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Functional Outcome of Steroid Injection in Plantar Fascitis: A Prospectiev Study

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Abstract

Plantar fasciitis is one of the most prevalent causes of painful heels in adults, with 10% of the population developing it over their lifetime. It is usually brought on by biomechanical stress and is thought to be induced by inflammation. Since the 1950s, corticosteroids have been used to treat plantar fasciitis. It is well known that steroids prevent fibroblasts from proliferating and the creation of ground substances. Plantar fasciitis can potentially be treated with a corticosteroid injection, which suppresses the growth of fibroblasts and the creation of ground-substance proteins. To evaluate the effectiveness and early outcome of steroid injections in the treatment of plantar fasciitis. The present study was a prospective study conducted for a period of 2 years. The study was conducted at department of Orthopedics, Sree Mookambika Institute of Medical sciences. A total of 35 cases were included in the study. This study included patients with unilateral persistent plantar fasciitis who had not improved after six weeks under conservative treatment. Patients who met the inclusion criteria for plantar fasciitis had a single intra-heel injection of triamcinolone and were followed up in the outpatient department at three, sixnine weeks apart. At 0, 4, 8, 1224 weeks, the functional result was assessed using the visual analogue score (VAS). Using ultrasonography, the thickness of the plantar fascia was determined both before and six months after the injection. Results were analysed using SPSS 22 version and the association was tested using Paired sample t-test. The age ranged from 38 to 63 years, with a mean of 44.34±11.57 years. There were 35 patients in the study; of them, 21 (60%) were male and 14 (40%) were female. The majority of the patients, 23 (65.71%), had plantar fasciitis in their right foot, whereas 12 (34.29%) had it in their left. The symptoms persisted on average for 68±18 days. The mean visual analog scale (VAS) for pain was 1.13 right after the corticosteroid injection, compared to a much higher mean VAS of 8.74 prior to the treatment. With an increase in duration, the VAS score decreased. The thickness of the plantar fascia was 5.60±0.556 mm prior to treatment, a 6-month follow-up investigation revealed a thickness of 3.75±0.404 mm. Injections of corticosteroids are useful for treating persistent plantar fasciitis because they improve functional result and provide quick pain relief.

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Key Words

Corticosteroid, heel pain, plantar fasciitis, visual analog score

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INTRODUCTION

Plantar fasciitis is the term used to describe heel pain caused by inflammation of the plantar fascia[1]. About 10% of people have this syndrome, which often affects older female runners and younger male runners. According to the literature, approximately 1-2 million patients consult their physicians[2]. The primary component that stabilizes the arch is the plantar fascia. Normal foot function depends on its dynamic role, especially its capacity to support the propulsive phase of gait, which it plays in elongating with increasing loads and storing elastic energy[1,2].

Athletes, obese people, those with tight tendon-achilles, people using inappropriate footwear prolonged standing are all susceptible to plantar fasciitis. Although the etiology is still poorly understood, it is known that, as opposed to an inflammatory disease, there is microscopic degradation of the plantar fascia, local disruption of the collagen matrixmicrotears. Predisposing variables include obesity, inflexible ankles, walking or running on hard, uneven surfaces stress from heavy weight-bearing activity[3].

The plantar fascia, which is located superficially to the muscles of the plantar surface of the foot, may be more accurately referred to as the plantar aponeurosis. The flexor digitorum brevis, the central muscle of the first layer, is covered by the thick, robust central portion of the plantar fascia, which extends deep to the superficial fascia of the plantar surface. Distally, it merges with the skin at the base of the digit creases and transmits five slips, one to each toe, in addition to being joined proximally to the calcaneus at the front calcaneal tubercle, the location of the muscle attachments. The pathophysiology of plantar fasciitis is fundamentally dependent on this anatomical configuration[4,5].

Despite the fact that the condition normally resolves on its own, patients anticipate seeing a physician to reduce pain due to its extended length (6-18 months). Sharp pain that starts slowly and is most painful along the anteromedial portion of the calcaneum is the complaint made by patients[6]. The pain is worst in the morning, right after getting out of bedafter spending a lot of time sitting still or being inactive. Typically, a clinical diagnosis is made, but in order to rule out alternative possibilities, radiological tests are needed[7].

With proper therapy, the vast majority of patients recover within a year. Plantar fasciitis can be treated in a number of ways, but there isn't any clinical proof supporting a particular course of action. Conservative methods for treating plantar fasciitis pain include nonsteroidal anti-inflammatory medications, physical therapy, stretching exercises, splints, calcaneal tapingsham taping. However, it has been found that all of these methods reduce pain in the same way. Surgery can be necessary in a small percentage of refractory cases[8].

Steroid injections have been used for many years to treat tendinopathy, including plantar fasciitis, Achilles tendinitis tennis elbow. About 75% of orthopedic doctors now routinely recommend corticosteroid injections as a treatment for plantar fasciitis. One benefit of utilizing steroid injections is that they are inexpensive and quickly relieve pain symptoms. But a lot of people are worried about the possible side effects of steroid injection, which could outweigh its advantages[9]. There were few studies in southern India, hence the purpose of this study was to determine the efficacy and result of steroid injection in clinically confirmed cases of plantar fasciitis.

Aims and Objectives: To evaluate the effectiveness and early outcome of steroid injections in the treatment of plantar fasciitis.

MATERIALS AND METHODS

The present study was a prospective study conducted for a period of 2 years from January 2022 to December 2023. The study was conducted at outpatient unit in department of Orthopedics, Sree Mookambika Institute of Medical sciences Individuals who had been suffering from unilateral chronic plantar fasciitis for longer than 6 weeks, had not received any previous heel injections, had been undergoing conservative treatment with oral analgesics, changing their footwear going to physical therapy for more than four weeks without experiencing any improvement in their symptoms and who were willing to participate in the study were included.

Patients with a history of psoriasis or eczema, bleeding disorders, septic arthritis of the foot and ankle, rheumatoid arthritis and gout, diabetic foot, tumors recent foot trauma were excluded from the study. Furthermore, patients with bilateral heel pain who had previously received local injections and were not willing to participate in follow-up were also excluded. The study comprised a total of 35 cases who met the inclusion criteria.

All patients who agreed to therapy and follow-up provided signed informed consent. Employment, body mass index (BMI), length of symptoms, type of treatment, co-morbidity addiction were all recorded from the patient. Based on their medical history, radiological findings ultrasonography measurements of the thickness of the plantar fascia, patients were diagnosed with persistent plantar fasciitis. The device used was a diagnostic ultrasonic scanner with an 8 MHz probe and a 4 cm broad transducer head. At the thickest point from the base of the medial calcaneal tubercle, where a bright echogenic line was clearly

evident, the thickness of the plantar fascia was measured. Any thickness of the plantar fascia greater than 4 mm was considered abnormal.

Patients who met the inclusion criteria for plantar fasciitis were given a single intra-heel injection of triamcinolone (drug and dose). Strict aseptic measures were followed when performing the surgery on an OPD basis. When the patient was in the supine position, the medial calcaneal tubercle was found to be the region of greatest discomfort. Before applying the steroids, 2cc of 2 ml lignocaine was injected into the skin. Utilizing a peppering strategy, which involves spreading in a clockwise direction, a more expansive zone of delivery over the plantar fascia was accomplished.

Following injection, the patients were watched for any adverse effects for 60 minutes and instructed to refrain from physical activity throughout this recovery period as well as to stay away from sports for the next six to eight weeks. Patients will be required to participate in frequent physiotherapy, ice, exercises modified shoe support for the next three months. It was not advised to use any kind of foot orthoses. At three, sixnine-week intervals, patients were checked on in the outpatient department. Pain at the injection site, a cortisone flarea pain-free period following the injection were seen. Additional plantar fascia tearing or rupturing, infection, heel pad thinning, lighter skin pigmentation facial flushing as a result of steroid injection were observed.

The Visual Analog Score [VAS] was used at 0, 4, 8, 1224 weeks to assess the functional result. The VAS ranges from 0-10, 0 indicates no pain, 1-3 indicates mild pain that is tolerable, 4-6 indicates moderate pain that disrupts with tasks, sleep, or concentration, 7-8 indicates severe pain that competes with basic necessities9-10 indicates the worst possible pain that necessitates bed rest. Using ultrasonography, the thickness of the plantar fascia was determined six months after the injection. Data entered in Excel sheet and results were analysed using SPSS version 22. Paired sample t-test was applied for calculation of p value. A $p<0.05$ were considered significant.

RESULTS AND DISCUSSIONS

The most common age group affected by plantar fasciitis was 41-50 years, 18(51.42%) followed by more than 51-60 years, >60 and <40 years in 10(38.37%), 5(14.28%) and 2(5.71%) respectively. The age group ranged from 38-63 years with the mean age of 44.34±11.57 years. Among the 35 patients included in the study, male patients were 21 (60%) while female patients were 14(40%). Majority of the patients 23(65.71%) had right foot plantar fasciitis while 12(34.29%) had left foot plantar fasciitis. Mean duration of symptoms was 68±18 days. Regarding occupation most of them 25(71.43%) were labourer, 8(22.86%) were government servant and 2(5.71%) were unemployed. Average duration of standing hours was 6.9±1.8 hours.

According to the Visual Analog Score, pain at the initial visit was low in 5 (14.29%), moderate in 13 (37.14%), severe in 9 (25.71%)the worst in 8 (22.86%). Pain after 3 months of injection was none in 5 (14.29%), mild in 17 (48.57%), moderate in 10 (28.57%), severe in 2 (5.71%)worst in 1 (2.86%) patients. The mean VAS for pain prior to the corticosteroid injection was 8.74, which was substantially greater the mean VAS for pain following the corticosteroid injection was 1.13. With an increase in duration, the VAS score decreased. The effect of the corticosteroid injection resulted in a considerable improvement in the VAS for pain when comparing the Mean thickness of plantar fascia before treatment and at 6 months after treatment was assessed by USG, the mean thickness was reduced after steroid injection. (Table 3)

Complications included pain at the injection site in 6 (17.14%), heel pad thinning in 2 (5.71%)lighter skin pigmentation in 1 (2.86%). No patient experienced plantar fascia rupture or infection. The pain-free period following injection was 43±13 days. The duration of follow-up was 118±25 days. Pain recurrence was noted in 2(5.71%) patients.

The most prevalent type of plantar fascia damage, accounting for 80% of cases, is plantar fasciitis, which is also the primary cause of heel pain. The illness tends to strike women, military personnel, older athletes, dancers, obese peopleyoung male athletes more frequently. It is estimated that 1 in 10 people may get plantar fasciitis at some point in their lives, with people between the ages of 40 and 60 most frequently affected.

The most common age group affected by plantar fasciitis was 41-50 years, 18(51.42%). Comparison of mean age and gender with other studies was described in (table 4).

In the study conducted by Ali[12] patients had a mean BMI of 25.13±10.43 kg/m^2. According to a study by Ahmed[13] 109 patients out of 150 study participants were overweight and had a BMI between 25 and 29.9. The mean BMI was 28.4±0.212. This was similar to the current study. The symptoms lasted for an average of 68±18 days. Comparison of laterality of Plantar Fasciitis with other studies was given in (table 5).

According to the Visual Analog Score, pain during the initial visit was severe in 9 (25.71%) and the worst in 8 (22.86%). Only 2 (5.71%) patients reported severe pain after 3 months of injections1 (2.86%) had the greatest discomfort. Pain mean VAS was 8.74 prior to corticosteroid administration; it decreased to 1.13±1.1 after the injection. The effect of the corticosteroid injection resulted in a considerable improvement in the

Table 1: Descriptive statistics of the patients

Variable	Mean±SD
Mean age (years)	44.34 ± 11.57
Mean duration of symptoms (days	75±21
Average duration of standing (hours)	68±18
Body Mass Index (kg/m^2)	26.23±9.68.

Table 2: Mean intensity of pain in plantar fasciitis as measured with VAS scale at follow up visits

Pre injection VAS	Post injection VAS at 2 weeks	Post injection VAS at 4 weeks	Post injection VAS at 12 weeks
8.74±2.7	4.54±2.1	2.4±3.2	1.13±1.1

Table 3: Mean thickness of plantar fascia before treatment and at 6 months after treatment

	Mean
Before injection	5.60 ± 0.556
6th month Post- injection	3.75 ± 0.404

Table 4: Comparison of mean age and gender with other studies

Studies	Mean Age (years)	Males	Females
Naeem Z *et al* [10]	41.83 ± 14.07	27 (54%)	23(46%).
Akram MR *et al*.[11]	42.24±9.30	102(72.9%)	38(27.1%)
Ali W *et al*.[12]	37.55±17.13	38 (63.3%)	22 (36.7%)
Ahmed M *et al*.[13]	43±0.707	55(37%)	95(63%)
Wahid A *et al*.[14]	42.83± 7.07	22(55%)	18(45%)
Present study	44.34 ± 11.57	21 (60%)	14(40%).

Table 5: Comparison of laterality of Plantar Fasciitis with other studies

	Plantar Fasciitis		
Studies	Right	Left	Bilateral
Naeem Z *et al*.[10]	31(62%)	19(38%)	-
Wahid A *et al*.[14]	61(61.61%)	23(23.23%)	15(15.15%)
Present study	23(65.71%)	12(34.29%)	-

VAS for pain when comparing the VAS for pain at different intervals. (p<0.001)

Similar to the current study, Naeem[10] noted that following injection, the VAS-measured pain intensity decreased from 5.41±3.1-1.3±7. At 12 weeks, there was a statistically significant decrease in pain (p<0.05). Similarly, following nine months of follow-up, Ali W et al.12 found that the pre-injection mean pain score had decreased from 7.34±7.5-1.03±4.9. According to Ahmed[13] the mean visual analog scale (VAS) for pain was 9.48 prior to the corticosteroid injection, 1.02 immediately following the injection1.89, 2.212.52 at 15 days, 1 month3 months, respectively. In contrast to the current study, Akram[11] observed that the pain intensity reduced in patients who got steroid injections, although this was not statistically significant (p = 0.723).

Mittal[15] found that pre-treatment VAS scores in group I was 6.60±1.14 and those in group II was 6.46±1.05. Following injection, the VAS score decreased to 3.10±1.18 in group II and to 4.9±1.33 in group I following the initiation of oral NSAIDs. VAS scores decreased in both groups until 4 weeks of follow-up, with group II consistently lower than group I (p<0.001). Following four weeks, both groups showed a trend toward higher VAS scores the patients reported a recurrence or worsening of their pain.

In terms of adverse reactions, 6 patients (17.14%) reported injection site pain, 2 patients (5.71%) reported heel pad thinning1 patient (2.86%) reported lighter skin pigmentation. However, none of the patients experienced plantar fascia rupture or infection. After the injection, there was no pain for 43 ± 13 days. The duration of follow-up was 118±25 days. Pain recurrence was noted in two patients (5.71%). According to Wahid[14] 6 (6.1%) of the study participants reported pain at the injection site, 2 (2.1%) reported heel pad thinning3 (3.1%) reported lighter skin pigmentation. However, no participant reported plantar fascia rupture or infection.

The USG measurements of the plantar fascia thickness in the current study were 3.75±0.404 mm for post-treatment and 5.60±0.556 mm for pre-treatment. The results of Parasuraman[16] were similar to those of the present study, in which the thickness of the plantar fascia was 5.76 mm prior to treatment and 4.56 mm after a 6-month follow-up.

CONCLUSION

Patients with plantar fasciitis who received a single corticosteroid injection experienced a notable improvement in their level of pain. The steroid injection not only offers significant relief from plantar fasciitis pain but also enhances psychological well-being and decreases the need for analgesics by allowing for 43±13 days of pain-free time. Therefore, the study suggested corticosteroid medication for a speedy recovery and increased functional outcome.

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