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Comparison of Stretching Exercises and Corticosteroid Injection in Pain Reduction of Patients with Plantar Fasciitis

Babak Siavashi[1]*, Seyyed Farid Naghshbandi[2] and Mohammad Reza Golbakhsh[3]

[1]*Orthopedic Surgery, Sina Hospital, Tehran University of Medical Sciences, Tehran, Iran*
[2]*Orthopedic surgeon, Sina Hospital, Tehran University of Medical Sciences, Tehran, Iran*
[2]*Orthopedic surgeon, Assistant professor of Tehran University of medical sciences, Sina hospital*

Abstract

Introduction: Plantar fasciitis is the most common cause of heel pain. Because its cause is uncertain, there is a lot of treatment methods for it. Our study compares the results of two most common treatments known as steroid injection and plantar fascia stretching with each other regard to decrease in pain and improvement in function.

Materials and methods: 66 patients with heel pain with clinical diagnosis of plantar fasciitis which other causes of heel pain are ruled out in them are studied. One group with local steroid injection and the other group with plantar fascia stretching exercises. After 2 and 8 weeks, they are re evaluated regard to function and pain scores.

Results: There is no difference between two groups regard to sex, age, height , weight and body mass index . There was significant decrease in pain and improvement in function steroid group , but, in the 8th week, two groups have the same results in those manners.

Discussion: It seems that because after 8 weeks of treatment with both therapeutic methods, the results were the same, it is better to use the less complicated and less expensive method (stretching) , but in cases which prompt pain relief and better function is desired, steroid injection may be better.

Keywords: Heel pain; Plantar fasciitis; Calcaneal spur; Steroid injection; Stretching

Introduction

Plantar fascitis is the most prevalent cause of pain in inferior part of the heel [1] and includes about 11-15% of all causes of foot pain which require treatment [2]. Plantar fascitis or calcaneal spur is a degenerative syndrome of plantar fascia and in 50% of cases accompanies calcium precipitation at the attachment site to the heel bone (calcaneous), hence it is called heel spur. According to most authors, partial rupture of this fascia and chronic inflammation at the attachment site to the bone leads to the emergence of symptoms [3,4]. However, other etiologies have been proposed such as being overweight, specific occupations, anatomic variations in the foot, biomechanic problem in the foot, and wearing inappropriate shoes. This disease is most commonly reported among females between 40-60 years old [5], and has no significant association with socioeconomic status. Patients experience annoying symptoms and make them refer to clinics frequently. Specific and defined symptoms of this syndrome includes plantar pain especially in the medial and inferior parts of the heel which exists during standing up from chair or bed in the first few steps and then decreases. The diagnosis of this disease is based on history taking and physical examination and laboratory measures and diagnostic imaging is applied to exclude other causes such as tumor or infection. In 30% of cases, the pain is bilateral and in these bilateral cases, rheumatoid arthritis, ankylosing spondylitis, and Reiter's syndrome should be considered. On physical examination, the patient feels pain with deep palpation of medial and lateral parts of the heel and the pain increases with raising big toe and fingers with the other hand. This condition is self-limited, but its course may last 6-18 months. Therefore, patients seek medical attention to relieve pain [6]. In most cases, resting with no weight bearing on the foot causes pain alleviation [7] and in some cases changing shoes decreases the symptoms.

Appropriate physical programs and stretching of the plantar fascia and Achilles tendon and elimination of their stiffness and reinforcement of interosseous plantar muscles are all effective modalities in improving symptoms. Therefore, some patients have tried rotating tennis ball with the plantar aspect of their feet or standing near to wall and bending forward while the plantar aspect of the foot is on the ground [8], On the other hand, application of steroidal and non-steroidal anti-inflammatory drugs (NSAIDs) or corticosteroid injection at the site of pain have been effective in decreasing pain [9]. Other treatment modalities such as medical shoe, orthosis or casting and even shock waves have been used for treatment but none of them showed significant application in treatment [10-12].

This study was done to compare two common methods of treatment including local corticosteroid injection and stretching exercises of plantar fascia.

Materials and Methods

This study was done as a clinical trial. The study population (inclusion criteria) consisted of patients who presented from 2004 to 2006 with a history of at least 10 months of heel pain and the diagnosis of plantar fasciitis (heel spur)was made based on physical examination. The patients did not respond to simple treatments and NSAIDs for three weeks and other causes of heel pain were excluded. Exclusion criteria were chronic systemic diseases, history of surgery or severe trauma to the heel or fracture of the heel, and heel pain due to causes other than plantar fasciitis.

***Corresponding author:** Babak Siavashi, Orthopedic surgeon, Assistant professor of Tehran University of medical sciences, Sina hospital, Fax: 0098-21-66348543; E-mail: siavashi@tums.ac.ir

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For exclusion of other causes of heel pain blood sugar level, complete blood count, serum levels of calcium, phosphorus, alkaline phosphatase along with erythrocyte sedimentation rate and C-reactive protein were evaluated. Antero-posterior and lateral radiographies of the foot were also taken. Then the patients were divided into two groups after a written conscent. The pre-designed questionnaire was filled out by a physician who was not aware of the intervention. In corticosteroid group, local injection of 25 mg corticosteroid was done at the site of maximal pain at the palm of the foot and then the patient was resting for 24 hours. In weeks 2 and 8, physical examination in terms of pain and function was done. In other group, stretching of plantar fascia was done and similar to the first group, before intervention and in weeks 2 and 8 pain assessment was done. For pain assessment, a visual analogue scale was applied. Functional assessment was based on need to walking aid. The method of stretching exercise was as follows: the patient sits on a chair and puts his/her painful foot on the contralateral knee and pushes back big toe and other fingers with the ipsilateral hand. The patient must put his contralateral hand on the palm of the foot and feels its stretching and stiffness during passive dorsiflexion of fingers. At this time, the patient should stretches plantar fascia for 10 seconds. This exercise was done three times a day and the patient repeated the aforementioned exercise for 10 times. The results of the two groups were compared using t test and chi-squared tests. Significance level was set at P value < 0.05. All statistical analyses were done using SPSS software fro Windows (Ver. 11.5).

Results

Sixty-six patients remained until the end of the study. According to the obtained results, mean age of the two groups was similar and was 55.3 and 55.5 years in corticosteroid and stretching exercise groups, respectively. The two groups was also similar regarding gender. Mean height and weight of the two groups was also similar without significant statistical difference.

According to the obtained results which are presented in Table 1, the pain severity before any intervention was similar in both groups. However, on second visit in the second week of the study the pain in corticosteroid group showed significant decrease compared to the group which received stretching exercises. After 8 weeks, the pain severity decreased in both groups however was similar between them.

In Table 2 the results of interventions regarding the function of the patients in weeks 2 and 8 are shown. As observed, the functional level of the patients was similar before the interventions, but in week 2 after intervention functional level of patients who were treated with corticosteroid improved significantly in comparison to stretching exercises group. After 8 weeks, although functional level improved in both groups, it was similar between them.

Discussion

Since plantar fascitis (heel spur) is the most common cause of pain in the inferior parts of the foot and is the cause of more than 15% of presentations due to foot pain and due to malfunction which it produces and its high prevalence in all age groups and in both genders and in any socioeconomic group, this condition and its treatments are always important for clinicians and several studies have been done about it. Access to the most useful treatment with the least complication and decrease in expenses is the objective of most studies.

	Mean pain severity in corticosteroid group	Mean pain severity with stretching exercise	P value
Before intervention	6.9	7.2	0.7
After 2 weeks	2.8	4.2	0.0
After 8 weeks	2.8	2.3	0.23

Table 1: Pain severity before intervention and after 2 and 8 weeks following intervention.

	Functional level in corticosteroid group	Functional level in corticosteroid group	P value
Before intervention	76	79	0.6
After 2 weeks	92	84	0.004
After 8 weeks	93	92	0.7

Table 2: Patient functional level before intervention and after 2 and 8 weeks following intervention.

In a study by Benedict et al. in 2003 in the US, 101 patients with chronic plantar fascitis with a mean age of 46 years were studies. They reported that most patients completed supportive techniques with satisfaction and only limited number of patients required other treatment modalities [13].

Benedict et al. in 2006 in the US studied 66 patients in a clinical trial with a 2-year follow-up. They reported that stretching Achilles tendon is more effective than other methods. Their results showed that 92% of all patients were satisfied of this treatment and 77% did not have any problem or limitation in performing stretching techniques. The authors concluded that stretching of plantar fascia is more effective and les expensive in comparison to other treatments [14].

Frater et al. in 2006 in UK studied the effects of corticosteroid injection in patients with plantar fascitis. They used bone scan to diagnose heel pain syndrome and follow-up of patients. They used primary phase changes for prediction of corticosteroid injection effects. Twenty-four patients, among them 8 had bilateral involvement (overall 32 feet) were enrolled. After injection, pain was alleviated completely or nearly completely in 20 feet. The remaining 12 feet showed short-term or no pain alleviation [15].

In a study by Crawford et al., short-term effects of corticosteroid injection were evaluated. The effect of corticosteroid injection in patient group was compared with the effect of local anesthetic in control group in the treatment of heel spur. In addition, the effect of anesthesia was also assessed. The study population consisted of 106 patients and the results were evaluated using VAS after 1, 3, and 6 months. They noted that corticosteroid injection alleviates pain in short-term interval time, but heel anesthesia before corticosteroid injection has no effect on treatment [16].

There is no study regarding the therapeutic effects and complications of corticosteroid injection versus stretching exercise. This study was designed to compare the therapeutic effects and complications of corticosteroid injection versus stretching exercises.

Our results indicate that although most patients with plantar fasciitis are women in the age range of 40-78 years, there was no significant difference regarding gender distribution. This finding is in agreement with that of Benedict et al. in 2003 in the US and Frater et al.

We did not find any significant association between height, weight, and body mass index (BMI) and the rate of responsiveness to treatment. Though studies such as Singh et al. has reported association between

BMI and the rate of heel spur prevalence, ours and similar studies did not evaluate the rate of the responsiveness to treatment and BMI.

The rate of responsiveness to treatment was evaluated with two methods in our study. The first was pain scale and the patient scales his/her pain in a page from 1 to 10. The second was function score which was based on the need to walking aid to start movement.

According to our findings, pain responded dramatically to local corticosteroid injection. The patients who received local corticosteroid had better pain scale and function score after two weeks than those who did not receive corticosteroid. This difference was statistically significant. But after 8 weeks both groups had decreased pain and better function prior to treatment with a significant difference. The difference between the two groups after 8 weeks with respect to pain and function was not different.

In conclusion, regarding no difference between corticosteroid injection and stretching exercises in plantar fascitis in long-term follow-up, and considering this fact that complications such as weakness and sometimes rupture of plantar fascia and fat pad atrophy are attributed to frequent corticosteroid injection, long-term injection of corticosteroid is not recommended for plantar fasciitis. For long-term management of this condition, it seems that stretching exercises are more safe and appropriate methods. However, according to the culture of our society and the expectations of the patients, combining different treatments is more affective in achieving a better outcome.

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