ value of <0.05 is considered as statistically significant.

7. Results and Discussion

A total of 50 patients of chronic plantar fasciitis were evaluated. First group of 25 patients treated with corticosteroid and second group of 25 patients were treated with PRP injection. About 21 (42%) belonged to 31-40 years age group, 12 (24%) belonged to 41-50 years age group, 9 (18%) belonged to 51-60 years age group and 8 (16%) belonged to 61-70 years age group. Females constituted majority, 35 (70%) while males were 15 (30%). The mean age in this study was 45.96 and standard deviation was 10.49. The mean age of all patients 46.03 ± 8.96 (22-68 years) in study by Aksahin et al¹⁰. The mean age was 55.6 yrs (31-79 years) in a study by Jain. K et al¹¹. The mean age was 54.4±10 in a study by Jimenez et al¹². In this study majority 33 (66%) of patients were aged 31-50 years.

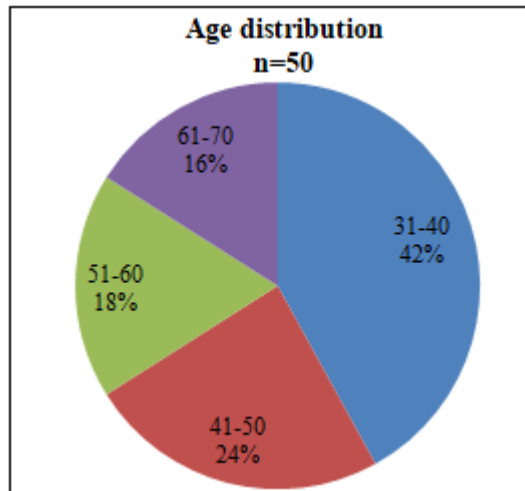
The average preinjection mean AOFAS score at 3 months after treatment in the steroid group was 45.10 and improved to 85.10 and in the PRP group was 40.05 and improved to 92.10. However, the steroid group scores degraded with a drop in the AOFAS rating to 72.40 at 6 months and 60.30 at 12 months after treatment. In contrast, the PRP group scores remained high with AOFAS scores of 88.50 at 6 months and

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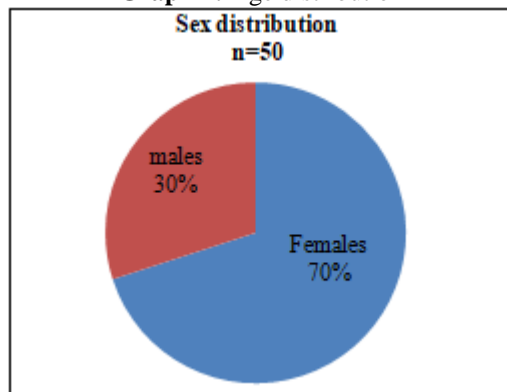
Results of present study as mentioned in Table 1 and Table 2 showed corticosteroid group has significant pain relief and

functional results at 3 months, but later on in 6 months and 12 months follow up, VAS and AOFAS score were showing less effect of corticosteroid on long term.

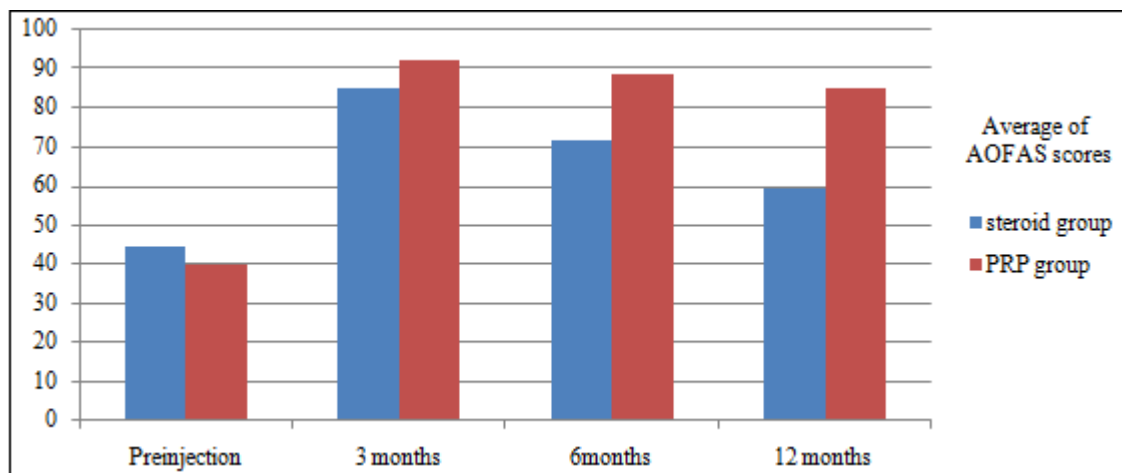
Results of present study as mentioned in Table 3 and Table 4 showed PRP group has significant pain relief and functional outcomes in 3 months, 6 months and 12 months follow up. VAS and AOFAS scores in PRP group showing equivalently consistent results in 6 months and 12 months follow up.



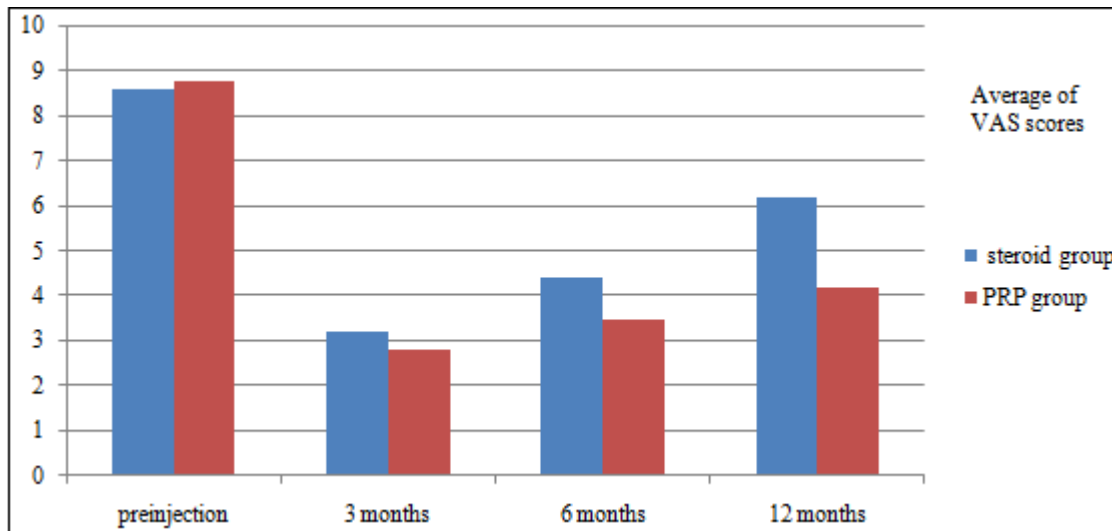
Graph 1: Age distribution



Graph 2: Sex distribution



Graph 3: Comparison of American Orthopedic Foot and Ankle Society score in steroid and PRP group



Graph 4: Comparison of Visual Analog score in steroid and PRP group

Table 1: Mean AOFAS score at pre and post injection at different follow up visits (steroid injection group)

Variables	Mean	Standard Deviation	P value
Pre injection	45.10	12.20	
3 months	85.10	10.50	<0.0001
6 months	72.40	12.60	<0.0001
12 months	60.30	14.20	<0.0001

Table 2: Mean VAS score at pre and post injection at different follow up visits (steroid injection group)

Variables	Mean	Standard Deviation	P value
Pre injection	8.6	0.78	
3 months	3.2	0.81	<0.0001
6 months	4.4	0.67	<0.0001
12 months	6.2	0.72	<0.0001

Table 3: Mean AOFAS score at pre and post injection at different follow up visits (PRP injection group)

Variables	Mean	Standard Deviation	P value
Pre injection	40.05	15.10	
3 months	92.10	13.20	<0.0001
6 months	88.50	10.20	<0.0001
12 months	85.20	9.40	<0.0001

Table 4: Mean VAS score at pre and post injection at different follow up visits (PRP injection group)

Variables	Mean	Standard deviation	P value
Pre injection	8.8	0.75	
3 months	2.8	0.89	<0.0001
6 months	3.5	0.82	<0.0001
12 months	4.2	0.93	<0.0001



Figure 1: Corticosteroid injection at point of maximum tenderness



Figure 2: PRP injection at point of maximum tenderness

8. Conclusion

The findings of present study showed PRP in the treatment of chronic plantar fasciitis is more effective and long-lasting therapy than that of corticosteroid injections, producing a significant clinical improvement. The response of patients with chronic plantar fasciitis to PRP injection was found to be good with highly significant results in long term than with corticosteroid treatment.

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