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Plantar fasciitis: A randomized comparative study of platelet rich plasma and low dose radiation in sportspersons

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HIGHLIGHTS

- Plantar Fasciitis makes up about 15% of patients requiring professional care due to foot symptoms Consequent to overuse being an important, etiological factor the condition is more common in athletes. The treatment methods are numerous with none proving to be clearly superior to others. We aimed at comparing two common treatment methods in search of the best treatment.
- This randomized study included 40 patients who did not improve with the initial institutional protocol consisting of stretching exercises, activity modification, and NSAID's for 6 months and underwent treatment with either platelet rich plasma (PRP) or 3.0 Gy radiation (LDRT) applied as 0.5 Gy twice weekly.
- The study identifies that PRP is as good as low dose radiation therapy in patients with chronic recalcitrant plantar fasciitis not responding to physical therapy in controlling pain and decreasing plantar fascia thickness. The results of both these procedures are quite encouraging, however PRP has the advantage of fewer sessions and easy accessibility.

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ABSTRACT

Background: Plantar Fasciitis makes up about 15% of patients requiring professional care due to foot symptoms. The treatment methods are numerous with none proving to be clearly superior to others. We aimed to compare two common treatment methods in search of the best treatment.
Method: All consecutive sportspersons presenting to our OPD with clinical diagnosis of plantar fasciitis underwent treatment consisting of stretching exercises, activity modification, and NSAID's for 6 months. First 40 patients who did not respond to the treatment were divided randomly into two groups of 20 patients each, Group A (Platelet rich plasma – PRP) and Group B (low dose radiation – LDR). At the time of final follow-up (6 months) the mean improvement in the pain score (Visual-Analogue-Scale), American Orthopaedic Foot and Ankle Score (AOFAS) and Plantar fascia thickness on ultrasound were compared.
Result: Significant improvement in all 3 parameters was noted at the time of final follow up within both groups. When compared to each other, the difference in outcome of both these Groups on the given 3 parameters came out to be insignificant ($p > 0.05$).
Conclusion: PRP is as good as LDR in patients with chronic recalcitrant plantar fasciitis not responding to physical therapy.

1. Introduction

The exact underlying cause of plantar fasciitis still eludes us [1]. It is a common problem making up to almost 15% of patients with foot symptoms requiring professional care [2]. Obe-

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Table 1
Comparison of Pain as assessed on Visual Analogue Scale, American Foot and Ankle score and Plantar fascia thickness on USG the time of initial presentation with that at 6 months.

	Pain (Visual Analogue Scale)				American Foot and Ankle score				Plantar fascia thickness on USG (mm)			
	Group A		Group B		Group A		Group B		Group A		Group B	
	Baseline	6months	Baseline	6months	Baseline	6 months	Baseline	6 months	Baseline	6 months	Baseline	6 months
1	7	3	7	3	55	87	48	88	7.2	6	6.8	6
2	8	2	7	2	38	87	50	90	7.4	6	6.6	5.8
3	6	3	6	2	60	90	50	90	6.6	5.8	6.6	5.4
4	7	2	7	2	40	87	50	88	7	5.9	6.8	5.6
5	6	2	7	3	61	90	55	85	6.6	5.4	6.4	5.2
6	6	2	6	1	60	94	60	97	6.8	5.2	6.7	5.4
7	7	3	5	2	50	88	61	90	6.7	5.8	6.2	5.2
8	8	2	7	2	34	90	50	90	7.1	5.9	7	5.5
9	6	3	8	3	55	90	38	87	6.8	5.8	7.1	6
10	7	2	6	2	50	90	55	90	6.6	5.8	6.4	5.6
11	7	2	7	3	50	87	55	88	6.9	5.3	7	5.9
12	8	3	7	3	35	85	48	85	7	5.7	6.8	6
13	6	2	6	2	55	87	61	90	6.8	5.2	6.6	5.7
14	6	1	5	2	60	97	60	90	6.6	5.4	6.4	5
15	7	2	6	2	55	88	61	94	6.4	5	6.5	5.4
16	6	2	7	3	61	90	50	88	6.8	5.6	7.2	6.1
17	6	3	7	3	55	85	50	87	6.8	5.6	7.2	5.9
18	5	1	8	4	60	98	35	85	6	5	6.9	6.2
19	7	3	6	2	48	87	48	94	6.8	5.7	6.6	5.3
20	7	2	5	1	48	85	65	97	6.4	5.6	6.4	5.2
Mean	6.65	2.25	6.5	2.35	51.5	89.1	52.5	89.65	6.765	5.585	6.71	5.62

sity (BMI > 30 kg/m^2), overpronation, running, prolonged standing and reduced ankle dorsiflexion are reported risk factors [3,4]. Although traditionally regarded as an inflammatory pathology secondary to microtears, it is more aptly described as a degenerative condition as inflammation is rarely reported on histopathology [5]. Plantar fasciopathy is therefore a better suited terminology. The underlying pathology is hence non-inflammatory with dysfunctional vasculature, which may be seen on ultrasound [6]. No single modality of treatment guarantees pain relief [7]. There is paucity of high quality studies to guide formulation of standardized guidelines.

Although Plantar fasciitis may be a self limiting condition, repeated excursion by athletes can lead to recalcitrant plantar fasciitis unresponsive to rest, NSAIDS, extracorporeal shock wave therapy and/or foot orthosis [8]. Steroids have long been used for the treatment of plantar fasciitis, and although the short term results may be encouraging there is no significant long term benefits [9]. The use of steroids has been linked to plantar fascia rupture and heel pad atrophy on repeated injections [10]. Studies have documented the beneficial effect of radiation in plantar fasciitis. [11–13] Similarly, the beneficial role of local Platelet Rich Plasma (PRP) injections in intractable plantar fasciitis has been published [14–16]. In this study, we aimed to evaluate and compare the results of local injection of PRP and low dose radiation therapy (LDRT) in managing patients with chronic recalcitrant plantar fasciitis not responding to physical therapy.

2. Method

Sportspersons presenting to the outpatient department, who were diagnosed with plantar fasciitis and failed conservative treatment for 6 months were identified and included in the study. Conservative measures included activity modification, ice packs, NSAID's, orthotics, and plantar fascia and Tendoachilles stretching. Patients who had received local steroid injections within the last 6 months were excluded from the study. Other exclusion criteria included patients with diabetes mellitus, gout, generalized inflammatory arthritis (Rheumatoid arthritis, Ankylosing spondylitis, Psoriatic arthritis), malignancy, pregnancy, bleeding diathesis, and radiculopathy. Written informed consent was obtained from all patients and was approved by the hospital ethical committee. Ethical standards according to Declaration of Helsinki were conformed to. A total of 40 consecutive patients who met the inclusion and exclusion criteria formed the study cohort. Eighteen patients were sprinters, 12 were marathon runners, 6 were footballers and 4 were kabaddi players (Kabaddi is a contact sport, which originates from India and is played between two teams of seven members each that occupies opposite halves of a field in which each team sends a "raider" into the other half, who runs into the opposing half, tag one or more members of the opposite team, then return to the home half before inhaling again to score a point). All patients underwent radiography to rule out other causes of heel pain including calcaneal tumor, calcaneal stress fracture, subtalar joint infection or arthritis, etc. The patients were randomly allocated using computer generated randomization chart into 2 groups: Group A (n = 20) was treated with PRP and Group B (n = 20) with low dose radiation (LDR). The mean age of patients in Group A (male 14, female 6) was 28.62 years and the mean BMI was 23.22; whereas in group B (male 12; female 8) the mean age was 26.54 years and the mean BMI was 22.82.

In group A, for preparation of PRP, 20 ml whole blood was collected from the patient and was processed according to the GPS system instructions (Cell Factor Technologies, Warsaw, Ind). After centrifugation, a platelet rich concentrate of about 3 ml per patient was obtained. Autologous platelet concentrate contains concentrated white blood cells and platelets are suspended in plasma [17]. As CPD (anticoagulant) makes the concentrate acidic, the platelet concentrate was buffered by using 8.4% sodium bicarbonate (in a ratio of 0.05 ml per ml of concentrate) to increase the pH to normal physiologic levels [17]. No activation agent was used during our procedure, as activation of the platelets is known to occur on exposure to the thrombin [18].

To minimize pain during heel injections, posterior Tibial Nerve block was administered with 2% Lignocaine Hydrochloride. Under ultrasound guidance, a 22 g needle was inserted perpendicular to the ultrasound probe; and around 3 ml of PRP was injected in the region of maximal fascia thickening [19]. We used the peppering technique to administer the injection. Immediately following the injection the patients were advised to keep in sitting position for 15 min. The patients were then sent home with the advice to restrict