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Corticosteroid Injection by Palpation Guide Versus Palpation Guide and Needling Method for Plantar Fasciitis



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ABSTRACT

Background: One of the most common causes of the heel pain is plantar fasciitis. If the conservative treatment is not effective, the local corticosteroid injection is an alternative. Various methods have been recognized for corticosteroid injection such as palpation-guided injection and ultrasound guided injection. This study was done to compare corticosteroids local injection using palpation alone and palpation with needling. **Methods:** Among 480 patients 110 patients (120 heels with plantar fasciitis) who did not respond to conservative therapy enrolled in this study. Patients underwent local corticosteroid injection using palpate guide and palpate guide with needling technique divided into group A and B, respectively. Groups A and B consisted of 54 patients (60 heels suffering from plantar fasciitis) and 56 patients (60 heels suffering from plantar fasciitis), respectively. **Results:** Both the VAS (visual analog scale) and the HTI (heel tenderness index) after treatment were statically significant in both group and more significant in group B ($P < 0.001$). the result in group B (palpation guide injection with needling) was more effective and better than group A (palpation guide injection alone). **Conclusion:** Palpation guided injection with needling of corticosteroids in plantar fasciitis is a cheaper, easier, and more effective method than common palpation-guided and ultrasound guided injection.

INTRODUCTION:

One of the most common causes of the heel pain is plantar fasciitis(1). About 10% of the population suffer from heel pain during their lifetime of which 80% suffering from plantar fasciitis (2-4). In literature, various terms have been used as plantar fasciitis such as Chronic Plantar Heel Pain, heel spur syndrome, runners' heel, painful heel syndrome, and Calcaneal Periostitis (5, 6).

Plantar fascia which preserves plantar medial arch is extended from the calcaneus to metatarsals, so it is always under stretch for carrying weight(7). So many mechanical risk factors are responsible for pressure loading in plantar fasciitis which is divided into two groups: internal and external factors. Internal factors are disease related such as pes planus, pes cavus, obesity, and reduced ankle dorsiflexion. External factors are environmental dependence such as: walking or running on a hard surface, increasing the duration or severity of running suddenly, and walking or standing longer than normal(8).

The Calcaneal spur has been found in heel lateral radiographs of more than 50% of plantar fasciitis patients which arises from a traction in the site of calcaneus and fascia attachment(9, 10). Although Calcaneal spur does not establish pain in plantar fasciitis, recent studies revealed that obesity is the most common plantar fasciitis risk factor (70%) following Calcaneal spur(9-11).

The histopathological changes of plantar fasciitis are unspecified; however, degeneration (near medial calcaneus tuberosity) and inflammation in acute phase have been reported in recent studies (12-15).

Ultrasonography recommended as one of the plantar fasciitis diagnostic tools. Plantar fascia with the thickness of 3 mm considers as normal, so if the fascia is more than 4 mm, it is abnormal (16, 17).

Treatment options in order of priority are, decrease functional activity especially exercise, plantar fascia stretch with forced foot dorsiflexion(18), message with ice, fixed splint dorsiflexion(19), physiotherapy, orthotics (20, 21), palliative drugs(21, 22), corticosteroids local injection(23-25).

Platelet Rich Plasma injection (PRP)(26), FECSWT (Focal Extra Corporeal Shock Wave Therapy)(27-30), and surgery(31, 32). One of the mentioned treatment is corticosteroids local injection which can be done using palpation or ultrasound methods (33, 34). This study was done to compare corticosteroids local injection using palpation and needling (new technique) with palpation alone.

METHOD:

In this prospective study, at first 480 patients with plantar fasciitis who referred to the orthopedic clinic from 2005 to 2015 treated conservatively with medicine, physiotherapy, and orthosis for about three months. Among 480 patients 110 patients (120 heels with plantar fasciitis) who did not respond to conservative therapy enrolled in this study.

Plantar fasciitis diagnosed based on physical examination, observation, laboratory tests, and lateral heel radiograph.

Inclusion criteria considered as plantar fasciitis patients with no good response to conservative therapy using medicine, physiotherapy, and orthosis during three months.

Exclusion criteria were as follow: previous heel surgery, contraindications for corticosteroid usage, heel pain causes other than plantar fasciitis, previous corticosteroid injection, diabetes, and plantar fasciitis secondary to rheumatic diseases.

Patients underwent local corticosteroid injection using palpation guide technique and palpation guide technique with needling divided into group A and B, respectively. Groups A and B consisted of 54 patients (60 heels suffering from plantar fasciitis) and 56 patients (60 heels suffering from plantar fasciitis), respectively.

Injection technique:

At first, the maximum tenderness point on the heel was defined in group A. In the second step, 2% lidocaine injected to anesthetize the specified point following injection of Depo-Medrol. In group B after anesthetizing, Depo-Medrol injected by moving needle subcutaneously with 1 to 2 mm intervals in five tenderness points. Patients were allowed to do intense activities within 24 to 48 hours after injection. Furthermore, plantar heel pain intensity (PHPI) and pain on palpation (POP) evaluated using visual analog scale (VAS) and heel tenderness index (HTI), respectively during four weeks after injection. PHPI measure

considering pain at rest or just after waking up from morning sleep, also POP measure the pain severity by heel pressuring.

VAS measures pain intensity subjectively using 10 millimeters line ranging from 0 (no pain) to 10 (very severe pain). HTI was evaluated by the physician which range from 0 to 3 as follow: 0=no pain, 1=painful, 2=painful and winces, and 3=painful winces and withdraws. Finally, Statistical analysis was performed using SPSS version 16.0 (SPSS Inc., Chicago IL).

RESULTS:

From all 120 plantar fasciitis, 38 (31.7 %) were related to male and 82 (68.3 %) were related to female. Right, left and both sides were affected in 58 (52.3%), 44 (39.6%) and 9 (10.8%) of the patients, respectively. The average of the age estimated 44.5 years which ranged from 29 to 64 years. The mean of BMI (Body Mass Index) and pain duration were 27.6 kilograms (62-89) and 6.51 months (3 to 21), respectively. 55 (45.8 %) of the patients had spur based on radiographs.(table.1)



| Table (1): Demographic characteristic of the patients with plantar fasciitis (Number of affected foot=120) | | |
|--|---------------------------|---------------|
| Age (mean, SD) | 44.5 (9,52) | |
| Gender | Male | 38 (%31.7) |
| | Female | 82 (%68.3) |
| Affected side | Right | 58 (%52.3) |
| | Left | 44 (%39.6) |
| | Both | 9 (%8.1) |
| Treatment method | Injection | 60 (%50) |
| | Injection+Needling | 60 (%50) |
| BMI (mean, SD) | 27.6 (3.09) | |
| Pain duration (month) (mean, SD) | 6.51 (2.34) | |
| Image finding | None | 65 (%54.2) |
| | Spur | 55 (%45.8) |
| Job | Employee | 48 (%40) |
| | Housewife | 43 (%35.8) |
| | Teacher | 13 (%10.8) |
| | Business | 2 (%1.7) |
| | Workman | 14 (%11.7) |
| VAS (mean, SD) | Before treatment | 9.46 (0.634) |
| | After treatment | 1.42 (1.29) |
| HTI (mean, SD) | Before treatment | 2.83 (0.374) |
| | After treatment | 0.492 (0.733) |

The differences between VAS before and after treatment and HTI before and after treatment in both the single and needling groups were statically significant ($P < 0.001$). (table.2)

Table (2): Comparing two methods of treatment (Injection alone, Injection + needling) in patients with plantar fasciitis.

| | | Injection (mean) | Injection+Needling (mean) | P-value |
|------------------------------|-------------------------|-------------------------|----------------------------------|------------------|
| Age | | 62.2 | 58.8 | 0.583 |
| BMI | | 28.5 | 29.3 | 0.532 |
| Pain duration (month) | | 5.64 | 6.46 | 0.192 |
| VAS | Before treatment | 9.28 | 9.63 | 0.004 |
| | After treatment | 1.65 | 0.850 | <0.001 |
| HTI | Before treatment | 2.75 | 2.92 | 0.015 |
| | After treatment | 0.767 | 0.217 | <0.001 |
| Gender | Male | 18 | 20 | 0.695 |
| | Female | 42 | 40 | |
| Job | Employee | 22 | 26 | 0.600 |
| | Housewife | 20 | 23 | |
| | Teacher | 9 | 4 | |
| | Business | 1 | 1 | |
| | Workman | 8 | 6 | |
| Affected Side | Right | 28 | 30 | 0.509 |
| | Left | 20 | 24 | |
| | Both | 6 | 3 | |
| Image findings | None | 32 | 33 | 0.855 |
| | Spur | 28 | 27 | |

The difference between both the VAS and the HTI after treatment between two groups were statically significant and better in palpation guide with needling (group B) (P>0.001).

DISCUSSION:

Typically plantar fasciitis is treated conservatively by reducing exercise, using drugs, orthosis, and physiotherapy. If the conservative treatment is not effective, the local

corticosteroid injection is an alternative(1). Various methods have been recognized for corticosteroid injection such as palpation-guided injection which is cheaper, easier, and the most common technique in addition to ultrasound guided injection which is more expensive due to the necessity of orthopedics and radiologists collaboration; however, few studies demonstrated that treatment outcomes are equal in both methods(38, 39). On the other hand, some studies suggested that ultrasound guided injection is more effective regarding the accuracy of the ultrasound in estimating injection zone (35, 38). Nowadays palpation guide is used as one of the most common corticosteroid injection methods (33).

Our study introduced palpation guided injection with needling as a cheaper, easier, and more effective method than common palpation-guided injection. Also, it seems that palpation-guided injection with needling is as effective as ultrasound guided injection considering the more scope covering by injection.

Clinical findings revealed significant decrease in P.O.P and P.H.P.I which is equal or even better than common techniques such as palpation guide injection and ultrasound guide injection.

It was not possible to compare our study with other studies as there are no other similar studies.

In our study, plantar fasciitis was common among elderlies (29-64 Ys.)(1), people with higher BMI(34), and females(68/3%) as same as what has been revealed in other studies.

In 55 patients (45.8 %) imaging showed the spur which was similar to other studies (5, 9-11).

Although corticosteroid injection results in calcaneus fat pad and plantar fascia rupture (35-37), our study was associated with no complications.

CONCLUSION:

Palpation guided injection with needling of corticosteroids in plantar fasciitis is a cheaper, easier, and more effective method with significant decrease in P.O.P and P.H.P.I than common palpation-guided and ultrasound guided injection.

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