



CLINICAL OUTCOME OF AUTOLOGOUS PLATELET RICH PLASMA INJECTION IN PLANTER FASCITIS

Orthopaedics

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ABSTRACT

Background: Planter fasciitis is a very common cause of heel pain, which resulting in significant morbidity and hamper activity of daily living. There are many treatment modalities are available for planter fasciopathy including NSAIDS physical therapy and steroid injections. **Methodology:** At tertiary center 50 patients with unilateral planter fasciitis who fulfilled the inclusion criteria and completed the follow up enrolled for study and followed for duration of 6 month. All patients included in the study were assessed using the preset proforma **Result:** The mean age of presentation was 52.4 ± 9.7 years (range 20-65). The pre-injection VAS score was 7.94 ± 0.61 which improved to 1.12 ± 0.32 at final follow which was significant on statistical analysis ($p < 0.005$). The FADI component of AOFAS score was measured initially at presentation it was 35.32 ± 2.65 which was significantly ($p < 0.005$) improved to 88.74 ± 1.084 on final follow up at 6 months.

KEYWORDS

PRP- platelet rich plasma PF – planter fascia VAS – visual analogue scale FADI – foot ankle disability index AOFAS – American orthopedic foot and ankle score

INTRODUCTION

Planter fasciopathy is one of the major etiologies behind the heel pain in adults. It is bilateral in 30% of patients presenting with heel pain in orthopedic OPD.^{1,2} The pathophysiology of the disease is seems to be multifactorial with several established risk factor like prolonged weight bearing, obesity, malalignment of foot, flat foot and it althetes.³ It is a self-limiting disease with a long chronic period which require a long duration of rehabilitation and conservative management like rest, eccentric stretching exercises, NSAIDS, orthosis like night splints etc.^{4,5,6} Failure of conservative management and long chronic period demand invasive treatment like corticosteroid injection in planter fascia at calcaneum insertion site as it is the origin of pain in these cases but its results are short term and associated with complication like injection site infection, heel pad atrophy and in some cases planter fascia rupture.^{7,8} There is no gold standard treatment modality available for this condition till now. Injection of autologous platelet rich plasma in planter fascia is recently proposed treatment in managing this condition as it is evidenced to have many growth factor and cytokines that may help in accelerating the healing process and also it does not have side effects.⁹

Aims And Objective

The aim of this study to see the effectiveness of PRP in planter fasciitis

Inclusion Criteria

- Age between 20 – 65 years
- Unilateral disease
- Failed conservative treatment for long duration
- Patients who gave informed consent

Exclusion Criteria

- Patients with history of previous injection of steroid in last 3 months
- History of previous foot surgery or any deformity
- Bilateral disease
- Neuropathy
- BMI > 30
- Gout
- Infection
- Any cardiovascular disease, renal aur hepatic disease
- Pregnancy or breast feeding
- Spondyloarthropathy
- Complex regional pain syndrome
- Not willing to give consent

Mehtodology

This is a prospective study conducted at tertiary level hospital in department of orthopaedics after approval from ethical committee. Total 80 patients with age between 20 – 65 years were enrolled for study 20 patients didn't give consent for participation and 10 patients didn't complete the follow-up. Total 50 patients after informed consent were thoroughly examined and detailed history was taken according to set proforma. The VAS score and FADI of AOFAS score was calculated at time of presentation, 6-week, 12 week and 6 months. All the patients were given single dose of PRP in planter fascia then 3 days of antibiotic with analgesics were prescribed. All the patients who received single dose of PRP regularly took physiotherapy and were systematically assessed at every follow up.

PRP was prepared by centrifuging the autologous blood and full aseptic condition.

- Blood was collected in acidified citrate dextrose vials and centrifuged in two phases
- Soft spin- plasma is collected and transferred to plain vial
- Hard spin- upper 2/3 of plasma is discarded and remaining is platelet rich plasma is collected in sterile vial for injection.

All the patients were observed in day care after injection and then followed up for 6 months Data collected was statistically analyzed using SPSS software, chi square test applied and significant differences ($p < 0.005$) in values were noted.

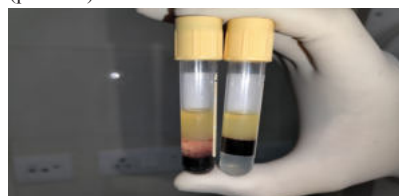


Image 1 : Plasma After Soft Spin

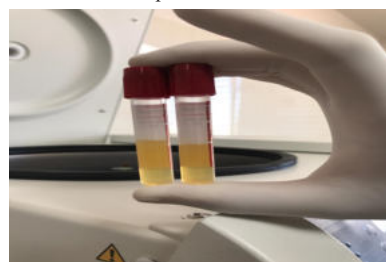


Image 2 : Plasma Collected In Plain Vial**Image 3 : After Hard Spin Prp Is Collected****Image 4 : Prp Is Injected In Planter Fascia**

RESULTS

- Total number of patients in study were 80.
- Out of 80 patients 20 patients didn't gave consent for intervention.
- 10 patients didn't present for regular follow up.
- So total 50 patients follow up was took for result analysis.
- The mean of presentation in our study was 52.4 ± 9.7 years with age ranging from 20 years to 65 years in which 7 patients were below 40 years and rest were above 40.
- There were 26 females and 24 males in study.
- Pre injection VAS score was 7.93 ± 0.62 which improved to 5.85 ± 0.35 ($p < 0.005$), 3.12 ± 0.92 ($p < 0.005$), 1.12 ± 0.33 ($p < 0.005$) at 6-week, 12 week and 6 months respectively.
- Pre injection FADI score was 35.28 ± 2.67 which improved to 61.67 ± 4.26 ($p < 0.005$), 80.55 ± 4.86 ($p < 0.005$), 88.73 ± 1.09 ($p < 0.005$) at 6 weeks, 12 weeks and 6 months respectively
- Platelet estimation done in whole blood, soft spin plasma, hard spin plasma which was approx. 2 lakh/cu.mm, 3.2 lakh/cu.mm, 5 lakh/cu.mm respectively

DISCUSSION

Planter fasciitis is a very common condition. It is often self-limiting condition. Most of the patients get relief spontaneous by the end of one year.¹⁰ But in some patients this condition lands up in chronic form and affect the activity of daily living and also creates a burden to health care system.^{11,12} In this disease the many patients use analgesics for long term that also add to significant morbidity. PRP therapy on contrary came out to be the good alternative to the disease management as the result suggest. There is various study which suggest that it is not inflammatory condition rather it is a degenerative pathology due to repetitive microtrauma at planter fascia origin.^{13,14} Repetitive microtrauma due to excessive use, reduced blood flow provide less oxygen and nutrients supply to planter fascia that led to slowing of healing process and leading to degeneration of fascia in long standing cases. Histological analysis of the planter fascia showed no sign of acute inflammation instead there signs of failure of healing process like collagen necrosis, chondroid metaplasia, Angio fibrotic degeneration and matrix calcification.^{23,24,25} Planter fasciitis management is mainly depended on conservative management non-steroidal anti-inflammatory drugs, splinting, physical therapy inform of tissue massage, planter fascia stretching exercises arch support, soft sole, arch support.^{15,16} Corticosteroid injection in planter fascia origin is mainly used in cases of refractory cases which are not relived by conservative management as it provide short term pain relief as corticosteroids have anti-inflammatory effects that help in reducing the pain in planter fasciitis.^{17,18} It require multiple doses of injection in planter fascia but it also carries risk of infection, planter fascia rupture, nerve injury, heel pad atrophy, osteomyelitis, abscesses formation, depigmentation of skin, relapse of disease.^{19,20,21} There are many studies

suggest that it contains cytokines, interleukins, and various growth factors like TGF(tumor like growth factor), VEGF(vascular endothelial growth factor), PDGF(platelet derived growth factors).²² These factors initiate the healing process at the site of disease in planter fascia which lead to disease remission and relief in symptoms.²³ In our study all patients were administered doses of platelet rich plasma in operation theatre under full aseptic precaution to reduce the chances of infection.

There are many randomized control trials were for assessing the efficacy of autologous platelet rich plasma injection therapy in planter fasciitis. Ragab et al.²⁶ in their study concluded that there was complete alleviation of pain with single dose platelet rich plasma injection in 88% of their patients ($n=25$) at 12-month follow-up. Martinelli & Marinozzi²⁷ did a study on 14 patients of plantar fasciitis who were given three doses of autologous platelet rich plasma injection and at 12 month follow up VAS scores had reduced from 7.1 pre-injection to 1.9 at the 1-year follow-up which was significant. Kumar et al.²⁸ did study on 44 patients with total heels were 50, the patients enrolled in the study received single dose of autologous platelet rich plasma injection. He reported that at 6-month post-injection, baseline RM score, VAS score and AOFAS improved from mean 4 to 2 ($p < 0.001$), 7.7 to 4.2 ($p < 0.001$) and 60.6 to 81.9 ($p < 0.001$) respectively.

There was a comparative study on effects of platelet rich plasma injection and corticosteroid injection was done by Jain and Murphy at al.²⁹ in this they compared platelet rich plasma injection with steroid injections and reported that the mean VAS, AOFAS, and RM scores in the PRP group was 3.3, 88.5, and 1.9 respectively and in the steroid group was 5.3, 75, and 2.6 respectively at the end of 12-month follow-up and this difference was statistically significant. Shetty and Dhillon et al.³⁰ reported that after 3-month follow-up post PRP injection, VAS, FADI of AOFAS scores were significantly improved in both steroid and PRP groups. Say et al.³¹ also conducted a study and reported that the mean AOFAS in patients who received PRP injection was 85.5 ± 4.2 and 90.6 ± 2.6 , compared with 75.3 ± 4.8 and 80.3 ± 4.7 in the steroid group, respectively at 6 weeks and 6-month follow-up. The difference in the scores were statistically significant ($p < 0.001$). All the studies concluded that the effects of platelet rich plasma injection in planter fasciitis showed better functional outcome and also the remission of disease was early. Above studies also suggest that the long-term effect of autologous platelet rich plasma injection has better outcome than the corticosteroid injection. Also, there is less chances of relapse of disease in PRP therapy. In our study the results were significant and also comparable with the other studies. All the patients in our studies didn't have any side-effects after PRP therapy. Patients tolerated the injection very well and all patients given injection under all aseptic precaution and managed at day care.

CONCLUSION

Planter fasciitis is a self-limiting condition but it significantly increases the morbidity and hampers the activity of daily living. There many treatment modalities available for treatment of planter fasciitis like physical therapy, NSAIDS, local steroid therapy but these all only reduces the symptoms of the disease. Most of the patients land up in chronic disease which is very difficult to treat and the current management strategies carries burden of many side effects. In our study, we conclude that autologous platelet rich plasma injection therapy is noble and carries minimal side effects like increase in pain in first week of therapy which is easily managed with oral analgesics. This therapy is efficacious in managing planter fasciitis and significantly reduce the use of analgesics with gradual and early return to normal lifestyle. Although there are limitation of this study is that there is small study population and short duration of follow up. Randomized control trial with larger study population and longer duration of follow up will be required to the assess the benefits of autologous platelet rich plasma injection therapy in management of chronic planter fasciitis in long term.

REFERENCES

1. Lapidus, P. W., & Guidotti, F. P. (1965). Painful heel: report of 323 patients with 364 painful heels. *Clinical Orthopaedics and Related Research*, 39, 178–186. (PMID: 14289759).
2. Sadat-Ali, M. (1998). Planter fasciitis/calcaneal spur among security forces personnel. *Military Medicine*, 163(1), 56–57. (PMID: 9465574).
3. Irving DB, Cook JL, Menz HB. Factors associated with chronic planter heel pain: a systematic review. *J Sci Med Sport* 2006;9:11–22. discussion 23–14
4. Tong KB, Furia J. Economic burden of planter fasciitis treatment in the United States. *Am J Orthop (Belle Mead NJ)* 2010;39:227–31.
5. Irving DB, Cook JL, Young MA, et al. Impact of chronic planter heel pain on health-related quality of life. *J Am Podiatr Med Assoc* 2008;98:283–9.

6. Toomey EP. Plantar heel pain. *Foot Ankle Clin* 2009;14:229–45.
7. Cheung JT, An KN, Zhang M. Consequences of partial and total plantar fascia release: a finite element study. *Foot Ankle Int* 2006;27:125–32.
8. Tatli YZ, Kapasi S. The real risks of steroid injection for plantar fasciitis, with a review of conservative therapies. *Curr Rev Musculoskelet Med* 2009;2:3–9.
9. Lee, T. G., & Ahmad, T. S. (2007). Intralesional autologous blood injection compared to corticosteroid injection for treatment of chronic plantar fasciitis. A prospective, randomized, controlled trial. *Foot Ankle International*, 28(9), 984–990. <https://doi.org/10.3113/FAI.2007.0984>. (PMID: 17880872).
10. Wolgin, M., Cook, C., Graham, C., & Mauldin, D. (1994). Conservative treatment of plantar heel pain: long-term followup. *Foot and Ankle International*, 15(3), 97–102. <https://doi.org/10.1177/107110079401500303>. (PMID: 7951946).
11. , K. B., & Furiá, J. (2010). Economic burden of plantar fasciitis treatment in the United States. *American Journal of Orthopaedics (Belle Mead NJ)*, 39(5), 227–231. (PMID: 20567740).
12. Irving, D. B., Cook, J. L., Young, M. A., & Menz, H. B. (2008). Impact of chronic plantar heel pain on health-related quality of life. *Journal of the American Podiatric Medical Association*, 98(4), 283–289. <https://doi.org/10.7547/0980283>. (PMID: 18685048).
13. Buchbinder, R. (2004). Clinical practice. Plantar fasciitis. *New England Journal of Medicine*, 350(21), 2159–2166. <https://doi.org/10.1056/NEJMcp032745>. (PMID: 15152061).
14. Lemont, H., Ammirati, K. M., & Usen, N. (2003). Plantar fasciitis: a degenerative process (fasciosis) without inflammation. *Journal of the American Podiatric Medical Association*, 93(3), 234–237.
15. ornwall, M. W., & McPoil, T. G. (1999). Plantar fasciitis: etiology and treatment. *Journal of Orthopaedic and Sports Physical Therapy*, 29(12), 756–760. <https://doi.org/10.2519/jospt.1999.29.12.756>. (PMID: 10612073).
16. Toomey, E. P. (2009). Plantar heel pain. *Foot and Ankle Clinics*, 14(2), 229–245. <https://doi.org/10.1016/j.fcl.2009.02.001>. (PMID: 19501805).
17. Genc, H., Saracoglu, M., Nacir, B., Erdem, H. R., & Kacar, M. (2005). Long-term ultrasonographic follow-up of plantar fasciitis patients treated with steroid injection. *Joint Bone Spine*, 72(1), 61–65. <https://doi.org/10.1016/j.jbspin.2004.03.006>. (PMID: 15681250).
18. Kiter, E., Celikbas, E., Akkaya, S., Demirkan, F., & Kiliç, B. A. (2006). Comparison of injection modalities in the treatment of plantar heel pain: a randomized controlled trial. *Journal of the American Podiatric Medical Association*, 96(4), 293–296. <https://doi.org/10.7547/0960293>. (PMID: 16868321).
19. uccilli, T. A., Jr., Hall, H. R., & Solmen, J. D. (2005). Sterile abscess formation following a corticosteroid injection for the treatment of plantar fasciitis. *The Journal of Foot and Ankle Surgery*, 44(6), 466–468. <https://doi.org/10.1053/j.jfas.2005.07.020>. (PMID: 16257677).
20. Acevedo, J. I., & Beskin, J. L. (1998). Complications of plantar fascia rupture associated with corticosteroid injection. *Foot and Ankle International*, 19(2), 91–97. <https://doi.org/10.1177/107110079801900207>. (PMID: 9498581).
21. Sellman, J. R. (1994). Plantar fascia rupture associated with corticosteroid injection. *Foot and Ankle International*, 15(7), 376–381. <https://doi.org/10.1177/107110079401500706>. (PMID: 7951973).
22. Molloy, T., Wang, Y., & Murrell, G. (2003). The roles of growth factors in tendon and ligament healing. *Sports Medicine (Auckland, N. Z.)*, 33(5), 381–394. <https://doi.org/10.2165/00007256-200333050-00004>. (PMID: 12696985).
23. Jozsa L, Reffy A, Kannus P, et al. Pathological alterations in human tendons. *Arch Orthop Trauma Surg* 1990;110: 15–21.
24. Snider MP, Clancy WG, McBeath AA. Plantar fascia release for chronic plantar fasciitis in runners. *Am J Sports Med* 1983;11:215–9.
25. Eppley BL, Woodell JE, Higgins J. Platelet quantification and growth factor analysis from platelet-rich plasma: implications for wound healing. *Plast Reconstr Surg* 2004;114:1502–8.
26. Ragab, E. M., & Othman, A. M. (2012). Platelets rich plasma for treatment of chronic plantar fasciitis. *Archives of Orthopaedic and Trauma Surgery*, 132(8), 1065–1070. <https://doi.org/10.1007/s00402-012-1505-8>. (Epub 2012 May 4 PMID: 22555761).
27. Martinelli, N., Marinozzi, A., Carni, S., Trovato, U., Bianchi, A., & Denaro, V. (2013). Platelet-rich plasma injections for chronic plantar fasciitis. *International Orthopaedics*, 37(5), 839–842. <https://doi.org/10.1007/s00264-012-1741-0>. (Epub 2012 Dec 19. PMID: 23250352; PMCID: PMC3631509).
28. Kumar, V., Millar, T., Murphy, P. N., & Clough, T. (2013). The treatment of intractable plantar fasciitis with platelet-rich plasma injection. *The Foot (Edinb)*, 23(2–3), 74–77. <https://doi.org/10.1016/j.foot.2013.06.002>. (Epub 2013 Jul 30. PMID: 23906977).
29. Jain, K., Murphy, P. N., & Clough, T. M. (2015). Platelet rich plasma versus corticosteroid injection for plantar fasciitis: a comparative study. *The Foot (Edinb)*, 25(4), 235–237. <https://doi.org/10.1016/j.foot.2015.08.006>. (Epub 2015 Aug 22 PMID: 26362235).
30. Shetty, V. D., Dhillon, M., Hegde, C., Jagtap, P., & Shetty, S. (2014). A study to compare the efficacy of corticosteroid therapy with platelet-rich plasma therapy in recalcitrant plantar fasciitis: a preliminary report. *Foot and Ankle Surgery*, 20(1), 10–13. <https://doi.org/10.1016/j.fas.2013.08.002>. (Epub 2013 Aug 16 PMID: 24480492).
31. Say, F., Gürlü, D., İnkaya, E., & Bülbül, M. (2014). Comparison of platelet-rich plasma and steroid injection in the treatment of plantar fasciitis. *Acta Orthopaedica Traumatologica Turcica*, 48(6), 667–672. <https://doi.org/10.3944/AOTT.2014.13.0142>. (PMID: 25637732).