Section: Orthopedics

Original Research Article

MANAGEMENT OF CHRONIC PLANTAR FASCIITIS WITH PLATELETS RICH PLASMA THERAPY- A PROSPECTIVE STUDY

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Abstract

Background: Plantar fasciitis is caused by repetitive overuse or over stretching gets inflamed.In plantar fasciitis, inflammation and degeneration occurs simultaneously. This is one of the commonest tendinopathies affecting in humans. It typically seen in both men and women of age group 40-70 years, with predominance in women. **Materials and Methods:** The Orthopedics department of BLDE Hospital conducted this study from January 1 to May 31, 2022. With 30 patients were chosen for the study. The patients were chosen based on our criteria, and a diagnosis was only determined after a clinical examination. The VAS and AOFAS grading systems were used to evaluate the pain status. Patients were checked on at two, six, twelve, and twenty-four weeks. Pain following injection and activity level were reported. The final resuult was assessed in three categories—excellent, very good, and poor—based on the amount of activity and the pain status at the end of the 24-week period. **Results:** The result for PRP group in mean VAS significantly decreased from 8.4 to 3.3, at six months follow up, and AOFAS 27.66 to 50.93.**Conclusion:** The results of this study indicate that short-term improvements in VAS scores for heel pain, functional outcome scores, and restoration of plantar fascia thickness in patients with chronic plantar fasciitis showed medically and statistically significant improvements. According to the study, local PRP injection is an effective and secure treatment for chronic plantar fasciitis.

INTRODUCTION

The plantar fascia is thickened aponeurosis made up of fibrous tissue that originates from Medial tubercle of calcaneus and run forward to form longitudinal arch of foot. Plantar fasciitis is a condition where the plantar fascia becomes irritated from repetitive overuse or overstretching. Inflammation and degeneration coexist in plantar fasciitis.[1] One of the most prevalent chronic tendinopathies affecting people in this condition. In the age range of 40 to 70 years, it commonly affects both men and women, but primarily women. 10% of the overall population has it, and 33% of occurrences are bilateral.[2]

In the past ten years, PRP and other regenerative therapies have dramatically increased clinical use in musculoskeletal, spinal, and sports medicine. Various factors have come together throughout this time to support this development. Advances in musculoskeletal ultrasound to facilitate diagnosis and guide interventions, as well as translation of treatment paradigms from colleagues in orthopaedics and surgery, have all worked in this field for a better knowledge of tendinopathy as a degenerative cellular and connective tissue process.[2]

Since the initial reports of PRP therapy's medical use from 1980-2000, with applications related to the fields of cardiac, dental, and maxillofacial surgery, it has grown in popularity in tissue regeneration and other specializations. PRP has been proven to be a successful autologous source for transfusion in cardiac surgery for correction of hematologic abnormalities and surgical blood loss following cardiopulmonary bypass. Anitua.[3] showed in the dental field that using PRP therapy at tooth extraction sites helped bone regeneration take place in sockets with compact, mature bone that had normal morphology. Marx and colleagues.[4] in

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maxillofacial surgery examined how PRP affected bone density and bone maturation rate in bone graft repairs of mandibular continuity deficits, showing that the addition of PRP to grafts boosted bone development.

As an intralesional biologic used to speed up the healing of cartilage, muscle, ligament, and, tendon PRP therapy has emerged as a highly sought-after treatment in today's musculoskeletal and sports medicine for its positive risk and impact on the healing of affected tissue, treating a variety of diseases, and speeding up the process of recovery.[5]

This article offers the most recent, clinically useful information on PRP's basic science, practical considerations for using it, evidence supporting PRP and steroid use in musculoskeletal medicine, recommendations for PRP preparation and steroid, patient selection, and suggested post-procedure recovery and return-to-sport protocols. The authors will discuss the gaps in our understanding of this form of regenerative medicine and suggest important areas for further investigation.[6]

MATERIALS AND METHODS

Patients admitted in Department of Orthopedics in BLDE (DEEMED TO BE UNIVERSITY) Shri B.M. Patil's Medical College, Hospital and Research Centre, Vijayapura with the diagnosis of CHRONIC PLANTAR FASCIITIS. The patients will be informed about the study in all respects and informed written consent would be obtained. The period of study will be from. 1st November 2020 to 31st May 2022. Follow up period will be 2 weeks,6 weeks, 3 months, 6 months.

Inclusion Criteria:

1. Patients diagnosed with chronic plantar fasciitis clinically, radiologically or both
2. Patients with no history of any local steroids injections in past 2 months
3. Age of more than 18 years.

Exclusion Criteria

1. Patients without any trial of conservative treatment
2. Infection or ulcer at the injection site
3. Pregnant ladies
4. Uncontrolled diabetes mellitus

Methods of PRP Preparation

Freshly produced autologous PRP was used to treat 30 patients with severe plantar fasciitis who had failed lengthy standard non-operative treatment.

The study's informed consent was provided by every patient, and it received institutional ethical committee approval.

In order to meet the inclusion criteria, all patients underwent a plain x-ray of the ankle joint from the side as well as basic investigations such haemoglobin, random blood sugar, lipid profile, and renal profile.In order to avoid sample clotting and platelet activation before usage, a sample of 18 cc venous blood was drawn from the patient's cubital vein and mixed with 2 cc of the anticoagulant Acid citrate dextrose solution (ACD).[7] Soft and strong spins were used in the double spin approach here. To minimise mechanical harm to the platelets, this sample was next centrifuged at 2000 rev / min for 12 minutes using a soft spin technique. [Figure 1] Additionally, the upper layer and intermediate layer, which contain few RBCs, are moved to a sterile container before being centrifuged hard for 10 minutes at 3000 rpm. The lower third of the plasma was removed, along with platelet pellets, and transferred to an injection syringe with an 18 gauge needle. The platelet-poor plasma was discarded. About 2.5 to 3cc of PRP are available for usage. This PRP is not activated or buffered.[8]

Nonsteroidal anti-inflammatory drugs use was not permitted during the first 2 weeks after treatment and was discouraged throughout the entire study period. No other treatment modalities were used during the study except exercises and footwear.[9]

Physical examinations were performed, clinical symptoms and pain state were measured, and the results were compared to the pre-injection condition using interval AOFAS hindfoot score data and VAS scoring. Assessment of pre- and post-injection state. periodically at the second, fourth, twelve, and twenty-four weeks following therapy with indicated scores.[10]

Figure 1: (After first centrifugation)

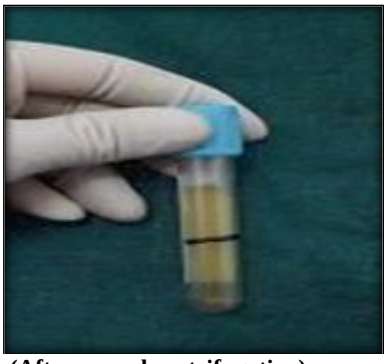

Figure 2: (After second centrifugation)

Injection Technique

After confirming the diagnosis as plantar fasciitis(clinically or radiologically or both), the patient is made to lie in a lateral position on the table with knee flexed up to 90 degrees. The affected foot is scrubbed with betadine scrub(7.5%

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of povidone-iodine). Then cleaned with spirit and painted with betadine solution(10% povidone-iodine). The most tender point of the foot is palpated and marked.

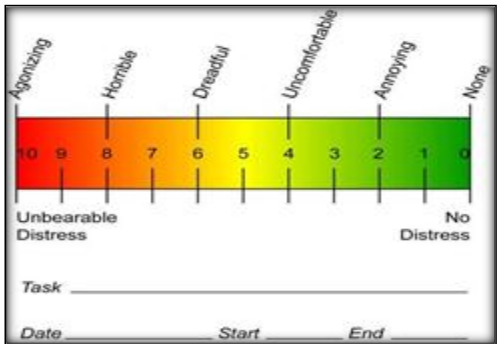
Then with 18G intramuscular needle the 3ml of PRP is injected with the peppering technique i.e..,fanning of PRP in all directions once u breach the subcutaneous layer.[6]

Main Outcome Measurements:

The outcomes of the study was calculated by Visual analogue scale scoring and AOFAS scoring. the values are added at pre-injection, 2th, 4th, 12th and 24th weeks post injection. Final results were measured based on the pain and activity level at 6 Months of follow-up.

Visual Analogue Scale

Numerical pain score is a subjective assessment of pain where the patient rates the intensity of the pain perceived. Score 0 refers to no pain. Score 10 refers to the worst pain possible.



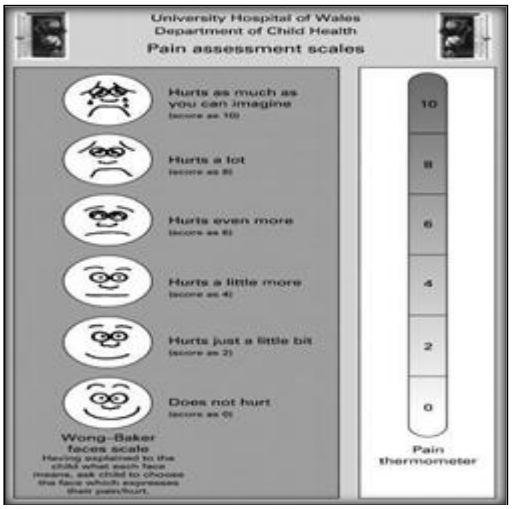


Figure A & B

American Orthopedic foot and ankle society ankle hindfoot score(AOFAS)

AOFAS rating system published in 1994, to rate the clinical status of ankle-hind foot, ranging from 0 to 100, with healthy ankle receiving 100.

1. Pain 40 points

None	40
Mild occasional	30
Moderate	20
Severe	0

2. Function(50 points)

Activity limitations, support requirement	
No limitations, no support	10
No limitation of daily activities, limitation of recreational activities, no support	7
Limited daily and recreational activities, cane	4
Severe limitation of daily and recreational activities, walker, crutches, wheel chair, brace	0

Maximum walking distance, block	
Greater than 6	5
4-6	4
1-3	2
<1	0

Walking surface	
No difficulty on any surface	5
Some difficulty on uneven terrain ,stairs ,inclines, ladders	3
Severe difficulty on uneven terrain ,stairs ,inclines, ladders	0

Gait abnormality	
None, slight	8
Obvious	4
Marked	0

Sagittal motion	
Normal or mild restriction (30 degrees or more)	8
Moderate restriction (15-29 degrees)	4
Severe restriction (<15 degrees)	0

Hind foot motion	
Normal to mild restriction (75-100 %normal)	6
Moderate restriction (25-74% normal)	3
Marked restriction (<25% normal)	0

Ankle-hind foot stability	
Stable	8
Definitely unstable	0

3. Alignment (10 points)

Good, plantigrade foot, midfoot well aligned	15
Fair, plantigrade foot, some degree of midfoot malalignment, no symptoms	8
Poor, non plantigrade foot, severe malalignment, symptoms	0

RESULTS

In BLDE Hospital and research center, between 1st November to 31st May 2022, all 30 patients with plantar fasciitis were followed by dept of orthopedics. In our study the total number of patients are 30, of which 21(70%), are female patients and 9(30%) patients are male. This study shows female predominance in plantar fasciitis.

In the study conducted by dept of orthopaedics in BLDE hospital, 30 patients were treated with platelet rich plasma therapy. Out of 30 patients, 14 showed symptoms on left foot and 11 showed symptoms on right foot and 5 showed symptoms on bilateral foot suggests that plantar fasciitis is seen commonly on left foot.

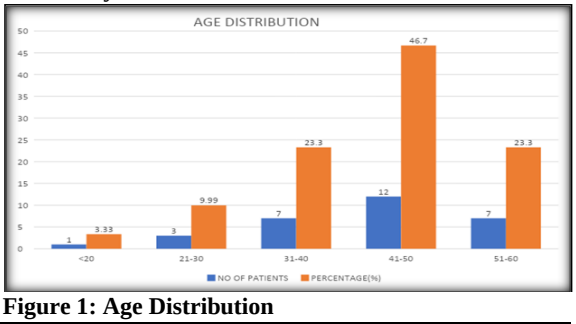


Figure 1: Age Distribution

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In this study which includes 30 patient, the mean age of patients presenting with plantar fasciitis is 41.30 years. The mean age of females patient included in our study is 43.3 years where mean age of male patients is 37.5. Majority of patients falling in the range of 40-50 years of age.

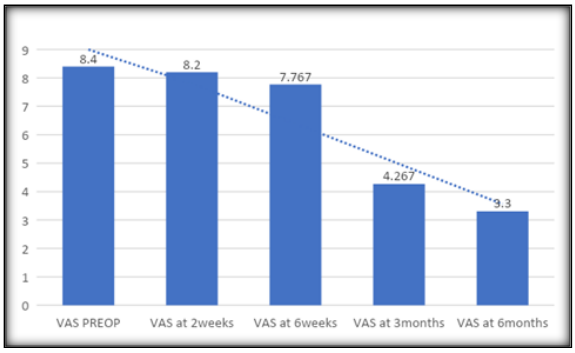

Figure 2: Visual Analogue Scoring

In the study conducted by department of orthopedics, 30 patients selected for the study were analyzed using visual analogue scoring system at 2 weeks, 6 weeks , 3months and 6 months.

The results show that there is no much difference in the relieve of pain at 2 week of follow-up(mean VAS score-8.2), whereas at 6 weeks of follow-up there is slight improvement(mean VAS score 7.7)

The patients when examined at 3month follow-up and 6 month follow-up there is significant relieve in pain with mean being 4.26 and 3.3 respectively.

This suggests that there is significant pain relief after 6 weeks of platelet rich plasma therapy, with more significant relief shown after at 3 months and 6 months follow up.

This signifies that the platelet rich plasma therapy shows relief in pain after 6 weeks of platelet rich plasma therapy and further there is significant reduction in pain relief at 3 months of follow-up and 6 months of follow-up.

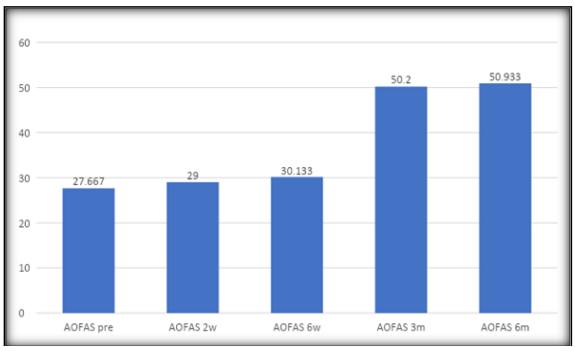

Figure 3: American Orthopaedic Foot and Ankle Score

In the study conducted by department of orthopedics, 30 patients selected for the study were analyzed using AOFAS SCORING along with visual analogue scoring system at 2 weeks, 6 weeks , 3months and 6 months.

The results show that there is no much difference in the functional outcome at 2 week of follow-up(mean AOFAS score mean-29), whereas at 6 weeks of follow-up there is slight improvement(mean AOFAS score mean- 30.13)

The patients when examined at 3month follow-up and 6 month follow-up there is significant increase in the function with mean being 50.3 and 50.9 respectively.

This suggests that there is slight increase in function after 6 weeks of platelet rich plasma therapy, with more significant function and moveent shown after at 3 months and 6 months follow up.

DISCUSSION

In its most basic definition, plantar fasciitis refers to inflammation of the plantar fascia at the point where it attaches to the calcaneum. Recent research, however, suggests that it is more likely plantar fascia deterioration than actual inflammation. In 2004, Dr. Barrett proposed that the condition is actually a degenerative change of the plantar fascia and was commonly known as plantar fasciosis. It was also confirmed by pathologist results that samples from chronic plantar fasciitis sufferers contained very few inflammatory cells.[11] Inflammation and degeneration are two of the events that are involved in the pathology's progression.

The initial course of treatment consists of a combination of conservative techniques, such as rest, the use of cold packs, non-steroidal anti-inflammatory medicines, and footwear changes, such as arch supports. Before the condition may be resolved, it may typically take several repeated session of the techniques like ultrasonic waves, electrical stimulation, and phonophoresis. Local intra-lesional injection or invasive plantar fascial release may be possibilities when the condition is unresponsive to the aforementioned conservative therapy approaches. Corticosteroid, Botulinum toxin, autologous blood, and platelet-rich plasma injections can be tested locally and intralesional. Numerous research highlight the benefits and drawbacks of various treatment options. Because PRP formulations were so effective at treating chronic tendinopathies, they were also used to treat severe cases of plantar fasciitis.[12]

CONCLUSION

The results of this study indicate that short-term improvements in VAS scores for heel pain, functional outcome scores, and restoration of plantar fascia thickness in patients with chronic plantar fasciitis showed medically and statistically significant improvements. According to the study, local PRP injection is an effective and secure treatment for chronic plantar fasciitis.

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