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RESEARCH ARTICLE

A SHORT TERM COMPARATIVE STUDY OF THE EFFECTIVENESS OF PRP VERSUS STEROIDS IN PLANTAR FASCITIS

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ABSTRACT

Plantar fasciitis is one of the most common causes of heel pain. Various treatment options are available, including nonsteroidal anti-inflammatory drugs, corticosteroid injections, orthosis, and physiotherapy. Platelet rich plasma (PRP) injection has emerged as a treatment alternative for many musculoskeletal conditions. To date, there is no single treatment supported by the highest level of evidence. High-quality studies involving double-blinded, placebo-controlled randomised controlled trials (RCTs) are hard to come by due to the debilitating pain experienced by most patients during the initial consultation. Another possible reason is the fact that most therapies are used in combination and thus there is poor evidence on which modality is the best. In this study, the relevant literature search of the physiology of running and the physiology of plantar fasciitis was done and autologous platelet-rich plasma (PRP) was compared to traditional cortisone injection in the treatment of chronic cases of plantar fasciitis. 30 patients were selected to evaluate & compare the effects of platelet rich plasma & steroid injection on planter fasciitis. They were divided into two groups Group A (15 patients) and group B(15 patients), with Group A receiving PRP (taken from the patients' blood, activated using calcium chloride and injected in a single dose) and Group B receiving Steroid(A single dose methylprednisolone with local anesthetic injection).The results were evaluated and compared using the AFAS score and the VAS score at 0 (pretreatment), 1, 2 and 3 months. A review of the relevant literature was also done.

INTRODUCTION

Plantar fasciitis is one of the most common causes of heel pain, accounting for about one million patient visits per year in the United States. Although it is usually a self-limiting condition with a majority of cases resolving within ten months, about 10% of patients develop chronic plantar fasciitis. Chronic muscle & tendon injuries are one of the problems which are encountered by human being since a long time. These injuries are generally repetitive strain injuries, commonly found in athletes. Intrinsic risk factors include obesity, pes planus, pes cavus and a shortened Achilles tendon. Extrinsic risk factors include walking on hard surfaces or barefoot, prolonged weight bearing, inadequate stretching and poor footwear. People who walk more during work are shown to be at a higher risk for developing this condition. There are various 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 tendinopathies. Various treatment options are available, including nonsteroidal anti-inflammatory drugs, corticosteroid injections, orthosis, and physiotherapy. There are various injectable agents which were also researched including simple solutions such as hyperosmolar dextrose (prolotherapy) to complex orthobiologic agents such as bone morphogenic protein,but none have achieved uniform success. Platelet rich plasma (PRP) injection has emerged as a treatment alternative for many musculoskeletal conditions. Although there are many treatment modalities for plantar fasciitis, there is little consensus on its clinical approach. To date, there is no single treatment supported by the highest level of evidence. High-quality studies involving double-blinded, placebo-controlled randomised controlled trials (RCTs) are hard to come by due to the debilitating pain experienced by most patients during the initial consultation. Another possible reason is the fact that most therapies are used in combination and thus there is poor evidence on which modality is the best. Aim- Early results of platelet rich plasma (PRP) injection have been promising. In this study, autologous platelet-rich plasma (PRP), a concentrated bioactive blood component rich in

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cytokines and growth factors, was compared to traditional cortisone injection in the treatment of chronic cases of plantar fasciitis. Physiology of running- During running, the vertical forces in the foot at foot strike may reach 2-3 times an individual's body weight. The plantar fascia and longitudinal arch are also part of the foot's shock absorption mechanism. During the heel-off phase of gait, tension increases on the plantar fascia, which acts as a storage of potential energy. During toe-off, the plantar fascia passively contracts, converting the potential energy into kinetic energy and imparting greater foot acceleration.

Physiology of plantar fasciitis- Biomechanical dysfunction of the foot is the most common etiology of plantar fasciitis. However, infectious, neoplastic, arthritic, neurologic, traumatic, and other systemic conditions can prove causative. The pathophysiology is traditionally believed to be secondary to the development of microtrauma (microtears), with resulting damage at the calcaneal-fascial interface secondary to repetitive stressing of the arch with weight bearing. Excessive stretching of the plantar fascia can result in microtrauma of this structure either along its course or where it inserts onto the medial calcaneal tuberosity. This microtrauma, if repetitive, can result in chronic degeneration of the plantar fascia fibers. The loading of the degenerative and healing tissue at the plantar fascia may cause significant plantar pain, particularly with the first few steps after sleep or other periods of inactivity. The term fasciitis may, in fact, be something of a misnomer, because the disease is actually a degenerative process that occurs with or without inflammatory changes, which may include fibroblastic proliferation. This has been proven from biopsies of fascia from people undergoing surgery for plantar fascia release. Studies have introduced the etiologic concept of fasciosis as the inciting pathology. Fasciosis, like tendinosis, is defined as a chronic degenerative condition that is characterized histologically by fibroblastic hypertrophy, absence of inflammatory cells, disorganized collagen, and chaotic vascular hyperplasia with zones of avascularity.

These changes suggest a noninflammatory condition and dysfunctional vasculature, which may be seen on ultrasound. With reduced vascularity and a compromise in nutritional blood flow through the impaired fascia, it becomes difficult for cells to synthesize the extracellular matrix necessary for repairing and remodeling. Material and Methods- 30 patients were selected to evaluate & compare the effects of platelet rich plasma & steroid injection on planter fasciitis. They were divided into two groups Group A (15 patients) and group B(15 patients) with Group A receiving PRP (taken from the patients' blood, activated using calcium chloride and injected in a single dose) and Group B receiving Steroid (A single dose methylprednisolone with local anesthetic injection). The results were evaluated and compared using the AFAS score and the VAS score at 0 (pretreatment), 1, 2 and 3 months.

Inclusion Criteria

- Heel pain localized to the medial tubercle of the calcaneum
- failure to respond to at least 6 months of conservative treatments including physical therapy, NSAIDs, stretch exercise, and heel cushion were recruited.

Exclusion Criteria

- Age less than 18 years or greater than 65 years
- History of previous foot surgery or trauma
- Associated nerve injury
- Any associated severe systemic disease
- History of previous local steroid injection into the heel pad
- Pregnant ladies

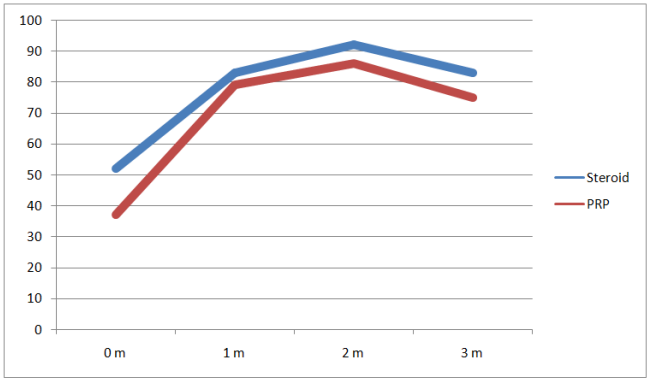
RESULTS

At 3 months, both the AFAS and VAS scores had improved from their pre treatment level in both groups. The scores in the Steroid group were marginally better than in the PRP group in both the scores. The steroid group had a pre treatment average AFAS score of 52, which initially improved to 83 at 1 months post treatment and further to 92 at 2months but decreased to the level at 1 month score at end of 3 months. A similar trend was seen in the PRP group, which started with an average pre treatment AFAS score of 37, which increased to 79 and 86 at 1 month and 2months respectively but decreased to about the level at 1 month score (79) at end of 3 months (75). The VAS score pre treatment, at 1month, 2 months and 3 months were 3.2, 2.3, 1 and 3.3 for the steroid group and 4.5, 4, 2.2 and 5.3 for the PRP group respectively. Heel fat pad atrophy and plantar fascia rupture are two of the most feared complications associated with corticosteroid injections, as they can lead to intractable long-term complications. Fortunately, no complications were seen in any patients.

Comparison of AFAS score

AFAS	0 month	1 month	2 months	3 months
Grp 1	52	83.5	92.6	83.5
Grp 2	37	79.3	86.3	75

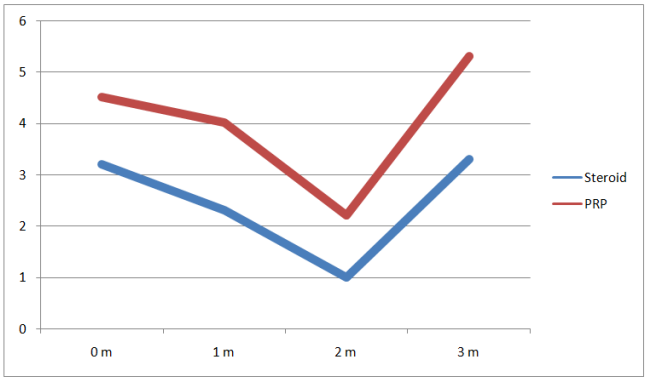
Comparison of AFAS score



Comparison of VAS score

VAS	0 month	1 month	2 months	3 months
Grp 1	3.2	2.3	1	3.3
Grp 2	4.5	4	2.2	5.3

Comparison of VAS score



DISCUSSION AND REVIEW OF LITERATURE

Corticosteroid injections have been used to treat plantar heel pain since the 1950s.Both orthopaedic surgeons and rheumatologists have been known to use them frequently. The advantages of corticosteroid injections include low cost, low complexity and rapid pain relief. However, many are concerned about the potential complications associated with this treatment modality, which may offset its benefits. Thus, the recommendation of corticosteroid injections as an initial or tier 1 treatment option by the American College of Foot and Ankle Surgeons (ACFAS) was met with much scepticism and raised certain controversial issues. To further complicate matters, in recent years, the advent of other injectable options (e.g. platelet-rich plasma, autologous blood and botulinum toxin have also made it more difficult to decide on the most appropriate course of action for their patients. As per literature review, different corticosteroids have been used for the injections. Five RCTs explored the use of long-acting corticosteroids, i.e. dexamethasone and betamethasone, while the other five investigated the use of intermediate-acting corticosteroids, i.e. methylprednisolone, prednisolone and triamcinolone.

The types of corticosteroids used for heel injections vary, as there is little evidence to suggest the superiority of one agent over the other. A meta-analysis by Gaujoux-Viala *et al* found no differences in efficacy between the various types of corticosteroids used. To guide the corticosteroid injections, seven RCTs used the palpation method, two used US-guidance, and one used both US- and palpation-guided injections in different arms. Three approaches of injections were employed in the studies: eight RCTs adopted the medial approach, one adopted the posterior approach and one involved injections through the plantar aspect of the heel pad. The main outcomes of the studies reviewed fall into the three following categories: (a) patient-assessed outcomes; (b) physician-assessed outcomes; and (c) disease-oriented outcomes. Patient-assessed outcome measures foot pain Visual Analogue Scale (VAS) and the foot pain domain of the Foot Health Status Questionnaire (FHSQ). All studies used the VAS as one of the scales to measure foot pain, except McMillan *et al* and Díaz-Llopis *et al*, which used the FHSQ.A variety of scales were used to measure other outcomes such as foot function, foot health and quality of life. Some of these scales were not designed to assess patients with plantar fasciitis; for example, the Maryland Foot Score was designed to assess foot injuries, the American Orthopaedic Foot and Ankle Society's Ankle-Hindfoot Scale was designed to assess ankle and hindfoot joint injuries, while the Foot and Ankle Disability Index (FADI) is used to detect functional limitations in subjects with chronic ankle instability. However, all three scales were used in conjunction with VAS in the studies concerned. Physician-assessed outcomes measue Heel Tenderness Index (HTI) and Tenderness Threshold (TT).

Disease-oriented outcomes measure plantar fascia thickness

Many studies have investigated the use of palpation-guided corticosteroid injections while some have looked solely at US-guided corticosteroid injections. One study by Ball *et al* included both palpation- and US-guided corticosteroid injections for comparison against a placebo, however, no significant differences in heel pain reduction between the US- and palpation-guided corticosteroid injection groups were found. Similar results were seen in a meta-analysis (comprising five RCTs with 149 patients) conducted by Li *et al* in which heel pain measured with VAS was not shown to be significantly different between the US- and palpation-guided corticosteroid injection groups. A Peppering technique was first described in 1964 for lateral epicondylitis, and subsequently done for plantar fasciitis. When using this technique, the needle is repeatedly inserted and withdrawn without complete emergence from the skin. It has been postulated that this repeated action leads to the creation of multiple small holes within the degenerative tissues, causing bleeding and initiating the healing process. Heel injections are regarded as painful. Studies have used either local or regional anaesthesia to mitigate the patients' pain. McMillan *et al* performed a US-guided posterior tibial nerve block prior to corticosteroid or placebo injections and found it effective in reducing the high level of pain experienced by patients during heel injections. Crawford *et al*'s four-arm study, which examined the efficacy of corticosteroid injections, local anaesthesia and tibial nerve block, reported improvements in the mean pain scores of all the groups at the one-month follow-up compared to the baseline; however, the two corticosteroid injection groups in the study showed significantly better results compared to the non-steroid groups. The significance of calcaneal spurs in patients with plantar fasciitis has been questioned in some studies. However, it has also been reported that calcaneal spurs are of little diagnostic value due to the high prevalence of calcaneal spurs in asymptomatic patients.

Conclusion

The authors concluded that local injection of platelet-rich plasma or corticosteroid is an effective treatment option for chronic plantar fasciitis.

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