"TO EVALUATE OUTCOME OF PLATELET RICH PLASMA INJECTION FOR "PLANTAR FASCITIS" IN PATIENT UNDERGOING CONVENTIONAL CONSERVATIVE TREATMENT"

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Abstract-
Background: Plantar fasciitis is a common cause of heel pain in adults. Although it is usually a self-limiting condition, the pain may become prolonged and severe enough to cause significant distress and disruption to the patient's daily activities and work. the primary objective of the study was to evaluate and compare the effectiveness of autologous PRP injection and conventional conservative therapy for plantar fasciitis.
Methods: A Prospective study was conducted from March 2022 to November 2022 amongst 70 patients with plantar fasciitis in Pt. J.N.M medical college and Dr B.R Ambedkar Memorial Hospital Raipur. All the patients were enrolled according to inclusion criteria and divided into 2 groups i.e. group A (n=35) received PRP Injection and group B (n=35) received conventional conservative therapy. VAS score was evaluated for all the included patients. The follow-up scheduled at 2 weeks,4weeks and 8 weeks after complete enrolment of patients.
Results- Between both the groups, the significant difference was observed at 2weeks,4weeks and 8 weeks follow-up from the pretreatment VAS score. At 8 weeks follow-up, statistically more significant improvement in mean VAS scores were seen in both the groups, however when both groups were compared to each other, improvement in mean VAS scores was statistically better in PRP injection group(A) as compared to conventional conservative group (B)
Conclusion- The present study concluded the use of PRP injection in plantar fasciitis seems safer and more effective than the conventional conservative treatment.

Keywords- **Plantar fasciitis, Platelet Rich plasma, VAS score.**

INTRODUCTION

Plantar Fasciitis (PF) is considered as one of the most extreme common causes of pain in the heel area among adult foot. Also, pain is exaggerated by different activities such as longstanding weight bearing.[1]

It can affect any age group but, individuals among 40-60 are at increased risk without sex predilection. Diagnosis of plantar fasciitis depends on history, clinical examination, and imaging modalities. PF treatment is divided into drug, non-drug, and surgical strategies. Non-Steroidal Anti-inflammatory Drugs (NSAIDs), corticosteroid injections are considered the foremost drugs; whereas, nondrug approaches have different common sorts, such as shoe embeds, ice Packs, extracorporeal shock wave treatment, plantar fascia Stretching exercises[2].

Anatomically, the plantar fascia has a vital role in the connection between the medial calcanea tuberosity and the proximal aspect of the phalanges and maintain the assistance of the medial longitudinal arch and sustain the ability to absorb dynamic shock. Additionally, plantar fascia and tendons and ligaments share the same histological and mechanical traits. So, they have the same etiological, pathophysiology, and management of the degeneration of tendons diseases called tendinosis[3].

Unfortunately, up till now, there is no gold considered standard therapy for the treatment of plantar fasciitis either drug or non-drug or surgical. Moreover, [4]revealed the mitigated regenerative role of Platelet-Rich Plasma (PRP) injections in tendon regeneration through the enhanced platelets development in the treatment of chronic tendinopathy, muscle, and cartilage injuries. Furthermore, Platelet-rich plasma, commonly referred to as "PRP', is a non-operative, permanent solution for conditions such as arthritis and ligament/tendon sprains and tears. Additionally, platelets are rich in their content of regenerative components such as growth and healing factors. So, treatment with PRP enhances the average level of an injured individual and can get back to a pain-free life in 4 to 6 to weeks. So, PRP was popular target treatment that used in common by professional athletes with minimizing dysfunctional behavior and symptoms such as stiffness and swelling, and their leading inflammation, tenderness, and pain[5].

Platelet-Rich Plasma (PRP) injection is an autologous biological blood-derived product that contains high concentrations of development growth factors. Delicate tissue recuperating is thought to be fortified through upgraded fibroblast relocation and multiplication, up controlled vascularization, and expanded collagen deposition.

Platelet-Rich Plasma (PRP)has the vital role to enhance the recovery of PF and the mean pain severity improvement has been enhanced for 45% during the 6 months follow-up with a high degree of satisfaction between patients of the treatment. Furthermore, other case study with no more than 1-year follow-up has detailed comparable results with understanding fulfillment rates of 79%-96%. To date, no controlled case studies for using PRP injections for the real improvement of chronic PF with fixed methodology

and promising outcomes. PRP utilization in the treatment of plantar fasciitis may be an unused methodology with promising outcomes, advancing the recovery by and regenerative medicine progress and induction of the healing process[6]

Method-This was a prospective, randomized study, single-center conducted in tertiary care center of India from march 2022 to November 2022. A total 70 patients with plantar fasciitis were included in this study. The male and female patient age between 19 to 70 years of plantar fasciitis patient was included in the study. The patients with systemic diseases like rheumatoid arthritis, gout, degenerative arthritis, or neural injury were excluded in the study. Patients with calcaneodynia secondary to neural injury or fracture, neural entrapment or earlier surgery including endoscopic plantar fasciitis release or open plantar fascial release, received local steroid injection and patients with diabetes mellitus were excluded from the study.

Preparation of platelet rich plasma- PRP is obtained from a sample of patients' own blood, where under all aseptic precautions, 30 cc venous blood is drawn yielding about 3-5 cc of PRP depending on the baseline platelet count of an individual, the device used, and the technique employed. The blood draw occurs with the addition of an anticoagulant, such as 3ml CPDA or 3.2% sodium citrate to prevent platelet activation prior to its use.
Then 2 centrifugations soft spin (the first at 2500 rpm for 7 minutes) to separate erythrocytes and a hard spin (second at 3200 rpm for 15 minutes) to concentrate platelets produced a unit (i.e. 3ml) of PRP.
The PF patients were assigning randomly using a simple method of randomization (odd for PRP group and even for conventional conservative group) into two equal groups (35 patients each) by one of the researchers who introduce the patients with either conventional conservative group or PRP injection group. Group A PRP was injected 1-3 ml PRP in supine position with 22-gauge needle. In group B was conservative group. VAS score for pain was used to evaluate the clinical results. VAS score calculated at the time of baseline, 2 weeks,4weeks and 8 weeks follow-up visit.

STATISTICAL ANALYSIS
The data was entered in Microsoft excel sheet for analysis and tested statistically on SPSS for windows version 1o software. Quantitative variable was described in descriptive statistical analysis was done for continuous variables, frequency distribution, mean ±SD and their percentages for categorical variables were calculated. T-test was used for normal distributed data. Unpaired t test was used to see results in intergroup (between PRP and conventional conservative group) mean score was statistically significant.

RESULT- In this study, the age of patients with PF between 19-70 years were enrolled. A total 70 patients were enrolled in this study; Selected patients allocated into group A and group B by randomization. All 70 patients successfully completed at 8-weeks follow-up.

TABLE 1. GENDER DISTRIBUTION OF THE STUDY SUBJECTS

Gender	Frequency	Percentage
F Table	41	58.6
M	29	41.4
Total	70	100.0

Distributions of patients according to sex were shown in Table 1. In this study 41.6% was male and 58.4% female patients participated. females are more affected than male.

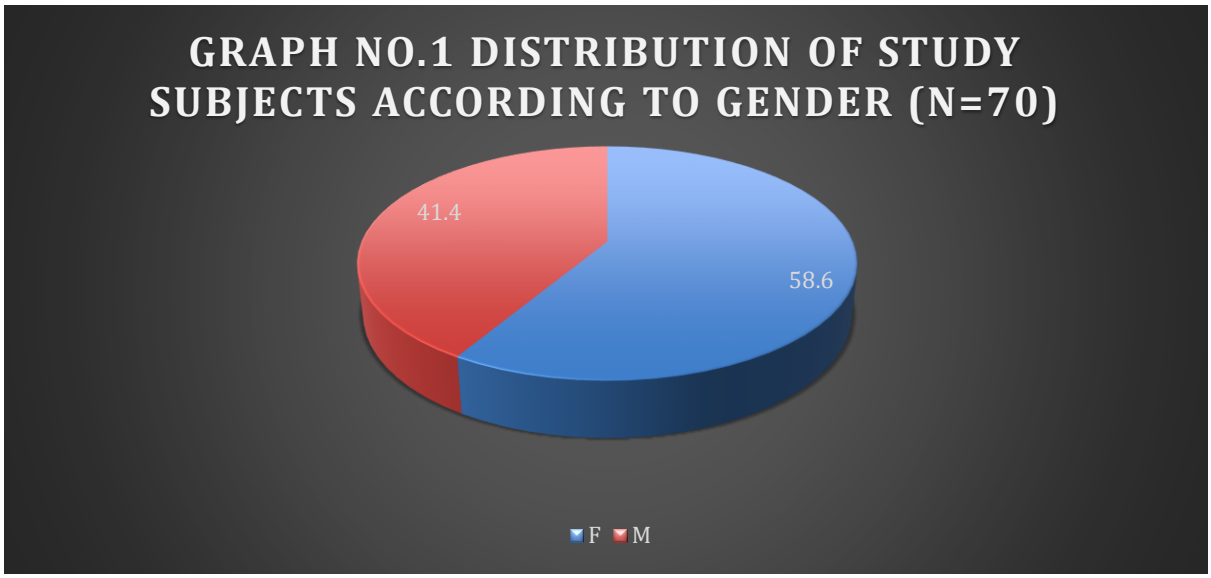


TABLE 2. AGE DISTRIBUTION OF THE STUDY SUBJECTS

AGE GROUP	FREQUENCY	PERCENTAGE
15-30	09	12.9
31-45	39	55.7
46-60	18	25.7
>60	04	5.7

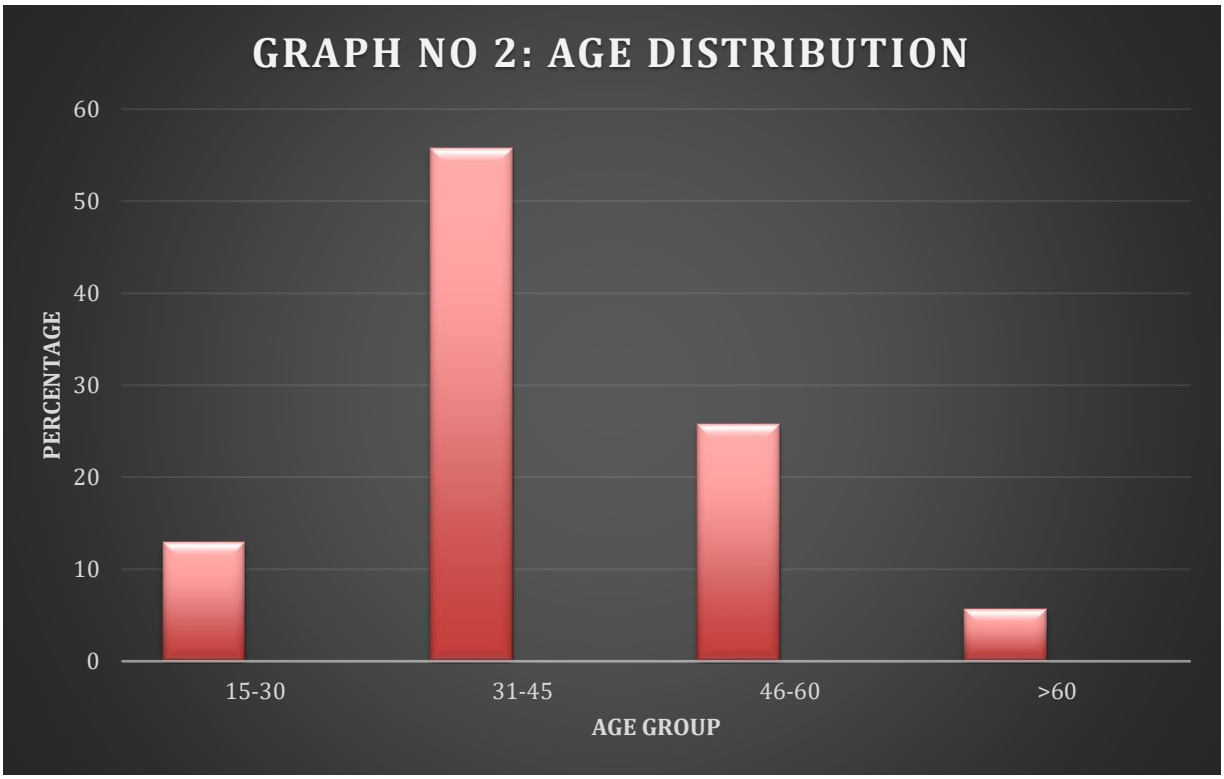
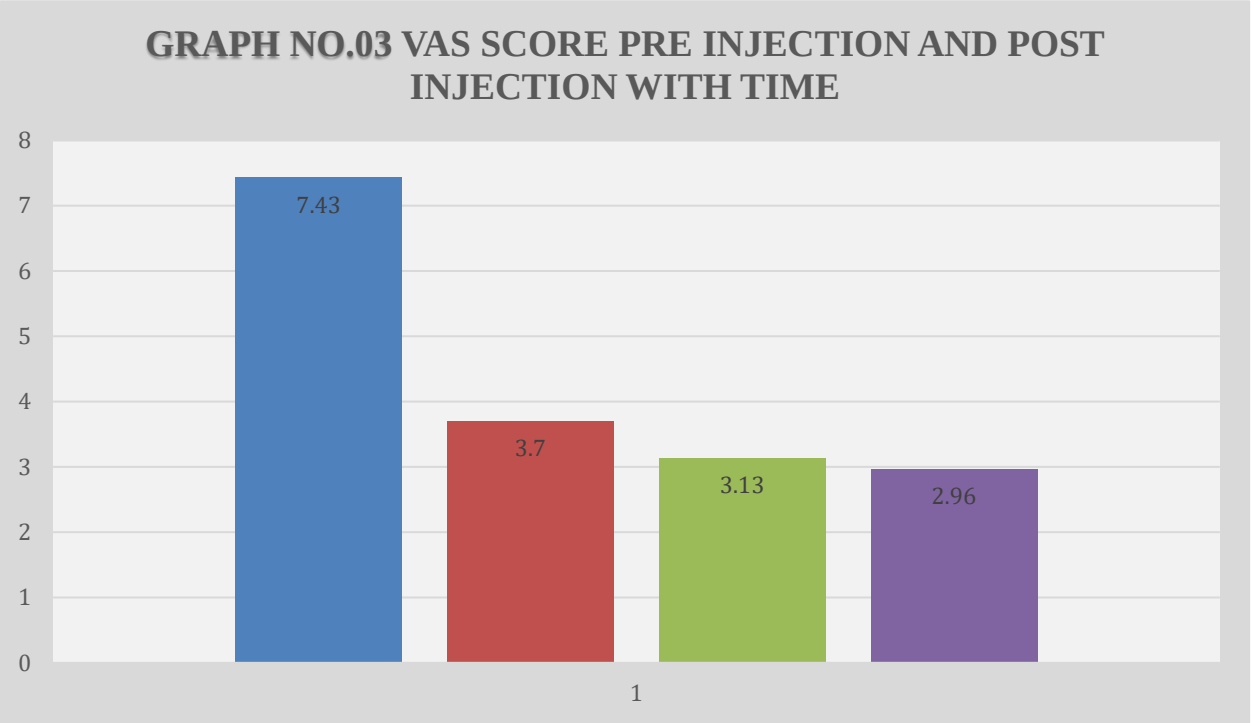


TABLE 3: VAS SCORE PRE-INJECTION AND POST INJECTION PERIOD

	N	Range	Minimum	Maximum	Mean	Std. Deviation
AGE	70	51	19	70	41.61	10.768
PRE-INJ. SCORE	70	4	5	9	7.43	.672
2 WEEKS	70	5	1	6	3.70	1.121
4 WEEKS	70	4	1	5	3.13	1.128
8 WEEKS	70	4	1	5	2.96	1.334



		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	PRE-INJ. SCORE - 2 WEEK	3.114	.796	.135	2.841	3.388	23.146	34	.000
Pair 2	PRE-INJ. SCORE - 4 WEEK	3.457	.919	.155	3.142	3.773	22.267	34	.000
Pair 3	PRE-INJ. SCORE - 8 WEEK	3.457	1.094	.185	3.081	3.833	18.697	34	.000

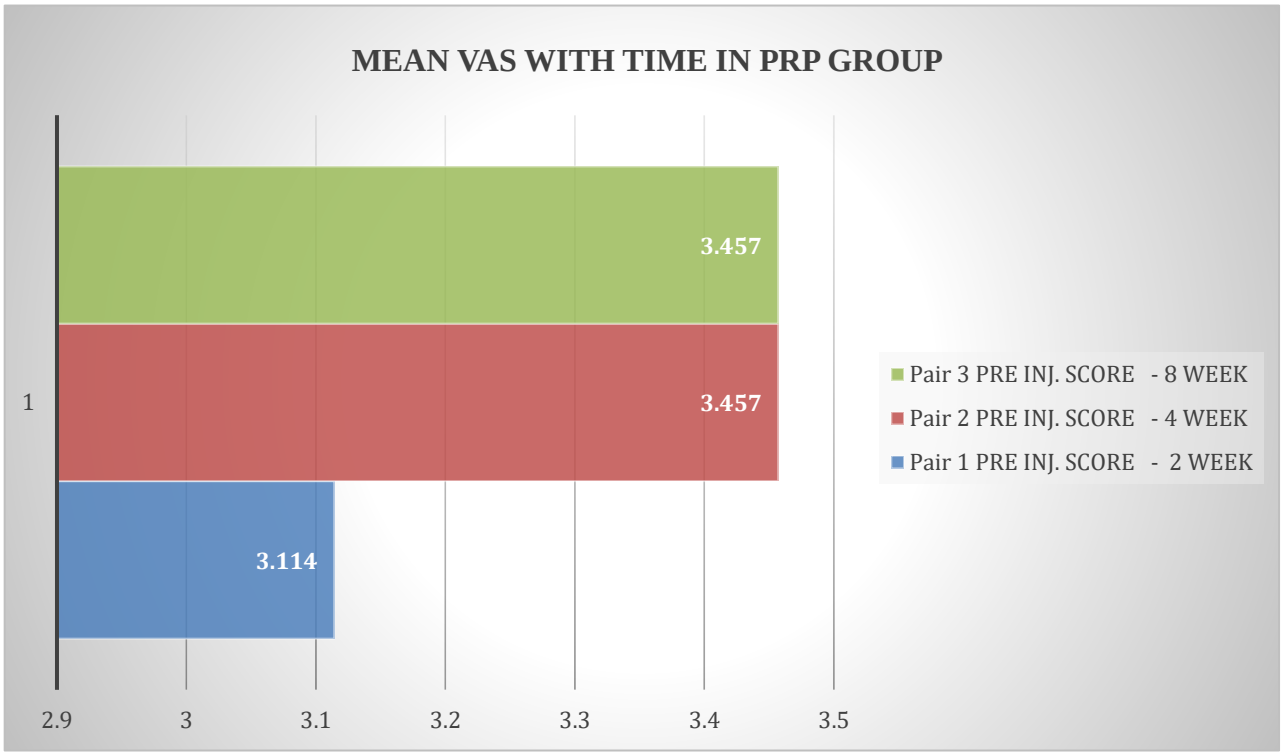


TABLE 5: COMPARISION OF MEAN VAS WITH TIME IN PRP GROUP

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRE-INJ. SCORE	7.37	35	.731	.124
	2 WEEKS	3.03	35	1.043	.176
Pair 2	PRE-INJ. SCORE	7.37	35	.731	.124
	4 WEEKS	2.23	35	.731	.124
Pair 3	PRE-INJ. SCORE	7.37	35	.731	.124
	8 WEEKS	1.89	35	.718	.121

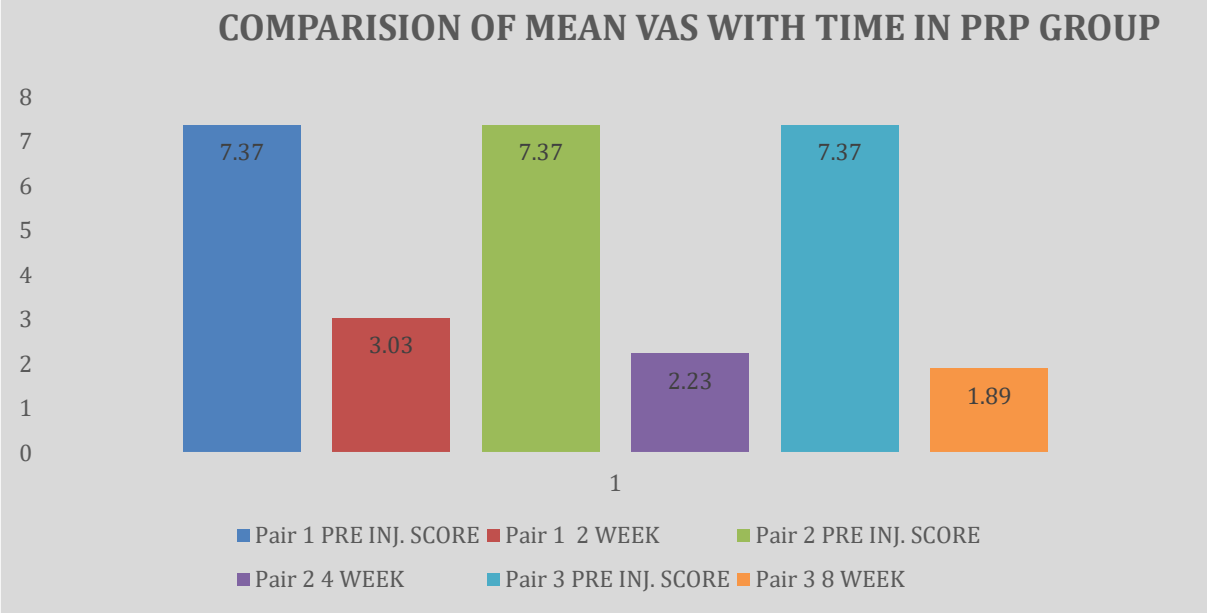
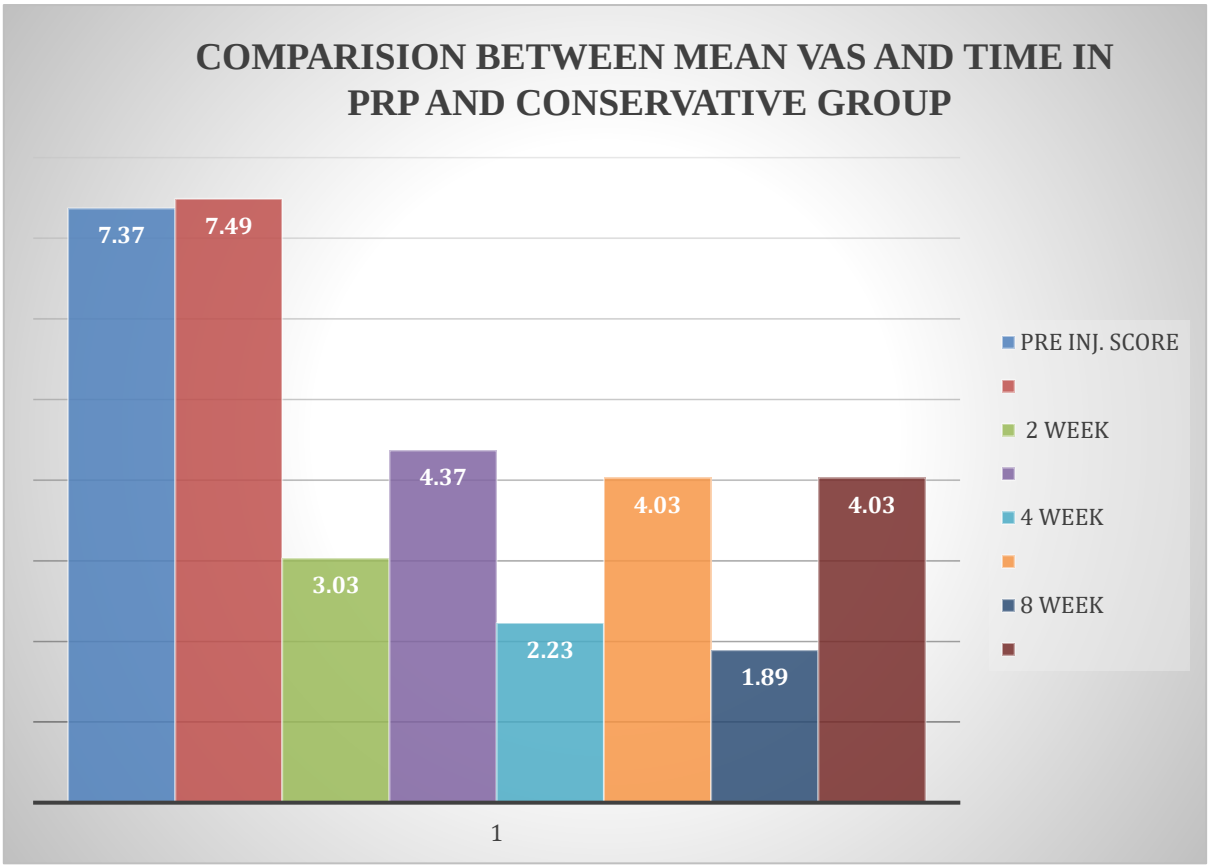


TABLE 6: COMPARISION BETWEEN MEAN VAS AND TIME IN PRP AND CONSERVATIVE GROUP

Code		N	Mean	Std. Deviation	Std. Error Mean
PRE-INJ. SCORE	1	35	7.37	.731	.124
	2	35	7.49	.612	.103
2 WEEKS	1	35	3.03	1.043	.176
	2	35	4.37	.731	.124
4 WEEKS	1	35	2.23	.731	.124
	2	35	4.03	.618	.104
8 WEEKS	1	35	1.89	.718	.121
	2	35	4.03	.857	.145



DISCUSSION

There are various modalities of treatment available for plantar fasciitis. The usual conventional conservative therapy is the mainstay treatment for most of the patients providing them with significant symptom improvement. The usual conventional conservative therapy includes RICE therapy (rest, activity modification, cold fomentation), non-steroidal anti-inflammatory drugs, orthoses (counterforce braces), physiotherapy, laser treatment, extracorporeal shockwave treatment, acupuncture, & ultrasound treatment. Local Injections of corticosteroids, autologous blood and platelet rich plasma are also a well discussed treatment option for plantar fasciitis. where corticosteroids were thought to be the gold standard treatment in plantar fasciitis. previously. At present, platelet rich plasma (PRP) is considered as an ideal biological autologous blood derived component giving positive results since recent times.

Platelets contains biologically active substance for blood clotting, such as coagulation factors, adhesive proteins and protease inhibitors. Platelets were also known to release growth factors like TGF-beta 1, CGF, VEGF, and PDGF. These growth factors are released once the platelet were activated. These growth factors initiate the process of tissue healing by cellular proliferation and differentiation, chemotaxis, tissue debris removal, angiogenesis, and extracellular matrix formation. these properties of tissue healing by platelets are used in treating degenerative enthesopathies life plantar fasciitis by direct local injection of autologous platelet rich concentrate. Concentration of growth factors depends of methods of preparation.

Various techniques have been described for the preparation of autologous platelet rich plasma. They differ in duration and speed of centrifugation. The containers used for platelet rich plasma preparation also differ to minimize the direct handling of blood. The volume of PRP is usually comes about 10 percent of the whole blood used.

This was a prospective study conducted on 70 patients which includes each group contains 35 patients. both groups of patients were selected based on the inclusion an exclusion criterion described. patients having chronic inflammatory conditions like rheumatoid arthritis are excluded from our study. Assessment of progression was done on numerical pain scoring system (VAS).

Our study showed improvement in VAS score at 2 weeks,4 weeks and 8 weeks similar to the results of Martinelli et al (2013) were VAS decreased from 7.1 to 1.9 in last follow up which was 7.43pre-injection to 3.03 at 2 weeks, 2.23 at 4 weeks and 1.89 at 8 weeks. The difference between 2,4 and 8weeks pain reduction were tested for significance by paired T-Test using SPS system and found that there was significance no significance difference in pain reduction between 2,4and 8weeks. But there was significance difference in pain score in 2,4and 8weeks by testing intendent t-test.

Gopinath et al (2018), in their study proved that with PRP injection VAS was reduced from 7.48 to 4.7 at the end of 3 months, while our study decreased it from7.1 to 1.9 at 8 weeks.

Verma et al (2019, their study showed improvement in VAS score was reduced from pre-injection 8.86 to 1.52 to at the end 6months and our study was showed VAS score decreased from 7.43 to 1.89 at the end of 8 weeks.

Shah et al (2019, in their study mean VAS score at pre-injection was reduced from 8.86 to 1.48 at the end of 6months, while our study showed reduced mean VAS score 7.4 to 1.89 at the end of 8weeks.
Deghady et al (2019, their study was proved that PRP injection was significant role in improvement of VAS score After 2 weeks and 6weeks, were our study showed similar improvement in VAS score after 2nd weeks and 4weeks.
Sahoo et al (2020, in that study effect of PRP injection was assessed in terms VAS score pre-injection of mean score is decreased from 2.0+-0.9 to 0.8+-0.8 follow up at 3 months and 6 months, while our study showed decreased in mean VAS score from 7.4 to 1.89 at follow up of 2 weeks ,4weeks and 8 weeks.
Yalcın (2020), study showed that patients received PRP injection, observed significant improvement in VAS score at 3rd month to compare with pretreatment score, while our study showed similar improvement at 8th weeks.
Sengodan et al (2020), evaluated the efficacy of platelet rich plasma injection for plantar fasciitis, in the study mean age of 40 years were included and treated with single PRP injection, VAS score was, observed reduced from 9.1 to 1.6 at 8weeks and 3 months of post treatment, in our study mean age of 55 years were included and treated with single PRP injection, assessed VAS score was decreases 7.43 to 1.89 weeks and 8 weeks of post treatment.
Our study showed that all the patient with plantar fasciitis are responding well to the usual conventional conservative therapy and data obtained from the conservative group was statistically significant in itself reducing the pain and improving the outcomes of the patients but the group who along with this conservative therapy were given a single additional injection of PRP showed results which are exceptionally better. Those patients when given PRP regimen are more at 1th follow up.
Platelet rich plasma is Autologous, cost effective and well tolerable for patients. So Platelet rich plasma injection therapy was more superior then conservative therapy, statically proven.

CONCLUSION

Our study of PRP injection in plantar Fasciitis showed statically more significant results in comparison to conventional conservative treatment observed at follow-up of 2 weeks, 4 weeks and 8 weeks in the terms of VAS pain score.
Platelet rich plasma injection is New, Autologous, effective, well Tolerated therapy, with prolonged effect and useful modality of treatment for plantar fasciitis patients and a safe choice of therapy. There is a no complication after PRP injection.
The response of plantar fasciitis patients was significantly better to PRP injection than comparison to conservative treatment.
Maximum benefits after PRP injection was observed at 4 weeks and 8 weeks, statistically more significant results in comparison to conventional conservative treatment.
Study with a greater number of patients and a longer follow up is required for a better outcome of PRP injection as an effective option for plantar fasciitis patients.

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