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Steroid injection versus Non-invasive Therapy in the Treatment of Plantar Fasciitis: A Study of 101 Cases

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Abstract

Background and objectives: about 10% of people have plantar fasciitis, the most prevalent foot condition. There are currently no applicable guidelines. We aimed to make a study hypothesis (no difference between using local steroid injections and steroids taken orally with home physical therapy) in treating plantar fasciitis.

Methods: An interventional study was done in Duhok, Kurdistan region, Iraq. The period between 15/5/2021-15/1/2023. A randomly selected 101 patients were divided into two groups. The first group received local steroid injections while the second group received oral steroids with Simple home physiotherapy. The Visual Analogue Scale and Foot Function Index were recorded during the trial for pain evaluation.

Result: Patients were randomly assigned to two comparable groups. The pain significantly increased in the first two weeks after corticosteroid injection in the heel, with a significant p-value of 0.001 and a mean difference of 1.36299; however, the pain decreased after eight weeks and three months, with mean differences in vas II and vas III of 0.21094 and -0.45781, respectively. There was a substantial difference between local injection and oral types of treatment in foot functional index in ff1 with p-value ≤ 0.001.

Conclusion: The use of local injection of steroids is more painful in the first two weeks and more sustained pain relief after that time with lesser recurrences of heel pain in cases of plantar fasciitis.

Keywords: Corticosteroid, Heel pain, Home physiotherapy, Local steroid injection, Oral steroid, Plantar fasciitis

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Introduction

"Painful heel appears to be a disorder which is seldom effectively treated, for the sole fact that the causation is not diagnosed," wrote Stiell in 1922. Since the etiology of this specific clinical entity is still unknown, Lapidus and Guidotti said that "the label of the painful heel is employed purposefully in preference to any other more precise etiologic diagnosis." Heel pad atrophy, plantar fasciitis, entrapment of the first branch of the lateral plantar nerve, calcaneal stress fracture, and tarsal tunnel syndrome should all be considered in the differential diagnosis of plantar heel discomfort.[1] The most typical cause of foot discomfort in adults, plantar fasciitis accounts for up to 15% of all foot symptoms requiring medical attention. Anyone of all ages, including children, can develop plantar fasciitis; cases have been documented in people as young as 7 and as old as 85. However, the condition can occur in active and passive adults of all ages.[2,3] Plantar fasciitis impacts patients' functional status such as household activities of daily living, usual work and hobbies, non-weight-bearing activities, walking-related activities, and running-related activities.[4] The pain is typically followed by unexpected weight gain, prolonged standing, a change in activity, or improper training. Increased activity, such as running, dancing, and playing basketball, exacerbates the pain.[5] Pain when extending the great toe and palpating the medial portions of the heel is a Pathognomonic feature.[6,7] Generally, the diagnosis of plantar fasciitis is primarily clinical. It corresponds to acute pain of the plantar aspect of the heel during the first steps in the morning or after a period of rest. The pain then improves with walking and then intensifies again towards the end of the day with activity and body weight.[8] Despite the ease of clinical diagnosis, both the etiology and treatment of plantar fasciitis remain controversial and poorly understood.[9] Effective therapies for this plantar aponeurosis or plantar fasciitis are correlated to an aponeurosis attack. It extends between the posteromedial calcaneal tuberosity and is poorly understood. Due to this pathology's incapacitating nature, individuals frequently seek medical attention. There are now two types of therapies: traditional, which includes rest, the application of ice, modifying footwear, orthopedic insoles or heel cushions, physiotherapy, analgesic pharmacological treatments, and surgical, which is only used in the most severely disabling cases. A practice directive has been released by the American College of Foot & Ankle Surgeons. About the identifying and managing of foot discomfort, particularly plantar fasciitis.[10] To our knowledge, there have no current recommendations in Duhok concerning treating this pathology. One challenge in the treatment of plantar fasciitis is that very few high-quality studies exist comparing different treatment modalities to guide evidence-based management.[11] The Cochrane Review recently took an interest in it and published, in June 2017, a systematic review of the literature on the treatment by corticosteroid injections of plantar fasciitis.[12,13] Myxoid degeneration, microtears in the fascia, collagen necrosis, and Angio-fibroblastic hyperplasia are among the histological findings of plantar fasciitis.[14] Plantar fasciitis a degenerative process without inflammation. Thus, the effectiveness of steroid injections, which work primarily as anti-inflammatory agents, as a therapy option for plantar fasciitis is questioned. Furthermore, regardless of the type of treatment used, the majority of patients with plantar fasciitis eventually get better over time.[15-19] Numerous studies have been conducted to compare the effectiveness of local injections of steroids with various forms of management. As a result, the current study was undertaken to compare the effectiveness of steroid injection and oral

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steroids with common at-home supportive measures in managing plantar fasciitis.

Patients and methods

An Interventional study design was established within the period 15/5/2021 through 15/1/2023 in Duhok Teaching Hospital, Throughout the trial, and after obtaining ethical clearance from the ethics committee, a large number of 140 patients were recruited and divided into two groups by random selection (lottery procedure). The first group received steroid injections (1 ml of methylprednisolone acetate 40 mg/ml and 1 ml of 1% lidocaine were administered by identifying the medial plantar calcaneal tuberosity and marking the zone of maximal tenderness in the plantar fascia and inserting a 25-gauge needle in a distal to proximal direction, into the fascia, reaching its superficial and deep surfaces while directing the needle perpendicular increase the likelihood of success).[20-21] The second group, received a 40 mg dose of corticosteroid orally (methylprednisolone), along with basic at-home physical therapy (calf message, rolling the heel on a cold bottle for 10-15 min three times per day, and putting the foot and half the leg in slightly warm water before going to sleep for 15-20 min) and both patient groups remained under observation. Unfortunately, through the study progress, only 101 patients were committed to the study.[22,23] Inclusion criteria, all patients already diagnosed with planter fasciitis, cases with plantar fasciitis both unilaterally and bilaterally based on findings from history and physical examination, and radiology. Also, patients aged 18 years and above of both genders who consented to follow-up after 12 weeks, People above the age of 18, and all patients enrolled in the present study diagnosed with planter fasciitis had similar pre-treatment VAS 0 severe pain scores. Exclusion criteria, patients who had a history of trauma to the same side at the foot and ankle, Patients receiving Prior treatment for plantar fasciitis, and pregnant women. Diagnosed cases were based on a history of sharp severe pain in the heel resolved as the activity progressed, and returned at the end of the day. The classic presentation is severe pain in the first step of the morning with ambulation. On physical examination, the patients had tender to palpation on the proximal plantar fascia at the side of medial calcaneal tuberosity, heel pain reproduced by forced dorsiflexion of the toes at the metatarsophalangeal joints with the ankle stabilized. Lateral plain radiography (x-ray) of the heel most of the patients had heel spurs. Data from the present study were collected using a 10-cm visual analog scale, where zero indicates no pain and 10 is the most agonizing pain a patient could endure. The patient's plantar fasciitis disability and the level of improvement following treatment were assessed using the Functional Foot Index questionnaire. To assess how foot pathology affects function in terms of pain, disability, and activity restriction. Functional Foot Index scale contains 17 items broken down into three sub-scales.[24] The patients were followed at two weeks, eight, and twelve weeks later, and patients were asked to rate how painful their heels were on a VAS score of VAS1, VAS2, and VAS3, respectively. Participants completed the FFI questionnaire as well when they were included in the study and at two, eight, and 12 weeks. FFI1, FFI2 and FFI3, respectively. This study was reviewed and approved by the Division of Scientific Research – Department of Planning, Duhok Directorate General of Health Research Ethics Committee (Reference Number: 27032024-2-7). Participants completed the VAS score and FFI questionnaire at two, eight, and 12 weeks included in the study. After the data collection was over, the data was imported into IBM SPSS Statistics version 23. Descriptive and analytical statistics were used to benefit the study objective as mean, T-test, and significant value of equal or less

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0.05 was used to determine statistical significance.

Results

The finding of this study shows that a large percent (35.6%) of the patients between the ages of (38-47) and (48-57), were female (74.3), housewives (66.3), were obese (71.3), their religion is Muslims (82.2), and complaint from bilateral foot pain (44.6), Table (1).

Table (1): Distribution of the patients according to their demographic characteristics

		Frequency	Percent
Age	18-27	5	5.0
	28-37	19	18.8
	38-47	36	35.6
	48-57	36	35.6
	58-More	5	5.0
Gender	Male	26	25.7
	Female	75	74.3
Occupation	Housewife	67	66.3
	Teacher	9	8.9
	Workers	25	24.8
BMI	Underweight	1	1.0
	Normal	2	2.0
	Overweight	26	25.7
	Obese	72	71.3
Religion	Muslim	83	82.2
	Christian	6	5.9
	Ezidian	12	11.9
Foot	Right foot	31	30.7
	Left foot	25	24.8
	Bilateral	45	44.6

To test the study hypothesis, the comparison between the local and oral types of treatment according to VAS1, VAS2, and VAS3 was done and the result shows a significant difference between the local and oral types according to VAS1 p-value ≤ 0.001 while there is no difference between these types of treatments to VAS2, VAS3, with P- value (0.572), (0.403) respectively, Table (2).

Table (2): Comparison between local and oral types according to VAS1n, VAS2n, and VAS3n.

			T-test for equality of means						
								95% confidence interval of the difference	
	Local Mean (SD)	Oral Mean (SD)	T	Df	Sig. (2-tailed)	Mean difference	Std. Error Difference	Lower	Upper
Vas1n	8.395 (0.638)	7.032 (1.164)	6.635	99	≤ 0.001	1.363	0.205	0.955	1.771
Vas2n	6.132 (1.474)	5.921 (1.986)	0.567	99	0.572	0.211	0.372	-0.527	0.949
Vas3n	4.526 (2.533)	4.984 (2.721)	-0.840	99	0.403	-0.458	0.545	-1.539	0.623

SED: Standard Error of the Difference

Also, this study's comparison of local and oral forms of treatment according to ff1, ff2, and ff3 shows that there is a substantial difference between local injection and oral types of treatment in ff1 with p-value ≤ 0.001, but no difference for ff2, ff3 with p-value 0.650, 0.365 respectively, Table (3).

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Table (3): Comparison between local and oral types according to FF1, FF2, and FF3.

	T-test for equality of means						
	T	Df	Sig. (2-tailed)	Mean difference	Std. Error Difference	95% confidence interval of the difference	
						Lower	Upper
Ff1	5.591	99	≤ 0.001	0.102	0.018	0.066	0.138
Ff2	-.456	99	0.650	-0.014	0.032	-0.078	0.049
Ff3	-.911	99	0.365	-0.040	0.044	-0.127	0.047

SED: Standard Error of the Difference

The Figure (1) shows the pain increase in vas1 first two weeks after injection of methylprednisolone and decline in pain severity for both types of management but in local injection of methylprednisolone more than oral steroid as shown in vas2 and vas3.

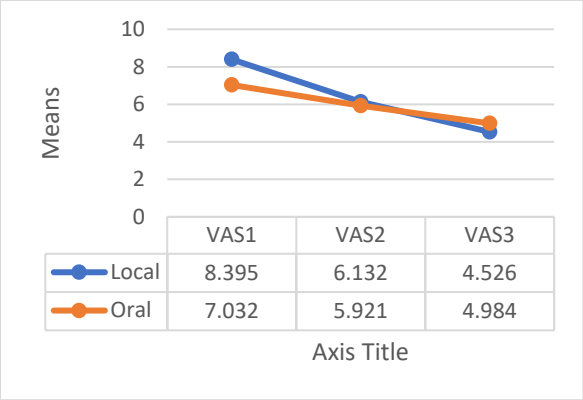

Figure (1): Pain means the local and oral types of management.

Discussion

Plantar fasciitis is one of the most common causes of painful heels in adults, assumed to be caused by inflammation and is precipitated by biomechanical stress. Our study showed that there were clinical and statistically significant differences in pain response in patients with plantar fasciitis treated with steroid injections compared to oral steroid and home physiotherapy treatment regimen, especially in the first two weeks, and significant changes in visual analog scores recorded by patients in terms of the worst pain experienced and morning pain at two weeks, eight weeks, and three months of follow up between the group that received a steroid injection and the oral steroid plus simple home physiotherapy group. Also, after the local injection, the pain was severe and worse for the first two weeks, but the subsequent reaction was much better than with oral steroids. Furthermore, we showed that the group that had the local injection in the first two weeks had high FFI scores, which allowed us to significantly distinguish between the two groups. These results imply that using steroid injections to treat this condition causes higher discomfort during the first two weeks but provides good results. The majority of studies investigated the use of palpation-guided corticosteroid injection Ryan et al showed that participants who underwent seven physiotherapist-led exercises daily over a 12-week period had significant improvements during the six-week and 12-week follow-up compared to baseline, although the improvement was not significantly better than the corticosteroid injection group.[16] Grice et al carried out a retrospective study on the clinical outcome of all patients who underwent a corticosteroid injection of the foot or ankle pain management, plantar fasciitis being a common cause amongst the patients.[18] Out of

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the total of 365 patients, 314 (80%) patients reported a significant improvement in symptoms, and 242 (66%) reported complete resolution of their pain, with 107 (29%) remaining asymptomatic at two years follow-up. Lastly, it is also difficult to assess the compliance of patients with several conservative treatment modalities prescribed other than the interventions given. However, there was a general improvement in both groups thus suggesting that the compliance across the two groups was relatively consistent. Systematic review and meta-analysis by Viglione et al demonstrated that the placebo effect represents an important component of all conservative approaches to treat plantar fasciitis.[19] This effect is statistically and clinically significant, increases over time, and depends on the type of conservative treatment applied to address plantar fasciitis. Because of the scanty studies related to this topic, the authors used their opinions in the interpretation of the study results.

Conclusion

The study concluded that using local steroid injection resulted in a significant rise in pain in the first two weeks of treatment, while a better effect than oral steroid treatment was present in relieving the pain after two weeks. Improvement in the symptoms following steroid injection is Suggested to use local steroid injection for patients requiring Faster pain relief.

Conflict of interest

The author discloses there is no conflict of interest.

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