Original Article

A comparative study of platelet rich plasma versus dextrose prolotheraphy in the treatment of plantar fasciitis

Ganesh Ganapatrao Degloorkar

Assistant Professor, Department of General Surgery, Dr. Ulhas Patil Medical College and Hospital, Jalgaon, Maharashtra, INDIA.
Email: ganeshdegloorkar@gmail.com

Abstract

Introduction: Plantar fasciitis (PF) is the most common cause of heel pain. The diagnosis is usually clinical and rarely needs to be investigated further **Aims and Objectives:** To compare effectiveness of platelet rich plasma versus Dextrose prolotheraphy in the Treatment of Plantar Fasciitis. **Methodology:** After approval from the institutional ethical committee, a hospital based study carried out at Surgery Department of a tertiary health care center during one-year period from June 2014 to June 2015. During the one-year period 32 patients included into study. These patients were included into Platelet rich plasma (PRP) 16 patients and Dextrose prolotheraphy (DP) 16patient's treatment by a computer generated random numbers respectively. The pain in patients was measured by Visual Analogue Scale (VAS). The statistical analysis done by unpaired t-test and chi-square test calculated by SPSS version 18 software. **Result:** The mean age was 38± 5 Yrs. and 39±6 Yrs. the difference is not statistically significant (t=1.21,df=30,P>0.05) , The Disease duration(month) was 22.58±10.22 and 34.94±11.53 and the difference is statistically significant (t = 3.2088, df = 30, P<0.001) , Baseline overall pain score (VAS) was 8.21±0.85 and 9.8±0.52 and difference is statistically significant (t=3.15, df=30, P<0.05), Fascia thickness (mm) was 2.10±1.09 and 4.2 ±1.28 and difference is statistically significant (t=5.1, df=30, P<0.01) respectively in the PRP and DP groups. As per echogenicity Normal echogenicity was in 70.00% of the PRP and 30.00% of DP patients similarly Hypo-echogenicity in 75.00% and 30.00%; Hyper-echogenicity in 22.22% and 77.78%; Biconvexity in 20.00% and 80.00% respectively in PRP and DP treatment group and the fascia thickness measured by echogenicity was significantly higher in DP treatment group this was statistically significant. (X^2 = 8.1778, p<0.05). **Conclusion:** The platelet rich plasma treatment method for Plantar Fasciitiswas found to be superior to Dextroseprolotheraphy with respect to less Disease duration, less pain and less Fascia thickness respectively.
Keywords: Platelet rich plasma (PRP), Dextrose prolotheraphy (DP), Plantar fasciitis (PF),VAS.

Address for Correspondence:
Dr. Ganesh Ganapatrao Degloorkar, Assistant Professor, Department of General Surgery, Dr. Ulhas Patil Medical College and Hospital, Jalgaon, Maharashtra, INDIA.
Email: ganeshdegloorkar@gmail.com
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INTRODUCTION

Plantar fasciitis (PF) is the most common cause of heel pain[1]. The diagnosis is usually clinical and rarely needs to be investigated further[2]. Ultrasonography can be used to confirm recalcitrant PF or to exclude other pathology based on findings of proximal plantar fascia thickness greater than 4 mm and areas of hypoechogenicity[3]. Numerous treatments, including rest, 36 weight loss, deep massage, stretching techniques, and heel cups usually start as patient-directed therapies and advance to nonsteroidal anti-inflammatory drugs, physical therapy, iontophoresis, night splint, and custom full-length arch supports as physician-prescribed therapies based on the 39 response of symptoms over weeks to months[1,3,4]. These treatments are effective for ~90% of cases within this timeframe; therefore, some authors have suggested that PF represents a self- limiting condition without explicit proof of a treatment benefit over a wait-and-see approach[2- 5]. However, approximately 10% of patients remain recalcitrant to conservative therapies,

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necessitating further aggressive procedures such as injection therapy, extracorporeal shock wave therapy, and in some cases surgical release of the plantar fascia[2,3,6]. The efficacies of these treatments have been evaluated in systematic reviews, but the evidence for their effectiveness is limited[7-9]PF results from a degenerative process in the plantar fascia at its calcaneal attachment[2]. In fact, the pathology of chronic cases is characterized by an angiofibroblastichyperblastic tissue that spreads throughout the surrounding tissue, creating a self-perpetuating cycle of degeneration[10]. Corticosteroid injections are a commonly used invasive procedure for the treatment of PF. However, the effect seems to be limited and short-lived, and further the use of corticosteroids is not a pathology-based therapy and has associated with the risks of fat pad atrophy and rupture of plantar fascia[2-4]Prolotherapy with dextrose (DP) has been reported to decrease pain and improve function in a variety of tendinopathies[11,12]. A potential biological effect of prolotherapy is supported by several clinical and animal studies, although the historical hypothesis that prolotherapy causes an inflammatory response leading to reduced tendon and ligament laxity has not been confirmed[5,13]. Hyperosmolar dextrose has been shown to increase platelet-derived growth factor expression and up-regulate multiple mitogenic factors that may act as signaling mechanisms in tendon repair[14]. Autologous platelet-rich plasma (PRP) injection is a relatively new modality. It aims to augment the natural healing process of tendon repair and regeneration by delivering high concentrations of growth factors directly to a lesion[15] so this study is done with the

MATERIAL AND METHODS

After approval from the institutional ethical committee, a hospital based study carried out at Surgery Department of a tertiary health care center during one-year period from June 2014 to June 2015. All the patients who were complaining of the heel pain and difficulty in walking were carefully examined clinically and radiologically to see plantar fascia thickness and diagnosed as patients of plantar fasciitis, during the one-year period 32 patients included into study . The patients having diabetes, immune compromised status, taking steroids for long duration, history of chemotherapy etc. excluded from the study After taking their written and explained consent these patients were included into Platelet rich plasma (PRP) 16 patients and Dextrose prolotheraphy (DP) 16 patients treatment by a computer generated random numbers respectively. The pain in patients was measured by Visual Analogue Scale (VAS). The statistical analysis done by unpaired t-test and chi-square test calculated by SPSS version 18 software.

RESULT

Table 1: Distribution of the Patients as per the various study variables

Variables	PRP (n=16) (Mean±sd)	DP (n=16) (Mean±sd)	P-value
Age	38± 5Yrs.	39±6 Yrs.	t=1.21, df=30,P>0.05
Disease duration(month)	22.58±10.22	34.94±11.53	t = 3.2088, df = 30, P<0.001
Baseline overall pain score (VAS)	8.21±0.85	9.8±0.52	t=3.15, df=30, P<0.05
Fascia thickness (mm)	2.10±1.09	4.2 ±1.28	t=5.1, df=30, P<0.01

The mean age was 38±5 Yrs. and 39±6 Yrs. the difference is not statistically significant (t=1.21,df=30,P>0.05) , The Disease duration(month) was 22.58±10.22 and 34.94±11.53 and the difference is statistically significant (t = 3.2088, df = 30, P<0.001), Baseline overall pain score (VAS) was 8.21±0.85 and 9.8±0.52 and difference is statistically significant (t=3.15, df=30, P<0.05), Fascia thickness (mm) was 2.10±1.09 and 4.2±1.28 and difference is statistically significant (t=5.1, df=30, P<0.01) respectively in the PRP and DP groups.

Table 2: Distribution of the Patients with respect to Echogenicity

Echogenicity	PRP	DP	Total
Echogenicity (Normal)	7 (70.00%)	3 (30.00%)	10 (100%)
Hypo-echogenicity	6 (75.00%)	2 (25.00%)	8 (100%)
Hyper-echogenicity	2(22.22%)	7 (77.78%)	9(100%)
Biconvexity	1 (20.00%)	4 (80.00%)	5 (100%)
Total	**16 (50.00%)**	**16 (50.00%)**	**32 (100%)**

(χ^2=8.1778. The p<.042477)

As per echogenicity Normal echogenicity was in 70.00% of the PRP and 30.00% of DP patients similarly Hypo-echogenicity in 75.00% and 30.00%; Hyper-echogenicity in 22.22% and 77.78%; Biconvexity in 20.00% and 80.00% respectively in PRP and DP treatment group and the fascia thickness measured by echogenicity was significantly higher in DP treatment group this was statistically significant. (χ^2 = 8.1778, p<0.05).

DISCUSSION

Usually syndromes that involve manifestation of the typical heel pain are called plantar fasciitis, but that term is not correct, because no histological evidence of inflammation is present in this condition; the terms ‘fasciosis’ or ‘fasciopathy’ are most appropriate terms to define heel pain associated with degeneration of the plantar fascia and atrophy of the abductor digitiminimi muscle.[16,17]Even though the exact aetiology is unknown, collagen degeneration at the origin of the plantar fascia, caused by repetitive microtears, appears to be the basis of the pain.[18]However, ∼10% of patients do not respond to

conservative therapies, necessitating further aggressive procedures such as injection therapy, extracorporeal shock wave therapy and, in some cases, surgical release of the plantar fascia.[19]. Corticosteroids injections can be effective in improving symptoms, but are associated with various complications such as rupture of the plantar fascia, calcaneal osteomyelitis and fat pad atrophy.[20] Platelet-rich plasma (PRP) is an autologous blood product in which the platelets have been concentrated. Several preclinical studies have shown PRP to be beneficial to tendon healing, possibly because of its anti-inflammatory property and the ability of the platelets to release several growth factors upon activation.[21] There is an increasing interest in PRP injections as a treatment for chronic PF, and recently several papers on this topic have been published.[22] In our study we have found that The mean age was 38±5 Yrs. and 39±6 Yrs. the difference is not statistically significant (t=1.21, df=30, P>0.05), The Disease duration(month) was 22.58±10.22 and 34.94±11.53 and the difference is statistically significant (t = 3.2088, df = 30, P<0.001), Baseline overall pain score (VAS) was 8.21±0.85 and 9.8±0.52 and difference is statistically significant (t=3.15, df=30, P<0.05), Fascia thickness (mm) was 2.10±1.09 and 4.2 ±1.28 and difference is statistically significant (t=5.1, df=30, P<0.01) respectively in the PRP and DP groups. As per echogenicity Normal echogenicity was in 70.00% of the PRP and 30.00% of DP patients similarly Hypo-echogenicity in 75.00% and 30.00%; Hyper-echogenicity in 22.22% and 77.78%; Biconvexity in 20.00% and 80.00% respectively in PRP and DP treatment group and the fascia thickness measured by echogenicity was significantly higher in DP treatment group this was statistically significant. (χ^2=8.1778, p<0.05).These findings are similar to Kim E *et al* [23].

CONCLUSION

The platelet rich plasma treatment method for Plantar Fasciitis was found to be superior to Dextrose prolotheraphy with respect to less Disease duration, less pain and less Fascia thickness respectively.

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