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COMPARISON BETWEEN ENDOSCOPIC SURGERY AND CALCANEAL PERFORATION IN THE MANAGEMENT OF PLANTAR FASCIITIS AND CALCANEAL SPUR

[1]*Thamer Khalaf Yaseen, (M.B.Ch.B, F.I.C.M.S) and [2]Dr. Mohammed Ahmed Moohialdeen, M.B.Ch.b, H.D(Orthopedic)

[1,2]Department of Orthopedics / Al-Nu'man Teaching Hospital.

***Corresponding Author: Dr. Thamer Khalaf Yaseen**
Department of Orthopedics / Al-Nu'man Teaching Hospital.

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ABSTRACT

Background: Ignoring plantar fasciitis may result in chronic heel pain that hinders the regular activities. Prolonged standing, decreased range of ankle dorsiflexion, an intense running regime and obesity are all risk factors for plantar fasciitis. Surgery including endoscopic surgery or calcaneal perforation is considered only after 12 months of aggressive nonsurgical treatment. **Aim of study:** To evaluate the clinical outcome of endoscopic plantar fascia release in comparison to calcaneal drilling. **Patients and Methods:** A comparative study conducted in the Orthopedic unit in two Teaching Hospitals in Iraq during a period of three years from Feb, 2014 – Jan, 2017. It involved 70 feet (60 patients) with plantar fasciitis; 35 feet (30 patients) by endoscopic release of planter fascia in addition to spur removal (Group 1) and other 35 feet were treated by calcaneal perforation (Group 2) after more than six months of conservative treatment without relieve of their symptoms. Postoperative Evaluation was assessed by Ankle-Hind Foot Scale before surgery and at 18th month after surgery, duration until full weight bearing after surgery, and duration until returning to full activity. Patients with systemic cause of heel pain such as gout, pseudo gout, rheumatoid arthritis, ankylosing spondylitis or patients with mechanical abnormality, history of heavy smoking, diabetes mellitus or peripheral vascular insufficiency were excluded from the study. **Results:** No statistically significant difference in the mean of age between the study groups (42.9 versus 44.3 years, P=0.465). No statistical significant differences between study groups regarding postoperative complications (P=0.16). Mean of Ankle-Hind Foot Score was significantly higher in group (2) than that in group (1) (98.2 versus 93.5, P=0.001). Regarding duration until full activity, patients in group (2) were needed significantly lower duration than patients of group (1) to reach full activity (6.12 versus 9.9 weeks, P= 0.003). **Conclusion:** Calcaneal perforation is superior in the management of plantar fasciitis compared to endoscopic release of planter fascia.

KEYWORDS: Plantar fasciitis, Calcaneal perforation, endoscopic release, Iraq.

INTRODUCTION

Plantar fasciitis (PF) is a common overuse injury that occurs as a result of repetitive traction forces on the plantar fascia at its origin over the distal calcaneus. It accounts for 8 – 10% of running related injuries and 80% of heel pain, and is commonly seen in primary care.[1,2] The plantar fascia plays an important role in the normal biomechanics of the foot and is composed of three segments, all of which arise from the calcaneus. The fascia itself is important in providing support for the arch and providing shock absorption. Despite the diagnosis containing the segment "itis," this condition is notably characterized by an absence of inflammatory cells.[3] Any factor that mechanically loads the plantar fascia can be considered a risk factor for plantar fasciitis. Risk factors can be divided into intrinsic and extrinsic factors. Intrinsic factors relating to the patient include obesity, pes planus, pes cavus, reduced range of ankle dorsiflexion and tight calf muscles.[4] Extrinsic factors, relating to the environment and training, include running on hard surfaces, walking barefoot, a sudden increase in running intensity and/or volume, and prolonged walking/standing.[5] 50% of patients with plantar heel pain may have heel spurs, but the relationship to sub calcaneal pain has not been established. Heel spurs are now thought to be a result of traction forces on the plantar fascia origin rather than the cause of plantar fasciitis.[6,7] Treatment is largely non-operative, with 90% – 95% of patients experiencing resolution of symptoms within 12–18 months. Conservative treatment includes NSAID, stretching, night splint use, foot orthosis use, physical therapy, and Extracorporeal shockwave therapy (ESWT). The remaining 5% - 10% don't improve with conservative treatment and may be

candidates for surgical treatment which can be divided into endoscopic surgery and calcaneal perforation.[5]

The aim of this study is to evaluate the clinical outcome of endoscopic plantar fascia release in comparison to calcaneal drilling.

METHODS

Study Design and Setting: A comparative study that was conducted in the Orthopedic unit, Al-Ramadi Teaching Hospital in Al-Anbar province and Al-Nu'man Teaching Hospital in Baghdad province during a period of three years from Feb, 2014 – Jan, 2017.

Study Population: The study involved 70 feet (60 patients) with plantar fasciitis visited our outpatient and private clinics. Plantar fasciitis was diagnosed by history, clinical examination, and radiographic assessments. We treated 35 feet (30 patients) by endoscopic release of planter fascia in addition to spur removal (Group 1) and other 35 feet were treated by calcaneal perforation (Group 2) after more than six months of conservative treatment without relieve of their symptoms. Patients with systemic cause of heel pain such as gout, pseudo gout, rheumatoid arthritis, ankylosing spondylitis or patients with mechanical abnormality, history of heavy smoking, diabetes mellitus or peripheral vascular insufficiency were excluded from the study.

Surgical Techniques

For group 1: The patient is placed in a supine position on a radiolucent operating table. Preoperative antibiotics are administered. A pneumatic tourniquet applied to the thigh is inflated to a pressure of 250 mm Hg. The medial portal is established using the posterior bony ridge of the medial malleolus as a guide. A line extended down from the posterior border of the medial malleolus to the sole of the foot with the foot in neutral position marked the correct point of entry. Under fluoroscopic control a spinal needle is passed under the spur. The incision is made only in the skin, and blunt dissection is done to only the deep-medial aspect of the plantar fascia. The lateral portal is established by placing a blunt trocar deep and perpendicular to the plantar fascia, and the skin, tented by the trocar, is incised vertically. A 4-mm-diameter (30°) arthroscope is passed through the medial portal, and the surgical devices are inserted through the lateral port. First, the plantar surface of the calcaneus and the calcaneal attachment of the plantar fascia should be identified for a landmark. If there was a heel spur, we resected it to establish a clear view of the plantar fascia using an arthroscopic burr. After exposure of the plantar fascia, its width is measured with a probe, and an area of less than the medial half of the plantar fascia is resected with an Arthro-Knife. The plantar fascia should be removed until the plantar fat tissue is exposed, which is the sign that the plantar fascia has been resected completely toward its superficial layer. After that, Closure of the portals with 3-0 nylon suture, the pneumatic tourniquet is released and compressive dressing is placed on the foot. Postoperative care includes active range-of-motion exercise of the foot and ankle is performed one day after surgery and partial weight bearing is allowed after surgery and gradually increases to full weight bearing in accordance with patient tolerance.

For group 2: Under spinal anesthesia, the patients were placed supine with knee and hip semi flexed. An incision was made along the medial side of heel extended one cm posterior and inferior to the top of the medal malleolus to one cm distally. The medical approach was preferred because is not weight bearing area. Drilling of medial calcaneal wall by 3.2 pit drill is about four to six holes in different directions. Followed up continued for six months.[6]

Evaluation was assessed by

- Ankle-Hind Foot Scale before surgery and at 18th month after surgery.[7]
- The duration until full weight bearing after surgery.
- The duration until returning to full activity.

RESULTS

No statistically significant difference (P=0.465) in the mean of age between the study groups as shown in table (1). This study involved 70 feet (60 patients) with plantar fasciitis. The age of the patients was ranging from 20 – 60 years with a mean of 43.6 ± 7.4 years; 66.7% were females and 56.7% were overweighed. Most of them were not diabetic (88.3%); right side was affected in 66.7% of group (2) while the left and right sides were affected equally in group (1). (Table 2).

Table 1: Comparison in age between study groups.

Study Group	Age (Years)		P - Value
	Mean	Std. Dev	
Group 1	42.9	7.1	0.465
Group 2	44.3	7.7	

Table 2: Distribution of study patients by general characteristics.

Variable	Study Group	
	Group 1 (%) n= 30	Group 2 (%) n= 30
Age (Years)		
< 30	6 (20.0)	8 (26.7)
30 - 45	11 (36.7)	13 (43.3)
> 45	13 (43.3)	9 (30.0)
Gender		
Male	11 (36.7)	9 (30.0)
Female	19 (63.3)	21 (70.0)
BMI Level (kg/m^2)		
Underweight or Normal (< 25)	4 (13.3)	5 (16.7)
Overweight (25 – 29.9)	18 (60.0)	16 (53.3)
Obese (≥ 30)	8 (26.7)	9 (30.0)
Side		
Right	15 (50.0)	20 (66.7)
Left	15 (50.0)	10 (33.3)

Table 3 shows the distribution of study groups by postoperative complication. One patient in group (1) developed osteomyelitis treated by below knee plaster which applied for six weeks with non-weight bearing follow by partial weight bearing four weeks. Three patients in group (1) and one patient in group (2) developed heel numbness, but these differences between study groups were statistically not significant (P=0.16).

Table 3: Distribution of study groups by postoperative complication.

Postoperative Complication	Study Group		P - Value
	Group 1 (%) n= 30	Group 2 (%) n= 30	
No complication	26 (86.7)	29 (96.7)	**0.16**
Osteomyelitis	1 (3.3)	0 (0)	
Heel numbness	3 (10.0)	1 (3.3)	

Table 4 shows the comparison between study groups by certain outcome parameters. We noticed that the mean of Ankle-Hind Foot Score was significantly higher in group (2) than that in group (1) (98.2 versus 93.5, P=0.001). Regarding duration until full activity, patients in group (2) were needed significantly lower duration than patients of group (1) to reach full activity (6.12 versus 9.9 weeks, P= 0.003).

There was no significant difference (P=0.752) in duration needed to reach full weight bearing between study groups.

Table 4: Comparison between study groups by certain outcome parameters.

Outcome Parameter	Study group		P - Value
	Group 1 Mean ± SD	Group 2 Mean ± SD	
Ankle-Hind Foot Score	93.5 ± 4.11	98.2 ± 6.82	**0.001**
Duration until full weight bearing (Days)	12.8 ± 3.77	12.5 ± 4.2	**0.752**
Duration until full activity (Weeks)	9.9 ± 6.17	6.12 ± 3.87	**0.003**

DISCUSSION

Controversial in Plantar Fasciitis etiology, repetitive trauma over the calcaneal medial tubercle may lead to degenerative painful changes[8], Usually self-limiting, when symptoms persist, conservative measures including stretching exercises, physical therapy, steroidal and non-steroidal anti-inflammatory drugs[9], when symptoms persist more than six months, surgery could be recommended. With the advent of less invasive surgery, endoscopic procedures have also been proposed.[10]

In the current study, osteomyelitis developed in 3.3% of patients in group (1). Heel numbness developed in 10% of patients in group (1) and 3.3% of patient in group (2), with no significant association between study groups (P=0.16). In the present study, the mean of Ankle-Hind Foot Score was significantly higher in group 2 (98.2 versus 93.5, P=0.001). Patients in group (2) were needed significantly lower duration to reach full activity (6.12 versus 9.9, P= 0.003). It is in consistent to a study conducted in Egypt (2017) involving percutaneous drilling, in which a statistically significant improvement in the mean of Ankle-Hind foot scale score

postoperatively at the last follow-up. No surgery-related complications, and the mean time for full recovery was 8 ± 3.7 weeks with no recurrence of pain by the last follow-up and no significant difference (P=0.752) in duration needed to reach full weight bearing between groups.[11] Lower results observed in Canada (2008), as the mean preoperative Ankle-Hind Foot Score was 66.5; the mean postoperative Ankle-Hind Foot Score was 88.2, also 18% felt no improvement overall, there were only two complications (superficial wound infections), Overall, results were favorable in over 80% of patients.[12] At the end of the follow-up period of an Egyptian study in 2014, ankle-hind foot mean score improved significantly (P = 0.001). about 37.5% of patients had excellent results, half of had good results, added to that no patient developed any neurologic symptoms, reflex sympathetic dystrophy, or foot deformities.[13] In Egypt (2014), the mean of Ankle Hind Foot Scale score was 64 points before surgery and 90 points at two years after surgery. About 85% of patients returned back to full preoperative activity by a mean of seven weeks and pain was improved significantly[14], agreed to two study in USA (2000)[15] and in (2007)[16], in which the mean of Ankle Hind Foot Scale score improved from 62 points to 80 points and from 62 points to 80 points respectively. Regarding the duration to returning to full activity, American researchers reported the clinical results of uniportal endoscopic plantar fasciotomy performed in 16 patients in 2004. The mean period to return-to-activity after surgery was 2.7 months.[10] In Japanese study in (2011), The mean Ankle Hindfoot Scale was significantly improved after surgery (P < 0.001). The mean duration to full weight bearing after surgery was 13.9 days. All patients returned to full athletic activities by a mean of 10.7 weeks, attributed this to that longer period was the need to resect a portion of the flexor digitorumbrevis muscle.[17] These differences observed might attributed to sample size of each study, procedures performed, field of vision in regard to endoscopic procedure and working space because of the fat tissue filling the space between the skin and the plantar fascia may obscure the vision field. In conclusion, calcaneal perforation is superior in the management of plantar fasciitis compared to endoscopic release of planter fascia.

CONCLUSION

Calcaneal perforation is superior in the management of plantar fasciitis compared to endoscopic release of planter fascia.

REFERENCES

1. Taunton JE, Ryan MB, Clement DB, et al. A retrospective case-control analysis of 2002 running injuries. Br J Sports Med., 2002; 36(2): 95–101.
2. Neufeld SK, Cerrato R. Plantar fasciitis: evaluation and treatment. J Am Acad Orthop Surg, 2008; 16(6): 338–346.
3. Buchanan BK, Kushner D. Plantar Fasciitis. Stat Pearls [Internet]. Last Update: May 17, 2017.
4. Beeson P. Plantar fasciopathy: revisiting the risk factors. Foot Ankle Surg, 2014; 20: 160–5.
5. Lim AT, How CH, Tan B. Management of plantar fasciitis in the outpatient setting. Singapore Med J., 2016 Apr; 57(4): 168–171.
6. Moroney PJ, O'Neill BJ, Khan-Bhambro K, et al. The conundrum of calcaneal spurs: do they matter? Foot Ankle Spec., 2014; 7: 95–101.
7. De Boer AS, Tjioe RJ, Van der Sijde F, Meuffels DE, den Hoed PT, Van der Vlies CH. The American Orthopaedic Foot and Ankle Society Ankle-Hindfoot Scale; translation and validation of the Dutch language version for ankle fractures. BMJ open., 2017 Aug 1; 7(8).
8. Sorensen MD, Hyer CF, Philbin TM. Percutaneous bipolar radiofrequency micro-debridement for recalcitrant proximal plantar fasciosis. J Foot Ankle Surg., 2011; 50: 165–170.
9. Davies MS, Weiss GA, Saxby TS. Plantar fasciitis: how successful is surgical intervention? Foot Ankle Int., 1999; 20: 803–807.
10. Saxena A. Uniportal endoscopic plantar fasciotomy: a prospective study on athletic patients. Foot Ankle Int., 2004; 25: 882–889.
11. Rizk AS, Kandel WA, Tabl EA, Kandil MI. Mid-sole release of the plantar fascia combined with percutaneous drilling of the calcaneus for treatment of resistant heel pain. Foot & ankle international, 2017 Nov; 38(11): 1271-7.
12. Urovitz EP, Birk-Urovitz A, Birk-Urovitz E. Endoscopic plantar fasciotomy in the treatment of chronic heel pain. Canadian Journal of Surgery, 2008 Aug; 51(4): 281.
13. Morsy M, Elsheikh M. Endoscopic release of resistant plantar fasciitis. The Egyptian Orthopaedic Journal, 2014 Jul 1; 49(3): 250.
14. Amin AH, Fahmy MH Endoscopic Deep-Fascial Approach for the Treatment of Plantar Fasciitis (2014). Orthop Muscul Syst., 3: 176.
15. O'malley MJ, Page A, Cook R. Endoscopic plantar fasciotomy for chronic heel pain. Foot & ankle international, 2000 Jun; 21(6): 505-10.
16. Bazaz R, Ferkel RD. Results of endoscopic plantar fascia release. Foot & ankle international, 2007 May; 28(5): 549-56.
17. Fumito Komatsu, Masato Takao, Ken Innami, Wataru Miyamoto, Takashi Matsushita Endoscopic Surgery for Plantar Fasciitis: Application of a Deep-Fascial Approach. Arthroscopy: The Journal of Arthroscopic and Related Surgery, 2011; 27: 1105-1109.