Original Article

Comparison of intralesional steroid and extracorporal shockwave therapy for relief of pain in plantar fasciitis

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Objective: To compare the efficacy of extracorporeal shockwave therapy and intralesional corticosteroid injection in patients with plantar fasciitis.

Methodology: This randomized controlled trial was conducted on 63 consecutive patients of plantar fasciitis with heel pain of greater than 6 months at Department of Orthopedic Surgery, Fauji Foundation Hospital, Rawalpindi from July 1, to Dec 31, 2018. Patients were randomly allocated into two groups; 63 patients in Group A were treated with extracorporeal shockwave therapy (ESWT) and 63 patients in group B were treated with intra-lesional steroid injection. The outcome was assessed in terms of relief of pain and functional outcome, according to Visual Analogue Scale (VAS).

Results: Pain relief was achieved in 51 of 63(81%) patients in the ESWT group and 48 of 63(76.2%) in the corticosteroid injection group after 6 weeks of treatment.

Conclusion: Corticosteroid injection and extracorporeal shockwave therapy were equally effective treatment modalities for plantar fasciitis. (Rawal Med J 202;45:115-119).

Keywords: Plantar fasciitis, Extracorporeal shock wave therapy (ESWT), corticosteroid injection (CSI).

INTRODUCTION

Plantar fasciitis (PF) is the most common and often disabling condition as a cause of chronic pain under the heel.[1] About 7% people who are more than 65 years of age complain of pain in the heel at some point in life, and more than 1 million people visit physicians for heel tenderness per year in the United States.[2,3] Plantar fasciitis is thought to be caused by collagen degeneration, and its necrosis, repetitive micro tears in the plantar fascia, and angio-fibroblastic hyperplasia of the plantar aponeurosis, which was once thought to be caused by inflammation. The exact cause, however, is poorly understood.[4]

The risk factors that may contribute to the onset of PF are categorized as internal factors and external factors. The internal factors include anatomic, functional and degenerative factors like decreased first metatarsophalangeal joint mobility and ankle dorsiflexion, unequal length of legs, thickening of the plantar fascia, and extensive pronation of foot. The external factors are prolonged standing, previous injuries, incorrect training and inappropriate footwear.[5,6] Obesity and high BMI are also well-known risk factors for this condition.[3]

Various treatment options are available for PF. The Cochrane review from 2010 examined 19 randomized trials that included treatment by non-steroidal anti-inflammatory drugs (NSAIDs), orthotics, physical therapy, night splints, heel pads, physical agents like extracorporeal shock wave therapy (ESWT), laser and invasive procedures including corticosteroid injections (CSI).[7] Most treatment options produced no clear advantage compared to no treatment or a control treatment, such as stretching.[6,8]

Minimally invasive non-surgical techniques employing CSI has been used. It may be effective for a short-term relief, but it is also associated with rupture of fascia.[8,9] Among noninvasive, ESWT is an extensively used alternative treatment. It is noninvasive, recovery time is less, and there is ease of administration to the patients.[10] Many studies, which have been done so far on the management of PF, lack data about the comparison of CSI and ESWT therapy in our local literature. In this study,

we comparee the efficacy of ESWT and CSI in patients with PF.

METHODOLOGY

This randomized controlled trial was conducted on 63 consecutive patients of PF seen at Department of Orthopedic Surgery, Fauji Foundation Hospital, Rawalpindi from July 1, to Dec 31, 2018. For randomization, odd social numbers were kept in group A and even numbers were kept in group B. Equal number of the patients were assigned to each group. All adult patients, both male and female, with symptomatic heel pain of greater than 6 months and those having unsuccessful response to conservative treatment with non-steroidal anti-inflammatory drugs and stretch exercises were included in the study. Patients with systemic inflammatory disease, connective tissue disease, and herniated intervertebral disc of lumbar spine, previous local trauma and bilateral PF were excluded. The study was approved by hospital ethics committee and a written informed consent was taken from all patients.

Patients in each group had degenerative changes on x-rays. The diagnosis was made based on history, physical examination and ultrasonographic findings of plantar fascia thickness of more than 4mm or reduced echogenicity or both. After randomization, 63 patients were in each group, each undergoing either ESWT or CSI. The ESWT method included 1000-1500 impulses with energy of 14 to 17 kv and 2 hz at 2-week intervals. In the CSI group, two injections of 2ml of 4mg/ml betamethasone dipropionate, plus 1 mL of lidocaine 2% was injected into the maximal tenderness point at the inferomedial calcaneal tuberosity. Patients were called for follow-up after 6 weeks to administer VAS and to examine thickness of plantar fascia with ultrasound.

The efficacy of two interventions was judged in terms of relief of pain and functional outcome according to VAS, (0 taken as minimum and 10 as maximum pain). All the study procedures and data collection were performed by the orthopedic surgeon to limit the selection bias and data quality.

Statistical Analysis: Data were analyzed by SPSS version 20.0. The frequency of successful achievement of relief of pain was compared among study groups using chi-square test. Effect of age, gender and duration of plantar fasciitis were controlled by stratification analysis and post stratification chi square test was applied to observe effect on outcome. $p<0.05$ was considered significant.

RESULTS

Out of 126 patients, 74(58.7%) were male and 52(41.3%) female. Mean age of patients was 52.48±7.56 years. Significant difference was not observed between groups for age, pre thickness of plantar fascia, Pre-VAS and post-operative VAS score while mean duration of plantar fasciitis and post thickness of plantar fascia was significant between groups (Table 1).

Table 1. Baseline characteristics between Groups.

Variable	Group A n=63	Group B n=63	P-Value
Age (Years)	52.49±8.06	52.48±7.11	0.991
Duration of plantar fasciitis (Months)	13.19±3.89	11.24±2.78	0.002
Pre Thickness of plantar fascia (mm)	4.07±0.91	4.04±0.77	0.858
Pre VAS	6.17±1.27	6.38±1.26	0.364
Post Thickness of plantar fascia (mm)	2.47±0.57	2.77±0.67	0.008
Post VAS	3.02±1.30	3.21±1.69	0.481

Table 2. Clinical presentation.

Variables	Group A n=63	Group B n=63	P value
Pain			
Yes	63(100%)	63(100%)	0.990
No	0	0	
Tenderness			
Yes	51(81%)	47(74.6%)	0.391
No	12(19%)	16(25.4%)	
Foot involved			
Right	25(39.7%)	36(57.1%)	0.050
Left	38(60.3%)	27(42.9%)	

Table 3. Pain relief between groups after 6 weeks of treatment.

Final outcome	Group A n=63	Group B n=63	Total	P-Value
Achieved	51 (81%)	48 (76.2%)	99 (78.6%)	0.515
Not Achieved	12 (19%)	15 (23.8%)	27 (21.4%)	

Table 4. Pain relief between Groups according to age, gender and duration.

Pain Relief		Age Groups (years)		Gender		Duration (months)	
		≤55	>55	Male	Female	7-12	>12
Group A n=63	Achieved	34 (82.9%)	17 (77.3%)	30 (78.9%)	21 (84%)	28 (84.8%)	23 (76.7%)
	Not achieved	7 (17.1%)	5 (22.7%)	8 (21.1%)	4 (16%)	5 (15.2%)	7 (23.3%)
	Total	41	22	38	25	33	30
Group B n=63	Achieved	34 (77.3%)	14 (73.7%)	27 (75%)	21 (77.8%)	35 (77.8%)	13 (72.2%)
	Not achieved	10 (22.7%)	5 (26.3%)	9 (25%)	6 (22.2%)	10 (22.2%)	5 (27.8%)
	Total	44	19	36	27	45	18
P-value		0.51	0.79	0.78	0.56	0.56	0.74

Pain was observed in all patients while tenderness was found in 98(77.8%) cases. Right foot was involved in 61(48.4%) patients and left foot in 65(51.6%) (Table 2). Pain relief was observed in 99(78.6%) cases. Comparison of pain relief between groups after 6 weeks of treatment is shown in Table 3. Stratification analysis found that age, gender and duration of PF had no effect on the outcome (Table 4).

DISCUSSION

Plantar fasciitis is the commonest cause of pain in the inferior heel. There are several different treatment modalities available which include physical therapy, drugs, instrumental and surgical treatment. Studies are going on exploring alternative treatment strategies for PF. However, pain relief is the main aim of management, as it leads to the improvement in the quality of life. Recent reviews and meta-analysis have analyzed several treatments options for PF with the main purpose of finding the best option available. It was found that less invasive treatment options like shock wave therapy, botulinum toxin type-A injections, platelet-rich plasma injections and intra-tissue percutaneous electrolysis dry needling had better long-term effects as compared to CSI, which have short acting effects and have local and systemic side effects.[5,9]

In our study, we found that pain relief was observed in 51 of 63 patients (81%) in the ESWT group and 48 of 63(76.2%) in the CSI group, which is statistically not significant (P=0.51). Porter et al conducted a study on 132 patients of plantar fasciopathy in 2005 and compared the efficacy of ESWT and CSI. They found that the patients in corticosteroid group had significantly lower levels of pain as compared to those who received ESWT, which is contrary to our study. However, another study by Saber et al found both ESWT and CSI were equally useful for pain relief in PF.[11]

Yucel et al compared the results of high-dose ESWT applied with an ankle block and CSI in patients with PF and found that after 3 months, pain relief was observed in 27 of 33 patients (82%) in the ESWT group and 23 of 27 (85%) in the CSI group, which means no remarkable difference in VAS score between two groups (P>0.05).[12]

Our study showed that the reduction in VAS score after treatment in ESWT group from 6.17±1.27 to 3.02±1.30 while in CSI group from 6.38±1.26 to 3.21±1.69 suggesting that both treatment modalities showed marked reduction in VAS score. Wang et al conducted a study in which

79 patients were treated with ESWT and 70 patients were treated with conservative measures like NSAIDs, physical therapy and local CSI. There was a significant change in the mean VAS score before (4.0±1.3) and after treatment (0.2±0.7) in the ESWT group but not in the control group (4.1± 1.1) and 4.2±1.7) before and after treatment, respectively.[13]

We had also observed the impact of the baseline characteristics on the outcome of pain relief. In our study, more pain relief was seen in ESWT group as compared to CSI group but not clinically significant. Studies have shown that PF can afflict anyone among all age groups, gender and races. The incidence of PF usually peaks at 40 and 60 years of age in the general population and in younger people among runners.[14,15]

In our study, female patients achieved more pain relief with both treatments i.e. 84% in ESWT group and 77.8%in CSI group as compared to male patients. Hansen et al showed a markedly increased risk of long-lasting symptoms in women which could be linked to hormonal, physical or other factors. Also, in our study, more pain relief was observed if the duration of PF was less than 7 to 12 months in both groups i.e. 84.8% in ESWT group and 77.8% in CSI group. Wolgin et al followed 100 patients with PF and concluded that patients who had excessive weight gain, pain on either side, or who were symptomatic for >6 months before treatment had an increased risk for consistent pain. However, more studies are required to compare the effect of duration of plantar fasciitis on treatment outcomes.[16]

There are few limitations of our study. We did not observe the effect of obesity on treatment outcome, as it is a risk factor. Second, subgroup analysis is required according to different intensity level in ESWT group as studies show the high-intensity ESWT had more chances of being the best treatment while the low-intensity ESWT was found inferior to CSI for VAS reduction within 3 months.

CONCLUSION

In our study, both treatment options ESWT and CSI were equally effective. There was no significant difference in two treatment options for plantar fasciitis. Due to easy availability of CSI, it remains the main line treatment options. However, ESWT remains the safe non invasive treatment over CSI with lesser side effects in patients.

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