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Original Research Article

Comparison of PRP versus corticosteroid (triamcinolone) Intralesional Injection in the Treatment of Chronic Plantar Fasciitis

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Abstract:

Background: Plantar fasciitis is defined as localized inflammation and degeneration of the plantar aponeurosis. Heel pain is the most common reason for presentation." Approximately 10% of the population will experience heel pain in their life. Many methods have already been tried for treating plantar fasciitis, including rest, night splints, Nonsteroidal anti-inflammatory drugs (NSAIDs), foot orthosis, stretching exercises, extracorporeal shock wave therapy, local injection of corticosteroids, and platelet-rich plasma (PRP) therapy has also been used with variable success.

Material and Methods: We conducted the study in the Department of Orthopedics and Traumatology at Nalanda Medical College and Hospital, Agam Kuaan, Patna, The study is based purely on clinical observations so no specific investigations were done for outcome analysis. The study was conducted for a total duration of 24 months with a minimum follow-up of 6 months. A total of 60 patients were included in the study. Patients were separated into PRP and steroid groups of 30 subjects each.

Results: In our study 60 patients with an average age of 43.6 years. Female to Male ratio is 2.3:1 approx. There was a female preponderance in our study. The majority of the patients were housewives (heavy physical workload). The PRP group had significantly higher mean AFAS and VAS scores at follow-up than the steroid group ($p<0.001$) There were no complications in 56 patients, 4 patients had a fever, and the patient was given antipyretics and antibiotics for the same and was settled.

Conclusion: PRP injection is an effective and well-tolerated alternative to corticosteroid injection in the management of chronic plantar fasciitis with the added advantage of almost no side effects due to its biological nature and better patient compliance. Furthermore, PRP has added analgesic and antimicrobial properties.

Keywords: corticosteroid injection (CS), Platelet-rich plasma (PRP), Plantar fasciitis (PF), Visual Analog Scale (VAS) score, American Foot and Ankle score (AFAS).

Introduction

Plantar fasciitis is defined as localized inflammation and degeneration of the plantar aponeurosis. Heel pain is the most common reason for presentation." Approximately 10% of the population will experience heel pain in their life [1]. The pathophysiology remains poorly understood but appears similar to Achilles tendinopathy with microscopic degenerative injury and local disruption of the collagen matrix and microtears rather than a failed healing response." The presence of erratic blood flow with zones of hypovascularization and hypervascularization also plays a role in the disease process [2-4]. Most commonly, patients come with a complaint of insidious onset sharp pain with maximal tenderness at the anterior medial border of the calcaneus, which is generally worst on the first few steps in the morning and with initial steps after prolonged sitting or inactivity [5], and on examination, there is mild-to-severe tenderness on the medial aspect of the heel. Many methods have already been tried for treating plantar fasciitis, including rest, night splints, nonsteroidal anti-inflammatory drugs (NSAIDs), foot orthosis, stretching exercises, extracorporeal shock wave

therapy, local injection of corticosteroids, and platelet-rich plasma (PRP) therapy has also been used with variable success [6]. Various types of surgical procedures have also been recommended for refractory cases [7]. Because traditional non-operative management of chronic plantar fascitis still fails in 10% to 15% of patients, numerous surgical treatments have been explored including, open, endoscopic, and percutaneous a fascial release with varying clinical outcomes [8-10]. The intralesional infiltration of corticosteroids provides a short-term reduction in PF pain, and it is considered an adjunct to core treatment for the relief of moderate to severe pain in people with PF. This approach, however, has limited efficacy in delaying disease progression, as well as undesirable potential side effects when administered in high doses and frequency. Recently, platelet-rich plasma (PRP) has been proposed as a potential treatment for chronic plantar fasciitis. PRP is a bioactive component of whole blood with concentrations of platelets above baseline values [11]. Platelets play a critical role in the normal injury repair cycle of the body as well as in modulating intercellular communication [12]. The platelets secrete a wide variety of cytokines and growth factors that act as chemo-attractants for reparative cells [13]. These growth factors modulate neo-vascularization and angiogenesis, promote mitogenesis, boost local collagen production, and provide anti-inflammatory effects by blocking cyclo-oxygenase-2 (COX-2) enzyme production [14]. These findings have led to the use of PRP as a vector to deliver growth factors to local muscle and tendon injury and repair zones to Induce and accelerate healing [15]. The objective of this study is to evaluate the clinical benefits of PRP when injected into the intralesional space compared to a corticosteroid (triamcinolone), which is a recognized pharmacological treatment in patients with PF. We hypothesized that intralesional injection of PRP reduces pain in a very short term, similar to triamcinolone, and it leads to an equal or more effective analgesic outcome plus better functional recovery at the 24th-week follow-up.

Materials and Method

We conducted the study in the Department of Orthopedics and Traumatology at Nalanda Medical College and Hospital, Agam Kuaan, Patna, between December 2021 to December 2023. The study is based purely on clinical observations so no specific investigations were done for outcome analysis. The study was conducted for a total duration of 24 months with a minimum follow-up of 6 months. The study was prospective and interventional type. Preinjection, patients were selected on an odd-even basis and were assessed according to a Visual Analog Scale (VAS) score and AFAS score. Post-PRP or steroid injection details were recorded for the period of 6 months at regular follow-up. They were evaluated by VAS score and AFAS score. Patients who had been diagnosed with plantar fasciitis, monitored for a minimum of 12 weeks, and showed no benefit from conservative treatment starting with stretching exercises and NSAIDs were included in the study. Diagnosis of plantar fasciitis was made by clinical examination.

Direct radiographs were examined to rule out other heel pathologies. Exclusion criteria were a systemic disease, pregnancy, active tumor or hematological malignant disease, infection, a history of anticoagulant use, use of NSAIDs in the five days before the study, Hb values of less than 11 g/dL, previous steroid injection to the heel area or ESWT therapy, a history of calcaneus fracture, or surgery in the heel area. A total of 60 patients were included in the study. Patients were separated into PRP and steroid groups of 30 subjects each. Patients were informed about the treatment options and those who accepted were included in the PRP group and the others in the steroid group. The selected patients who satisfied the above inclusion criteria were then registered, and all history and clinical details were recorded in the history sheet as per the pro forma.

Risks and benefits were thoroughly reviewed with the patient and informed written consent was obtained. The procedure was done on an outpatient basis and under complete aseptic conditions.

The site of maximum tenderness was pre-marked with a sterile marker. Patients of Group I received 1 mL of PRP injection into the origin of the plantar fascia at the site of maximum tenderness by peppering technique (using a 20-gauge needle), i.e., spreading in a clockwise manner was used to achieve a more extensive zone of delivery, with a single skin portal and four to five passes through the fascia itself. Group 2 patients received 1 mL of steroid (40 mg triamcinolone) by the same techniques. Patients were rested for 20 min and then they were allowed to walk.

Post injection protocol

- A patient was advised to rest for 20 min and ice fomentation.
- Post procedure oral antibiotic was given for 2 days.
- Patients were advised to avoid hot tubs for the first 48 hours to reduce infection risk.
- Tramadol or opiates were given to avoid post-procedure soreness.
- NSAIDs may impair the inflammatory phase of healing, so it was avoided.

Functional results

1. VAS score

2. AFAS score

Follow-up protocol

The patients were evaluated through VAS score and AFAS score preprocedural,6 weeks and 24 weeks.

Results

Table 1: Distribution of patients according to age

S.No.	Age Group (Years)	Cases	Percentage
1	18-30	12	20
2	31-40	18	30
3	41-50	25	41.7
4	>50	5	8.3
Total		60	100

There were 60 patients with an average age of 43.6 years. In our study, the youngest patient was 19 years and the oldest patient was 59 years. For evaluation purposes, the different age groups were categorized into 18-30, 31-40, 41-50, and >50 years. The majority of patients were in the age group of 41-50.

Table 2: Distribution of patients according to gender

S.No.	Gender	Cases	Percentage
1	Male	18	30
2	Female	42	70
Total		60	100

Out of 60 cases, 18 were male and 42 were female. Female to Male ratio is 2.3:1 approx. There was a female preponderance in our study.

Table 3: Distribution of patients according to laterality:

S.No.	Laterality	Cases	Percentage
1	Right	20	33.3
2	Left	40	66.7
Total		60	100

Out of 60 cases, 33.3 % of patients had Plantar Fascitis on the right side and 66.7 % had Plantar Fascitis on the left side showing the preponderance for the left side.

Table 4: Distribution of patients according to occupation

S.No.	Occupation	Cases	Percentage
1	Housewife	24	40%
2	Labourer	14	23.3%
3	Farmer	8	13.3%
4	Student	4	6.7%
5	Others	10	16.7%
Total		60	100

Out of 60 cases, 24 were housewives (heavy physical workload), 4 were students (mild physical workload), and 8 were farmers and 14 were laborers. The majority of the patients were housewives (heavy physical workload).

Table 5: Distribution of patients according to the duration of PlantarFascitis:

Duration in months	Frequency	Percentage
3-5	40	67.7%
6-8	14	23.3%
9-11	4	6.7%
>12	2	3.3%
Total	60	100

Table 6: Distribution of patients according to Complications:

S.No.	Complications	Cases	Percentage
1	Mild Fever	4	6.7%
2	None	56	93.3%
Total		60	100

There were no complications in 56 patients, 4 patients had a fever

Table 7: Comparison of VAS scores of the groups between different time intervals

Time interval	PRP group	Steroid group	P*	P* (Differences in scores)
Preprocedural	8.61 ±0.96	8.51 ±0.86	≥0.05	<0.001 (6th week vs. baseline)
6th weeks	2.21 ±0.76	3.81 ±1.06	<0.001	<0.001 (6th month vs. baseline)
24th weeks	.91 ±0.76	2.51 ±0.86	<0.001	≥0.05 (6th month vs. 6th week)

Table 8: Comparison of AFAS scores of the groups between different time intervals

Time interval	PRP group	Steroid group	P*	P* (Differences in scores)
Preprocedural	62.52 ±8.38	59.72 ±5.58	≥0.05	0.005 (6th week vs. baseline)
6th weeks	85.12 ±4.08	74.92 ±4.68	<0.001	0.002 (6th month vs. baseline)
24th weeks	90.22 ±2.48	79.92 ±4.58	<0.001	≥0.05 (6th month vs. 6th week)

Discussion

Several nonsurgical treatment methods are available for the treatment of plantar fasciitis with various success rates. The ideal treatment for plantar fasciitis has not been determined. The use of PRP in foot and ankle pathologies has begun to increase. Our study was designed to compare the effect of PRP and steroid injection in the treatment of chronic plantar fasciitis. Intralesional injection is the preferred method to administer PRP/steroid into the lesion, and the peppering technique (multiple penetrations without withdrawing the needle allow dispersal of PRP or corticosteroid to a larger area) is adequate for administration of PRP or steroid [16]. Intralesional injection is a very simple procedure, that takes only around 40 to 45 min including the preparation time of PRP, financially very low cost, requires less surgical skill, and hence can be done on an outpatient basis. The effect of PRP/steroid in plantar fasciitis was indirectly assessed by improvement in pain, mobility, and daily activity through VAS and AFAS scores. In our study, 100 (50 patients in each group) patients of PF with a mean age of 43.6 years (range 19 to 59 years) were included in the study. 18 (30%) were males and 42 (70 %) were females, 20 (33.3%) patients had right-side involvement, and 40 (66.7%) patients had left side affected. The majority of the patients were housewives (heavy physical workload). In the PRP group, the mean VAS score was 2.21 ±0.76 at the 6th-week follow-up and .91 ±0.76 at the 24th-week follow-up. The mean AFAS score was 85.12 ±4.08 at the 6th week and 90.22 ±2.48 at the 24th week. The differences between the pretreatment and follow-up scores were statistically significant.

In the steroid group, the mean VAS score was 3.81 ±1.06 at the 6th-week follow-up and 2.51 ±0.86 at the 24th-week follow-up. Mean AFAS scores were 74.92 ±4.68 and 79.92 ±4.58 at the 6th week and 24th weeks follow-ups. The differences between the pretreatment and follow-up scores were statistically significant.

The PRP group had significantly higher mean AFAS and VAS scores at follow-up than the steroid group ($p<0.001$) There were no complications in 56 patients, 4 patients had a fever, and the patient was given antipyretics and antibiotics for the same and was settled.

Nicolo Martinelli et al (2012) [17] studied Fourteen consecutive patients with chronic PF receiving three injections of PRP into the Plantar fascia and were assessed 12 months after the procedure. The modified Roles and Maudsley score and a visual analog scale (VAS) for pain were used to evaluate the clinical results. According to the criteria of the Roles and Maudsley score, at 12 months of follow-up, results were rated as excellent in nine (64.3 %), good in two (14.3 %), acceptable in two (14.3 %) and poor in one (7.1 %) patient. VAS for pain was significantly decreased from 7.1 ± 1.1 before treatment to 1.9 ± 1.5 at the last follow-up ($p < 0.01$). Results indicate that treating chronic PF with PRP injections is safe and has the potential to reduce pain.

Dr. Paresh Vilasrao Patil et al (2017) [18] study was conducted on 60 people divided into two groups of which 30 were given local PRP & the other 30 were given steroids and regular follow-up was done. Similarly, in both groups, functional status improved significantly over a period of one year with 73% of patients in the steroid group and 97% in the PRP group achieving excellent functional status. The PRP group had significantly higher mean VAS, AHFS, and RMSPS scores at 1-year follow-up than the steroid group.

Nishanth Shetty et al (2018) [19] studied 50 patients were selected with 25 in each of the groups. Both groups were evaluated subjectively and functionally before the respective injection and then evaluated on follow-up at 3 weeks, 6 weeks, and 6 months with the same scoring systems. We concluded that both PRP and corticosteroid injections provide symptomatic relief in the treatment of plantar fasciitis both functionally and subjectively; results at 6 months are suggestive that PRP injections provided better functional results.

Tarun Kukrejaet et al (2017) [20] studied, forty patients having chronic plantar fascitis who were treated with PRP and corticosteroid injection. In this study, we observed that 17 patients (85%) who received the PRP injection said the results were excellent at the end of the treatment and about 14 patients (70%) who received corticosteroid

injection said the results were acceptable. Based on the results of our present study, we suggest that PRP can be a successful procedure for the management of patients, who have chronic plantar fasciitis. Sunil H. Shetty et al (2018) [21] conducted a randomized controlled trial of 90 patients: PRP (n = 30 patients), CS (n = 30 patients), and placebo (n = 30 patients). The patients were followed at regular intervals until 18 months post-injection using validated instruments.

The mean visual analog scale score showed significant improvement in all groups between baseline and 18-month follow-up with CS showing significantly better improvement than PRP in the short term, whereas longer-term PRP was significantly better than CS, both PRP and CS are safe and effective treatment options for chronic PlantarFascitis, showing superior results to placebo treatment. The longer-term results and less reinjection and/or surgery rate of PRP make it more attractive as an injection treatment option versus CS injection

Conclusion

The use of a single PRP/steroid injection in the treatment of PF has the advantage of being a simple procedure, taking only 30mins, financially at a very low cost, requiring less surgical skill, and hence an OPD/Minor procedure with negligible side effects and is more satisfying to the patient and helps treat unresponsive chronic pain and also delays progression of disease. Our study demonstrates PRP injection to be an effective and well-tolerated alternative to corticosteroid injection in the management of chronic plantar fasciitis with an added advantage of almost no side effects due to its biological nature and better patient compliance. Furthermore, PRP has added analgesic and antimicrobial properties.

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