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ORIGINAL ARTICLE

Platelet Rich Plasma versus Corticosteroid Local Injection Results in Treatment of Planter Fasciitis in New-Cairo

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ABSTRACT

Background: Chronic plantar fasciitis is a common orthopedic condition that can demonstrate hard to effectively treat. In this study, platelet-rich plasma (PRP), a concentrated bioactive blood segment wealthy in cytokines and growth factors, was compared to cortisone injection in the treatment of Chronic plantar fasciitis resistant to traditional nonoperative management.
Methods: Between October 2016 and the end of September 2017; sixty patients exhibited to New Cairo clinic with chronic plantar fasciitis, 30 patients were treated with PRP infusion, and 30 patients were treated with corticosteroid injection. This study compares the efficacy of (PRP) with that of corticosteroid local injection in chronic plantar fasciitis toward the finish of follow up time of 6 months concurring AOFAS score framework out of 100. **Results:** At the end of follow up, group treated by plasma rich platelets injection demonstrated that mean score was 83.5 of 100. While other treated by corticosteroid injection demonstrated mean score was 61.8 of 100 .No complication detected after the end of follow up period. **Conclusions:** Both PRP injection and corticosteroid injection are modalities for treatment of chronic plantar fasciitis. PRP preparation is a costly and complicated procedure than corticosteroid injection but PRP is more powerful and strong than cortisone injection for the treatment of chronic plantar fasciitis. Concerning corticosteroid side effects PRP infusion is safer in treatment of Chronic plantar fasciitis.

Keywords: Chronic plantar fasciitis; Platelet-rich plasma (PRP), Corticosteroid

INTRODUCTION

Plantar fasciitis is a typical reason for heel pain in grown-ups. It is evaluated that more than 1 million patients look for treatment every year for this condition, with 66% setting off to their family physician.[1] Plantar fasciitis is believed to be brought about by biomechanical abuse from delayed standing or running, along these lines making microtears at the calcaneal enthesis [1-3]. A few specialists have esteemed this condition "plantar fasciosis," inferring that its etiology is a more chronic degenerative process versus acute inflammation [2,3].

Diagnosis of plantar fasciitis depends on patient history, risk factors and physical examination discoveries. Most patients have heel torment and snugness in the wake of standing up from bed toward the beginning of the day or after they have been situated for a drawn out time. Regularly, the heel agony will enhance with ambulation yet could strengthen by the end of the day if the patient keeps on strolling or represent quite a while. On physical examination, patients may stroll with their influenced foot in an equine position to abstain from putting weight on the excruciating impact point. Palpation of the average plantar calcaneal area will evoke a sharp, cutting pain [2,3]. Inactive lower leg/first toe dorsiflexion can cause inconvenience in the proximal plantar fascia; it can likewise survey snugness of the Achilles tendon. Different reasons for heel pain ought to be looked for if history and physical examination discoveries are atypical for plantar fasciitis [2].

Corticosteroid infusion into the beginning of the plantar fascia is the present standard of management. Cortisone has been appeared to

have no or only short term advantage over placebo [4, 5]. Corticosteroid infusion is related with expanded danger of plantar facial burst, disease, and fat cushion decay [6, 7]. The danger of plantar fascial rupture is between 0-5% [6, 7]. The dangers might be limited by avoidance of impact activity for 10 days and infrequent repeated use [7].

Another treatment alternative is platelet rich plasma (PRP). PRP was created during the 1970s and is autologous, implying that it originates from your very own body. It is blood plasma that has been concentrated with platelets 5-10 times the ordinary sum found in an individual's blood [8, 9].

METHODS

A planned interventional configuration will be received to satisfy the reason for the investigation in course of events from October 2016 to the end of September 2017 (based on 6 months follow up for each case).

Sixty patients randomly chosen whose having plantar heel pain worse on early steps at the morning or potentially after times of sitting or lying fizzled moderate administration , which have been presented to orthopedic department new Cairo hospital (30 of them will be treated with utilizing PRP and the other 30 will be treated with utilizing corticosteroid).Written informed consent was obtained from all participants and the study was approved by the research ethical committee of New Cairo Hospital. The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

The included examination populace will be quiet with showing protest of plantar heel torment more awful on early morning as well as after rest, fizzled traditionalist administration who exhibited to Orthopedic Department in New Cairo Hospital

In 30 feet 3 ml of platelets concentrate and in the other 30 feet 2 ml Betamethazone dipropionate was injected into the most tender area of plantar fascia using a peppering technique (a single skin portal and 4 or 5 penetrations to fascia) on alternative basis

The last outcomes were surveyed utilizing an Ankle-Hindfoot Score system out of 100 points. The American Orthopaedic Foot and Ankle Society (AOFAS) Ankle-Hindfoot Score is among the most commonly used instruments for measuring the outcome of treatment in patients who sustained a complex ankle or hindfoot injury. It combines a clinician-reported and a patient-reported part [10](Table 1).

Statistical analysis

Data were fed to the computer and analyzed using SPSS software package version 20.0 .Qualitative data were described using number and percent. Quantitative data were described using range (minimum and maximum) mean, standard deviation and median, Comparison between different groups regarding categorical variables was tested using Chi-square test.

RESULTS

At the end of the follow up period, patients were assessed by AOFAS score system out of 100 points.[10] Results showed that the mean in PRP injection was 83.5 where in corticosteroid injection was 61.8 . Statistically significant at $p \leq 0.05$ (Table 2) Figure (1). Table (3): Patients demographic data

For the sake of statistical analysis, excellent, and good results were considered as satisfactory, while fair, and poor results were considered as unsatisfactory as shown in Table (4), 24 patients treated with PRP were satisfactory and 6 were unsatisfactory, while 8 patients treated with corticosteroids were satisfactory and 22 were unsatisfactory.

Factors that may affect the final outcome:

Gender: There was statistically significant relationship between gender and final score in PRP group and corticosteroid group. In PRP group, 24 feet were satisfactory, 17 females and 7 males. In corticosteroid group, 8 feet were satisfactory, one female and 7 males.

Age: There was statistically significant relationship between age and final score in PRP injection group while in corticosteroid group there was no significant relationship between age and final score .The patients presented to the study were age scale from 21 to 60 years. The mean age in satisfactory patients in PRP group was 37 while in unsatisfactory patient was 45.

Body mass index: There was statistically significant relationship between body mass

index and final score in PRP group while in corticosteroid group there was no significant relationship. In PRP group, the mean body mass index in satisfactory results was 25.7, while in unsatisfactory results was 30.4.

Calcaneal spur: There was no statistically significant relationship between calcaneal spur and final score in PRP group and corticosteroid group.

Table 1. AOFAS (100 Points Total)

Item	*Point*
Pain (40 points)	
• *None*	*40*
• *Mild, occasional*	*30*
• *Moderate, daily*	*20*
• *Severe, almost always present*	*0*
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, wheelchair, brace*	*0*
Maximum walking distance, blocks	
• *Greater than 6*	*5*
• *4-6*	*4*
• *1-3*	*2*
• *Less than 1*	*0*
Walking surfaces	
• *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 (flexion plus extension)	
• *Normal or mild restriction (30° or more)*	*8*
• *Moderate restriction (15°-29°)*	*4*
• *Severe restriction (less than 150).....0*	*0*
Hindfoot motion (inversion plus eversion)	
• *Normal or mild restriction (75%-100% normal)*	*6*
• *Moderate restriction (25%-74% normal)*	*3*
• *Marked restriction (less than 25% normal).*	*0*
Ankle-hindfoot stability (anteroposterior,varus-valgus)	
• *Stable*	*8*
• *Definitely unstable*	*0*
Alignment (10 points)	
• *Good, plantigrade foot, midfoot well aligned*	*15*
• *Fair, plantigrade foot, some degree of midfoot malalignment observed, no symptoms*	*8*
• *Poor, nonplantigrade foot, severe malalignment, symptoms*	*0*

- *A score of 90 to 100 points was considered excellent.*
- *A score of 80 to 89 points was considered good.*
- *A score of 70 to 79 points was considered fair.*
- *A score of less than 70 points was considered poor."10*

Table 2. Comparison between two studied groups according to score

	PRP (n = 30)		Corticosteroid (n = 30)		Test of sig.	P
	No.	%	No.	%		
Score after						
Poor	4	13.3	18	60.0	χ^2= 17.703*	MCp= 0.001*
Fair	2	6.7	4	13.3		
Good	9	30.0	3	10.0		
Excellent	15	50.0	5	16.7		
Total	30	100%	30	100%		
Min. – Max.	15.0 – 100.0		15.0 – 100.0		Z= 4.021*	<0.001*
Mean ± SD	83.50 ± 18.72		61.83 ± 21.15			
Median	87.50		60.0			

χ^2: value for Chi square MC: Monte Carlo test
Z: Z for Mann Whitney test *: Statistically significant at p ≤ 0.05

Table 3. Comparison between two studied groups according to satisfaction

	PRP (n = 30)		Corticosteroid (n = 30)		Test of sig.	P
	No.	%	No.	%		
Score after						
Unsatisfactory	6	20.0	22	73.3	χ^2= 17.143*	<0.001*
Satisfactory	24	80.0	8	26.7		
Min. – Max.	15.0 – 100.0		15.0 – 100.0		Z= 4.021*	<0.001*
Mean ± SD	83.50 ± 18.72		61.83 ± 21.15			
Median	87.50		60.0			

χ^2: value for Chi square
Z: Z for Mann Whitney test
*: Statistically significant at p ≤ 0.05

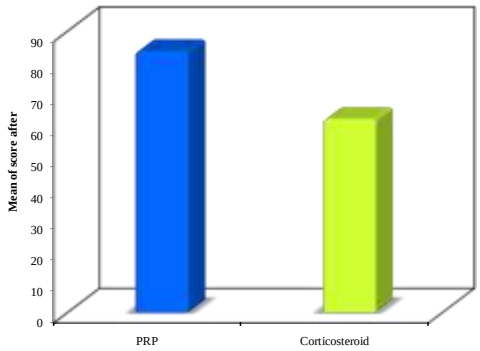

Figure 1. Comparison between two studied groups according to AOFAS score

DISCUSSION

Plantar fasciitis is viewed as a self- limiting condition. Luckily, 85-90 percent of these cases will react to traditionalist treatment; and ten to fifteen percent will require operative intervention [11].

Steroid injection is a famous technique for treating the plantar fasciitis yet is by all accounts helpful in the short term and only to a small extent [12]. Treatment with steroids has a high recurrence of backslide and relapse. Most likely on the grounds that intra fascial injection may prompt permanent adverse changes within the structure of the fascia and in light of the fact that patients will in general abuse the foot after infusion because of direct pain relief [13].

Researchers have reported that PRP has four to 6 the normal level of growth factors, which results in fibrocytes relocation and enlistment of neovascular development [14] in particular, in an ongoing investigation of one study [15] a beneficial outcome of injection of PRP in the normal extensor root for sidelong

epicondylitis was seen. It exhibits that a solitary infusion of PRP enhances pain and capacity more than corticosteroid infusion. These enhancements were continued after some time with no revealed complications.

The utilization of autologous PRP is certifiably not another treatment. The healing cascade which is the physiological reaction to any damage or careful intercession, is very much reported and depends on proteins that are conveyed to the mending site by platelets and white blood cells notwithstanding those proteins that are available in the plasma [14]. Effective tissue recuperating and recovery requires a framework or lattice, undifferentiated cells and flag proteins and bond particles (development factors). It is outstanding that platelets influence mitogenic movement of cells like osteoblast, chondroblast or tenoblast [16].

Injection of PRP into the influenced tissues tends to the recuperating stages important to switch the degenerative procedure which are going on in the base of plantar fascia [17]. The individual cytokines present in the platelet α granules have been appeared to upgrade fibroblast movement and multiplication ,up-direct vascularization, and increment collagen statement. The cytokines present in platelet α granules have been appeared to influence the mending stages important to turn around an endless plantar fasciitis. Changing development factor β1 is appeared to altogether build type I collagen creation by ligament sheath fibroblast. Moreover, a large number of these cytokines have been idea to work in a portion subordinate way [18].

In spite of the fact that PRP is an intriguing issue now in the field of orthopedic prescription, the vast controlled, twofold visually impaired logical investigations to approve its viability are required. Shockingly, to date, the writing is loaded with pilot considers with little example for treatment of plantar fasciitis (single individual stories). These sorts of studies are not adequate to approve another logical treatment technique on logical proof, and we can't utilize it for examination with our investigation [15, 17, 18].

This investigation looks at the adequacy of platelets rich plasma with that of corticosteroid neighborhood infusion in constant plantar fasciitis toward the finish of follow up time of a half year concurring AOFAS score framework out of 100 [10].

In this study satisfactory results in PRP group were 80%, while in corticosteroid group 26.7% were satisfactory. These results were comparable to the results of other studies.

Shetty et al, analyzed between the viability of corticosteroid versus PRP injection in perpetual plantar fasciitis in a follow up period of three month. The outcomes demonstrated that there was noteworthy clinical enhancement in PRP amass at three months after the injection [18].

Monto, thought about between single injection by corticosteroid and PRP one in chronic plantar fasciitis not reacting for moderate treatment in forty patients. The outcomes demonstrated that PRP was more viable and sturdy than cortisone injection for the treatment of perpetual obstinate instances of plantar fasciitis [19].

Aksahin et al, contrasted the viability of corticosteroid injection and PRP injection in sixty patients with chronic plantar fasciitis not reacting for moderate treatment. The outcomes demonstrated that that the two strategies were compelling and fruitful in treating plantar fasciitis. At the point when the potential complexity of corticosteroid treatment was mulled over, PRP injection is by all accounts more secure and in any event having same effectivity in the treatment of plantar fasciitis [20].

Regarding to factors affecting results:

Age: Patients with plantar fasciitis are usually middle aged. In this study, the mean age of PRP group was 38.63 ± 7.18 years and 37.17 ± 8.82 years with corticosteroid injection. This is steady with Abd El Gawad's discoveries in his investigation on 63 patients, where he detailed the mean age to be 39.8 years [26]. Cardinal et al in an examination on 15 patients with plantar fasciitis, the mean age was 45 years [27]. Benton et al in his investigation on 35 patients with agonizing heel, his mean age was 47 years [27]. Baxter and Pfeffer in their investigation on 53 patients with difficult heel the mean age was 43 years [28].

Satisfactory results observed in patients of younger age group. The mean age with satisfactory results was 37.0 ± 6.96 years, ranging from 21–46 years in PRP group while in corticosteroid injection group the mean age was 32.50 ± 10.84 years, ranging from 20–46 years. This may be due to the better ability of the tissues in the younger age group to heal than older age groups. Most available literatures have not mentioned the possibility of affection of the results of treatment by age, in spite of the fact that in one examination by Tagy, he guaranteed that better outcomes were experienced in the more seasoned age gatherings and restored this to the inclination to an inactive existence of these groups [29].

Gender: Females in this study represent 60% of all patients. In other studies heel pain was found to be more common in females, for example 80.3% in El-Rashidy et al's arrangement and 92.5% in Tagy

This may mirror a lower limit of threshold in females and greater tolerance in males, just as expanded occurrence of overweight in females (high weight record). Looking into the writing uncovered an extraordinary distinction in assessment as respects the event of plantar fasciitis in connection to the sex of the patient.

Acquiring practically like this examination, El-Rashidy et al on 100 detailed an event in females of 80.3% and 19.7% in males in his study [30]. Hendrix et al on 51 patients announced an event of 76.4% in females a 23.6% in males in his study [31].

Benton et al on 35 patients revealed an event of 77.1% in females a 22.9% in males in his study.26 Cardinal et al on 15 patients announcing a moderately lower event of 60% in females and 40% in males in his study.[27] Turgut et al on 73 patients detailing a 69.9% event in females and a 30.1% event in males in his study [31].

On the other hand, Baxter and Pfeffer announced a lower frequency of 35.9% in females and a higher event of 64.1% in males in their study [28]. Lapidus and Guidotti on 171 patients detailed an event of 25.8% in females and an event of 74.2 in males in their study [32]. Furey on 103 patients revealed a 44.6% event in females and a 55.4% event in males in his study [33].

In this examination, in PRP injection gathering, 70% of the tasteful outcomes were females, while in corticosteroid infusion amass 12.5% of agreeable outcomes were females. Then again, in different written works no notice of this relationship was made.

Body mass index: In this study, in PRP injection group, 24 of 30 feet were satisfactory with body mass index ranging from 19.5 [34] with mean 25.7. On the other hand, in other literatures no mention of this relationship was made [35].

Complications: However none of our patients recorded with complications just after injection or during the follow up period in any study we reviewed with our study.

Torg et al revealed that corticosteroids can help control the inflammation of plantar fasciitis [36]. The significant danger of corticosteroids is plantar fascia rapture related with degeneration of the fascia and fat cushion decay following numerous injections. O'Brien and Martin revealed a triumph rate of 33% utilizing neighborhood corticosteroids in the treatment of plantar fasciitis [37]. Leather expert disheartened their utilization in light of their dangers and on the grounds that the relief from discomfort is temporary [38].

So results of our study were compatible with the other studies done to compare the efficacy of local injection of plasma rich platelets and corticosteroid in chronic plantar fasciitis.

However, this study had some limitations:

1. The study was conducted only on sixty feet.
2. It was a randomized prospective study with no control group.
3. Short duration of follow up.
4. Exclusion criteria exclude diabetic, gouty and rheumatic patients, so we did not know the efficacy in that group of patients.

CONCLUSION

Both PRP infusion and corticosteroid injection are modalities for treatment of chronic plantar fasciitis. PRP preparation is a costly and confused strategy than corticosteroid injection.PRP is more compelling and solid than cortisone injection for the treatment of chronic headstrong instances of plantar fasciitis. As to corticosteroid reactions PRP injection are

more secure in treatment of chronic plantar fasciitis.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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