

ORIGINAL ARTICLE

To Compare the Effectiveness of Platelet Rich Plasma vs Steroid Injection in the Management of Planter Fasciitis

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ABSTRACT

Objective: The study was done to compare the effectiveness of Platelet Rich Plasma (PRP) vs steroid injections in the management of planter fasciitis.

Study Design: It was a comparative study.

Place and Duration of Study: This study was conducted for the duration of one year from October 2021 to September 2022 in Pakistan Railway General Hospital, Rawalpindi.

Materials and Methods: The study was conducted on 500 patients that visited tertiary care unit for a period of one year. Two groups were made based on random sampling technique and type of treatment given for plantar fasciitis (Platelet Rich Plasma and steroid). After the preparation of platelet rich plasma by centrifugation method that separates the red blood cells from plasma and obtain the final volume of plasma with high concentration of platelets. A total of 3ml of platelet rich plasma was injected after all aseptic measures around the area of maximal tenderness in group A patients. 40 mg injection of triamcinolone acetonide was given to the all the participants in group B patients after doing all aseptic measures around the area of maximal tenderness after clinical examination

Results: There were 250 patients in each group including both male and females. The average age of patients in our study was 45.9 ± 5.6 years and 45.9 ± 4.5 years in both groups respectively. Patient in group A had more effective pain relief in long term follow up than patients in group B. The Visual Analog Scale (VAS) score values gradually decreased as the duration of treatment increased with the lowest value obtained as $0.68 \pm 0.65^*$ and $0.60 \pm 0.69^*$ for steroid and PRP group respectively. There was no post injection problem in either group.

Conclusion: Our study concludes that PRP administration for the treatment of plantar fasciitis can be more effective as compared to steroid as it gives positive results even after 12 months of follow-up.

Key Words: *Plantar Fasciitis, Steroid Injections, And Platelet-Rich Plasma (PRP), Foot Function Index (FFI), Visual Analog Pain Scale.*

Introduction

Plantar fasciitis also known as plantar fasciosis is an

orthopedic condition characterized by pain and tenderness in the heel and bottom of the foot. It results from the inflammation and micro tears in the plantar fascia. This condition affects daily activities such as walking and standing and can be paralyzing. There are several treatment options available for plantar fasciitis, including rest, medications, shockwave therapy, tapping and injections. Two highly known injection therapies used for plantar fasciitis are platelet-rich plasma (PRP) and steroid injections. In PRP therapy, the affected area is injected¹⁻² with a concentrated solution of platelets and growth factors from the patient's own blood. This solution is believed to promote healing and reduce inflammation with no adverse effect on the plantar fasciitis. Steroid injections, on the other hand, involve the injection of a corticosteroid into the affected area to reduce inflammation. Recent

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studies suggest the use of steroid injection if the pain is persistent for more than 6 weeks despite use of noninvasive modalities³. There is ongoing debate among medical professionals about the effectiveness of these two treatments for plantar fasciitis. Some studies suggest that PRP may be more effective than steroid while others suggest the opposite. A meta-analysis⁴⁻⁶ found that PRP was more potent than placebo injections in reducing pain, the effect was not statistically significant. Several studies have investigated the effectiveness of steroid injections for the therapy of plantar fasciitis. In addition to the meta-analysis, several other studies have also provided evidence for the effectiveness of PRP. The purpose of the following study was to determine the differences between the effectiveness⁷⁻⁸ of platelet-rich plasma (PRP) injection and steroid injection in the management of plantar fasciitis. Plantar fasciitis is most seen in people between the ages of 40 and 60 and is more common in women than men. PRP is a relatively new treatment for plantar fasciitis and more research is needed to determine its long-term effectiveness.

It is important to note that PRP is not suitable for everyone and should be avoided in cases of platelet dysfunction or bleeding disorders. Steroid injections have been used for decades to treat a variety of conditions, including plantar fasciitis. They are well-established treatment option and are effective in reducing pain and inflammation.⁹ They can have side effects, such as thinning of the skin or changes in skin color, especially if used repeatedly. They should not be used in patients who have an infection or skin condition at the injection site¹⁰. They should also be avoided in patients who are diabetic or have poor circulation to the feet. The study aimed to evaluate the safety and tolerability of both treatments, as well as their impact on quality of life.

Materials and Methods

The aim of this comparative study was to evaluate the effectiveness of platelet rich plasma vs steroid in patients with planter fasciitis. This study was conducted in the Department of orthopedics, Pakistan Railway General hospital, Rawalpindi from October 2021 to September 2022 on 500 patients who visited tertiary care unit for a period of one year. Methodology was designed after permission from ethical review board. Two groups were made based

on type of treatment given for plantar fasciitis (PRP and steroids). Participants were equally and randomly divided into 2 groups by lottery method and after recruitment of the participants, the nature of the research, as well as its goals, was explained to each participant and written informed permission was acquired from patients or their families. There were 250 patients in each groups. The average age of patients in our study was 45.9 ± 5.6 years and 45.9 ± 4.5 years in both groups respectively.

Patients with age 18 to 65 years old, diagnosed with the planter fasciitis and pain of more than 4 on a visual analog scale who failed to respond for conservative management were included in the study. Exclusion criteria included previous trauma/surgery on the affected heel, pregnancy, active infection, previous injections, and bleeding disorders. All participants had heel pain for at least 6 months and had failed previous conservative treatment. The injection of triamcinolone acetonide (40mg) was given to the all the participants in the steroid group. The injection of autologous platelet-rich plasma (3ml) was given to all the patients in the PRP group. For preparation of PRP, an initial method of centrifugation that separated the red blood cells from plasma followed by second centrifugation to concentrate platelets and ultimately obtain the final smallest volume of plasma with high concentration of platelets. The Statistical Package for the Social Sciences (SPSS) version 23 was used throughout the data analysis process. Descriptive statistics was used to outline the demographic and analytic characteristics of the participants. The primary outcome measured the change in pain score measured on a VAS after the injection. Secondary outcome measured functional improvement measured by the Foot Function Index (FFI), patient satisfaction, and adverse effects.

Results

There were 100 males and 150 females in PRP group and 118 males and 132 females in the steroid group. In the PRP group there were 130 patients whose right foot was affected, and 120 patients had left foot affected. In the Steroid group there were 120 patients with right and 130 with left foot affected as shown in table no. I.

Visual analogue scale score was compared for patients. The data was collected after 1, 6 and 12

Table I: Characteristic Features of Patients

Features	PRP group (number of patients=250)	Mean ±SD	Steroid group (Number of patients=250)	Mean ±SD	P value
Age (year)		45.9 ± 5.6		45.9±4.5	0.005
Gender (male/female)	(100/150)		(118/132)		0.003
Affected foot (right/left)	(130/120)		(120/130)		0.005

months of treatment. It was found as per VAS scores that the statistically significant improvement was observed in pain after 1, 6 and 12 months of treatment in case of both PRP and steroid groups. Table II shows the VAS score values gradually decreases as the duration of treatment increases with the lowest value obtained as $0.68 \pm 0.65^*$ and $0.60 \pm 0.69^*$ for steroid and PRP group respectively. The VAS scores for Steroid group are lower than PRP group in the initial duration of treatment but after a follow-up of 12 months. The mean VAS score of steroid group and PRP group was compared. The PRP VAS scored was better than steroid group.

Table II: VAS Scores Comparison of Both Treatment Groups for Pretreatment and Post Treatment at 1, 6 and 12 Months

	Pretreatment	1 Month	6 Months	12 Months
Steroid Group				
VAS	7.60 ± 0.82	4.00 ± 1.00*	2.80 ± 1.00*	0.68 ± 0.65*
PRP Group				
VAS	7.72 ± 0.84	6.44 ± 0.92*	3.92 ± 0.91*	0.60 ± 0.69*
*Significant at $p < 0.05$ Comparison of 1 month, 6 months & 12 months to pretreatment scores Mean ± SD				

The statistical analysis was conducted. For equality of mean the T test, for equality of variance the Levene's Test and degree of freedom was calculated. It was found that the data was significant statistically.

Table III: Statistical Analysis of the Results

Pairs	Levene's Test for Equality of Variances		t-test		Sig. (2-tailed)	95% Confidence Interval of the Difference	
	F	Sig.	t-test for Equality of Means	Degree of Freedom		Lower	Upper
Steroid PRP							
VAS0	0.006	0.940	-0.511	48	0.611	-0.592	0.352
VAS1	0.023	0.880	-8.994	48	0.000	-2.985	-1.895
VAS2	0.003	0.953	-4.143	48	0.000	-1.663	-0.577
VAS3	0.072	0.790	-0.423	48	0.674	-0.460	0.300

Discussion

Despite the introduction of multiple non-surgical methods for the effective treatment of plantar fasciitis, there is still needed to determine the ideal

procedure and there is utmost need to do the long term follow up of patients to determine the single modality that is efficient, cost effective with less complication compared to different surgical techniques that put more burden on patients and associated with higher complications. Recently the PRP use has gained attention for the treatment of foot and ankle pathologies¹¹. The corticosteroid injection help to relieve inflammation, promote fibrosis that ease pain and rapid healing with less complexity.¹² This study was designed for the comparison of the results of steroid injection and PRP for the plantar fasciitis treatment.

Our study has suggested that during the initial stages of treatment and after 1, 6 months of treatment the steroid injection had more functional outcomes than single dose of PRP for plantar fasciitis but after a follow-up of 12 months the mean VAS score was less for PRP as compared to steroid injection which suggest that long term effectiveness can be obtained by using PRP. Studies have shown that because of mechanical loading plantar fasciitis is caused by the inflammatory reaction to micro tears¹². Steroid injections are in use for treatment of plantar fasciitis, but it only gives short term positive results¹³. In our study we compared the Visual analogue scale scores for patients before treatment and after 1, 6 and 12 months of treatment for both groups. It was found as per VAS scores that there was a significantly noticeable improvement in pain after 1, 6 and 12 months of treatment in case of both PRP and steroid groups. Our study is in accordance with the previous reports where there was gradual reduction in VAS score after steroid and PRP treatment.

Table II shows the VAS score values that gradually decreases as the duration of treatment increases with the lowest value obtained as $91.05\%(0.68 \pm 0.65)^*$ and $92.27\%(0.60 \pm 0.69^*)$ for steroid and PRP group respectively. The average pain reduction for Steroid group is lower than PRP group after 1 and 6 months of treatment but after 12 months the values were calculated, and data revealed that the mean VAS score of PRP was less than the mean VAS score of steroid group which suggest that steroid injection can give better results for short term pain relief, but PRP dose can be used as a long-term treatment. Steroid injections have been used for decades to treat a variety of conditions, including plantar

fasciitis¹³. They are well-established treatment option and are effective in reducing pain and inflammation. They act quickly and the relief of pain is usually noticed within a few days¹⁴. Another study also explains the anti-inflammatory activity of steroid injections and PRP dose¹⁵. As per studies growth factors and proteins like vitronectin, fibronectin and thrombospondin found in PRP play an important role in the healing of tissue and for the regeneration of bones¹⁶. PRP with the assistance of growth factors stimulates stem cells to fasten the repair of cells and improves the circulation of blood.¹⁷ As per studies it was found that PRP also enhances the tenocyte proliferation for the fast recovery of tendon as it has growth factors that provides revascularization thereby increasing the expression of collagen in the tenocytes.¹⁸⁻²⁰ The statistical analysis was conducted. For equality of mean the T test, for equality of variance the Levene's Test and degree of freedom was calculated. It was found that the data was significant statistically. Our study shows the anti-inflammatory response of PRP dose after 1, 6 and 12 months and the long-term results were significantly better than steroids. In our study before treatment the VAS score in steroid group was 7.60 ± 0.82 and after treatment an average pain reduction was found to be $47.36\%(4.00 \pm 1.00)^*$, $36.48\%(2.80 \pm 1.00)^*$ and $91.05\%(0.68 \pm 0.65)^*$ for 1, 6 and 12 months respectively. Meanwhile the VAS score for PRP before treatment was 7.72 ± 0.84 and after 1,6 and 12 months of treatment by PRP dosage the average pain reduction was found to be $16.58\%(6.44 \pm 0.92)^*$, $49.22\%(3.92 \pm 0.91)^*$ and $92.27\%(0.60 \pm 0.69)^*$ respectively. That explains the gradual decrease in VAS score and slight difference in the VAS scores for PRP and steroid groups. Previous studies have reported that PRP has better outcomes than steroid for plantar fasciitis, our results showed that despite low VAS score in steroid group, PRP is better option as it gives long term results²⁰⁻²¹. It is important to note that PRP is not suitable for everyone and should be avoided in cases of platelet dysfunction or bleeding disorders.

Conclusion

Being an elective procedure, patient satisfaction following injection remains an important factor for the surgeon when recommending this procedure for treatment. Our study concludes that PRP

administration for the treatment of plantar fasciitis can be more effective as compared to steroid as it gives positive results even after 12 months of follow-up, therefore it can be considered as a long-term treatment as compared to steroid injections. However, more studies need to be done by using larger sample size and longer follow-up period so that a more elaborate and precise result can be made to better understand the efficacy of PRP.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon request.

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