

Injection therapy for the management of planter fasciitis with platelet- rich –plasma.

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Abstract:

Background:

platelet-rich-plasma is increasingly used in planter fasciitis. This study show the clinical outcomes of a single PRP injections.

Method:

This study was done between Dec. 2015 and Oct. 2016, thirty patient receive single injection of platelet-rich –plasma All patients underwent prospective clinical evaluation, including visual analog scale (VAS) for pain for six month follow up .

Results:

most of the patient (VAS) significantly improve from 5.7,to 2.0 ($p > 0.05$) after injection with platelet-rich –plasma .

Conclusions: PRP injections in planter fasciitis showed better improvement in outcomes .

Key words: PRP, planter fasciitis

Introduction:

Plantar fasciitis (PF) is one of the most common cause of heel pain, accounting for about 11 % to 15 % of symptom requiring treatment.[1] Although the suffix “ –itis ” implies an inflammatory disorder , mounting evidence indicates that this foot disease is associated with degenerative changes, and should be appropriately classified as a “fasciitis ” or “fasciopathy .”[1,2]

The treatment choices for relieving PF symptoms include activity modification, plantar fascia stretch, night splints ice massage , nonsteroidal anti-inflammatory drugs combined with other treatment modalities, local steroid injections, extracorporeal shockwave therapy, prp injection and surgery.[3] Approximately 10 % of PF patients cannot be relieved by conservative treatment , whose long course is not satisfactory.[4] In addition, surgical treatment is considered the last choice because of serious injury, risks, and postoperative complications.

The symptoms of planter fasciitis are like stabbing pain with the first steps in the morning.

Once the foot is on the go and walking, the pain usually gets decrease. However, this pain is likely to return from long periods of standing or getting up from a seated position after inactivity period. The cause of PF is multifactorial and that explains the multiple treatment modalities [5]

PRP is an autologous high concentration of platelets obtained by whole blood centrifugation with specific protocol. The supernatant includes many growth factors such as platelet-derived growth factors alpha, beta, transforming growth factors beta 1 and beta 2, vascular endothelial growth factor , and epithelial growth factor which can play important role in tendon healing.[6,7] For instance, PDGF plays a role in cell differentiation and neovascularization, TGF stimulates tendon differentiation and formation of collagen, EGF induces fibroblast proliferation, and VEGF stimulates neovascularization. During recent years, clinicians tend to use PRP in neuropathies and fasciitis more due to the lower risk of complications such as gastrointestinal problems and local complication occurring with this

method in comparison to other conservative methods.[8] The aim of the present study was to determine the effectiveness of PRP administration in patients with plantar fasciitis. Platelet Rich Plasma is defined as the plasma fraction of autologous blood having a platelet concentration above baseline [9,10]. Normal platelet concentration is 200,000 platelets/ul. Studies have shown that clinical efficacy can be get with a minimum increase of 4x this baseline (1 million platelets/ul) [11]. Slight variability exists in the ability to concentrate platelets, largely depending on the manufacturer's equipment and methods of preparation.

The use of autologous PRP was first time used in 1987 by Ferrari et al. [12] following an open heart surgery, to avoid excessive transfusion of homologous blood products. Since at time, the application of PRP has been safely used and documented in many fields including; orthopedics, sports medicine, dentistry, ENT, neurosurgery, ophthalmology, urology, and wound healing; as well as cosmetic, cardiothoracic, and maxillofacial surgery. Studies suggest that PRP can affect inflammation, postoperative blood loss, infection, narcotic requirements, osteogenesis, wound, and soft tissue healing e.g. tendons. In addition to local hemostasis at sites of vascular injury, platelets contain an abundance of growth factors and cytokines that are potentiate the soft tissue healing and bone mineralization [15]. An increased awareness of platelets and their role in the healing process has lead to its therapeutic applications.

There are many drawbacks of local injection of steroids at heel: mainly rupture of the plantar fascia and atrophy of the fat pad.[13,14] In an observational study, Avedon and Baskin [14] reported a plantar fascial rupture rate of 10 % in patients after steroid injection for plantar fasciitis. Another drawback in the extreme pain experienced by some patients during an infiltration of the tissues surrounding the calcaneum.

Methods:

Our study was done at the Orthopedic Department of AlQadisiyah teaching hospital, Iraq, This study was done between Dec. 2015 and Oct. 2016. After approval from ethical committee thirty patients were included in study after screening & exclusion from diagnosed criteria

The inclusions criteria:

(1) the heel pain more than 6 months; (2) pain score of the affected site greater than 4 on the visual analog scale (from 0 – 10); (3) diagnosis of plantar fasciitis; and (4) no or little response to conservative treatment for at least 3 months.

The exclusion criteria:

(1) another diagnosis was found, such as fracture, rheumatologic or neurologic diseases; (2) history of surgery of the heel region; (3) any injections on affected heel, such as steroid, within 3 months; (4) unstable medical disease or known uncontrolled systemic diseases.

The patients included in our study were more than the twenty years old, have pain and tenderness on the medial tubercle of the calcaneum on weight bearing after rest which resolved, either partly or fully, after activity.

There are many kind of systems used to prepare the PRP. In our study we used the Ycellbio prp system. For PRP preparation, 20 mL venous blood was drawn from the antecubital vein using an aseptic technique and mixed with the anticoagulant citrate phosphate dextrose adenine (CPDA-1) 1.5 cc. The blood was then placed into the PRP kit and centrifuged for 4 minutes at 3,400 rpm to separate it into platelet-poor plasma, red cells, and PRP. After blood was collected, 1.5-2 mL PRP was made and used for injection. A sterile field was set up and ensure throughout the procedure. Depending upon the clinical examination the injection is given to the patient at the pre marked area at the medial aspect of heel, which was previously confirmed with radiograph.

To all patient used a povidone iodine dressing at the injection site after the procedure. Patient was watched for 15 min then they were discharging home with advice to take the rest for next 24 h. They were advised to not to take an anti-inflammatory analgesic drug for it. The

paracetamol was the only analgesic which was given. all atients were evaluated with VAS score before the procedure & then after one, three- & six-months interval.

Table 1: VAS pain score in patients with PRP therapy.

Vasa score before props therapy	Vaz score at done month	Vaz score at three months	Vaz score at six months
7	2	2	1
7	3	3	3
6	3	3	2
5	1	1	1
7	3	3	2
7	2	2	1
5	1	1	1
6	3	2	2
7	2	2	2
6	1	1	1
6	2	2	2
5	1	1	1
7	2	1	1
5	2	2	3
6	2	2	3
5	2	2	2
7	3	3	3
6	2	2	2
7	3	2	2
6	2	2	1
5	1	1	1
7	3	3	3
8	3	3	3
7	3	3	3
5	1	1	1
7	3	3	3
6	1	1	1
6	2	2	2
5	2	2	2
6	2	2	2

Results:

The results evaluated on the basis of VAS score. We asked the to rate their results depending on the scoring system of VAS

(Tables 1).The patient follow up done at one month, three months & at six months. All Patients were asked about their pain by VAS score. They were examined for presence of any

complication of the injection site like soft tissue infection, osteomyelitis, loss of function and presence of stiffness. In our study no one of patient develop complication like mentioned above.

After one month of treatment VAS score significantly ($p < 0.001$ in PRP therapy (Table

Table 3 Vasks score before and after treatment with PPX.

	Before treatment Mean (SD)	10 Month after treatment Mean (SD)	30 Months after treatment Mean (SD)	60 Months after treatment Mean (SD)
PPX therapy (n ¼ 30)	15.7 (0.762)	12.1 (1.03)	12.1 (0.453)	12.0 (0.453)
	$p > 0.055$	< 0.055	$p < 0.0015$	$p < 0.0015$

Discussion :

Chronic muscle & tendon injuries are one of the problems which are affect the human being since last long time. These injuries are generally repetitive strain injuries, commonly found in athletes and active person . There are many treatments which include conservative methods in initial stages to surgery in later stages. On minimal invasive aspect Ultrasound-guided fenestration and tenotomy surgery has been used with good results as an effective treatment of chronic tendinosis.[16,17] There are various injectable agents which were also researched including simple solutions such as hyperosmolar dextrose[18] (prolotherapy) to complex orthobiologic agents such as bone morphogenic protein,[19] but none have achieved uniform excellent success.

The use of PRP is a quick, minimally invasive, and relatively low-cost therapeutic strategy and, for these reasons, from the last three decades, PRP injections have been studied as a therapeutic alternative for different musculoskeletal injuries. The results of this trial show that the PRP therapy should be used in comparison to other therapies for relief . And These findings also are in agreement with previous literature data

3). Those patients who are treated with PRP therapy VAS score falls at three months and remains constant till six months. At one, three and six months those who are on PRP therapy VAS score remains significantly lower than before the treatment.

in patients suffering from Achilles, patellar, and elbow enteropathies.[18]

The main findings of this study are that PRP injection resulted in better pain control and the improvement in functional outcome was stable and maintained up to a mid-term follow-up.

Regarding the amount of injection , Although smaller volume (2-3 ml) of PRP was injected in present study or even 1.5 ml such as in previous study.[19] and the proportion of spread beyond tendon was similar with the study of Loftus et al. (2012) used 3.5 ml of volume, which can be detected by ultra sound .so the amount of PRP is even 1.5 ml is adequate to achieve good result.

Other therapies modalities do also need less expertise in comparison to this therapy. The staff should be well trained to form PRP from blood while it is not needed with steroid injections or others. Corticosteroid injections have also been used extensively for this problem, but studies showed that there is controversy about their efficacy.

Conclusions:

Planter fasciitis is a common and disabling condition that leads to sever pain, time away from work, and difficultly with activities of daily living. Many different types of

treatments have been investigated to help patients relieve pain and resume function more quickly while also helping to facilitate healing like steroid injection. Recent studies within the field of biologics including our study, show that PRP have some promising

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results with minimal side effects. Future developments in the use of PRP in musculoskeletal system will likely require large scale studies and recommendations for use.

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