

Effectiveness of Local Steroid Injection in Treatment of Plantar Fasciitis

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ABSTRACT

INTRODUCTION: Plantar fasciitis is a common pathological condition affecting the hind foot, and can often be a challenge for clinicians to successfully treat. Successful treatment of plantar fasciitis usually requires a combination of treatment modalities, rather than administering only one treatment at a time. The aim of this study was to find out the efficacy of single dose steroid injection in treatment of planter fasciitis which is an easy procedure and can be carried out on an OPD basis.

METHOD: A prospective interventional study was done in Narayani Subregional Hospital over a period of 1 Year (Jan-2016 to Dec.2016). 50 patients of age more than 18 years and painful heel of more than 3 months were included in the study. Patients with associated Diabetes Mellitus, local infection, tumor, previous surgery or fracture were excluded. Injection is performed with 2ml of a 50/50 mixture of triamcinolone acetonide (20 mg per ml) and xylocaine (1ml) 2%, given locally by 21 gauge needle at the site of maximum tenderness on medial tubercle of calcaneus by palpatery methods. Pre-procedure visual analogue scale (VAS) and the foot function index (pain sub-scale) were assessed. The patient was followed up at 1 month, 3 months and 6 months after the injection. Obtained data were analyzed in SPSS.

RESULT: Of the 50 cases with 57 heels enrolled in our study, the mean age was 38.92 years. 70% of the patients were in the age group of 18-40 years with M: F ratio of 1:1. Majority of patients were physically active (70%) followed by sedentary lifestyle (30%). The mean duration of symptoms was 6.7 months and the mean BMI was 25.58. About one fourth (24%) of the patients had calcaneal spur. The mean pre-procedure pain score and the foot function index were 8.82 and 81.54 respectively. Reduction in patient's pain score (VAS) and improvement in foot function index scale were significantly greater at 1 month but at 3 month and 6 month follow-up, no therapeutic advantage could be detected.

CONCLUSION: A single dose steroid injection doesn't offer a therapeutic benefit in long term.

KEY WORDS: corticosteroid injection, effectiveness, heel pain, plantar fasciiti, risk factors

INTRODUCTION

Plantar fasciitis is a common pathological condition affecting the hindfoot, and can often be a challenge for clinicians to successfully treat¹ It is an overuse injury causing inflammation at the origin of the plantar fascia and surrounding perifascial structures, such as the

calcaneal periosteum. It is the most common clinical problem that causes inferomedial heel pain in adults.² Lapidus and Guidotti, in 1965, found that the number of patients in their foot clinic with plantar fasciitis was greater than those with any other recorded foot lesion. It affects 10% of the population during the course of a lifetime. It has been reported that approximately 5% of patients who are diagnosed with plantar fasciitis undergo surgery for the condition. It is estimated that more than two million people receive treatment for plantar fasciitis in the United States each year.³

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This overuse syndrome has been recognized for almost two hundred years.⁴ In 1812, Wood described this condition, which has been referred to by various synonyms, including plantar fasciitis, heel pain syndrome, subcalcaneal pain syndrome, calcaneodynia, subcalcaneal bursitis, calcaneal periostitis, neuritis, heel spur syndrome, subcalcaneal spur syndrome, stone bruise, medial arch sprain, runner's heel, jogger's heel, and policeman's heel.⁵ This confusion in terminology reflects the poor understanding of the etiology of the plantar fasciitis.⁶

Successful treatment of plantar fasciitis usually requires a combination of treatment modalities, rather than administering only one treatment at a time.⁷ Although many authors agree that mechanical treatment should be considered a cornerstone of any plan of treatment, some debate remains regarding the most effective form of mechanical intervention.⁸

Non operative treatments of plantar fasciitis vary widely. It includes shoe modifications, use of pre fabricated and custom inserts, stretching exercise, physical therapy, non steroidal anti-inflammatory medications, steroid injections, night splints, application of a cast or any combination of the for going modalities.⁹

In common with other musculoskeletal conditions, steroid injection have been used to treat plantar heel pain since the 1950s and is one of the frequently described treatment of painful heels in the medical literature. In a survey of orthopaedic surgeons, 73% reported using steroids to treat painful heels, often in conjunction with heel pads, ultrasound and stretching exercise.¹⁰ There are drawbacks in injecting the heel with steroids, mainly rupture of the plantar fascia and atrophy of the fat pad. In an observational study, Acevido and Beskin reported a plantar fascial rupture rate of 10% in patients after steroid injection for heel pain. Another drawback is the extreme pain experienced by some patients during an infiltration of the tissues surrounding the calcaneum. The risk of plantar fasciitis increases as the range of ankle dorsiflexion decrease. Individuals who spend the majority of their workday on their feet and those whose body mass index >30kg/m² are also at increased risk for the development of plantar fasciitis. Reduced ankle dorsiflexion, obesity and work-related weight-bearing appear to be independent risk factors for

plantar fasciitis. Reduced ankle dorsiflexion appears to be the most important risk factor.¹¹

METHOD

A prospective interventional study was done in Narayani Subregional Hospital over a period of 1 Year (Jan-2016 to Dec.2016). 50 patients of age more than 18 years and painful heel of more than 3 months were included in the study. Patients with associated Diabetes Mellitus, local infection, tumor, previous surgery or fracture were excluded. Patient was positioned supine on bed and Under aseptic precaution, Injection is performed with 2ml of a 50/50 mixture of triamcinolone acetonide (20 mg per ml) and xylocaine (1ml) 2%, given locally by 21 gauge needle at the site of maximum tenderness on medial tubercle of calcaneus by palpatery methods.¹ Patients are advised to rest for 24 hours after procedure. Analgesics are prescribed as necessary.

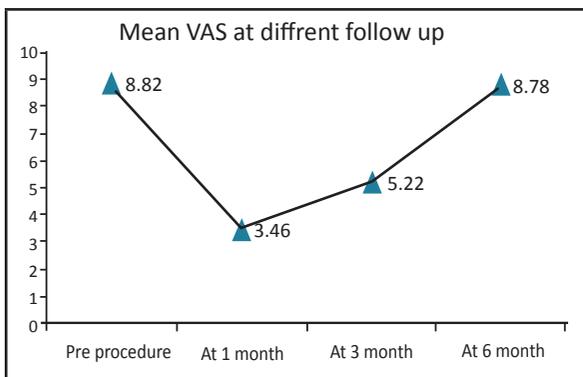
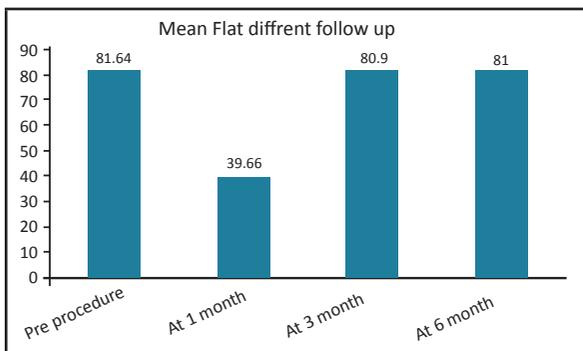
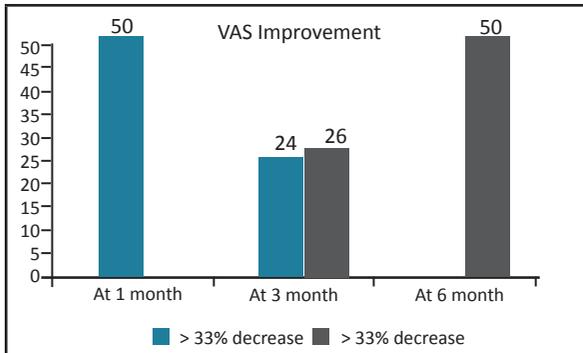
Pre-procedure visual analogue scale (VAS) and the foot function index (pain sub-scale) were assessed. The patient was followed up at 1 month, 3 months and 6 months after the injection.

The selected data were analyzed with the help of SPSS. (Statistical package for social science) software windows program using the student t-test for quantitative variables and chi- square test for qualitative variables. Values of $p \leq 0.05$ is considered significant with confidence level of 95% throughout the study.

RESULT

Of the 50 cases with 57 heels enrolled in our study, the mean age was 38.92 years. 70% of the patients were in the age group of 18-40 years with M: F ratio of 1:1. Majority of patients were physically active (70%) followed by sedentary lifestyle (30%). The mean duration of symptoms was 6.7 months and the mean BMI was 25.58. About one fourth (24%) of the patients had calcaneal spur. The mean pre-procedure pain score and the foot function index were 8.82 and 81.54 respectively. Reduction in patient's pain score (VAS) and improvement in foot function index scale were significantly greater at 1 month but at 3 month and 6 month follow-up, no therapeutic advantage could be detected. No relationship was found between duration of pain and pain reduction at 1 month follow-up, BMI

group and pain reduction at 1 month follow-up, age group and pain reduction at 1 month follow-up. Pain and sedentary or active occupation did not appear to be associated and there was no apparent relationship between patient's age and pain.



DISCUSSION

Despite the lack of understanding of the causes of plantar fasciitis, most authors agree that it is a self-limiting condition in the vast majority of cases and that surgery is not the treatment of choice. Approximately 95% of those with plantar fasciitis will have resolution of their symptoms in six to eighteen months. Although the natural history may be associated with symptomatic improvement in the absence of any intervention, most patients have sufficient pain and incapacitation

that they eventually seek medical evaluation and treatment. The mainstay of treatment for acute and chronic plantar fasciitis remains non-operative because conservative techniques are successful in over 90% of patients. However, there is no consensus about which treatment is the best or the most cost-effective, and there is inconsistency in the treatment provided by various practitioners.

The success of conservative care for the treatment of patients with plantar fasciitis requires a combination of treatment modalities. Such modalities should address the inflammatory component that causes the discomfort and the biomechanical factors that produce the disorder. Patient education is imperative. Patients must understand the etiology of their pain, including the biomechanical factors that caused their symptoms. In addition, it is important, but difficult, to make the patient understand that treatment consists of several methods and that a total, not a fragmented, effort is necessary.

Corticosteroid injection remains a popular treatment method in most studies. If other measures fail, a corticosteroid injection near the plantar fascia origin may provide adequate pain relief. Despite its common use, there is minimal evidence for its effectiveness. One randomized controlled trial found corticosteroid injection had a success rate of 70% or more, and a second randomized trial indicated that corticosteroid injection relieved symptoms for four weeks. Corticosteroid injections are not without complications. Potential risks of multiple corticosteroid injections include osteomyelitis of the calcaneus, loss of cushioning through atrophy of the fat pad beneath the calcaneus, collagen degeneration and calcification, and weakness and rupture of the plantar fascia. In addition, corticosteroid injections are often followed by a recurrence of symptoms.

The minimum age of the patient in our study was 20 years and maximum up to 60 years with mean age of 38.92 years and standard deviation of 9.07. Majority of patients (70%) fell in the group of 18-40 years followed by 30% in the age group of 41-60 years. Finding of our study is comparable to the study done by R.S. Kulkarni whose youngest patient was a boy of 14 years and the oldest was 68 years and 67% of the patients were in age group 31-50 years. In our study, the mean age of the patient is slightly younger than the study of F.

Crawford et al, where the age range was 30-87 years with mean age of 57 years, the study done by Daniel et al, where mean age was 49 years. The patients of this age group are frequently involved in outdoor activities (farming in our country). This may be the cause of higher incidence in the age group of 18-40 years.

In our study, 50% patients were male and 50% patients were female. The finding of our study is comparable to study done by R.S. Kulkarni, where 49.5% of patients were male and 50.4% were female. But in a study of F. Crawford et al, 65% of patients were female and 35% patients were male. In Daniel et al study, 34% were male, whereas 66% were female. In our study, equal numbers of male and female patients, that is because of simultaneous and equal participation in farming in our part of the world.

In this study involvement of left side was present in 44%, right side in 42% and bilateral in 14% of the patients. The finding of this study is similar to the study done by Furey J. G. et al, where 15% of patients had bilateral plantar fasciitis.

In this study, minimum pain duration was 3 months and maximum 12 months with mean pain duration of 6.7 months. Majority of the patients (54%) fell 6-9 months duration of pain. The finding of this study is comparable with the study done by F. Crawford et al, where mean pain duration was 6 months and study done by R.S. Kulkarni where the mean pain duration was 8 months.

Majority of the patients (50%) in our study were farmer, followed by businessman (30%) and sportsman (20%).

Majority of the patients (56%) in our study fell in body mass index group of 25-30. 38% had BMI < 25 and 6% had BMI > 30. But study of Daniel et al, majority of the patients had BMI >30. In our study BMI of our patients were less may be because of poor socio-economic status of the patient and country.

In this study 38 patients (76%) had normal X-ray of heel but 12 patients (24%) had calcaneal spur. Though the calcaneal spur were more common in older age group (41-60 years) patients as compared to 18-40 years age group, the findings is statistically not significant ($p = 0.08$). Calcaneal spur was also associated with higher weight of the patient (mean = 66.58 Kg) as compared to normal X-ray finding (mean = 64.05 Kg) . But this

association is also not statistically significant ($p = 0.35$). The findings of our study were comparable to study done by Rubin G et.al where 15-25% of patient had calcaneal spur and that proportion increased with age and obesity.

The mean pre-procedure pain score and mean pain score at 1 month, 3 month and 6 months are 8.82, 3.46, 5.22 and 8.78 respectively. The mean pain score significantly decreased at 1 month follow-up ($p = 0.000$) though at 3 months of follow-up, the pain reduction is statistically significant ($p = 0.000$) as compared to pre-procedure pain score. There is significant increase of pain ($p = 0.007$) when compared between 1 month follow-up (mean pain score = 3.36) and 3 month follow-up (mean pain score = 5.52). No statistically significant difference in pain reduction could be detected at 6 month follow-up and between 1 month and 6 month, 3 month and 6 month follow-up. The p Values are 0.159, 0.513 and 0.130 respectively. At 1 month follow-up all patients had significant pain reduction (>33%) but at 3 months follow-up only 48% of patients had significant pain reduction and finally at 6 months follow-up, all the patients had less than 33% pain reduction. Both scales of pain showed short term effectiveness of the steroid injection which was maximum at 1 month follow-up. The findings of this study were comparable to the study done by F. Crawford et. al and Karl B. et. al which had clearly shown the short-term effectiveness of the steroid.

There was no relationship between the duration of pain and pain reduction at 1 month follow-up ($p = 0.733$), BMI group and pain reduction at 1 month follow-up ($p = 0.782$) and age group of the patient and pain reduction at 1 month follow-up ($p = 0.363$). Pain and sedentary or active occupation did not appear to be associated ($p = 0.438$). There was no apparent relationship between patient age and pain ($p = 0.678$). The finding of this study is comparable to that of F. Crawford et. al.

The mean foot function index had significantly improved at 1 month follow-up ($p = 0.000$). No statistically significant improvement in foot function index could be detected at 3 month and 6 month follow-up, the p Values were 0.258 and 0.320 respectively.

As far as complications are concerned various literatures have reported that steroid injection in

painful heel is associated with fat pad atrophy, plantar fascial rupture, infection and sometimes extreme pain during injection. Acevide et. al reported 10% plantar fascial rupture in patients treated with multiple steroid injections. But in this study we did not come across any major complications. However, there was minor complication of having extreme pain while injecting steroid in one patient. We did not come across plantar fascial rupture, this could be due to adequate post-procedure rest and limitation of activity for 48 hours and use of single dose of steroid injection. Usually multiple dose steroid injections are associated with plantar fascial rupture. Similarly we did not come across any complications of infection. This could be due to proper preparation of the part with antiseptic solution and sterile drapping of the part during injection and use of single steroid injection only.

CONCLUSION

This study shows reduction in patient's pain score and foot function index scale significantly greater at 1 month but at 3 months and 6 months follow-up, no therapeutic advantage could be detected. The short term nature of benefit from steroid injection had previously been reported in the treatment of painful shoulders and in observational studies of painful heels. This trial corroborates these findings and it appears that a single dose steroid injection doesn't offer a therapeutic benefit in long term.

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