

# Comparative Study of Efficacy of Corticosteroid Versus Analogues PRP in Chronic Plantar Fasciitis in Andhra Pradesh Population

B. Bhanu Pratap<sup>1</sup>, Kiran Kumar Tapal<sup>2</sup>

<sup>1,2</sup>Assistant Professor, Department of Orthopaedics, Vishwa Bharathi Medical College Panchikalapadu, RT Nagar, Kurnool.

**How to cite this article:** B. Bhanu Pratap, Kiran Kumar Tapal. Comparative Study of Efficacy of Corticosteroid Versus Analogues PRP in Chronic Plantar Fasciitis in Andhra Pradesh Population. Indian Journal of Public Health Research and Development/Volume 15 No. 1, January-March 2024.

## Abstract

**Background:** Plantar fasciitis is a common pathological condition of the foot and can be a challenge for clinicians to treat successfully.

**Method:** Out of 60 patients 30 patients were injected corticosteroid 2ml (8 mg) along with 0.5ml of plain 2% xylocaine using 20G wide bore needle. PRP (platelet rich plasma) was prepared from the autologous blood, drawn from cubital vein three BD vacutainer tubes which is 2.7 ml tube that contains 0.35 ml of 3.2% of sodium citrate as an anti coagulant. Blood was centrifuged twice, first time at 1200/rpm, second time 2400 rpm. The platelets were checked randomly by pathologist by Neubauer's chamber method or auto analyser. PRP was injected at tenderness site, after injecting 2% of xylocaine with 20 Gauge needle and follow-up was done for a week, 6th week, 3rd month and 6th months and outcomes of results were noted.

**Results:** Clinical manifestations were VAS Baseline score - 7.137 in PRP group, 7.214 was in steroid group. Baseline of AOFAS was 53 (SD±5.12) in PRP group, 54.6 (SD±3.30) in steroid group. VAS score at 6th week was 2.62 in PRP group, 1.94 in steroid, at 3rd month 1.94 in PRP, 2.89 in steroid group, at 6th month 1.42 in PRP and 3.79 in steroid group. AOFAS scores was highly significant ( $p < 0.001$ ) at 6th weeks, 3rd months and 6th months.

**Conclusion:** Corticosteroid therapy is more effective for short duration relief but PRP therapy is more effective for long term relief.

**Key Words:** platelet rich plasma, Corticosteroids, Plantar Fasciitis, 2% xylocaine, 20 Gauge Needle

## Introduction

Plantar fasciitis is classified as syndrome that results from repeated trauma to plantar fascia at its origin on the calcaneus. Plantar fasciitis is a common cause of heel pain and is the result of a degenerative process of plantar fascia at its calcaneal attachment. Age, Obesity, excessive weight bearing and tight Achilles tendon are the common predisposing

factors<sup>(1)</sup>. Plantar fasciitis presents in a most characteristic manner, a gradual onset and worsening with time, pain in the morning on rising from rest and localization over the medial slip of the origin of the fascia<sup>(2)</sup>. Methods of treatment are the use of insoles, modification of shoes, stretching, physiotherapy, ice or cold, NSAID, analgesics, shock wave therapy and immobilization<sup>(3)(4)</sup>. If not responded local corticosteroid and/or autologous platelet rich plasma

**Corresponding Author:** B. Bhanu Pratap, Assistant Professor, Department of Orthopaedics, Vishwa Bharathi Medical College Panchikalapadu, RT Nagar, Kurnool.

**E-mail:** bhanu7123@gmail.com

injected locally in the management of chronic plantar fasciitis. It was suggested that platelet rich plasma given locally was more effective than corticosteroid but some research have reported that local corticosteroid have been more effective than platelet rich plasma (PRP) hence attempt is made to compare the efficacy of both and outcome results were noted in adults of both sexes.

### Material and Method

60 (sixty) patients aged between 25 to 60 years who visited to orthopaedic

Department of Vishwa Bharathi Medical College Hospital, Penchikalapadu, RT Nagar, Kurnool, Andhra Pradesh were studied.

**Inclusive Criteria:** The patients diagnosed plantar fasciitis by clinical and radiological evaluation presenting a complaint of planter heel pain more than 6 week (>6 weeks) and plantar fascia thickness was > 4 mm at the area of maximum tenderness (USG of heel for plantar fascia) were selected for study.

**Exclusion criteria:** Patients with severe anaemia thrombocytopenia, immune compromised, non-cooperative patients were excluded from the study.

**Method:** Out of 50, 25 patients were given corticosteroid 2 ml (8 mg) and 25 patients were given PRP. Depomedrol injection along with 0.5ml of plain 2% xylocaine using 20 G wide bore needles into the point of maximum tenderness. Post injection, patients were asked to take rest for 15 minutes and then allowed to walk.

**PRP preparation and administration** - For the preparation of - PRP blood was withdrawn from cubital vein with the help of BD vacutainer eclipse in three BD vacutainer tubes which is 2.7ml tube that contains 0.5ml of 3.2% sodium citrate an anticoagulant and volume of approximately 2.35 ml for whole blood. It was prepared using a 2 - spin technique, in the 1<sup>st</sup> low spin step blood is centrifuged at 1200 rpm for 10 minutes in a Routine 380 R centrifuge model (Hettich, zentrifugen). After the formation of three layers (a bottom layer of RBC, an upper layer composed of plasma, platelets and some WBS an intermediate layer or Buffy coat, composed mostly WBC). The upper layer just above the Buffy coat was collected

with a 10 ml syringe; this collection was performed carefully to avoid disturbing the bottom layer of RBC and the Buffy coat layer. Depending upon the centrifugal force of the spin, the collected volume ranged from 0.75 ml to 1.25 ml in each BD vacutainer. Approximately 1 ml of upper layer of the sample that underwent the first spin step was collected and transformed to one empty tube (approximately 3 ml). The tube was centrifuged again for 10 minutes at 2400 rpm. The upper half of the plasma volume platelet poor plasma (PPP), was removed. The remaining volume of PRP was used for injection. Platelet count was estimated by pathologist. The PRP was randomly checked for number of platelets by Neubauer's chamber or auto analyser. Most of the sample had a platelet count more than 1,000,000/ $\mu$ l in 5 ml volume that is 5 times the baseline. After this the PRP is shaken by just turning the tube 2 to 3 times to mix the platelets.

**PRP injection technique** - patients was asked to resume supine position the involved foot was cleaned and prepared with spirit and povidoneIodine. The site of maximum tenderness i.e. medial aspect of the foot at the origin of plantar fascia was marked using marker. One ml of 2% plain xylocaine was infiltrated into the skin and subcutaneous tissue. Dry needling, also called peppering, was used to locally "injure" the soft tissue to stimulate the inflammatory response concomitant delivery of the PRP then modulates (enhances) the healing response. Each marking point of tenderness is penetrated with a 20 G-gauge needle until the underlying periosteum is touched. A gristly crunchy texture is audibly and palpably noted as the needle is advanced. After contacting the periosteum, the needle was gently partially withdrawn and then advanced in fan like wheel (peppering) the area 7 to 10 times. Next, 1 ml of the PRP is injected as this peppering manoeuvre is continued. This process is then carried out at each marked site.

**Post-injection care** - post injection, patients were asked to rest for 15 minutes and then allowed to walk. As PRP effectively induces an inflammatory response, some patients experienced minimal to moderate discomfort following the injection which usually last for upto 1 week. They are instructed to ice the injected area if needed for pain control and modify activity as tolerated. Acetaminophen was

the optional analgesic and NSAIDS were avoided. After 48 hours, patients were given a standardized stretching protocol to follow for 2 weeks. Patients were advised to avoid strenuous activities and rest for 2 weeks. No aggressive running or jumping activities were allowed for 2 weeks. After 4 weeks of the procedure, patients were allowed to proceed with normal sporting or recreational activities as tolerated. Any type of foot orthoses was not advised.

Each patient was assessed functionally using American orthopaedic Foot and ankle score (AOFAS), visual analogue scale (VAS) scores and radio-logically by ultrasound thickness of plantar fascia. The AOFAS, VAS scores were recorded before treatment and at follow up visit scheduled at 6 weeks, 3<sup>rd</sup> month and six month.

The duration of study was from May-2018 to March-2022

**Statistical analysis:** Clinical manifestations comparison, VAS, AOFAS, pain severity was studied by using t test and percentage. The statistical analysis was done in SPSS software. The ratio of male and female was 2:1.

Consent taken from participants.

### Observation and Results

- **Table-1:** Clinical manifestations of patients with chronic plantar fasciitis Right heel - 17 (56.6%) PRP group, 18 (60%) corticosteroid group,
- Left heel -12(40%) PRP group, 13 (43.3%) corticosteroid group
- VAS Baseline - 7.137 in PRP group, 7.214 in corticosteroid group,
- Baseline AOFAS score 53±5.1 in PRP group, 5.60 in corticosteroid group.
- Thickness of Fascia - 5.72 in PRP group, 5.60 in corticosteroid group.

**Table-2:** Comparative study of VAS in both group

- Pre-treatment-PRP group 7.137 in PRP group, 7.214 in corticosteroid group.

- 6 Weeks 2.62 in PRP group, 1.94 in corticosteroid group.
- 3 months 1.94 in PRP group, 2.89 in corticosteroid group.
- 6 months 1.42 in PRP, 3.79 in corticosteroid group.

**Table-3:** Comparison of pain sensitivity in both groups

- No pain VAS-0 at 6<sup>th</sup> months, 5 (6%) in PRP group only
- Mild pain VAS 1,2,3 - 6<sup>th</sup> week 14 (46.6%) in steroid, 24 (80 %) in PRP group, At 3<sup>rd</sup> month 25 (83.3%) at corticosteroid, 11 (36.6%) in PRP, At 6<sup>th</sup> month 20 (66.6%) in PRP and 5 (20%) in steroid
- Moderate pain (VAS 4,5,6) - pre-treatment 10 (33.3%) in steroid, 6 (20%) in PRP group, At 6<sup>th</sup> week, 16 (53.3%) steroid group, 15 (16.6%) in PRP group, At 3<sup>rd</sup> month 5 (16.6%), in steroid 19 (63.3%) in PRP group. At 6<sup>th</sup> month 4 (13.3%) PRP group, 23 (76.6%) steroid.
- In severe pain -(VAS 7, 8, 9) pre-treatment 19 (63.3%) in steroid group, 23 (76.6%) PRP group and no pain is reported later on.

**Table-4:** Comparison of AOFAS score in both groups -

- During pre-treatment 54 (±5.12) in PRP group, 55.30 (±3.20) in steroid group, t test 1.17 and p>0.24 (p value was insignificant).
- At 6<sup>th</sup> week 79.4 (±2.40) in PRP group, 86.04 (±1.30) in steroid group, t test 13.3 and p value was highly significant (p<0.001)
- At 3<sup>rd</sup> month 85.60 (±2.15) in PRP, 78.48 (1.88) in steroid group, t test value 13.65 and p value highly significant (p<0.001).
- At 6<sup>th</sup> months 88.04(±3.10) in PRP group, 72.64 (±3.30) in steroid group, t test 18.6 and p value highly significant (p<0.001)

### Discussion

Present comparative study of efficacy of corticosteroid versus Platelet Rich Plasma injection in the management of chronic plantar fasciitis in Andhra Pradesh Population. The clinical manifestations were: Right heel was treated in 17 (56.6%) persons

using PRP, 18(60%) were given corticosteroid. Left heel was treated in 12 (40%) persons using PRP, 13 (43.3%) were given corticosteroid. VAS Baseline 7.137 in PRP group, 7.214 in steroid group, Baseline of AOFAS 53 ( $\pm 5.12$ ) in PRP group, 54.6 ( $\pm 3.30$ ) in steroid group. Thickness of plantar fascia 5.72 in PRP group, 5.60 in steroid group (Table-1). VAS score at 6 weeks 2.62 in PRP group, 1.94 in steroid group. In 3rd month 1.94 in PRP group, and 2.89 in steroid group. At 6th months 1.42 in PRP, 3.79 in steroid group (Table-2). In Comparison AOFAS score in both groups: during pre-treatment 54 ( $\pm 5.1$ ) in PRP group, 55.3 ( $\pm 3.2$ ) in steroid group. At 6th weeks 79.4 ( $\pm 2.40$ ) in PRP group, 86.04 ( $\pm 1.30$ ) in steroid group, t test was 13.3 and  $p < 0.001$ , At 3rd month 85.6 ( $\pm 2.15$ ) in PRP, 78.48 ( $\pm 1.88$ ) in steroid group, t test was 13.65 and  $p < 0.001$ , At 6th month 88.04 ( $\pm 3.10$ ) in PRP, 72.64 ( $\pm 3.3$ ) in steroid, t test 18.6 and  $p < 0.001$  (Table-4). These findings are more or less in agreement with previous studies (5)(6)(7).

Plantar fasciitis is considered an overuse injury and such patient's history will typically reveal some combination of either intrinsic or extrinsic factors that contribute to the development of the injury. Extrinsic factors are due to unyielding surface on exercise (movement) and improper and excessively worn foot wear (8). Intrinsic factors include obesity, foot structure, reduced plantar flexion strength and reduced flexibility of the plantar flexor muscles and tensional malalignment of the lower extremity (9). The most often cause of plantar fasciitis is excessive pronation (inversion) of foot. Increased tension placed arch lowering during standing and walking.

The non-surgical management for the treatment of the symptoms and discomfort associated with plantar fasciitis are (1) reducing pain and inflammation (2) reducing stress to tolerate level (3) restoring muscle strength and flexibility involved tissue. Corticosteroid local injection gives sudden relief for pain and inflammation but to reducing stress, to tolerate and restoring muscle strength PRP proved to be efficient because enables cell proliferation, angiogenesis and cell migration are stimulated resulting in tissue regeneration. Platelets secrete anti microbial peptides, suggesting an antibiotic effect (10). Moreover PRP has anti-inflammatory and analgesic effects also. It is also reported that PRP is superior

to hyaluronic acid, visco supplementation because PRP is a biological product (11). Hence PRP HAS a multi potential application in orthopaedics & sport medicine. While corticosteroid has many side effects on prolong usage like osteoporosis, loss of immunity even addiction to steroids is also recorded.

### Summary and Conclusion

In the present comparative study of PRP and corticosteroids in the management of chronic fasciitis confirmed that PRP injection is an efficient and safe therapeutic option for the treatment of chronic plantar fasciitis but long duration treatment has to be the protocol to get satisfactory result. But this study demands further histo-pathological, nutritional, genetic, musculo-skeletal study. Because despite many contributing factors, none of these factors have proven to be predictive of clinical outcome, plantar fasciitis occurs at any age in both sexes and in many occupations.

**Limitation of study:** Owing to tertiary location of research centre and small number of patients and lack of latest technologies, we have limited findings and results.

**Table 1: Clinical Manifestations of patients with chronic plantar fasciitis**

(No. of patients: 60)

SI No	Manifestations	PRP group (30)	Corticosteroid Group(30)
1	Right heel	17 (56.6%)	18 (60%)
2	Left heel	12 (40%)	13 (43.3%)
3	VAS Base line score	7.137	7.214
4	Base line of AOFAS	53 $\pm$ 5.12	54.6 $\pm$ 3.30
5	Thickness of plantar fascia (in mm)	5.72	5.60

AOFAS = American orthopaedic Foot and ankle score, PRP = Platelet rich plasma, VAS = visual analogue scale

**Table 2: Comparison of VAS (Visual Analogue score) in both groups**

Visual score	PRP group (30)	Corticosteroid Group (30)
Pre treatment	7.137	7.214
6 Weeks	2.62	1.94
3 months	1.94	2.89
6 months	1.42	3.79

**Table 3: Comparison of pain severity in both groups**

VAS	Pre treatment		6 <sup>th</sup> week		3 <sup>rd</sup> month		6 <sup>th</sup> month	
	Steroid (%)	PRP (%)	Steroid (%)	PRP (%)	Steroid (%)	PRP (%)	PRP	Steroid
No pain VAS-0	0	0	0	0	0	0	5 (16%)	0
Mild pain VAS 1, 2 3	0	0	14 (46.6%)	24 (80%)	25 (83.3%)	11 (36.6%)	20 (66.6%)	6 (20%)
Moderate pain VAS 4, 5 6	10 (33.3%)	6 (20%)	16 (53.3%)	5 (16.6%)	5 (16.6%)	19 (63.3%)	4 (13.3%)	23 (76.6%)
Severe pain VAS- 7 8, 9	19 (63.3%)	23 (76.6%)	0	0	0	0	0	0
Worst pain VAS - 10	0	0	0	0	0	0	0	0

PRP = Platelet Rich Plasma, VAS = Visual Analogue Scale

**Table 4: Comparison of AOFAS score in both groups**

AOFAS score	PRP Group (30)	Corticosteroid group (30)	t test	p value
Pre-treatment	54 (SD±5.12)	55.30 (SD±3.20)	1.17	p>0.24
6 Weeks	79.4 (SD±2.40)	86.04 (SD±1.30)	13.3	P<0.001
3 Months	85.60 (SD±2.15)	78.48 (SD±1.88)	13.65	P<0.001
6 Months	88.04 (SD±3.10)	72.64 (SD±3.30)	18.6	P<0.001

AOFAS = American Orthopaedic Foot and Ankle Society Score

PRP = Platelets Rich Plasma

The research paper was approved by Ethical committee of Vishwa Bharathi Medical College and hospital Penchikalapadu, RT Nagar, Kurnool-518467.

**Conflict of Interest:** No

**Self:** Funding

## References

1. Corn wall MW, Mcpoil TG - plantar fasciitis Aetiology and treatment J. ortho sports phys. The 1999, 9; 756-59.
2. Gullen NP, Singh D - Plantar fasciitis a review Br. J. Hosp. Med. (London) 2006, 67, 72-6.

3. Young CC, Rutherford DS - Treatment of plantar fasciitis *Journal of Am. Family physician* 2001, 63, 467-78.
4. Chandler TJ, Kiber WB - Biochemical approach to the prevention, treatment and rehabilitation of plantar fasciitis *sports Med.* 1999, 15, 344-52.
5. Taunton J, Raycon M, Cemant D - Retrospective case-control analysis of 2002 running injuries *Br. J. Sports Med.* 2002, 36, 95-101.
6. Buchbinder R - Clinical practice plantar fasciitis *N Engl. Med.* 2004, 350, 2159-66.
7. Lemant H, Ammirati K - Degenerative process (fasciosis) without inflammation *J. Am. Padiatr. Med. Ass.* 2003, 93, 234-37.
8. Crawford F, Thomson C - Interventions for treating plantar heel pain (Review) *Cochrane* 2003, 19, 803-811.
9. Kan F, Buda R - Platelet rich plasma: inter articular knee injections produced favourable results and degenerative cartilage lesions - knee surg. *Sports traumatol. Arthrosc.* 2010, 18, 472-479.
10. Drago L, Bortolin M - Anti microbial activity of pure plate rich plasma against micro-organisms isolated from and cavity *BMC microbial* 2013, 13, 47-51.
11. Krivickas LS - Anatomical factors associated with overuse sports injuries *sports Med.* 1997, 24; 132-146.