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Orthopaedics

REFRACTORY PLANTAR FASCIITIS- PRP OR LOCAL CORTICOSTEROID?

KEY WORDS:

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ABSTRACT

Background/Purpose: Plantar Fasciitis is often a nuisance to treat because of its intractable nature. Corticosteroid injections have been conventionally used to treat such cases. One emerging therapeutic modality is the use of Platelet-Rich-Plasma. We compare the efficacy of the two modalities. **Methods:** 60 patients with intractable plantar fasciitis were randomised to receive either autologous PRP or Corticosteroid injection. All patients were assessed with the Visual Analogue Score (VAS) for pain and the Foot & Ankle Disability Index (FADI) Score. Data was collected prospectively on the cohort, pre-treatment, and at 1st, 2nd, 6th and 12th week post injection and the results were compared. **Results:** Both treatment cohorts had 30 patients, with the PRP injection group having an average age of 42.0 ± 12.98 years and Corticosteroid injection had an average age of 39.4 ± 10.09 years. PRP injection group had male to female ratio of 0.875 while corticosteroid injection group had a ratio of 0.67. Mean FADI scores and VAS scores on 2nd and 6th week of study were significantly higher in corticosteroid injection group as compared to the PRP injection group, while the mean of two scores had no significant difference between the two groups when measured on 1st and 12th week. **Conclusion:** Although both techniques have similar immediate and long term results, corticosteroid injection has better pain relief in short term.

Introduction:

Pain in heel is a common and incapacitating cause of disability worldwide affecting over a million people every year.[1] The resulting painful walking is not only a trouble at individual level, but also a nuisance for the community.

The most common cause of pain in heel is plantar fasciitis. It is thought to be caused by biomechanical overuse from prolonged standing or running, and mostly occurs in people with sedentary lifestyle or athletes. Histopathologically, it is thought to be secondary to myxoid degeneration, microtears within the plantar fascia, collagen necrosis and angiofibroblastic hyperplasia of the plantar aponeurosis, and not due to an inflammatory process, and so the use of term "plantar fasciosis" is advocated, which implies that etiologically, it is more of a chronic degenerative process rather than acute inflammation. Appreciating the etiology is important as the major cause of pain is the irritation occurring secondary to the disease process, rather than a spur or other mechanical factor.

Patients present with pain at the anteromedial prominence of the calcaneum, which is exacerbated by passive dorsiflexion of the toes. Diagnosis is straightforward and radiological investigations are not generally required. There are various treatment options, and most cases resolve with icing, nonsteroidal anti-inflammatory drugs (NSAIDs), rest and activity modification and shoe modifications. Recalcitrant cases are managed with tertiary treatment options like corticosteroids, botulinum toxin type A, autologous blood injection, platelet-rich plasma (PRP) injection, nitroglycerin patches, extracorporeal shock-wave therapy (ESWT)[2,3], and in severe recalcitrant cases, surgical procedures are employed.[4]

Most commonly used tertiary treatment options are local corticosteroid injections and PRP injections. Both modalities are found to be effective in different studies[5,6,7,8,9], and interestingly enough, both have antipodal mechanism of action, with former aimed at reducing the inflammatory and degenerative process, while latter aims to increase the inflammatory process to accelerate healing.

Debate persists not only regarding which is the better modality, but also whether either of the modality is at all effective.[10]

This study is aimed at comparing the efficacy of local corticosteroid injections and PRP injections for treatment of recalcitrant Plantar fasciitis (no benefit with conservative methods for 2 weeks) using Visual Analog scale for pain and FADI score (Foot and Ankle Disability Index score).

Materials and Methods:

This prospective randomized study was conducted at a tertiary care hospital in Navi Mumbai between January 2021 and May 2022. Approval of Institutional ethics committee was obtained before the start of study. Following inclusion and exclusion criteria were used to select study population:

INCLUSION CRITERIA:

1. Patients with age more than 18 yrs
2. Patients with maximal tenderness at the attachment of the Plantar Fascia on the medial aspect of the Calcaneal tuberosity
3. Patients who were diagnosed with Plantar Fasciitis and who had been treated conservatively with little or no relief for more than 2 weeks.

EXCLUSION CRITERIA:

1. Patients with previous surgery for heel pain.
2. Pregnant or lactating patient
3. Patients with previous treatment with Corticosteroid injection in the last six months.
4. Any local skin pathology at injection site.

Sampling method and sampling size:

A total of 231 patients presented to Orthopedics outpatient department, of whom 137 patients met the inclusion criteria. Of them, 77 patients were excluded based on exclusion criteria, and 60 patients were selected for study. These patients were divided in 2 groups by random allocation, using chit method, with first group of 30 patients allocated the group for Corticosteroid injection and the other group of 30 patients allocated autologous PRP treatment. (Fig 1)

Anatomy[11]:

Plantar fascia is a thickening of deep fascia in the sole of the foot, and originates from the medial process of the Calcaneal tuberosity and inserts through several slips into the plantar plates of the metatarsophalangeal joints, the flexor tendon sheaths, and the bases of the proximal phalanges of the digits. The Plantar aponeurosis supports the longitutidinal arch of the foot and protect deep structures in the sole.

Treatment protocol:

Informed consents were taken for both groups of patients.

Corticosteroid: Single dose of 40 mg of Inj. Triamcinolone Acetomide was used. (Fig 2)

Platelet Rich plasma: Single dose of 4 ml of Autologous platelet rich plasma was used. PRP was prepared according to the National IADVL PRP Taskforce Recommendations using double spin method. (Fig 3)[12,13]

Baseline VAS scores and FADI scores were recorded of all patients.

Both injections were injected into the area of maximal tenderness after following all aseptic precautions in respective groups.

After injection, NSAIDs were prescribed to patients of both groups for pain relief for a maximum of 3 days.

VAS and FADI scores were collected for all patients after the injection, at 1st week, 2nd week, 6th week and 12th week.

Results:

Out of 60 patients, 26 were male, while 34 female with male to female ratio of 0.76. All these patients were equally divided in 2 groups, with the PRP injection group having an average age of 42.0 ± 12.98 years and comprising of 14 males and 16 females (ratio= 0.875). Patients treated with Corticosteroid injection had an average age of 39.4 ± 10.09 years, which was not significantly different from the former group, and had a male to female ratio of 0.67 with 12 males and 18 females. (Table 1)

Table 1: Demographics

	PRP injection	Corticosteroid injection	T test and P value
Cases	30	30	t = 1.194 P = 0.237 Not significant
Age (in years)	42.0 ± 12.98	39.4 ± 10.09	
Sex (M/F)	14/16	12/18	

It was observed that mean baseline FADI scores were low in both the groups (Table 2). There was no statistically significant difference between mean FADI scores of the two groups at 0th week (baseline), 1st week and the 12th week (P>0.05). However, there was statistically high significant difference of mean FADI scores between the the groups on 2nd and 6th week of investigation (P<0.001), where the mean FADI scores were significantly higher in corticosteroid injection group as compared to the PRP injection group.

Table 2: Foot & Ankle Disability Index (FADI) Scores

	FADI scores				
Time period	PRP injection	Corticosteroid injection	t— test value	P- value and Significance	
	Mean ± SD	Mean ± SD			
Baseline or 0 week	38.10 ± 8.26	38.40 ± 5.73	t=0.163	P = 0.871	NS
1 week	48.26 ± 8.16	51.10± 6.19	t=1.514	P = 0.136	NS
2 weeks	56.86 ± 6.37	63.73 ± 5.40	t = 4.498	P = 0.000	HS
6 weeks	68.10 ± 5.83	74.13 ± 5.76	t = 4.028	P = 0.000	HS
12 weeks	81.53 ± 7.01	82.13 ± 4.68	t - 0.390	P = 0.011	NS
ANOVA test	F = 153.19	F = 248.99			
P- value	P = 0.000 VHS	P = 0.000 VHS	- - -	- - -	

On analyzing the VAS scores (Table 3), they were found to be high on the baseline investigation in both the groups. There was no statistical significant difference of mean VAS scores between the the two groups at 0th week (baseline), 1st week and the 12th week (P>0.05), but there was statistically very highly significant difference of mean VAS scores between the these groups on 2nd and 6th week of follow up (P<0.001). The mean VAS scores were significantly low in coticosteroid injection group as compared to the PRP injection group on 2nd and 6th week of follow up. On 12th week, VAS score had significant dip in the PRP injection group as compared to the score on 6th week. Such significant decrease was not observed in the other group.

Table 3: VAS Scores

Time period	VAS scores	t— test value	P- value and Significance		
	PRP injectio	Corticosteroid injection			
	Mean ± SD	Mean ± SD			
Baseline or 0 week	8.07 ± 0.62	8.33 ± 0.66	t = 1.588	P = 0.118	NS
1 week	7.06 ± 0.73	6.67 ± 0.64	t= 1.952	P = 0.563	NS
2 weeks	6.23 ± 0.97	4.96 ± 1.03	t = 4.4891	P = 0.000	HS
6 weeks	4.46 ± 0.89	3.33 ± 1.18	t = 4.173	P = 0.000	HS
12 weeks	2.90 ± 1.09	3.13 ± 0.71	t = 0.767	P = 0.451	NS
ANOVA test	F = 164.21	F = 331.53			
P- value	P = 0.000, VHS	P = 0.000 VHS			

Discussion:

Although plantar fasciitis is a self limiting condition, it can remain chronic, with poor prognostic factors including overweight patients, patients with bilateral symptoms, and the patients who seek medical attention after prologed

duration of symptoms (more than 6 months of onset of pain).[14] GK Rose in 1955 conceded that Heel pain, although is not a serious disease for an Orthopedic surgeon, but as a consequence of its intractable nature, is not welcomed by any orthopedician.[15] Over 7 decades, and advent of several treatment modalities later, confusion still persists, and the condition still remains an enigma, both for the surgeon and the patient.

This study prospectively compared the efficacy of the 2 commonly used new non operative techniques: intralesional corticosteroid injection and intralesional autologous Platelet Rich plasma injection. These 2 techniques were also selected as they are based on totally different mechanisms of action based on different pathophysiology of the disease. Appreciating their effects and efficacy also helps in understanding the underlying pathophysiology of the disease, which still remains obscure. Also both these techniques are relatively easier and don't require a lot of skill to get trained in, and are perspicuous and acceptable to the patients. There are many studies available that attest to the efficacy of both techniques.[16] However, few studies exist that have compared the two techniques with each other. Even those that exist do no show similar results and disagree with each other, and not clearly state which is the better technique. Results of these studies are also based on the own downsides of both the techniques. The most important side effect of intralesional corticosteroids is plantar fascia rupture[17,18], while disadvantages of PRP injection include need for drawing own blood, higher cost of centrifugations, and slightly longer duration of treatment. Although, corticosteroid injection is associated with plantar fascia rupture, but no such case was seen in our study; this doesn't refute that such side effect exists.

Similar to previous studies, VAS and FADI scores were used as outcome indicators in this study. VAS scale, though subjective, is easier for patients to express and easier for the researcher to record and compare. FADI score provides the needed objectivity, and is not a cumbersome score to record. The advantage of using these scores is that it was easier to compare the results of our study with the previous studies and get a context of the results of all these studies.

Comparability of age, sex and baseline scores of each group indicates that randomisation in this study is successful. Also, comparability of these population characteristics to previously done studies reiterate the fact that plantar fasciitis affects people of age 30-70 years and has no significant specific sex preponderance, which further strengthens the unbiasedness of the sampling method.

Results of this study clearly show that Cortcosteroid injection has better outcomes in short term results (2^{nd} and 6^{th} week), however, the immediate outcomes (1^{st} week) and long term results (12^{th} week) showed that no technique is superior to the other. Reason for such a result may be that actually there is no difference in efficacy, which also shows why the underlying pathophysiology is obscure, and that it may be due to both, the inflammatory process as was thought before and the degenerative process. Such result may also be due to the shortcomings of this study. The two groups were not compared with a third group of a placebo, and it cant be clearly determined whether the symptoms may have improved as part of the natural history of disease; although the two techniques have separately been proven to be more efficacious than the placebo in previous studies. The study does not account for the confounding effects of patients who may have experienced other treatments, like over the counter analgesics for pain in heel or other parts of body, ice or heat application, amount of rest which is among the most important method for pain relief. Moreover, less sample size could have been a factor.

We do not negate the result of our study, but the results could have been strongly established if a third group of placebo was included, enquiries regarding usage of other modalities were made and a larger sample size taken up.

Conclusion:

In conclusion, it can be stated that although both techniques have similar immediate and long term results in treatment of intractable plantar fasciitis, however, corticosteroid injection has better pain relief in short term.

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