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Original Research Article

Effectiveness of intralesional platelet rich plasma injection among 40 patients in plantar fascitis: A prospective study

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Abstract

Objective: The objective of the study is to evaluate the effectiveness and tissue response of intralesional platelet‐rich plasma (PRP) injection with serial USG follow up among 40 patients in plantar fascitis.

Materials and Methods: A total number of 40 patients with plantar fascitis. Pre‐ and post‐intervention visual analogue scale (VAS) for the assessment of pain relief and assessment of plantar fasicia(PF) thickness using USG with 1 month, 3 month and 6 month follow up.

Results: The mean VAS scores for heel pain measured at 1st month of treatment was 3.025±0.831, at 3months was 2.225±0.5767, at 6months was 0.025±0.1581. The decrease in mean VAS score was statistically significant when compared with pre-treatment values (8.926±0.565).

The mean plantar fascial thickness measured at 1 month was 3.575±0.5006, at 3 months was 3.4±0.4961, at 6 months was 3.1±0.2819. The decrease in mean plantar fascial thickness was statistically significant when compared with pre-treatment values (6.5725±0.7161).

Conclusion: Intralesional injection of the PRP is effective and safe modalities of treatment for plantar fasciitis with significant reduction in PF thickness.

Keywords: Plantar fasciitis, platelet‐rich plasma, VAS

Introduction

Plantar fasciitis is occurs due to a degenerative process resulting in acute and chronic inflammation of plantar fascia (PF) and is one of the common causes of heel pain. Approximately 10% of the population experience plantar heel pain at some point during their lifetime. [1] It may also cause calcification at the origin of the PF and bony traction spur formation. The aetiology of plantar fascitis is somewhat controversial, but many factors that may precipitate the condition include poor foot mechanics due to pes planus or cavus foot type, obesity, inappropriate footwear, nerve entrapment, fat‐pad atrophy, and repetitive microtrauma [2].

Patient with plantar fasciitis comes with heel pain which is characterized by first‐step pain. This pain happens after a period of rest, such as in the morning when waking up from bed.

This acute pain usually reduces after the first couple of steps, either disappearing completely or remaining as a constant pain that worsens again after a period of rest [2, 3].

Diagnosis of planter fascitis is clinical and by taking a detailed history and physical examination. Although radiological studies are done to confirm the diagnosis to rule out other

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causes of heel pain. Plain radiographs can rule out other bony lesions and stress fractures whereas ultrasound is another relatively inexpensive diagnostic tool that can rule out certain causes of heel pain such as plantar fibromatosis, foreign body, plantar xanthomas, and can aid in diagnosis by establishing plantar fascial thickness and the presence of fascial tears [4,5].
Other investigations that are not routinely done are magnetic resonance imaging, technetium bone scintigraphy and electromyography. Depending on the overall clinical picture, blood tests such as a white cell count, human leukocyte antigen B27, antinuclear antibodies, and uric acid may also be performed in younger patients or patients who have bilateral heel pain [6].
The initial treatment of plantar fasciitis is conservative that includes rest, activity modification, and medication therapy with nonsteroidal anti‐inflammatory drugs (NSAIDs), acetaminophen, or corticosteroids. Other therapy includes stretching, orthotics and night splints, corticosteroid injections, platelet‐rich plasma (PRP) injections, autologous blood injections, botulinum toxin injections, extracorporeal shock wave therapy, and radiation therapy. Surgical options include partial or complete PF release and gastrocnemius release if the patient has continued pain even after 6-12 months of nonsurgical management [4, 6].
We conducted a prospective study to find out the effectiveness and tissue response with intralesional PRP injection in plantar fascitis.

Material and Methods

After obtaining written informed consent, prospective study was conducted.

INVESTIGATIONS : CBC , RBS , HIV , HBSAG , XRAY AND USG

Inclusion criteria

- Patients willing to give written informed consent
- Patients of either sex aged between 18 and 60 years
- Patients with plantar heel pain worse with rising in the morning or after periods of sitting lying presenting for 4 weeks or more
- Patients with maximal tenderness at the attachment of the plantar fascia on the medial tubercle of the calcaneus

Exclusion criteria

- Patients aged less than 18 years and greater than 60 years
- Patients with previous foot deformity, previous foot surgery
- Patients with anemia, hemorrhagic disorder, pregnancy, diabetes, and on anti-coagulant therapy
- Patient not willing to give informed consent
- Local skin pathology at injection site.
- Patient who had received any previous treatment in the form of local injections of steroids.
- Patients who were suffering from symptoms of pain around the anteromedial heel due to other reasons like calcaneal spur, calcaneal osteomyelitis, old calcaneal fracture, compression neuropathies such as tarsal tunnel syndrome or impingement of the medial calcaneal nerve, gout and rheumatoid arthritis.
- Dysfunction of the knee, ankle, or foot
- Patient with neuropathic symptoms (radiculopathy, tarsi sinus syndrome)
- Patient with complex regional pain syndrome or with metastatic cancer

Initially, 43patients were included in this study but 3 patients were lost during follow‐up period. Hence, finally, 40 patients of plantar fasciitis in the age group of 18–60 years were

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taken for intralesional PRP injection locally.

The study was conducted at Krishna Rajendra hospital, Mysore Medical college and Research Institute, Mysore, Karnataka, India, between Feb 2021 and Aug 2022.

Patients included were those with age group between 18 and 60 years presenting with complaints of plantar heel pain, worse with rising in morning and/or after periods of rest with maximal tenderness at the attachment of the PF on the medial tubercle of the calcaneus for 4 weeks or more and willingness to forgo any other concomitant conservative treatment modality; NSAIDS and orthotic devices during the study.

Patients excluded were those with inflammatory or degenerative polyarthritis, diabetes mellitus, local or systemic infection, peripheral vascular diseases, metabolic diseases such as gout, clotting disorder, anticoagulation therapy, neuropathic symptoms, complex regional pain syndrome, metastatic cancer, previous surgery, pregnancy or breastfeeding female patients and previous treatment with corticosteroid injection in the past 6 months or NSAIDs treatment within the past 7 day.

After 48 hrs of treatment, patients were given a standardized stretching protocol to follow for 2 weeks. Patient biography, detailed history, and clinical evaluation were done along with ultrasonic evaluation of PF thickness of both feet. The diagnosis was made on clinical and radiological ground. All the fresh cases were initially treated with contrast bath foot stretching exercise and silicone heel pad for 4 weeks. Follow‐up of patients after treatment was done at 4 weeks, 12 weeks, and after 24 weeks. We used visual analogue scale (VAS) for the assessment of pain relief. Ultra sonographic evaluation of the thickness of PF was done pre-treatment and after 4^{th} week, 12^{th} week and 24^{th} weeks of treatment. In all the patients whereas thickness of more than 4 mm was considered abnormal [7‐9].

Platelet‐rich plasma preparation method

Twenty ml of a patient's own venous blood was withdrawn from cubital vein under aseptic condition and collected in presterilized centrifuge vials preloaded with anticoagulant sodium citrate in a ratio of 1:9. This blood was then centrifuged at 1500 rpm for 15 min(1^{st} spin). The obtained plasma was centrifuged with 2500 rpm for 10 mins(2^{nd} spin).The platelet‐poor plasma was extracted and discarded. Two ml of PRP was harvested finally containing approximately 6-8 times the concentration of platelets compared to baseline whole blood [10].

Procedure

The procedure was done on an outpatient basis and under complete aseptic condition. Patients received 2 ml of autologous PRP injection into the origin of the PF and directly into site of maximum tenderness at the heel through "peppering technique," i.e., single skin entry, partially withdrawing the needle, redirecting, and making multiple penetrations to the fascia. The patients were monitored for 20 min for any adverse reactions [10].

Results

40 patients were included in our study.

Table 1: Pain assessment done using VAS score

Table 1	Sample (n)	Sum (∑x)	Mean (μ)	Standard deviation (σ)
Before PRP	40	366	8.926	0.565
4^{th} week after PRP	40	121	3.025	0.831
12^{th} week after PRP	40	88	2.225	0.5767
24^{th} week after PRP	40	01	0.025	0.1581

The mean VAS scores for heel pain measured at 1st month of treatment was 3.025±0.831, at 3months was 2.225±0.5767, at 6months was 0.025±0.1581. The decrease in mean VAS score was statistically significant when compared with pre-treatment values (8.926±0.565).

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Table 2: Plantar fascia thickness assessment with serial USG follow up.

Table 2	Sample (n)	Sum (∑x)	Mean (μ)	Standard deviation (σ)
Before PRP	40	262.9	6.5725	0.7161
4th week after PRP	40	143	3.575	0.5006
12th week after PRP	40	136	3.4	0.4961
24th week after PRP	40	124	3.1	0.2819

The mean plantar fascial thickness measured at 1 month was 3.575±0.5006, at 3 months was 3.4±0.4961, at 6 months was 3.1±0.2819. The decrease in mean plantar fascial thickness was statistically significant when compared with pre-treatment values (6.5725±0.7161).

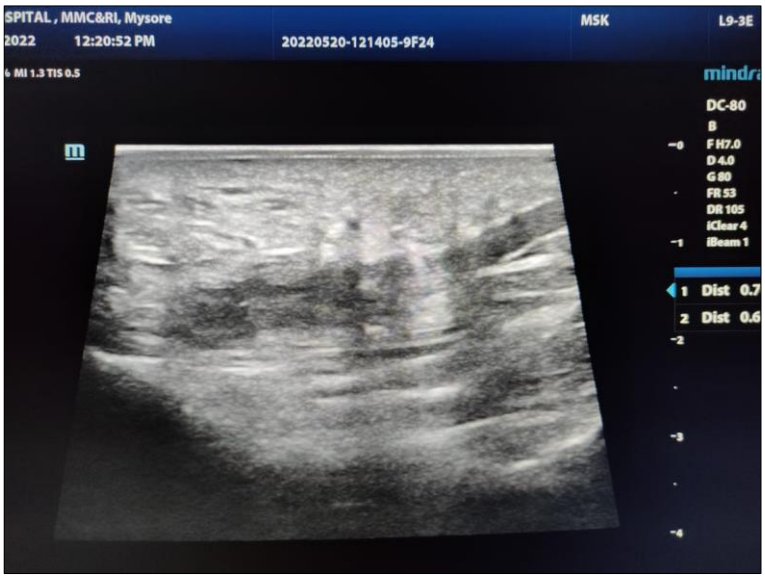

Fig 1: Plantar fascia thickness before PRP injection 6.7mm

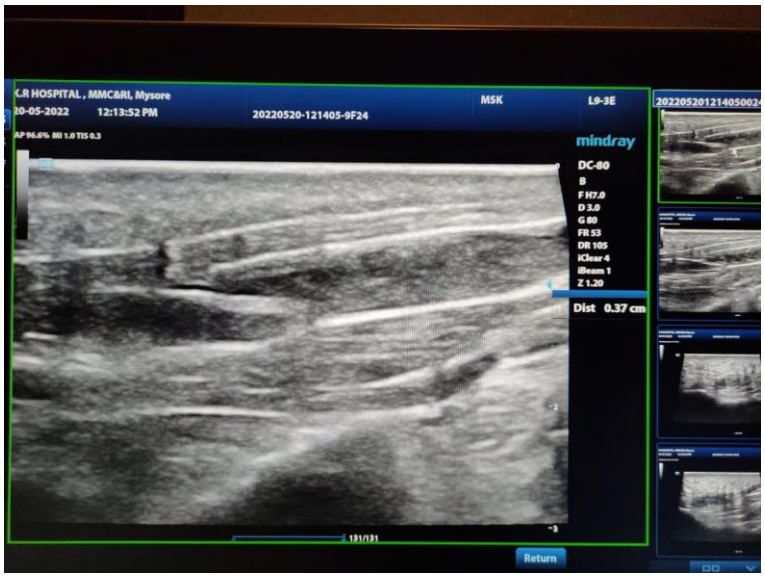

Fig 2: Plantar fascia thickness at 4th week post PRP injection 3.7 mm

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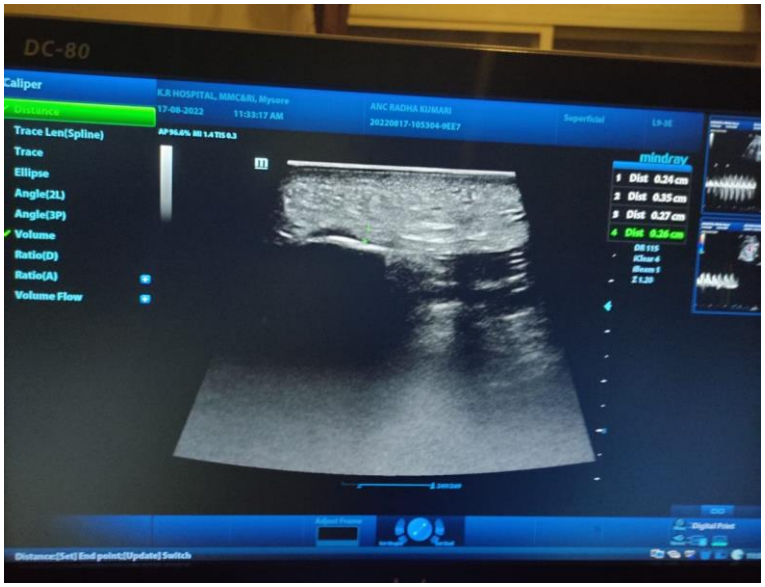

Fig 3: Plantar fascia thickness at [12th] week post PRP injection 2.6 mm

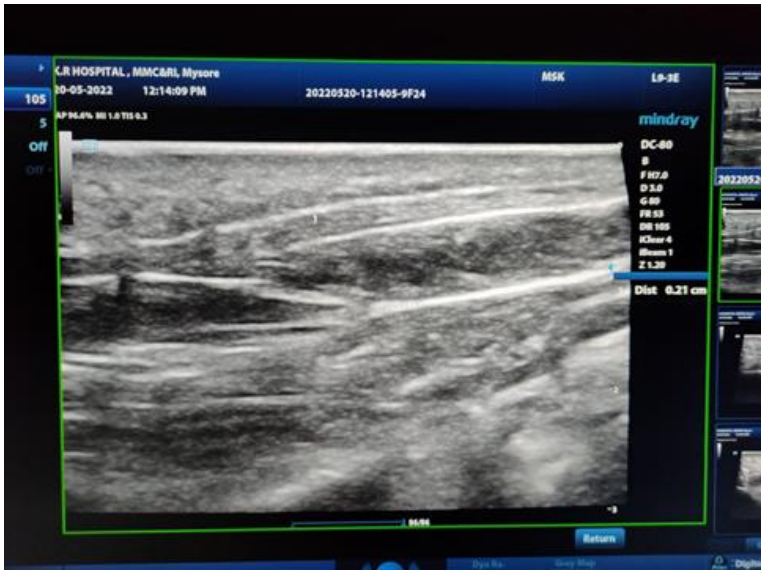

Fig 4: Plantar fascia thickness at [24th] week post PRP injection 2.1 mm

There was a significant decrease in mean plantar fasica thickness at 4th week, 12th week and 24th week of post treatment. [figure 1, 2, 3, 4,]

Discussion

Plantar fasciitis is one of the most common causes of heel pain in adults. However, the true etiology of plantar fasciitis is still unknown and many different etiological factors have been attributed. The etiology and treatment are still not fully understood. In general, plantar fasciitis is a self‐limiting disease.

Unfortunately, the time until resolution is often 6-18 months, which can lead to frustration for patients and physicians. The diagnosis of planter fasciitis is done by taking a detailed history and physical examination. Whereas imaging studies are done to confirm the diagnosis or rule out other causes of heel pain [6, 11].

There are many available treatment methods, but in chronic debilitating conditions conservative treatment may fail.

Already various other injectable agents have been researched in the past including simple solutions such as hyperosmolar dextrose to complex orthobiologic agents such as bone morphogenic protein, but none achieved uniform success.

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PRP injection has emerged as a treatment alternative for many musculoskeletal conditions. Steroid injections are often effective in the short term although they have been shown to cause fat pad atrophy and very occasionally, they may precipitate rupture of the PF [6, 12].

Tatli and Kapasi in their study concluded that steroid therapy, when coupled with plantar stretching, can provide efficacious pain relief [13].

Ragab and Othman conducted a study on 25 patients with chronic plantar fasciitis and concluded that PRP is safe and useful treatment modality in the treatment of plantar fasciitis [11].

In our study, all patients were in the age group between 20 and 60 years. The mean patient age was 39.475±9.896 years. In total, males comprised 45% and females comprised 55% of total 40 subjects.

We followed every subject at 1st month, 3rd month and 6th month after giving injection and used VAS score and PF thickness to evaluate the effectiveness of treatment [7-9].

The mean VAS score decreased continuously from baseline which was statistically significant.

The difference in mean VAS score between pretreatment and 24 weeks of posttreatment was highest [Tables 1].

In the current study, reduction in PF thickness is significant which is measured by ultrasonography after 4th week, 12th wek and 24th week of treatment.

Hence, this study outlines that intralesional injection of both the PRP are effective and safe modalities of treatment for plantar fasciitis. We found no serious complications (local or systemic) in our study with PRP therapy. Limitation of this study is the variability of platelet concentration among different patients, short duration of study, and small sample size. However, future studies with a larger patient population and a longer follow‐up may provide a better insight into the efficacy of PRP treatment modality.

Conclusion

Our study is a prospective study which showed intralesional injection of the PRP is effective and safe modalities of treatment for plantar fasciitis with significant reduction in PF thickness.

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