

Original Research Article

Efficacy of platelet rich plasma in comparison to steroid for the management of chronic plantar fasciitis

Ankit Thora^{1*}, Anurag Tiwari², Nishit Bhatnagar³, Mukul Mohindra⁴

Department of Orthopaedics, ¹Shalby Hospital, Indore, ²AIIMS Hospital, Bhopal, Madhya Pradesh, ³Maulana Azad Medical College, New Delhi, ⁴Safdarjung Hospital, Delhi, India

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*Correspondence:

Dr. Ankit Thora,

E-mail: dr.ankit20@gmail.com

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ABSTRACT

Background: Chronic plantar fasciitis is often a difficult to treat entity and platelet-rich plasma (PRP) is an upcoming modality instead of steroid in chronic cases of plantar fasciitis resistant to traditional non-operative management.

Methods: Sixty patients with chronic plantar fasciitis were prospectively randomised into 2 groups and treated with either a single injection of 3 cc PRP or 40 mg DepoMedrol (Cortisone) injection and followed for a year. Immediately prior to PRP or cortisone injection American Orthopedic Foot and Ankle Society (AOFAS) hind foot scoring was done for all patients. These scores were repeated at 6 weeks, 6 months and 12 months.

Results: Six weeks evaluation of AOFAS after PRP and corticosteroid administration, the mean visual analogue scale (VAS Score) showed a significant increase in corticosteroid group (4.2) as compared to PRP group (5.8). But, the PRP group (1.8) showed significant improvement in mean VAS scores as compared to Steroid group (3.4) after a year of the treatment. Similarly, the AOFAS score improved significantly in the steroid group (64.4) at 6wks as compared to the PRP group (52.2) but at 12 months however, the PRP group sustained its effect with a mean AOFAS score of 92.2 while in the steroid group, the score dropped to a mean of 78.4.

Conclusions: PRP was more effective than steroid for the long term treatment of chronic plantar fasciitis. Level of Evidence: Level I, prospective randomized comparative series.

Keywords: PRP, Steroid injection, Plantar fasciitis

INTRODUCTION

Plantar fasciitis is one of the most common diagnoses in patients presenting with chronic foot pain that upsets roughly 10% of the population.¹ Owing to its failure to respond easily to conservative and interventional modalities it produces extensive annual economic burden. The pathophysiology is still not extensively understood, but is known to involve microscopic degeneration of the plantar fascia and local disruption of the collagen matrix and microtears rather than an inflammatory pathology.² Predisposing factors include stress produced by excessive

weight-bearing activity, obesity, stiff ankle, and walking or running on uneven and hard surfaces.

The presence of zones of hypovascularization and hypervascularization in the fascia has also been hypothesized.^{3,4} Clinically pain, local tenderness and associated morning heel stiffness which improves as the patient carries out daily activities are hallmark of this disorder.⁵ A battery of conservative and interventional approaches have been postulated and are prevalent on personal experiences but no consensus is available in terms of reproducible results. Non-operative approaches include rest, contrast bath, sole inserts, stretching and

strengthening exercises, braces, night splints, nonsteroidal and steroidal anti-inflammatory medication, and physical therapy.⁵ Interventions include applying Steroid injections, autologous blood and open, endoscopic or percutaneous fascial surgical release of plantar fascia which have shown variable success in literature.⁶⁻¹¹

Recently, PRP has shown promising outcomes in the treatment of tennis elbow, osteoarthritis of the knee and various other musculoskeletal disorders. PRP is a concentrate of platelets (7 to 10 times) from the whole blood prepared by ultracentrifugation of the blood sample from the patient.¹² PRP is a rich source of a number of cytokines and growth factors that attract reparative cells.^{13,14} These agents include platelet derived growth factor (PDGF), transforming growth factor- beta 1 (TGFB-1), epidermal growth factor (EGF), insulin-like growth factor (IGF), fibroblast growth factor (FBGF) and vascular endothelial growth factor (VEGF) etc. which modulate neovascularization and angiogenesis, promote mitogenesis, improve local collagen production, and have anti-inflammatory effects by blocking cyclo-oxygenase-2 (COX-2) enzyme production. There is still paucity of literature available on use of PRP in chronic refractory cases of plantar fasciitis. We have compared the efficacy of PRP injection in plantar fasciitis as compared to traditional steroid injections in a prospective cohort of 60 patients.

METHODS

The study was conducted at Lok Nayak Hospital, New Delhi between June 2014 and November 2015.

Sixty patients between 18 and 70 years of age with chronic plantar fasciitis who had symptoms for more than 6 months and failed conservative management for at least three months in spite of an exhaustive trial of rest, physio therapy, silicone shoe inserts, night splints, contrast bath and drug therapy were included in the study. Patients with diabetes, those with prior injection in the foot, prior surgery or fractures of the foot, inflammatory pathologies, pregnancy and on-going infections were excluded.

The patients were randomized into 2 groups for prospective treatment and evaluation. Group A (30 patients) was treated with a single ultrasound guided injection of autologous PRP prepared by low spin centrifugation, whereas Group B (30 patients) was treated with a single ultrasound guided injection of 40 mg DepoMedrol.

Patient was laid in supine position and the point of maximal tenderness which is usually the medial aspect of the foot at the origin of plantar fascia was marked. Skin and subcutaneous tissue was infiltrated with bupivacaine after which three ml of PRP was injected using a 22G needle in a fan shaped manner. In the steroid group 40

mg Depomedrol solution was injected in a similar manner.

Patients were denied doing strenuous activities for 2 weeks. Follow up examination was done at 6weeks, 6months and 12 months. VAS and AOFAS score outcomes were evaluated at each follow-up. The use of NSAIDS was discouraged throughout the study period.

Data analysis (VAS and AOFAS scores) was done using SPSS software with categorical values being compared using a Pearson’s chi-square test and pre-treatment continuous variables using the Student t test. The level of clinical significance was set at p=0.05.

RESULTS

At the initial visit before injection therapy the PRP group patients and Corticosteroid injection group patients had a mean VAS of 6.95 and 7.2 respectively.

Six weeks evaluation of FAOS after PRP and corticosteroid administration, the mean VAS Score showed a significant increase in Corticosteroid group (4.2) as compared to PRP group (5.8).

On the contrary, the PRP group (1.8) showed significant improvement in mean VAS scores as compared to Steroid group (3.4) after a year of the treatment. Steroids failed to show long term decrease in VAS score (p<0.05).

At 6 months follow up there was statistically insignificant difference in the VAS scores in the two groups.

At the initial survey the PRP and Corticosteroid injection groups had mean AOFAS of 36.8 and 34.7 respectively. These improved significantly in the steroid group (64.4) at 6wks as compared to the PRP group (52.2).

At 12 months however, the PRP group sustained its effect with a mean AOFAS score of 92.2 while in the steroid group the score dropped to a mean of 78.4.

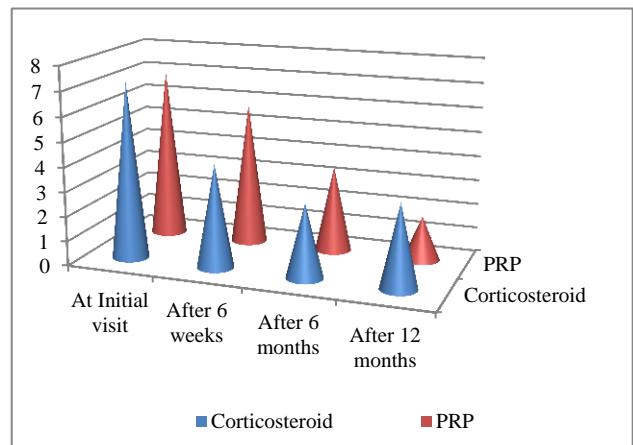


Figure 1: Mean VAS score.

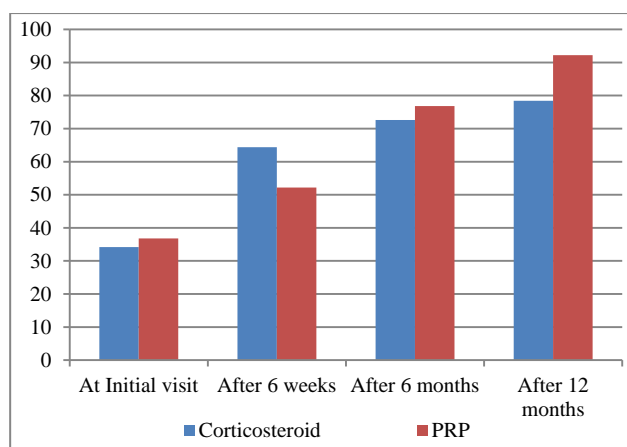


Figure 2: Mean AOFAS score.

DISCUSSION

The present study was conducted during the period from June 2014 to November 2015 sixty patients with chronic plantar fasciitis who failed to respond to conservative management were randomised prospectively into two groups and treated with PRP (Group A) and steroid injection (Group B). The minimum follow up period was 12 months and maximum follow up was till 16 months. We evaluated our results in terms of VAS Score and AOFAS scores and compared our results with the available literature.

In the present study we found that the improvement in VAS score at 6 weeks was statistically significant in the steroid group (4.2) as compared to PRP group (5.8). Early improvement in the first month in our patients treated by PRP can be mostly attributed to a possible anti-inflammatory effect due to the inhibition of cyclooxygenase-2 (COX-2) enzymes by the cytokines in PRP.^{12,15} However, better early improvement in the steroid group implies that the anti-inflammatory effect of PRP due to COX 2 inhibition is less as compared to steroid. In a study by Tiwari et al, the VAS score significantly reduced in both PRP and corticosteroid groups at 1 month, but at 3 months following treatment it increased in corticosteroid group and remained constant in PRP group till 6 months.¹⁶ In our study however, steroid group showed better VAS Score values at 6weeks.

In the present study, we observed that 6 months follow up the VAS Scores were insignificant in both the groups (VAS Score 3 and 3.5 in steroid and PRP group respectively). Akashin et al, in a prospective study divided 60 patients in 2 non randomized consecutive groups of 30 and treated them by either 40 mg methylprednisolone or 3 cc of PRP.¹⁷ They followed them for 6 months. The mean VAS scores decreased from 6.2 to 3.2 in the steroid group and from 7.33 to 3.93 in the PRP group at 6 months follow up. The results were found to be statistically insignificant. This is in tune with the observations in our study.

In the present study, the long term follow up results at 12 months were encouraging in the PRP (VAS score 1.8) group and it appeared to be more beneficial than steroid injection (VAS Score 3.4). The possible mechanism of long term clinical improvement is the release of growth factors and chemo-attractants from the highly concentrated platelets which improved collagen upregulation and neovascularization.^{13,14,18} Ragab and Othman followed a group of 25 PRP treated patients with chronic plantar fasciitis for around 10.3 months and reported VAS score improvement from 9.1 to 1.6.¹⁹ Ninety two percent of their patients had little or no noticeable limitations at the end of the study. Results similar to ours were also observed by Jain et al, Shetty et al and Say et al.²⁰⁻²² Martinelli et al used 3 weekly injections of PRP for chronic plantar fasciitis and observed that the average VAS scores decreased from 7.1 to 2.1 after 12 months.²³ This study advocates use of multiple injections of PRP instead of one with no potential complications and excellent long term pain. In the Indian setting cost and compliance with multiple injections is a major concern, hence we resorted to single PRP injection.

Our results are conflicted in a meta-analysis published by Singh et al on 521 patients from 10 different studies where they concluded that PRP injections are associated with improved pain and function scores only at 3 month follow-up when compared with steroid injections but insignificant at 1, 6- or 12-month follow-up.²⁴ This may be due to a relatively small sample size in our study.

Lee et al conducted prospective randomised study of 64 patients for a period of 6 months and compared autologous blood injection with steroid injection.²⁵ They observed that at 6 weeks and 3 months, the corticosteroid group had significantly lower VAS, but the difference was not significant at 6 months. We too found a significant reduction in VAS score at 6 weeks with corticosteroid group like in this study, but at 6 months it was insignificant and at 12 months there was significant reduction in VAS with PRP group compared to corticosteroid group as against an insignificant change noted by Lee et al. Possible explanation of this finding is that we used PRP instead of autologous blood which is supposed to have more concentration of cytokines and growth factors as compared to autologous blood.

In the present study, at the initial survey the PRP and Corticosteroid injection groups had mean AOFAS of 36.8 and 34.7 respectively which improved significantly in the steroid group (64.4) at 6 weeks as compared to the PRP group (52.2). But at 12 months, the PRP group sustained its effect with a mean AOFAS score of 92.2 while in the steroid group the score settled to a mean of 78.4. Lopez-Gavito et al in a small subset of patients with severe chronic plantar fasciitis noted AOFAS hind foot score improvement from 39 to 97 within 1 month and average VAS scores improvement from 9 to 2 after PRP treatment.²⁶ There was no control or comparison group

and the sample size was relatively small in this study. There was early improvement in our patients too with PRP but it was only subtle and insignificant.

CONCLUSION

In conclusion, the use of PRP in chronic cases of plantar fasciitis seems more efficacious in long term than the traditional treatment of steroid injection. Although steroid possibly leads to a better short term outcome it fails to sustain its effect in the longer run. Also, despite the long-term benefit of PRP injection in chronic plantar fasciitis, it is advisable to stick to the fundamental treatment paradigm of conservative measures as they suffice in majority of the cases. Only in resistant and chronic severe plantar fasciitis where all conservative measures have been exhausted should PRP be tried. The strengths of this study are its randomized and prospective longitudinal nature, the long length of follow-up, and its high subject retention rate.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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