DOI: https://doi.org/10.53350/pjmhs221641025

ORIGINAL ARTICLE

Comparison of Corticosteroids Versus Platelet-Rich Plasma for the Treatment of Plantar Fasciitis: A longitudinal Study

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ABSTRACT

Aim: To compare the effectiveness of corticosteroids therapy and platelet-rich plasma (PRP) therapy for the treatment of plantar fasciitis.

Study design: A longitudinal study

Place and Duration: This study was conducted at Liaquat University of Medical and Health Sciences Jamshoro Pakistan from June 2020 to June 2021

Methodology: A total of 120 participants were considered in the study. Participants were divided into two groups. Both groups consisted of 60 patients each. One group was treated with corticosteroids injection (n=60) and the other was treated with PRP (n=60). All the participants were assessed clinically at the time of induction of treatment, after six weeks of the treatment, and after six months of the treatment. The clinical assessment included the visual analog pain scale (VAS), Roles and Maudsley scoring, and the American Foot & Ankle Society (FAS).

Results: A significant improvement in plantar fascia thickness, VAS, and AFAS was observed after the injection was given to the participants of both groups. The mean AFAS of the PRP group at 6th week was 84.6±4.8 and in the sixth month, it was 90.4±2.9. The value of AFAS of the corticosteroid group at 6th week was 75.3±4.7 and it was 80.1±4.2 in the sixth month. The mean value of VAS in the PRP group at the 6th week was 2.5±1 and at the 6th month was 1±0.7. Likewise, the value of VAS in the corticosteroid group at 6th week was 4±1.2 and at 6th week was 2.7±0.8. There were no complications in both groups.

Conclusion: The corticosteroids injection and PRP injection have the same effectivity for the treatment of plantar fasciitis.

Keywords: Plantar Fasciitis, PRP, Corticosteroids

INTRODUCTION

Plantar fasciitis is usually defined as overexertion of the plantar fascia. It is the most common known cause of pain in the heel in adult individuals [1]. The onset of the pain is gradual. It is usually sharp in nature. It is felt mostly on the medial side of the heel. The pain is exaggerated in the morning and whenever an activity is initiated. The pain is relieved on the provision of any kind of warmth. The etiology of this ailment is not fully understood. A problem in the biomechanics of the foot and differences in the foot structure can induce microtrauma in the plantar fascia. It results in inflammation as well as degeneration of plantar fascia [2]. The prevalence of plantar fasciitis is seen more in runners and athletes [3]. Lower height of foot arch in runner females has been seen to be associated with plantar fasciitis. Increased BMI, decreased dorsiflexion at the ankle, and regular activities of weight lifting are other risk factors of plantar fasciitis [4].

The supportive treatment available for the reduction of inflammation is the use of nonsteroidal anti-inflammatory drugs (NSAIDs), strapping technique, stretching exercises, extracorporeal shock wave therapy, heel pad, and arch support. Corticosteroid injections are preferred when the supportive treatment fails to resolve the issue. Heel pain is effectively reduced by the induction of corticosteroids injections locally [5]. These injections boost the pain relief process as well as anti-inflammatory mechanisms.

Corticosteroid injections inhibit the proliferation of fibroblasts and ground proteins. However, the expected adverse effects of these injections are infection, rupture of fascia, skin pigmentation, fat atrophy, nerve injury, flare, and muscular damage [6]. The platelet-rich plasma (PRP) injections have been recently introduced and it has given an effective treatment of plantar fasciitis [7]. The benefits of this therapy include regeneration of tendons by matrix synthesis, cellular chemotaxis, and proliferation [8]. The present study aims at a comparison of corticosteroid injections and PRP injections for the therapy of plantar fasciitis.

METHODOLOGY

The study included 120 participants with complaints of plantar fasciitis. The patients were recruited from the outpatient clinic of the orthopedic department of our hospital. Permission was taken from the ethical review committee of the institute. The diagnosis of plantar fasciitis was made based on clinical signs and symptoms. The patients that had clinical signs including tenderness in the heel upon palpation and mostly when a step is initiated after rest were said to have plantar fasciitis.

The patients were included on the basis of inclusion and exclusion criteria. According to the inclusion criteria, the patients diagnosed with plantar fasciitis, patients with failure of supportive or conservative treatment, and has more than 5 points of pain on the visual analog scale. The included participants should also sign an informed consent. On the other hand, patients who had previous such treatment, history of surgical treatment, lower limb pathology such as a calcaneal fracture or tarsal tunnel syndrome, history of diabetes treatment, gout, rheumatoid arthritis, hematological disease, pregnancy, and recent use of aspirin, were excluded from the study. The patients were divided into two groups. One group was given PRP injection and this group included 60 participants. The other group was injected with corticosteroids locally. The latter group also included 60 patients. The patients were briefed about the treatment options and written informed consent was signed by all the participants.

PRP was prepared by the method guided by Anitua et al [8]. A total of 30 cc of blood was taken from the patient's antecubital region. The blood was mixed in a 3.2% sodium citrate solution. The blood was centrifuged at 1800 rounds per minute for eight minutes at room temperature. From the centrifuges sample, 3.5 ml of PRP was obtained. 1 ml of it was sent to the laboratory for a bacteriological test and assessment of platelet count. 2.5 ml of PRP having 5.5% calcium chloride, in its activated form, was injected in the foot on the medical aspect in the area of maximum tenderness. The injection was given under aseptic measures. The

patient was asked to stay in the supine position for at least 20 minutes.

On the other hand, the corticosteroid group patients were injected with a mixture of methylprednisolone (40 mg/1 ml) and Xylocaine 2% (1 ml). The technique of peppering was used in the participants of both groups. The injection was injected in 4-5 different locations. Standard plantar fascia and Achilles strengthening and stretching exercises were applied to the participants of both groups. Rest and immobility were advised to all the patients for two days followed by the injection. NSAIDs, splints, or orthosis were given to none of the patients. Patients were evaluated at the time of performance of the treatment, at the 6th week after the treatment, and then at the 6th month after the treatment. The AFAS and VAS were noted for both groups for the sake of clinical evaluation. Function, pain, walking surfaces, maximum distance of walking, gait abnormality, hind-foot motion, ankle hind-foot stability, and alignment of the patient was evaluated in AFAS. For the assessment of subjective satisfaction and side effects of the treatment, patients were questioned. Data were analyzed in IBM SPSS version 26. For the evaluation of mean values in both groups, the Mann-Whitney U test was applied.

RESULTS

Systemic or local complications were not observed in any of the patients during or after the application of the treatment. The ages of the patients, their gender, initial AFAS, and VAS score of all the patients were similar. All these variables are given in Table 1. There was no significance in the above-mentioned variables of both groups. The values of AFAS in the PRP group were such that they were 84.6±4.8 at the sixth week after the treatment. It was 90.4±2.9 after six months of the treatment. The value of VAS at the 6th week was 75.3±4.7 and it was 80.1±4.2 in the sixth month. There were no complications in both groups. The comparison is given in Table 2. The mean AFAS of the PRP group at 6th week was 84.6±4.8 and in the sixth month, it was 90.4±2.9. The value of AFAS of the corticosteroid group at 6th week was 75.3±4.7 and it was 80.1±4.2 in the sixth month. The mean value of VAS in the PRP group at the 6th week was 2.5±1 and at the 6th month was 1±0.7. Likewise, the value of VAS in the corticosteroid group at 6th week was 4±1.2 and at 6th week was 2.7±0.8.

Table 1: Comparison of baseline characteristics of patients in both the groups

Variables	PRP Group n=60		Corticosteroid Group n=60		P-value
	n	Mean ± SD	n	Mean ± SD	
Age (year)		46.3±7.6		47±6.7	≥0.05
BMI		24.3±6.2		25.5±5.6	
Gender Male Female	 12 48		 14 46		≥0.05
Affected foot Right Left	 24 36		 26 34		≥0.05
VAS		62.4±8.6		60.6±5.9	≥0.05
AFAS		8.3±1		8.6±0.7	≥0.05

Table 2: Comparison of VAS and AFAS score of both groups

Variables	PRP Group n=60	Corticosteroid Group n=60	P-value (According to Mann-Whitney U test)	P-value (Difference in scores)
AFAS				
Baseline	62.4±8.6	60.6±5.9	>0.05	0.006
6th week	84.6±4.8	75.3±4.7	<0.001	0.003
6th month	90.4±2.9	80.1±4.2	<0.001	>0.05
VAS				
Baseline	8.3±1	8.6±0.7	>0.05	<0.001
6th week	2.5±1	4±1.2	<0.001	<0.001
6th month	1±0.7	4±1.2	<0.001	>0.05

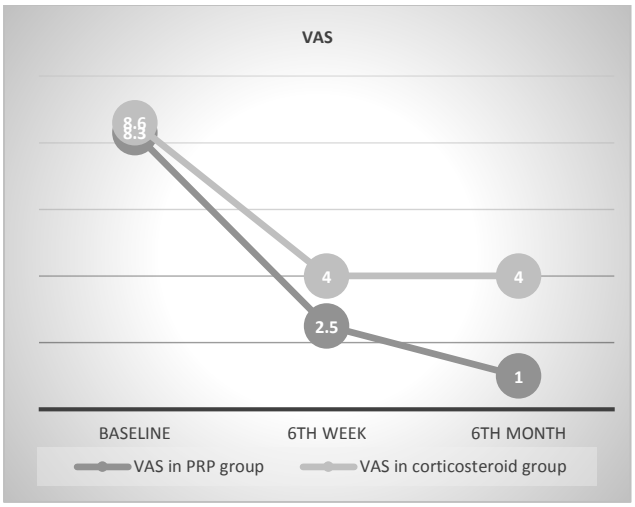

Figure 1: The difference between VAS in PRP and corticosteroids group

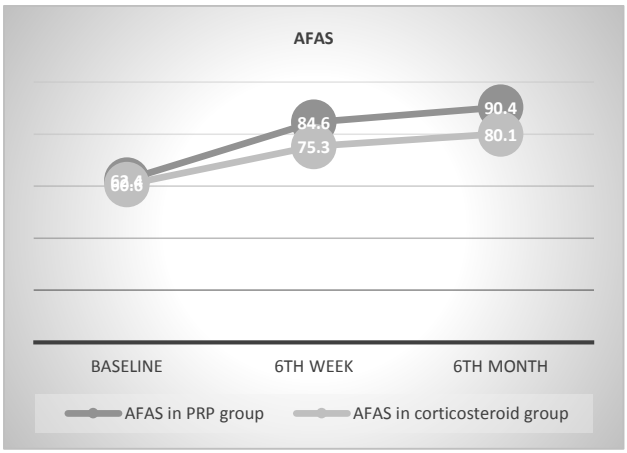

Figure 2: The difference between AFAS in PRP and corticosteroids group

DISCUSSION

The mean age of the participants in the present study was 46 years. Other such studies on plantar fasciitis have shown similar ages of the patients [9]. According to the study of Tabrizi et al, plantar fasciitis is common in obese persons [10]. While some studies suggest that the mean value of BMI of patients with plantar fasciitis is 30 kg/m^2 [11]. The BMI of the patients in the present study was 24.9 kg/m^2. The lower value of BMI of our study compared to another study could be due to participants belonging to low socioeconomic strata of the society.

There was no specific correlation of gender seen with plantar fasciitis in any literature. The present study suggests that the number of male patients was more than the number of female patients. Hence, a slight predominance of male patients was seen. However, the difference was not statistically significant. The exact pathology of plantar fasciitis is not certain. The common factors in this regard are excess of proteinous substance, vascularity, damage to collagen fibers, and proliferation of fibroblast in a focal region [12]. Corticosteroids are helpful in the inhibition of the proliferation of fibroblasts and the expression of proteinous substances [13]. According to the present study, the VAS score had reduced after the corticosteroid injection as compared to the VAS score taken before the injection. The improvement was more dominant in 6 months after the injection was administered.

It has been suggested by the study of Kalaci et al that plantar fasciitis is rather a generative process and not an inflammatory process [14]. This narrative has been proved by

histological examination of the tissue taken from plantar fasciitis. The findings suggested myxoid degeneration and degeneration of the fascia as well as bone marrow with vascular ectasia [12]. PRP is considered as an autologous source of growth factors such as transforming growth factor β (TGF-β), insulin-like growth factor-1 (IGF-1), vascular endothelial growth factor (VEGF), basic fibroblast growth factor (bFGF), and platelet-derived growth factor (PDGF). These factors are responsible for the migration and synthesis of collagen. This phenomenon leads to angiogenesis and hence helps in ligament and tendon healing. PRP is used in different sub-branches of orthopedics and medicine for the promotion of the healing process. According to the study of Vahdatpour et al, PRP is a better treatment option compared to corticosteroids [16]. However, in the study of Acosta et al, the rate of healing of both PRP and corticosteroids is similar [17]. The present study is consistent with the study of Acosta et al in terms of reduction of VAS score and betterment of AFAS score.

CONCLUSION

The observation of VAS score and AFAS score suggest that PRP injection and corticosteroids injection are equally effective in the treatment of plantar fasciitis.

Funding source: None

Conflict of interest: None

Permission: It was taken from the ethical review committee of the institute

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