

Original Research Article

Platelet rich plasma in treatment of plantar fasciitis

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ABSTRACT

Background: Platelet rich plasma (PRP) has been a breakthrough in the field of medicine especially in the field of orthopaedics for enhancing bone and soft tissue healing. Plantar Fasciitis is a very common problem in the field of orthopaedics and are very difficult to treat and a challenge to orthopaedicians. The aim of our study was to find out the efficacy of autologous PRP in relieving pain in patients with plantar fasciitis.

Methods: In this study, 25 patients with plantar fasciitis (age above 18 years) were selected. The pain intensity was assessed with visual analogue score initially and during follow up. All subjects were given single autologous intralesional PRP injection and the results were assessed using difference in VAS.

Results: The mean pain score at presentation was 8.08. The mean pain scores at subsequent intervals of 1,2,4,6 months after injection were 4.32, 2.60, 1.88 & 2.00 respectively. ($P < 0.05$ which is statistically significant). The maximum pain relief was seen at 4th month post PRP injection and the pain relief was sustained till the last follow up.

Conclusions: From our study we have found that intralesional autologous PRP is effective in relieving pain in patients with plantar fasciitis. PRP is biological and can be a safe adjuvant in the treatment of Plantar Fasciitis.

Keywords: Platelet rich plasma, Plantar fasciitis, Visual analogue score

INTRODUCTION

Platelet rich plasma (PRP) has been a breakthrough in the field of medicine especially in the field of orthopaedics for enhancing bone and soft tissue healing. Plantar Fasciitis is a very common problem in the field of orthopaedics and are very difficult to treat and a challenge to orthopaedicians. Autologous PRP is a simple and cost effective means of treating plantar fasciitis by tissue regeneration.¹

Plantar fasciitis is one of the most common causes of heel pain in adults. The cause of pain is due to collagen degeneration at the origin of plantar fascia. The plantar fascia is thickened fibrous fascia that originates from the

medial tubercle of calcaneum and run forward to support the longitudinal foot arch.

The aim of our study was to find out the efficacy of autologous PRP in relieving pain in patients with plantar fasciitis.

METHODS

This is a prospective trial involving the patients in the department of orthopedics, PSGIMSR Coimbatore, Tamil Nadu, India from Jan 2015 to Jan 2016.

In this study, 25 patients with plantar fasciitis (age above 18 years) were selected. The pain intensity was assessed

with visual analogue score initially and during follow up. All subjects were given single autologous intralesional PRP injection and the results were assessed using difference in VAS.

Selection of patients

Patients with history of pain and localized tenderness on the medial calcaneal tubercle.² The classic sign is pain that occurs with few steps in the morning or at the start of walking which decreases as they warm up.²

Inclusion criteria

Patients clinically diagnosed to have plantar fasciitis, patients not responding to conservative treatment even after a minimum period of 3 months, both males and females of age 18 years and above.

Exclusion criteria

Less than 3 month duration of plantar fasciitis, patients without any trial of conservative treatment, recent local steroid injection (less than 2 months), infection or ulcer at the injection site, rheumatoid arthritis, seronegative spondyloarthritis, pregnant ladies, patients younger than 18 years, suspicion of diagnosis.

Methodology

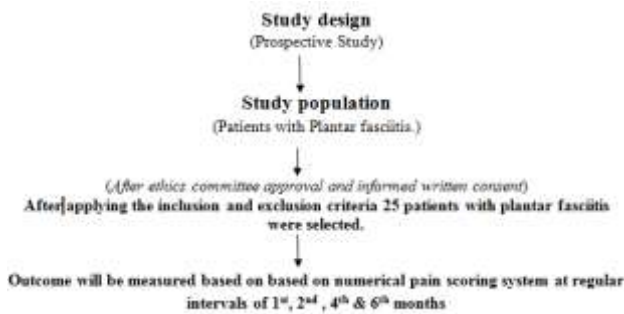


Figure 1: Study design.

Method of preparation of PRP

PRP was prepared using double spin centrifugation method.

10 ml of venous blood is drawn from cubital vein. The blood is transferred into 2.7ml vacutainer prefilled with acid citrate dextrose. Acid citrate dextrose will bind to calcium and prevents blood clotting with no known interference to platelet function and no contraindications for using in human beings. The blood is then transferred in the vacutainer till the marking and centrifugation was done. Initially, with 1500 RPM for 3 minutes. After the initial rotations, blood was separated into plasma and RBC. The plasma will lie in the top with light yellow colour and was withdrawn and transferred into another

container without mixing RBC. Later this container is again centrifuged with 2500 rpm FOR 3 MINUTES. After the 2nd centrifugation, the plasma is separated into 2 layers. The top half is platelet poor plasma and bottom half will be platelet rich plasma. The top half is discarded and bottom half is used for infiltration.

Technique of infiltration

Using a 21 Gauge, 1 and 1/2 inch needle, 1ml PRP is injected initially over the maximum tenderness point, and another 1 ml, was injected into the surrounding tissue with the same entry portal. This technique is known as peppering technique.

Pain scoring system

Visual analogue pain scoring system was used (Figure 2).

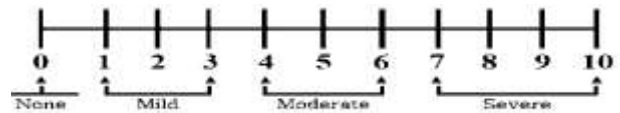


Figure 2: Visual analogue scoring system for assessment of pain.

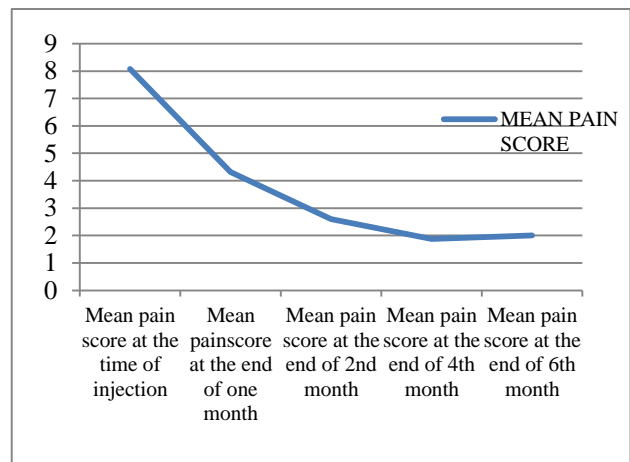


Figure 3: Mean pain score.

RESULTS

Patients were analyzed for pain relief subjectively at 0, 1, 2, 4 and 6 months. The results are given below.

Mean pain score

The mean pain score of patients with plantar fasciitis at 0, 1,2,4,6 months were 8.08, 4.32, 2.60, 1.88 & 2.00 respectively. While comparing the results at 0,1,2,4,6 months follow up, it was found that patients started getting pain relief at one month post injection, which was statistically significant (p value <0.05). However the maximum pain relief was seen at 4th month post injection which was also statistically significant (p value <0.05).

Table 1: Showing mean pain scores at 0, 1, 2, 4 and 6 months intervals.

Patients receiving	Mean pain score at the time of injection	Mean pain score after 1 month	Mean pain score after 2 months	Mean pain score after 4 months	Mean pain score after 6 months
PRP					
Plantar Fasciitis	8.08	4.32	2.6	1.88	2

Table 2: Showing Mean, T-Test and P-values at 0, 1, 2, 4 and 6 months intervals.

Pairs	Time interval	Mean	T-Test	P- Value
Pair 1	Pain at presentation & 1 month	4.32 ± 0.802	16.660; CI (3.29-4.22)	<0.00
Pair 2	Pain at presentation & 2 month	2.60 ± 0.645	33.309; CI (5.1-5.8)	<0.00
Pair 3	Pain at presentation & 4 month	1.88 ± 0.881	26.847; CI (5.72-6.67)	<0.00
Pair 4	Pain at presentation & 6 month	2.00 ± 0.957	24.877; CI (5.57-6.58)	<0.00

Statistical analysis

Statistical analyses were performed by SPSS for windows 19.0 software system version. Comparing the results at 0, 1, 2, 4, 6 months. P value for the test was taken as 0.05. Our study shows that the pain relief obtained following autologous PRP injection is statistically significant.

DISCUSSION

Platelet rich plasma (PRP) is also known as platelet rich concentrate, autologous platelet gel or platelet releasate. Platelet rich plasma is a portion of the plasma fraction of autologous blood with a concentration of platelets above the base line values.³ In addition to platelet concentrate, autologous PRP contains complement of clotting factors and secretory proteins.⁴ Normal platelet counts ranges between 150000/ μ L and 350000/ μ L, and average about 200000/ μ L in blood.⁵ "PRP was introduced by M. Ferrari in 1987 as an autologous component in an open heart surgery to avoid homologous blood product transfusion".⁶

Platelets contain biologically active substance for blood clotting, such as coagulation factors, adhesive proteins and protease inhibitors. Platelets contain growth factors like TGF β 1, CGF, VEGF, and PDGF.^{7,8} When activated these growth factors initiates the process of tissue healing by cellular proliferation and differentiation, chemo taxis, tissue debris removal, angiogenesis, and extra cellular matrix formation.^{9,10} These properties of autologous PRP are used in the treatment of plantar fasciitis. An added advantage of autologous PRP is that it eliminates concerns about immunogenic reactions and disease transmission.¹¹

Our study was a prospective study including 25 patients with plantar fasciitis (age above 18 years). The pain intensity was assessed with visual analogue score initially and during follow up. PRP was prepared by double spin centrifugation method and the platelet count in our samples ranged between three to six lakhs per cc. All subjects were given single intra-lesional PRP injection and the results were assessed using difference in VAS. In

our study we did not use local anaesthetic agent which could bias our study by producing pain relief.

The results of our study matched with the results of the study by Ehab Mohamed Selem Ragab et al on 25 patients with plantar fasciitis, they concluded that average pain at the time of presentation was 9.1 and post autologous PRP injection was 1.6 at end of follow up (10.3 months).¹ Which was statistically significant (P <0.001).

In a comparative study by Ertugrul Aksahin et al they concluded that both PRP and corticosteroid treatment is equally effective in treating plantar fasciitis.²

The mean pain score at presentation was 8.08. The mean pain scores at subsequent intervals of 1,2,4,6 months after injection were 4.32, 2.60, 1.88 and 2.00 respectively. (P <0.05 which is statistically significant). The maximum pain relief was seen at 4th month post PRP injection and the pain relief was sustained till the last follow up.

The limitations of our study were that our study is not a randomized control double-blinded study, and the sample size was small and follow up was of shorter duration. The available data is insufficient to validate the efficacy of PRP in relieving pain in patients with Plantar Fasciitis. Further randomized control studies with large study population and the longer duration of follow up are needed to validate the efficacy of autologous PRP in the management of plantar fasciitis.

CONCLUSION

From our study we have found that intralesional autologous PRP is effective in relieving pain in patients with plantar fasciitis. PRP is biological and can be a safe adjuvant in the treatment of Plantar Fasciitis.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Ragab EMS, Othman AMA. Platelet rich plasma for treatment of chronic plantar fasciitis. *Arch Orthop Trauma Surg.* 2012;132:1065-70.
2. Aksahin E, Dogruyol D, Yuksel HY, Hapa O, Dogan O, Celebi L, et al. The comparison of the effects of corticosteroids and platelet rich plasma for treatment of plantar fasciitis. *Arch Orthop Trauma Surg.* 2012;132:781-5.
3. Marx RE, Carlson ER, Eichstaedt RM, Schimmele SR, Strauss JE, Georgeff KR. Platelet rich plasma: growth factor enhancement for bone grafts. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1998;85:638-46.
4. Mehtra S, Watson JT. Platelet rich concentrate: basic science and current clinical applications. *J Orthop Trauma.* 2008;22(6):433-43.
5. Robert E Marx: platelet rich plasma what is prp and what is not PRP. *Implant Dentistry.* 2001;10(4):225-8.
6. Ferrari M, Zia S, Valbonesi M, Henriquet F, Venere G, Spagnolo S, et al. A new technique for hemodilution, preparation of autologous platelet-rich plasma and intraoperative blood salvage in cardiac surgery. *Int J Artif Organs.* 1987;10(1):47-50.
7. Maynard DM, Heijnen HF, Horne MK, White JG, Gahl WA. Proteomic analysis of platelet alpha-granules using mass spectrometry. *J Thromb Haemost.* 2007;5(9):1945-55.
8. Foster TE, Puskas BL, Mandelbaum BR, Gerhardt MB, Rodeo SA. Platelet-rich plasma: from basic science to clinical applications. *Am J Sports Med.* 2009;37(11):2259-72.
9. Sanchez AR, Sheridan PJ, Kupp LI. Is platelet-rich plasma the perfect enhancement factor? : a current review. *Int J Oral Maxillofac Implants.* 2003;18:93-103.
10. Einhorn TA. The science of fracture healing. *J Orthop Trauma.* 2005;19(10):4-6.
11. Alsousou J, Thompson M, Hulley P, Noble A, Willet K. The biology of platelet rich plasma and its application in trauma and orthopaedic surgery. *J Bone Joint Surg Br.* 2009;91(8):987-96.

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