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Comparison of Platelet Rich Plasma Injection and Intraregional Steroid Injection In the Management of Plantar Fasciitis: A Prospective Study of 40 Patients

Rajat Malot
Associate Professor, Department of Orthoapedics, Pacific medical college and Hospital

ABSTRACT

Introduction: Plantar fasciitis is most common cause of chronic heel pain and it's typically aggravated on weight bearing after a period of rest .Its diagnosis is mainly clinical and there are various modalities of treatment of this condition. We compare platelet rich plasma injection and intraregional steroid injection in long term pain relief in plantar fasciitis.

Material and Methods: Patient of plantar fasciitis with symptoms lasting more than 6 weeks were included in study. Patients with other coexisting disease like diabetes mellitus, vascular insufficiency, hypothyroidism and previous surgery were excluded from disease. In this prospective double-blind study, 60 patients who fulfilled the criteria were divided randomly into two groups. Patients in Group A received PRP injection and those in Group B received steroid injection. Patients were assessed with visual analog scale (VAS) and American Orthopedic Foot and Ankle Society (AOFAS) score. Assessment was done before injection, at six weeks, three months and six months follow-up after injection.

Results : Mean VAS score in group A decreased from 6.14 to 1.10 after receiving PRP injection while in group B , Mean VAS score decreased from 8.20 to 1.40 at 3 months follow up. There was also statistical significant improvement in AOFAS score in PRP injection group as compared to steroid group at 6 months follow up.

Conclusion : Both PRP and Steroid have benefit in relieving pain for short term however long term benefit is more seen in patient receiving PRP injection.

Keywords: *Plantar fasciitis, plasma rich plasma (PRP), steroid .*

***Corresponding Author**
Rajat Malot
Associate Professor, Department of Orthoapedics, Pacific medical college and Hospital

INTRODUCTION:

Plantar fasciitis is a common condition commonly affection young female. There is characteristic pain over the plantar surface of foot with more localization of pain at the heel where plantar fascia is attached1. The pain is more severe after a period of brief rest and it's gradually relieved as walking continues. There is inflammation of plantar fascia due to either overuse or repetitive micro trauma. It's more common in patient suffering from hypothyroid, diabetes, overweight, and gout. There are many treatment suggested for plantar fasciitis however no single treatment is effective on long term basis and most often patients requires combination of treatment modalities 2. Local steroid injection is used in plantar fasciitis from many years and it provide short term benefit however there is lack of data supporting its long term benefit and multiple injection are reported to have side effect like heel pad atrophy , infection and depigmentation of skin5. Recently PRP (platelet rich plasma) is used in many conditions of chronic pain like tennis elbow, rotator cuff tendinitis and plantar fasciitis however there is less scare literature about its use in plantar fasciitis and its long term superiority over other treatment plantar fasciitis.

In this study we compared the PRP with most common used steroid injection over 6 month follow up and also document its technique and report any side effects associated with PRP injection.

Material and Methods:

This study was conducted at Department of orthopedic, Pacific medical college and hospital, Udaipur, India from March 2020 to July 2021.This is randomized prospective double blind study. Patients having clinical symptoms and history suggestive of plantar fascia were identified and taken for study. Patient having other illness associated like diabetes, neurological issue, vascular insufficiency, previous surgery were excluded from the study. Ethical clearance was taken from institutional review board and informed written consent of all participants were taken. We included 40 patients in study group and randomized in two study groups. Group A received PRP injection and group B received

steroid injection. Randomization was done after assigning number to each patient and then putting all this number chits in a jar. This jar is now well shaken and one chit is taken an assigned to group A and then next chit is assigned to group B and this is repeated again to complete all numbers. Once the group is created, procedure begins. Injection is given by another colleague who is unaware about group allocation to eliminate bias.

Blood was drawn from patients in both groups for blinding purpose and a screen was used while giving injection so the patients were blinded from the type of treatment they were receiving.

Group A receive 3 ml of PRP injection and group B receive 2ml of Depomedrol(80mg) injection. No NSAIDS were given during the treatment .Physical therapy was continued in both groups.

PRP is prepared by taking 5ml of blood from cubital vein and then pouring it in centrifuge tube which contain sodium citrate. The tube is centrifuged at 1200 rpm for 10 min in routine centrifuge table. Following centrifugation three layers were identified, of which, the bottom layer consisted of red blood cells, the intermediate layer of white blood cells, and upper layer of plasma, platelets, and some white blood cells. Upper 2 ml of platelet rich plasma is taken for injection.

Both injection are given by same person at site of maximum tenderness in heel under all aseptic conditions. Blood sugar levels were checked in both groups before injection administration.

The patients were assessed before injection and during follow-up at six weeks, three months and six months. The assessment was conducted with the visual analog scale (VAS) for pain and the American Orthopedic Foot and Ankle Society (AOFAS) score for function. The measurement were done by colleague who is unaware about group allocation.

Statistical analysis, was done using SPSS 11 software. Independent t-test was used to compare the mean difference between the two groups, paired t-test was used to compare the mean difference between before and after paired data.

Results:

Out of 40 patients, there were 28 female and 12 male. None of the patient were lost in follow up. Mean age of patients in group A was 34 .4 years and in group B it was 37.8 years. Right heel was affected in 21 patients and left heel was affected in 19 patients.

Mean visual analog scale score (VAS) in Group A was 6.14 and it improved to 1.10 at 3 months interval. At 6 months it further improved to .90. In group B , mean VAS was 8.20 and at 3 months it was 1.40 and 6 months follow up it was 1.10. The difference between two group was statistically significant ($p<0.00$) at 6 month follow up.

Mean AOFAS score in Group A and Group B before injection was 48 and 52 respectively. AOFAS score improved to 77.2 in Group A and 78 in Group B, respectively, at 6 month follow up. The difference between the two groups was statistically significant at the six-month follow-up ($p< 0.001$)

Table1 : Mean VAS Score in both groups

	Group A (PRP)	Group B (Steriod)	
Pre treatment	6.14	8.20	
3 months	1.10	1.40	
6 months	0.90	1.10	P<.001

Table 2 : Mean AOFAS score in both groups

AOFAS score	Group A (PRP)	Group B (Steroid)	
Pre treatment	48	52	
3 months	64	65	
6months	77	78	P<.001

DISCUSSION:

Plantar fasciitis is inflammation and swelling of thick plantar fascia present at the sole of the foot. There is so much pain that it interferes with day to day activity. Histological findings like chondroid metaplasia, calcification, and collagen necrosis suggest a degenerative mechanism of plantar fascia.

Various treatment modalities have been tried treat this chronic condition. Among all available options, corticosteroid injection is far by most common and effective modality however its side effects and its long term benefit is doubtful so alternate options need to be tried . The main action of steroid is to inhibit fibroblast proliferation and expression of ground glass protein.

In past few studies, platelet rich plasma have shown promising results in treating plantar fasciitis(7,9,11,12) . As PRP contain high amount of transferring growth factor ,vascular endothelial growth factor, platelet derived growth factor, various interleukins like interleukin 4,8,13 , Interferon- a, TNF a.. It increases fibroblast migration and proliferation and improves collagen deposition, which promotes angiogenesis and fiber repair.

There are not many study available which compares PRP with steroid. When steroid injection was compared with autologous blood injection in a study by Lee et al, they found that the corticosteroid group had significantly lower VAS than autologous blood group1. Monto et al comparing PRP and corticosteroid injection in the treatment of failed non-surgical treatment of plantar fasciitis, concluded that a single injection of PRP improved pain and function more than steroid injection and beneficial effects sustained for a longer time.

In our study we compared both treatment modalities at short term and long term follow up. There are various methods of preparation of platelet-rich plasma. In each method of preparation, platelet concentration varies. However no literature suggest superioty of one preparation over other. Also injection was given without ultrasound usage in our study.

Jain et al 3 in their study comparing single injection of PRP and steroid injection in chronic plantar fasciitis, found no significant difference in functional outcome in both groups at six months follow-up. However in our study there was no significant difference at 3 month follow up but significant difference was present at 6 month follow up as PRP patient have significant pain relief at 6 months as compared to steroid group. Probable reason of this long term benefit is because of ability of PRP to enhance repair of plantar fascia rather than just anti-inflammatory property.

Limitation of this study is lack of standardization of preparation of platelet rich plasma and lack of exact mechanism of action of PRP in plantar fasciitis. However the result of PRP injection are encouraging.

CONCLUSION:

Both corticosteroid and platelet rich plasma have immediate benefit in pain control in patients having plantar fasciitis however PRP has long term benefit over steroid in these patients.

Conflict of interest: The authors declare that there is no conflict of interest.

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