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Original Research Paper

Orthopaedics

A COMPARATIVE STUDY ON EFFICACY OF PLATELET RICH PLASMA VS CORTICOSTROID INJECTION IN TREATMENT OF CHRONIC PLANTER FASCIITIS

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ABSTRACT

Background- Plantar fasciitis is a common cause of heel pain. It is a disabling disease in its chronic form[1]. Various treatment options are available including Nonsteroidal anti-inflammatory drugs, physiotherapy, orthosis, corticosteroid injection and lately autologous platelet-rich plasma (PRP) has been used. **Purpose:** To compare the efficacy of platelet rich plasma and corticosteroid injections in reducing pain and improving functional outcome in patients with chronic plantar fasciitis. **Materials and Methods:** To compare the efficacy a non-randomized comparative prospective clinical trial conducted in the Department of Orthopaedics, Adichunchanagiri institute of Medical Sciences, B.G NAGARA after obtaining ethical clearance. This study consisted of 80 patients diagnosed with the chronic planter fasciitis. Patients fulfilling inclusion criteria was included in the study for a period of 18 months (November 2020 to May 2022). Visual analogue scale for pain scores were used as outcome variables. **Results:** In the present study, pain was assessed using a 10-point VAS. Pre-injection, mean VAS score was 8.23 ± 1.12 and 8.53 ± 1.09 in the corticosteroid and PRP group respectively, with no significant difference between them (p value = 0.22). At 3 weeks, mean VAS score was 8.38 ± 1.39 and 6.88 ± 1.19 in the corticosteroid and PRP group respectively. Though the mean VAS score was lower in the PRP group, there was no significant difference between them (p value = 0.31). At 6 weeks, we observed that mean VAS score was lower in the PRP group (5.2 ± 0.94) as compared to corticosteroid group (5.5 ± 0.88), though the difference was not statistically different. At 3 months, we observed that mean VAS score was significantly lower in the PRP group (3.58 ± 0.81) as compared to corticosteroid group (4.03 ± 0.83), p value < 0.05. The trend continued at the next follow up as well. At 6 months, we observed that mean VAS score was significantly lower in the PRP group (1.78 ± 0.66) as compared to corticosteroid group (2.15 ± 0.58), p value < 0.01. **Conclusion:** PRP was more effective and durable than steroid injection for the treatment of chronic recalcitrant cases of planter fasciitis.

KEYWORDS : heel pain, plantar fasciitis, corticosteroid, platelet-rich plasma

INTRODUCTION

Plantar fasciitis is a one of the commonest cause of heel pain. It is a disabling disease in its chronic form[1]. It is a degenerative tissue condition of the planter fascia rather then inflammation. Approximately 15% of all foot complaints coming to the attention of health-care professionals can be attributed to this cause[2]. This condition also accounts for 8% of all injuries in athletes in running-related sports[3].Various treatment options are available including Nonsteroidal anti-inflammatory drugs, physiotherapy, orthosis, corticosteroid injection and lately autologous platelet-rich plasma (PRP) has been used.

MATERIALS AND METHODS

This is a non-randomized comparative prospective clinical trial conducted in the Department of Orthopaedics, Adichunchanagiri institute of Medical Sciences, B.G NAGARA after obtaining ethical clearance. This study consisted of 80 patients diagnosed with the chronic planter fasciitis. Patients fulfilling inclusion criteria was included in the study for a period of 18 months from November 2020 to May 2022. Visual analogue scale for pain scores were used as outcome variables.

INCLUSION CRITERIA

1. Patients diagnosed with chronic plantar fasciitis
2. Patients with age 20-75 years, of either sex
3. Duration of symptoms more than 3 months
4. Patients not responding to oral medications more than 3 months

EXCLUSION CRITERIA

1. Nerve related symptoms (tarsal tunnel syndrome, radiculopathy, foot and ankle osteoarthritis)
2. Generalized inflammatory arthritis, including ankylosing spondylitis, rheumatoid arthritis or psoriasis.
3. Patients with systemic disease
4. Hemoglobin <5.0 g/dl
5. Local Infection
6. History of calcaneus fracture
7. Surgery in the heel area

SAMPLING

The sample size was calculated using following formula:

$n = (Z\alpha/2 + Z\beta)\, 2 * (SD * 2) / d2$

n- Sample size

Zβ/2 – Z value at 1% error (2.58)

Zβ – Z value at 10% (1.28)

SD- average standard deviation of the character = (SD1+SD2)/2

d - clinically relevant effect (taken as 1 VAS point)

During the study duration, we included 80 patients fulfilling the study criteria,40 in platelet rich plasma and 40 in corticosteriod treatment group.

INTERVENTION

Before administration of the PRP or steroid injection, all patients underwent a random blood sugar level assessment. The participants were appropriately counselled before the injection. Injections were given under aseptic condition.

PRP Group

For PRP preparation, blood was drawn from the cubital vein into two to three EDTA tubes under aseptic condition. Vacutainer was centrifuged at 1350 rpm for 8 min in a routine 380 R -8 C Plus centrifuge model. 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. The concentrate in the upper layer was carefully collected. The collected volume ranged from 1 to 1.25ml in each vacutainer. Approximately, 1ml of the upper layer of the sample that underwent the first spin step was collected and transferred to one empty 6ml tube. This tube was centrifuged again for 10 min at speed of 2500 rpm (second spin). The upper half of the plasma volume, platelet poor plasma (PPP), was removed. The remaining volume of PRP was used for injection.

The injection was given at the site of maximal tenderness using peppering manoeuvre with 20- gauge-needle after initial instillation of local anaesthesia (1ml of 2% plain xylocaine).

Corticosteroid Group

In the corticosteroid group, the patients received 2ml (80mg) Triamcinolone along with 0.5ml of plain 2% xylocaine using 20G wide bore needle into the point of maximum tenderness.

After injection, all patients were allowed to immediately walk with or without weight bearing support and activities such as running or jumping are avoided for at least 4 weeks after the last injection.

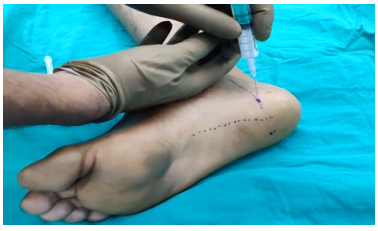

FIG.1 Picture showing infiltration of corticosteroid injection at the most tender point under a sterile precaution.

DATA COLLECTION

Data were collected using a pre-designed semi-structured study proforma. Information on demographics was collected. Comorbid disorders and the patients' clinical presentation were included in the clinical information. History and duration of heel pain was noted for all patients. Pain was assessed using VAS pain scale. VAS was assessed using a ruler with anchor points 0 as no pain 10 as the worst possible pain. These assessments were made pre-intervention, then at 3 weeks, 6 weeks, 3 months and 6 months postintervention. Complications of the procedure were also documented.

A home exercise program for plantar fascia and Achilles tendon stretching was demonstrated and explained to both groups (three sets of each exercise for 10 min duration with 10 repetitions in each set).

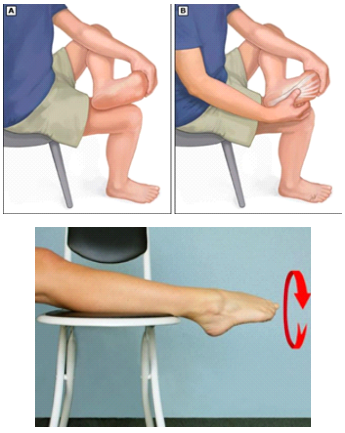

FIG.2 Stretching exercises advised to the patients after PRP and corticosteroid injection for the period of 2 weeks.

STATISTICAL ANALYSIS

The analysis included profiling of patients on different demographic, laboratory and clinical parameters. Descriptive analysis of quantitative parameters was expressed as means and standard deviation. Ordinal data were expressed as absolute number and percentage. The two treatment groups were compared for differences in age, gender composition, and pre-treatment measures of pain and function. Cross tables were generated and chi square test was used for testing of associations and student t test was used for comparison of quantitative parameters. Within group comparisons were analysed using repeat measure ANOVA. P-value < 0.05 is considered statistically significant. All analysis were done using SPSS software, version 24.0.

RESULTS

In the present study, pain was assessed using a 10-point VAS. Pre-injection, mean VAS score was 8.23 ± 1.12 and 8.53 ± 1.09 in the corticosteroid and PRP group respectively, with no significant difference between them (p value = 0.22). At 3 weeks, mean VAS score was 8.38 ± 1.39 and 6.88 ± 1.19 in the corticosteroid and PRP group respectively. Though the mean VAS score was lower in the PRP group, there was no significant difference between them (p value = 0.31). At 6 weeks, we observed that mean VAS score was lower in the PRP group (5.2 ± 0.94) as compared to corticosteroid group (5.5 ± 0.88), though the difference was not statistically different. At 3 months, we observed that mean VAS score was significantly lower in the PRP group (3.58 ± 0.81) as compared to corticosteroid group (4.03 ± 0.83), p value < 0.05. The trend continued at the next follow up as well. At 6 months, we observed that mean VAS score was significantly lower in the PRP group (1.78 ± 0.66) as compared to corticosteroid group (2.15 ± 0.58), p value < 0.01.

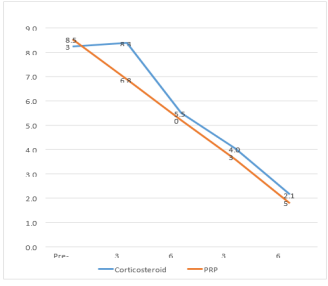

FIG.3 Change in VAS in corticosteroid and PRP group patients

DISCUSSION

Age- It was observed that 58.8% were aged 20 to 40 years, 36.3% were aged 41 to 60 years and 5% were aged 61 to 75 years. It was found that the distribution of patients according to age was similar in the corticosteroid and PRP group (p value = 0.77). In the study by Sahoo et al, mean age of patients in the PRP group was 39.4 years and that in the corticosteroid group was 37 years[3].

Gender- In our study, 42.5% were females. In the corticosteroid group, 37.5% were females, while in the PRP group 47.5% were females. Gender distribution was similar in the two treatment groups (p value = 0.36).

Site In the corticosteroid group, bilateral heel was involved in 30%, left heel in 47.5% and right heel in 22.5%. In the PRP group, bilateral heel was involved in 30%, left heel in 27.5% and right heel in 42.5%. On analysis, the distribution of patients according to site of plantar fasciitis was similar (p value = 0.11).

Pain It was assessed using a 10-point VAS. Gould et al concluded that VAS is widely used due to its simplicity and adaptability to a broad range of populations and settings[4]. The VAS is more sensitive to small changes, especially when looking at change within individuals.

Pre-injection, mean VAS score was 8.23 ± 1.12 and 8.53 ± 1.09 in the corticosteroid and PRP group respectively.At the end of 6 months, we observed that mean VAS score was significantly lower in the PRP group (1.78 ± 0.66) as compared to corticosteroid group (2.15 ± 0.58), p value < 0.01.

CONCLUSION

Based on the results of our study, we conclude that:
1. Pain (based on VAS) was significantly lower in PRP group at 3- and 6-months follow up.
2. Functional outcome which is inversely proportional to VAS score was significantly higher in PRP patients at 6 weeks, 3 months and 6 months follow up.
3. One case from PRP group had pigmentation at the site of injection and from the corticosteroid group, there was one case each of plantar fascia rupture and heel abscess.

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