

Efficacy of Platelet Rich Plasma in Comparison to Steroid for the Management of Chronic Plantar Fasciitis.

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ABSTRACT

Background: Planter fasciitis is an injury of unknown origin in more than 80% cases. It affects quality of life as well as daily activity of the patients. Various surgical procedures, autologous blood and steroid injection also have been applied without constant success. Platelets rich plasma have been found effective in various orthopedically disorders like osteoarthritis, tennis elbow etc. That is why the present study was designed to compare the efficacy of platelets rich plasma injections and steroidal injections for the treatment of planter fasciitis. **Methods:** The present interventional study was conducted from July 2016 to June 2018. Study population was divided into groups. Group I included patients (n=40) of a single ultra sound guided platelets rich plasma injection whereas, group II contained patients (n=40) with a single ultra sound guided depomedrol 40 mg injection. Scores of VAS and AOFAS were recorded at the initial level and follow ups after the injections. Follow up examinations were done at 6 weeks, 6 months and 12 months. **Results:** There was a significant improvement in mean VAS scores of platelet rich plasma group patients (1.8) compare to corticosteroid injection group patients (3.4) after one year of the treatment. However, results showed that steroids failed to show long term decrease in VAS score ($p<0.05$). Mean AOFAS was significantly increased (64.4) in the steroid group at 6wks as in comparison of platelet rich plasma group (52.2). **Conclusion:** Findings of the present study showed that improvement in steroid group was faster but benefits were lost in longer run. In contrast, platelets rich plasma was more effective in sustaining the long term beneficial effects.

Keywords: Platelets rich plasma, steroids, planter fasciitis.

INTRODUCTION

Planter fasciitis is an injury of unknown origin in more than 80% cases. It affects quality of life as well as daily activity of the patients. It can affect any individual irrelevant to his lifestyle whether physically active or sedentary. Planter fasciitis is a challenging disease to be cured for clinicians as it can take months or years to be resolved.^[1] Interference in the collagen matrix Micro tear of the planter fascia as well as its degeneration along with interference of collagen matrix are considered underline cause of planter fasciitis. However exact pathology of planter fasciitis is still unknown.^[2] Walking on an uneven hard surface, increased weight, stiffness of ankle joint, long term weight bearing actions are among important predisposing

factors for planter fasciitis.^[3] Pain and stiffness felt in the hell soon the patients start activity in the morning which subsides gradually as patients carries out daily activities is considered as the characteristic feature of planter fasciitis.^[4,5] Various non-operative approaches like physiotherapy, sole inserts, rest, exercises, medications both steroidal and none steroidal have been applied without any fruitful results.^[6] Nonetheless, surgical procedures, autologous blood and steroid injection also have been applied without constant success.^[7-11] Platelets rich plasma is concentrated platelets prepared by centrifugation of the patients have been found effective in various orthopedically disorders like osteoarthritis, tennis elbow etc.^[12] That is why the present study was designed to compare the efficacy of platelets rich plasma injections and steroidal injections for the treatment of planter fasciitis.

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MATERIALS AND METHODS

The present interventional study was conducted from July 2016 to June 2018 at department of physical medicine & rehabilitation. The present study

included 18 to 45 years eighty patients both male and female suffering with planter fasciitis at least last six months and had been not relieved by at least three months conservative treatments. Patients with any type of injury, disability, prior surgery, diabetes mellitus and pregnancy were excluded from the study.

The population of the study was randomly divided into two groups via computer generate numbers. Group I included patients (n=40) of a single ultra sound guided platelets rich plasma injection whereas, group II contained patients (n=40) with a single ultra sound guided depomedrol 40 mg injection.

Patient was asked to lie down in supine position Xylocaine 1% 2to 3 ml was applied for local anaesthesia to the maximum tenderness point at planter fasciitis usually medial aspect of foot.^[13] Local soft tissue was injured by using the peppering (dry needle) to evoke inflammatory response. This process was ended up after contacting the hard bone and leads to increase of preparing area up to 10 times. After this needle was gently and partially withdrawal from the planter fascia. This was followed by injection of either steroid or protein rich plasma.

Scores of VAS and AOFAS were recorded at the initial level and follow ups after the injections. ^[14,15] Patients were advised to avoid exhausting activities at least for 2 weeks. Follow up examinations were done at 6 weeks, 6 months and 12 months. NSAIDS was not used throughout the period of the study by all the patients of each group.

Statistical analysis

Results of the present study were analysed by student t test and chi square test. SPSS software v 0.21 was used to for the entire statistical calculations. The p value <0.05 was considered as statistically significant.

RESULTS

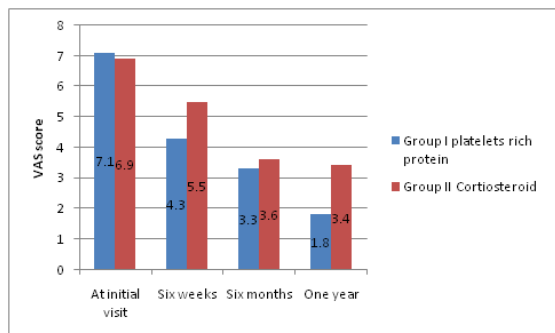


Figure 1: Comparison of VAS scores for both groups.

Results of the current study revealed that there was mean VAS of 6.9 and 7.1 of platelet rich plasma group patients and Corticosteroid injection group patients respectively before the treatment. There was

a significant decrease in VAS score of platelet rich plasma group patients (5.5) in comparison of corticosteroid injection group patients (4.3) after one month of the treatment. Further, a significant improvement in mean VAS scores of platelet rich plasma group patients (1.8) compare to corticosteroid injection group patients (3.4) after one year of the treatment. However, results showed that steroids failed to show long term decrease in VAS score (p<0.05).

After 6 months follow up there was statistically insignificant difference in the VAS scores of both groups.

The mean AOFAS of the platelet rich plasma group and corticosteroid injection group at the initial survey were 36.8 and 34.7 respectively. Further, mean AOFAS was significantly increased (64.4) in the steroid group at 6wks as in comparison of platelet rich plasma group (52.2). The mean AOFAS score were 76.9 and 64.8 respectively for platelet rich plasma group and steroid group patients at six months. However, at 12 months, the mean AOFAS was sustained for the platelet rich plasma group (92.2) whereas a decreases of the mean AOFAS was observed for the steroid group patients(78.4).

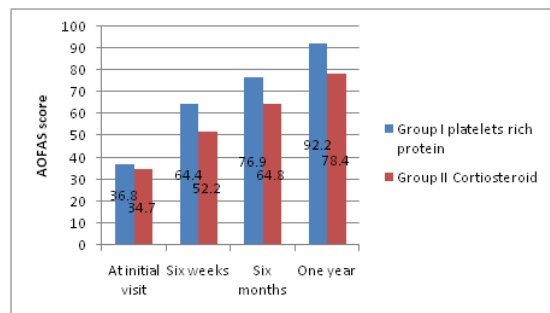


Figure 2: Comparison of AOFAS scores for both groups.

DISCUSSION

Present study was designed to assess the effects of platelet rich plasma under group I patients with chronic plantar fasciitis and corticosteroid injection under group II patients with chronic plantar fasciitis who did not respond to conservative management. Results of the current study showed that there was statistically significant decrease in VAS score at 6 weeks of the steroid group II (4.2) compared to platelet rich plasma group I (5.8). These findings are very similar to the previous study of Tiwari et al 16 as they reported there was a significant decrease of VAS score in steroid group patients at 1st month for steroid group in comparison of platelet rich plasma group. Moreover they observed that this decrease of VAS score was gradually continuous for steroid group though it was sustained for platelet rich plasma group up to 6 months. However, in our study steroid group showed better VAS Score values at 6 weeks.

This early improvement at 6 weeks in group II patients of platelet rich plasma seems to be due to platelets have anti-inflammatory effect due to the inhibition of cyclo-oxygenase-2 enzymes by the cytokines.^[12,15] Nonetheless, better improvement as observed in the current study in steroid group compare to platelet rich plasma groups may be because steroid effects is more spontaneous in comparison of inhibition of cyclo-oxygenase-2 via platelets rich plasma.^[12,13]

Further, present study recorded that the VAS score was an insignificant difference between VAS score of platelet rich plasma group I (3.3) and steroid group II (3.6) at six months. These findings are in agreement with earlier study of Akashin E et al,^[17] as they recorded an insignificant difference between VAS score of steroid group and platelet rich plasma group at six months. However, there was a significant decrease in VAS score at six months compare to initial level in both groups. Similarly, Ragab et al observed a significant improvement in VAS score from >9 to <2 in patients with platelets rich plasma after 10 months.

Results revealed that there was a significant decrease in VAS score in group I patients on platelets rich plasma compare to group II patients on corticosteroid injection. This significant improvement in platelets rich plasma group may be due to platelets rich plasma leads to increase formation of collagen as well as improves blood circulation via secreting growth factor.^[13,18]

Results of the current study showed that there was a significant increase of mean AOFAS in both groups after six weeks. However, this increase was more significant in group II patients on steroid injection compare to group I platelet rich plasma group patients after six weeks. Further, findings of our study revealed that mean AOFAS was constantly maintained in group I platelet rich plasma group patients whereas, it was not sustained in group II patients on steroid injection. These results are very similar to the earlier study of Lopez-Gavito et al,^[19] as they recorded significant improvement in the mean AOFAS in platelet rich plasma group compare to steroid injection group. Alike, Singh D et al,^[20] Beeson P et al and Say F et al,^[21,22] recorded similar increase in AOFAS score in the platelets rich plasma patients.

Injury of plantar fascia is repaired by platelets rich plasma which in turn improves the functional outcome.^[23] Studies reported that all most similar improvements in plantar fascia have been observed in platelets rich plasma injection as well as steroid injection. Moreover, there is significant improvement in platelets rich plasma patients compare to steroid injection patients at 6 months.^[24,25]

CONCLUSION

Findings of the present study showed that steroid injection was more effective in reducing the pain and discomfort of the patients in short term as patients felt ease soon after the treatment. On the other hand, there was a gradual and consistent improvement in pain and discomfort of patients with platelets rich plasma injection. Moreover, improvement in steroid group was faster but benefits were lost in longer run. In contrast, platelets rich plasma was more effective in sustaining the long term beneficial effects. Therefore, we strongly recommend the use of platelets rich plasma injection over steroid injection to sustain long term beneficial effects. However, studies on larger populations are warranted to evaluate the comparative efficacy of both platelets rich plasma injection and steroid injection for the treatment of planter fasciitis.

REFERENCES

- Riddle DL, Pulisic M, Pideoe P, Johnson RE. Risk factors for plantar fasciitis: a matched case-control study. *J Bone Joint Surg Am.* 2003;85-A:1338.
- Wei LC, Lei GH, Sheng PY, Gao SG, Xu M, Jiang W, et al. Efficacy of platelet-rich plasma combined with allograft bone in the management of displaced intra-articular calcaneal fractures: A prospective cohort study. *J Orthopaedic Res.* 2012;30(10):1570-6.
- Kajikawa Y, Morihara T, Sakamoto H, Matsuda K, Oshima Y, Yoshida A, et al. Platelet-rich plasma enhances the initial mobilization of circulation derived cells for tendon healing. *J Cell Physiol.* 2008;215:837-45.
- Lyras DN, Kazakos K, Verettas D, Polychronidis A, Tryfonidis M, Botaitis S, et al. The influence of platelet rich plasma on angiogenesis during the early phase of tendon healing. *Foot Ankle Int.* 2009;30:1101-6.
- Toomey EP. Plantar heel pain. *Foot Ankle Clin.* 2009;14:229-45.
- Cheung JT, An KN, Zhang M. Consequences of partial and total plantar fascial release: a finite element study. *Foot Ankle Int.* 2006;27:125-32.
- Barrett S, Erredge S. Growth factors for chronic plantar fasciitis. *Podiatry Today.* 2004;17:37-42.
- Dorotka R, Sabeti M, Jimenez-Boj E, Goll A, Schubert S, Trieb K, et al. Location of modalities for focused extracorporeal shock wave application in the treatment of chronic plantar fasciitis. *Foot Ankle Int.* 2006;27:943-7.
- Lee TG, Ahmad TS. Intralesional autologous blood injection compared to cortisone injection for treatment of chronic plantar fasciitis. A prospective randomized controlled trial. *Foot Ankle Int.* 2007;28:984-90.
- Maley DS, Pressman M, Assili A, Kline JT, York S, Buren B, et al. Extracorporeal shockwave therapy versus placebo for the treatment of chronic proximal plantar fasciitis: results of a randomized placebo controlled double blinded multicenter intervention trial. *J Foot Ankle Surg.* 2006;45:196-210.
- Tsai WC, Hsu CC, Chen CP, Chen MJ, Yu TY, Chen YJ. Plantar fasciitis treated with local steroid injection: comparison between sonographic and palpation guidance. *J Clin Ultrasound.* 2006;34:12-6.
- Hall MP, Brand PA, Meislin RJ, Jazrawi LM, Cardone DA. Platelet-rich plasma: current concepts and application in sports medicine. *J Am Acad Orthop Surg.* 2009;17:602-9.
- Anitua E, Andia I, Sanchez M, Azofra J, del Mar Zaldueño M, de la Fuente M, et al. Autologous preparations rich in growth factors promote proliferation and induce VEGF and

- HGF production by human tendon cells in culture. *J Orthop Res.* 2005;23:281-6.
14. Anitua E, Sanchez M, Nurden AT, Zalduendo M, de la Fuente M, Azofra J, et al. Reciprocal actions of platelet-secreted TGF-beta 1 on the production of VEGF and HGF by human tendon cells. *Plast Reconstr Surg.* 2007;119:950-9.
 15. Shen W, Li Y, Zhu J, Huard J. Interaction between macrophages, TGF-beta 1, and the Cox-2 pathway during inflammatory pathway phase of skeletal muscle healing after muscle injury. *J Cell Physiol.* 2008;214:405-12.
 16. Tiwari M, Bhargava R. Platelet rich plasma therapy: A comparative effective therapy with promising results in plantar fasciitis. *J Clinl Orthop Trauma.* 2013;4(1):31-5.
 17. Akashin E, Dogruyol D, Yuksel HY, et al. The comparison of the effect of corticosteroids and platelet-rich plasma (PRP) for the treatment of plantar fasciitis. *Arch Orthop Trauma Surg.* 2012;132:781-5.
 18. Mishra A, Pavelko T. Treatment of chronic elbow tendonosis with buffered platelet rich plasma. *Am J Sports Med.* 2006;34:1774-8.
 19. Lopez-Gavito E, Gomez-Carlin LA, Parra-Tellez P. Platelet-rich plasma for managing calcaneus tendon tendinopathy and plantar fasciitis. *Acta Ortop Mex.* 2011;25:380-5.
 20. Singh D, Angel J, Bcntk-y G, Trevino SG. Fortnightly review. Plantar fasciiti. *BMJ.* 1997;315:172-17.S.
 21. Beeson P. Plantar fasciopathy: revisiting the risk factors. *Foot Ankle Surg.* 2014;20(3):160-5.
 22. Say F, Gürler D, Inkaya E, Bülbül M. Comparison of platelet-rich plasma and steroid injection in the treatment of plantar fasciitis. *Acta Orthop Traumatol Turc.* 2014;48(6):667-72.
 23. Tallia AK, Cardone DA. Diagnostic and therapeutic injection of the ankle and foot. *Am Fam Physician.* 2003;68:1356-62.
 24. Singh P, Madanipour S, Bhamra JS, Gill I. A systematic review and meta-analysis of platelet-rich plasma versus corticosteroid injections for plantar fasciopathy. *Int Orthop.* 2017;41(6):1169-81.
 25. Martinelli N, Marinozzi A, Carni S, Trovato U, Bianchi A, Denaro V. Platelet-rich plasma injections for chronic plantar fasciitis. *International orthopaedics.* 2013;37(5):839-42.

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