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Dr. Kasturi Mohan Batra
Associate Professor, Department
of Orthopaedics, SGT Medical
College, Hospital & Research
Institute, Gurugram, Haryana,
India

Dr. Shekhar Tank
Assistant Professor, Department
of Orthopaedics, SGT Medical
College, Hospital & Research
Institute, Gurugram, Haryana,
India

Dr. Avinash Kumar Singh
Post Graduate Resident,
Department of Orthopaedics,
SGT Medical College, Hospital &
Research Institute, Gurugram,
Haryana, India

**Dr. Dhamelia Dhyey
Shambhubhai**
Post Graduate Resident,
Department of Orthopaedics,
SGT Medical College, Hospital &
Research Institute, Gurugram,
Haryana, India

Dr. Arora Jatin
Post Graduate Resident,
Department of Orthopaedics,
SGT Medical College, Hospital &
Research Institute, Gurugram,
Haryana, India

Dr. Saviya Ram Gordhanbhai
Post Graduate Resident,
Department of Orthopaedics,
SGT Medical College, Hospital &
Research Institute, Gurugram,
Haryana, India

Corresponding Author:
Dr. Shekhar Tank
Assistant Professor, Department
of Orthopaedics, SGT Medical
College, Hospital & Research
Institute, Gurugram, Haryana,
India

A prospective study to compare clinical outcome of use of corticosteroid vs its combination with physiotherapy in patients of plantar fasciitis

**Dr. Kasturi Mohan Batra, Dr. Shekhar Tank, Dr. Avinash Kumar Singh,
Dr. Dhamelia Dhyey Shambhubhai, Dr. Arora Jatin and Dr. Saviya
Ram Gordhanbhai**

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Abstract

Introduction: Plantar fasciitis is the one of the commonest causes of heel pain (especially inferior heel pain) that can progress to chronic plantar fasciitis and cause severe pain [1]. Several treatment modalities have been used to manage this, including physiotherapy (strengthening and stretching exercises), botulinum and corticosteroid injections [2]. Local corticosteroid injections have been used extensively for these cases since long period, because of its availability and cost-effectiveness, which made it a good treating modality. In our study we aim to compare the combined effect of corticosteroid with physiotherapy Vs corticosteroid alone.

Material and methods: In our study, we took 65 patients, age ranging from 30-65 years and divided into 2 groups through blind chit method, G1 (n=34) who were advised strength training and stretching exercises with corticosteroid injections and G2 (n=31) were those who only got corticosteroid injection. Outcome in both groups was assessed by measuring the heel pain using the Visual Analogue Scale (VAS) [3]. For VAS functional pain improvement, the Confidence Interval (95%) is 5-35 mm ($p < 0.05$).

Result: There is statistically significant improvement in the primary outcomes at 4 months. Comparing G1 with G2 the mean difference in VAS pain during function is 23 mm (confidence interval i.e. CI 95% is 5-35 mm, $p < 0.05$). For the secondary outcome improvement for G1 group as compared to G2 for VAS pain during daily function at 2 months $p < 0.05$ at 4 months $p < 0.003$ and at 12 months $p < 0.05$. For VAS morning pain the difference was only significant ($p < 0.05$) at only 4 months.

Conclusion: The most important finding of our study is that corticosteroid injections combined with physiotherapy had a superior short and long-term effect in plantar fasciitis patients without any severe side effects. A single ultrasound guided dexamethasone injection is a safe and effective short-term treatment for plantar fasciitis [4].

Keywords: Planter fasciitis, corticosteroid injection, dexamethasone injection, physiotherapy, visual analogue scale

Introduction

Plantar fasciitis is the one of the most common cause of heel pain (especially inferior heel pain). Approximately 10% population, round the globe, get affected by it over their life time. The pain usually resolves by itself but approximately 10% of this can progress to chronic plantar fasciitis with severe pain that might affect their daily routine. Plantar fasciitis gradually becomes a considerable problem for athletes.⁵ Plantar fasciitis is caused by an inflammation of the plantar fascia that give rise to pain, this can be due to on & off tear of planter fascia either due to microtrauma or due to degenerative non inflammatory condition (the latter is also known as planter fasciosis). Plantar fasciitis is very common in middle & old age people and can affect both sedentary as well athletic people. High risk individuals are those having obesity, diabetes, pes planus, prolong standing or bare foot walking and last but not the least poor footwear [6].

Several modalities have been suggested and used for the management of plantar fasciitis. Previous published literatures favouring any specific guidelines for treating plantar fasciitis are very less.

Corticosteroid injections in plantar fasciitis have been used since very long period, their availability and cost-effectiveness made it a good treating modality. But the risks and few potential side effects along with other potent treating options like Plasma rich platelets, botulinum injection etc. are hinderance in choosing it as first line treatment for plantar fasciitis. Till now, there are paucity of studies showing clinical effect of cumulative therapy of both physiotherapy and corticosteroid injection. In our study we compare the clinical effect of two different treatment modality on plantar fasciitis: local corticosteroid injection alone Vs combined treatment with strength training and stretching modalities.

Materials and methods

Our study is a randomised control prospective study in which the patients (n=65) were selected from orthopaedic OPD at SGT hospital and was approved by Ethical committee. All selected patient gave a written informed consent and the procedure done on the patients were randomly given by chit system to overcome the bias. Two group, Group G1 (n=34) patients and Group G2 (n=31) patients were included.

On the basis of previous investigations of VAS pain score it was estimated that n= 30 was needed to detect a 30% difference in VAS score between treatment groups with an 80% power SD = 15 mm (scale 0–100 mm, 2-tailed alpha = 0.05).⁷ Outcome scores were collected at the time of procedure, 2 months, 4 months, 12 months. Primary outcome was measured as pain during daily function on a 100-mm VAS score at 4 months and pain during daily function was defined as average pain during everyday living, and a change of 9 mm is considered clinically relevant for patients with plantar fasciitis^[8]. The secondary outcomes were measured as pain in the foot or heel during the first step in the morning (VAS morning pain) at 2 months, 4 months and 12 months. Pain during function is also measured in secondary outcome at 2 months, 4 months and 12 months.

Inclusion criteria

1. Symptoms of plantar fasciitis (first step pain & tenderness over the medial aspect of calcaneum)
2. Ultrasonographic (US) changes with at least 4 mm thickening of the fascia at the medial insertion of the painful side described as a criterion for plantar fasciitis and no signs of rupture.
3. 30–65 years of age and able to speak and write Danish and sign an informed consent.

Exclusion criteria

1. Symptoms for less than 3 months
2. Corticosteroid injection in the previous 6 months
3. Patients with any signs or clinical features suggestive of spondyloarthropathy or other
4. Arthritis
5. Inflammatory diseases or diabetes mellitus
6. Diseases affecting circulation in the lower limb (e.g. venous ulcer, claudication)
7. Sensory dysfunction (e.g. neuropathy)
8. Infection in foot or leg
9. Pregnancy
10. Daily use of pain medication
11. Previous operations in the lower limb or other diseases that would complicate the interventions
12. Inability to join the program and attend supervision during the training period.

Procedure

1. Corticosteroid injections containing 1 ml Lignocaine 1% and Containing 1 mL of 4 mg/mL dexamethasone sodium phosphate.
2. 23-gauge syringe (0.6 × 30 mm)
3. Ultrasound machine.

The first 2 months were intervention periods for physiotherapy and/or corticosteroid injections and patients were instructed to light activities and avoid heavy or strenuous activities like jumping or running during this period. Patients were also instructed to wear sport shoes/ or silicon heels^[9].

Patients of G1 (n=34) who were also enrolled for physiotherapy along with corticosteroid injection were advised by the physiotherapist to do stretching exercises thrice a day: by stretching calf and manually dorsiflex the toes to stretch plantar fascia and keep stretched for 10 seconds, repeat it for 10 times. Also advised to do strengthening exercises thrice a week: by heel rising, flexion of great toe and inversion of foot against elastic band for 5 seconds.

Injections to the patients were given which were containing 1 ml Lignocaine 1% and, containing 1 mL of 4 mg/mL dexamethasone sodium phosphate administered using a syringe (0.6 × 30 mm) under ultrasound guidance from the medial side just beneath the Plantar Fascia. Corticosteroid injections were administered once every month until the Plantar Fascia thickness was less than 4 mm as determined by ultrasonography with a maximum of three injections. All patients who fall under (G2=31) received injections containing 1 ml Lignocaine 1% and, containing 1 mL of 4 mg/mL dexamethasone sodium phosphate administered using a 23-gauge syringe (0.6 × 30 mm) under ultrasound guidance just beneath the plantar fascia. Outcome that was assessed to measure foot pain include the Visual Analogue Scale (VAS) at 2 months, 4 months, 12 months. Results are reported as mean ± sem unless otherwise noted. Based on VAS pain score from previous studies it was estimated that n = 25 was needed to detect a 30% difference in VAS score between treatment groups with an 80% power, SD = 15 mm (scale 0–100 mm), 2-tailed alpha = 0.05. For VAS functional pain improvement, the Confidence Interval (95%) is 5–35 mm ($p < 0.05$).

Statistical analysis

All outcome parameters were analysed using two-way ANOVAs with treatment regimen (group) followed by Tukey's multiple comparisons test post hoc test in case of significance unless otherwise noted. Results are reported as mean ± sem unless otherwise noted. For VAS functional pain improvement, the Confidence Interval (95%) is 5–35 mm ($p < 0.05$).

Result

In our study, there is statistically significant improvement in the primary outcomes at 4 months. Before giving treatment: VAS pain score during function in G1 patients = 54 and G2 patients = 45. VAS morning pain in G1 group patients = 53 and G2 group patients = 57. The VAS pain during functions in everyday life is improved by 48 mm and 31mm in G1 and G2 group respectively. Comparing group G1 with group G2 patients, the mean difference in VAS pain during function is 23 mm (confidence interval i.e. CI 95% is 5–35 mm, $p < 0.05$). For the secondary outcome the statistical outcome at all time points (2 months, 4 months and 12 months) was

collected and we compared it with initial statistical data. It shows a significant improvement for G1 group as compared to G2 group for VAS pain during daily function at 2 months $p < 0.05$ at 4 months $p < 0.003$ and at 12 months $p < 0.05$. For VAS morning pain the difference was only significant ($p < 0.05$) at only 4 months.

Discussion

Most studies use corticosteroid injection as a monotherapy.¹⁰ Prior studies have shown good short-term (1–2 months) effect of corticosteroid injections in plantar fasciitis¹¹ and in other tendinopathies, but the effect appears to dissipate or completely vanish in the longer term (3–12 months). Ryan *et al.* compared corticosteroid injections and stretching to daily strengthening and stretching exercises over 12 weeks and concluded that both groups improved without any intergroup differences.¹² Precise injection site is also important to get good outcome and most studies had been used a medial approach while some inject through the fat pad.¹³

Conclusion

In our study, the results of combined treatment, stretching & strength training and corticosteroid injection, is better compared to treating alone with corticosteroid, in both the short and long term use clinically. On the basis of these results, we can possibly use this treatment modality for other overused injuries that share similar adaptations and pathological features although it remains to be shown in future studies.

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