



COMPARISON OF EFFECTIVENESS OF PLATELET RICH PLASMA INJECTION WITH EXERCISES IN TREATMENT OF PLANTAR FASCIITIS

Sports Science

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ABSTRACT

Introduction: Plantar fasciitis is most common cause of heel pain.

Aim: To compare the effectiveness of platelet rich plasma (PRP) injection over exercises in treatment of plantar fasciitis.

Material and methods: Sixty patients of plantar fasciitis were randomised into 2 groups of 30 each. One group received PRP injection and other group performed plantar fascia stretching exercises only. Follow up was done at 2, 4, 8 and 12 weeks. Visual Analogue Scale (VAS) and Roles-Maudsley Subjective Pain Score (RMS) was used to assess outcome at each follow up.

Results: Decrease in pain levels and functional improvement was seen in both the groups. Mean VAS scores were significantly better in PRP group at 2 weeks ($p=0.001$), 4, 8 and 12 weeks ($p<0.05$). Mean RMS was statistically significant at 8 weeks ($p=0.001$) follow up in PRP group compared to exercise group but found to be non significant at other follow ups ($p>0.05$).

Conclusion: PRP injection was effective over exercises in management of plantar fasciitis.

KEYWORDS

platelet rich plasma; exercise; plantar fasciitis

INTRODUCTION

Plantar fasciitis is the most common cause of heel pain(1). It is the pathology of plantar fascia at the bottom of foot. Although, thought of as an inflammatory process, plantar fasciitis is a degenerative disorder in the fascia, and thus can be referred as Plantar Fasciosis(2). It's pathology is poorly understood, but it is assumed that it is due to microscopic degenerative injuries along with local disruption of collagen matrix and microtears(3).

Plantar fascia is tensed when the normal biomechanics of feet is disturbed. It's stress-causing factors includes running, sudden increased activity level, obesity and rapid weight gain, non-orthopedic shoes, long-term standing up or walking and doing activities on a hard surface(4,5).

Plantar fasciitis patients complains of stinging and burning pain inside the heel. Pain is excessive at the first steps after getting up in the morning. It alleviates after a few steps however it becomes severe towards the end of the day based on activity. Sometimes, slight swelling and erythema occurs. The patient may remain symptomatic from period may range from several weeks to year(6).

A large number of conservative treatment options are available for plantar fasciitis(7) including physiotherapy, plantar-fascia-stretching exercises(8), icepacks, night splints, prefabricated and custom-made insert, shoe modification, nonsteroidal anti-inflammatory drugs (NSAIDs), corticosteroid injections and extracorporeal shock-wave therapy (ESWT) and even surgery.

Recently, Platelet-rich plasma (PRP) injections has shown promising results for treating muscle and tendon injuries and degeneration(9). The rationale for using PRP is to increase tendon regenerative abilities with a high content of cytokines and cells, in hyper physiologic doses, which should promote cellular chemotaxis, matrix synthesis, and proliferation (10). The purpose of our study was to compare the effectiveness of platelet rich plasma over exercises alone in management of plantar fasciitis.

MATERIAL AND METHODS

This study is a prospective single blind randomised control trial conducted from the year 2017-2018 at Sports Injury Centre, VMCM and Safdarjung hospital, New Delhi. Informed consent was taken from all the patients at the start of the study.

Patients with plantar fasciitis, above 18 years of age were included in

the study. Patient with history of any metabolic or endocrine diseases, haemorrhagic disorders, any foot or ankle pathology, local soft tissue infection, skin ulceration or history of local corticosteroid injection were excluded from the study. A total of 60 patients were enrolled in the study after fulfilment of inclusion and exclusion criteria. Randomisation was done by computer block randomisation method and all the participants were randomised into 2 groups of 30 each.

Patients from group A received a PRP injection. While group B patients were only advised to do standardised stretching program including Achilles tendon, plantar fascia and hamstring stretches along with intrinsic foot muscles strengthening exercises. The PRP is prepared by extraction of 20 ml of patient peripheral blood and added to it 2.5 ml of anticoagulant (CPDA). This is further processed by centrifugation (2000 revolutions per minute for 10 minutes) in a ROTOFIX machine. Pre and post preparation platelet counts were taken from patient blood samples and PRP respectively. PRP is injected locally into the point of maximum tenderness at the heel via a peeping technique. After the procedure patients were instructed to apply ice on to the injected area for pain control. Only Paracetamol tablets (maximum 3 tablets a day) of 500 mg strength were allowed to the patients. Standardised stretching program including Achilles tendon, plantar fascia and hamstring along with intrinsic foot muscles strengthening exercises were added 2 weeks following injection.

OUTCOMES MEASURES

Patients were assessed for level of pain and functional status at the start of the study (day 0), 2, 4, 8 and 12 weeks following start of the treatment.

Pain was assessed using Visual analogue scale(VAS), which is a subjective scale whose left and right side corresponds to no pain (0) and unbearable pain (10). Patient marked the scale to indicate their current level of pain. In order to assess pain with functional status Modified Roles and Maudsley Score (RMS) is used. It is a subjective four-point scale to evaluate the patient's pain in relation to normal daily activities. Score 1-4 is used, where score 1 signifies excellent quality of life and score 4 signifies poor quality of life.

STATISTICAL ANALYSIS

Categorical variables were presented in number and percentage (%) and continuous variables were presented as mean \pm SD and median. Normality of data was tested by Kolmogorov-Smirnov test. Data was found to be normally distributed. Qualitative variables were compared using Chi-square test. Quantitative variables were compared using

unpaired T test between the two group at baseline and at each follow ups. A p value of <0.05 was considered statistically significant.

RESULTS

A total of 60 patients were randomised into 2 groups of 30 each. Both the groups had similar baseline characteristics in terms of age, gender, side and duration. Mean age group of participants was 31.5 ± 7.9 years. Mean duration of symptoms was 3 weeks in both the groups. There were 33 males and 27 females in the study. 50% of injections were performed on right feet and 50% on the left feet.

Table 1 summarises the outcome measures of Visual Analogue Scores in both the groups at baseline and at 2, 4, 8 and 12 weeks of follow up. There was no difference in both the groups in VAS on their first presentation after inclusion in the study. The mean VAS scores reduced significantly in both the PRP and exercise groups at each follow up visits from their previous values. Also, there was a statistically significant difference between the case and the control group with a mean VAS score of 5.9 ± 1.45 & 7 ± 1.08 respectively at 2weeks, 3.57 ± 1.19 and 5.27 ± 1.14 at 4 weeks, 1.7 ± 0.84 and 3.33 ± 1.3 at 8 weeks and 0.53 ± 0.63 & 1.77 ± 1.3 at 12 weeks. The difference between the two groups was significant at all the subsequent visits (p<0.05).

Functional status along with pain during activity of daily living were assessed using RMS score at baseline at and at each follow up. There was no statistical difference between both the groups in their baseline RMS scores. Mean RMS scores did improved over time in both the PRP and exercise groups at each follow up, but the RMS scores between the 2 groups were found to be non significant at 2weeks (p=0.33), 4weeks(p=0.6), and 12 weeks(p=0.18). The mean RMS score was found to be statistically significant in PRP group as compared to Exercise group at 8 weeks(p=0.001) follow up.

Table1: VAS trend at each follow up.

	PRP	EXERCISE	p- VALUE
VAS AT DAY 0			
Sample size	30	30	
Mean ± Stdev	8.33 ± 1.42	8.53 ± 1.28	0.57
Median	8.5	9	
Min- Max	4-10	6-10	
VAS AT 2 WEEKS			
Sample size	30	30	
Mean ± Stdev	5.9 ± 1.45	7 ± 1.08	0.001
Median	6	7	
Min- Max	2-8	5-9	
VAS AT 4 WEEKS			
Sample size	30	30	
Mean ± Stdev	3.57 ± 1.19	5.27 ± 1.14	<0.05
Median	3.5	5	
Min- Max	1-6	3-7	
VAS AT 8 WEEKS			
Sample size	30	30	
Mean ± Stdev	1.7 ± 0.84	3.33 ± 1.3	<0.05
Median	2	3	
Min- Max	0-4	2-6	
VAS AT 12 WEEKS			
Sample size	30	30	
Mean ± Stdev	0.53 ± 0.63	1.77 ± 1.3	<0.05
Median	0	1.5	
Min- Max	0-2	0-4	

Table 2: RMS trend at each follow up

	PRP	EXERCISE	p- VALUE
RMS AT DAY 0			
Sample size	30	30	
Mean ± Stdev	3.9 ± 0.31	3.83 ± 0.38	0.46
Median	4	4	
Min- Max	3-4	3-4	
RMS AT 2 WEEKS			
Sample size	30	30	
Mean ± Stdev	2.97 ± 0.32	3.03 ± 0.18	0.33
Median	3	3	
Min- Max	2-4	3-4	
RMS AT 4 WEEKS			
Sample size	30	30	

Mean ± Stdev	2.97 ± 3.47	2.63 ± 0.49	0.6
Median	2	3	
Min- Max	1-21	2-3	
RMS AT 8 WEEKS			
Sample size	30	30	
Mean ± Stdev	1.73 ± 0.52	2.10 ± 0.31	0.001
Median	2	2	
Min- Max	1-3	2-3	
RMS AT 12 WEEKS			
Sample size	30	30	
Mean ± Stdev	1.23 ± 0.43	1.43 ± 0.68	0.18
Median	1	1	
Min- Max	1-2	1-3	

Figure 1: VAS trend at each follow up.

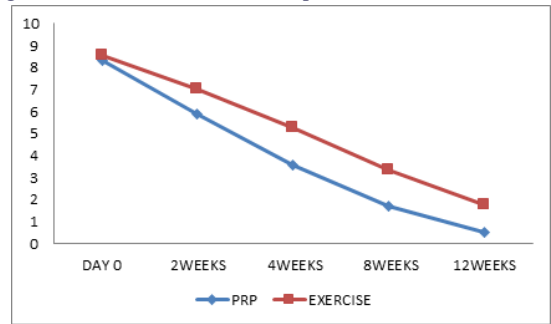
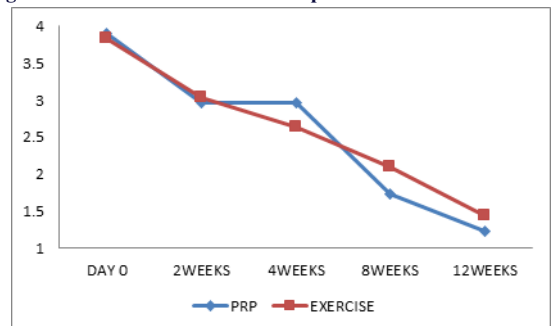


Figure 2: RMS trend at each follow up.



DISCUSSION

This study has reached its predetermined primary outcome that PRP is more effective than exercises alone in treatment of plantar fasciitis. Literature has documented the role of PRP in treatment of plantar fasciitis (11-14). This study showed that both exercise and PRP leads to pain reduction in plantar fasciitis but the improvement seen in plantar fasciitis group was statistically significant as compared to group who performed only exercises.

In a study by Di Giovanni et al.(8) on 82 patients of chronic plantar fasciitis in a two years prospective clinical trial, using plantar fascia stretching exercises alone concluded that plantar fascia stretching exercises are effective and inexpensive treatment of plantar fasciitis. But that study did not had any control group. In our study exercises does provided pain relief and functional improvement at each follow up but the improvement was significantly lower as compared to the patients those received PRP injections.

A meta-analysis by Wei-Yi Yang et al.(15), analysed nine randomised control trials, comparing efficacy and safety of PRP over steroid in management of plantar fasciitis using various outcome measures like Foot and ankle disability index (FADI), VAS, RMS and American orthopaedic foot and ankle society(AOFAS) scale concluded that limited evidence supports, PRP is superior to steroid for long term pain relief. However in short and intermediate term, non significant differences were observed between the groups. As PRP is safe and effective treatment for both short and long term relief in plantar fasciitis. It can be used with exercises for management of plantar fasciitis.

There are some limitations of this study. Firstly, RMS score alone was used for functional status evaluation. So, more scoring systems in addition to RMS can be used to effectively evaluate the response in terms of function. Secondly, Three months follow up would be short,

especially for assessment of clinical outcomes such as VAS and RMS. So, further study with large follow up would be necessary.

CONCLUSION

This study concludes that local infiltration of platelet rich plasma injection along with exercises in patients of plantar fasciitis is found to be superior than performing plantar fascia exercises alone. Keeping in mind of its safety profile PRP can be used effectively in patients of plantar fasciitis in any age group and in athletes also.

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