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Original Research Article

Evaluation of the Efficacy of Surgical Excision of Calcaneal Spur as a Treatment for Preventing Chronic Heel Pain: A Prospective Study

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Conflict of interest: Nil

Abstract:

Introduction: The inferomedial aspect of the calcaneal tuberosity experiences pain and sensitivity, which is indicative of painful heel syndrome. Different surgical techniques may be employed in situations that are unresponsive to conservative therapy. This study aimed to describe the functional effects of a combined calcaneal spur excision, drilling, and plantar fascia release procedure for the management of persistent heel discomfort.

Method: The American Orthopaedic Foot and Ankle Score (AOFAS), Visual Analogue Scale (VAS), and Short Form 12 Physical Composite Score (SF-12 PCS) findings for patients were compared between preoperative and postoperative periods. Radiologically, the recurrence of the calcaneal spur was examined.

Results: The median preoperative scores were 43 on the SF-12 PCS, 8.56 on the VAS, and 51.66 on the AOFAS. The AOFAS, VAS, and SF-12 PCS median postoperative scores were 91.4, 2, and 58, respectively.

Conclusion: effective early outcomes in the treatment of persistent heel pain were achieved with percutaneous calcaneal drilling, spur excision, and minimally invasive plantar fascia release.

Keyword: Calcaneal spur, heel pain, plantar fascia release and Calcaneal decompression, are other related terms.

Introduction

In orthopaedic practise, plantar heel discomfort is a prevalent clinical issue that affects 10% of the population [1]. The medial tubercle, which is where the plantar fascia attaches to the calcaneus, is typically the area of pain [2]. Calcaneal spur, calcaneal periostitis, plantar fasciitis, and lateral plantar nerve entrapment are some known etiological reasons for this discomfort, while the specific origin is uncertain [3].

Pain and sensitivity in the inferomedial part of the calcaneal tuberosity are symptoms of painful heel syndrome. In the adult population, the frequency is around 15% [4]. Plantar fasciitis is believed to be the main contributor to painful heel syndrome, despite the fact that its exact cause is still unknown [5]. Other potential causes of plantar fasciitis include thicker plantar fascia, calcaneal periostitis, a calcaneal spur, entrapment of the lateral plantar nerve's first branch, improper foot mechanics, and systemic illness [6–10].

About 15% of people have what is known as a plantar calcaneal spur (PCS), which is the growth of the calcaneus tuberosity. Even though the connection between PCS and plantar heel pain has been previously discussed, it is also possible for PCS to be asymptomatic [2]. According to reports, the size of the spur, whether it pushes the inferior calcaneal nerve or causes a microtear in the fascia of the plantar foot, and any current inflammation may all be factors in PCS pain [2,3, 11-12].

A change in footwear, physiotherapy, extracorporeal shock therapy, or steroid injections can typically improve problems in patients [13.14]. Surgery can be used to treat painful heel syndrome cases that have not responded to conservative therapy (for more than six months). The surgical method is typically chosen based on the etiological elements thought to be the cause. The literature describes a number of surgical procedures. A plantar fasciotomy is typically the first step in a procedure, and it may then be coupled with different methods including calcaneal drilling, spur removal, or lateral plantar nerve release [15].

This article details the early functional results of patients who underwent surgery using a combination of the plantar fasciotomy, percutaneous calcaneal drilling, and calcaneal spur excision procedures.

Materials and Methods

A retrospectively study of 19 heels of 14 patients who had received conservative care for at least six months after obtaining their signed consent. In response to persistent symptoms, a calcaneal spur excision, percutaneous calcaneal drilling, and plantar fasciotomy procedure was carried out.

Exclusion criteria included having an active plantar infection, having a history of a systemic inflammatory or metabolic disease (such as rheumatoid arthritis or diabetes mellitus), having surgery on the ipsilateral foot or ankle for a different reason, having surgery at a different facility, and skipping routine checkups. The inclusion criteria were not met by three patients, thus they were excluded. In the study, 15 heels from 11 patients were used.

The data was contrasted to the preoperative data, and a statistical analysis was done to see how the preoperative and postoperative AOFAS, VAS, and SF-12 PCS values differed. We looked at the radiograms to see if the calcaneal spurs had returned.

Surgical Technique and Postoperative Patient Care:

Before the procedure, all of the patients signed informed consent forms. Depending on the patient's preference and the anesthesiologist's recommendation, the procedures were performed under spinal or general anaesthesia. The same surgeon operated on each patient at the same hospital. The medial decubitus posture was used for positioning the patients. A combination procedure involving plantar fasciotomy, percutaneous calcaneal drilling, and calcaneal spur removal was performed on all of the patients. Under fluoroscopy, the calcaneal spur was identified on the lateral plane with a K-wire. A 3.5-mm guidewire was inserted over the K-wire to engage the calcaneal spur and the calcaneus after the insertion location of the K-wire was expanded with a scalpel. A 2.7-mm cannulated drill was used to entirely debride the spur, and a fine curette was used to remove any remaining spur material. Between three and six drill holes were produced on the inferior cortex via the same incision, and calcaneal drilling was done.

The big toe was dorsiflexed to stretch the plantar fascia, which could be felt beneath the layer of skin, in order to release it. On the centre of the medial plantar area, where the tendon of the plantar fascia could be felt, a transverse 1-cm incision was created. Careful dissection revealed the medial margin. All of the toes were dorsiflexed to stretch the plantar fascia, and one-third of the medial edge of the plantar fascia was separated from the rest of the fascia. The tension was released by using a scalpel to cut the fascia's already-detached third, and the plantar release operation was finished. Three weeks following the procedure, the patients were allowed to walk with their heels. It was advised to use arch support insoles and walk completely weight-bearing after the third surgical week. Before being released from the hospital, patients were shown plantar fascia stretching exercises and instructed to perform foot and ankle rehab exercises on a regular basis. Following discharge, the patients were contacted for follow-up visits every two months for the first, second, fourth, and eighth weeks.

Statistical Analysis:

The Wilcoxon signed-rank test and dependent t-test were used to analyse the differences between the parameters assessed preoperatively and at the most recent control visit. The threshold for significance was set at $P<0.04$.

Results

Table 1: Results of the preoperative and postoperative SF-12 PCS, VAS, and AOFAS

	n	Min.	Max.	Median	SD
MHT (weeks)	16	6.00	17.00	9.00	4.00
postop AOFAS	16	75.00	99.00	91.40	8.28
Preop AOFAS	16	42.00	69.00	51.66	9.32
Postop VAS	16	1.00	5.00	2.00	2.14
Preop VAS	16	5.00	10.00	8.56	0.98
Postop SF-12 PCS	16	54.70	60.00	58.00	2.06
Preop SF-12 PCS	16	33.10	54.00	43.00	7.75

AOFAS: American Orthopaedic Foot and Ankle Score; MHT: Mean healing time; postop: Postoperative; preop: Preoperative; SF-12 PCS: Short Form 12 Physical Composite Score; VAS: Visual Analogue Scale.

At the control visit, the patients were contacted, and the plantar area was checked for any signs of an infection or skin blemishes. Patients' levels of pain were assessed during heel-walking tests. American Orthopaedic Association. In addition to a patient satisfaction survey, the Foot and Ankle Score (AOFAS), Short Form Physical Composite Score (SF-12 PCS), and Visual Analogue Scale (VAS) for pain were given (Table 1). The patients were questioned about how long it took for full healing to occur, whether they needed to use an insole or another type of support following the procedure, and whether there were any complications. All patients had weight-bearing

anteroposterior and lateral radiograms taken of the afflicted feet.

Table 2: Preoperative and postoperative AOFAS, VAS, and SF-12

	n	Min.	Max.	Mean	SD
Follow-up time (months)	16	13.00	21.00	15.00	3.00
Age (years)	16	37.00	53.00	47.06	6.00
BMI (kg/m^2)	16	20.00	31.21	25.00	4.00

BMI: Body mass index

16 heels in all, 3 heels each from 3 men and 14 heels of 10 women, were used in the study. In 7 patients, the left heel underwent surgery, and 9 in the right heel. Patients ranged in age from 37 to 53, with a mean of 47.06. Patients' average body mass index (BMI) ranged from 20 to 31.21 kg/m^2, or 25 kg/m^2. With a range of 12 to 22 months, the average follow-up length was 14.8 months (Table 2).

BMI had no significant statistical impact on the study's findings. Following surgery, surveys about patient satisfaction were sent out, and the results showed that 46.6% of patients said they were extremely satisfied, 40% said they were very satisfied, 6.6% said they were somewhat disappointed, and 6.6% said they were completely unsatisfied.

In 2 (13.3%) of the patients who had radiological follow-up, calcaneal spur development recurred. One patient had a patient with tissue infection and a wound that took a long time to heal at the incision site. In a different case, the heel area lacked sensation, and pain was felt lateral to the plantar region's midline. Oral medicines and local debridement were used to treat a superficial tissue infection. No patient required a second procedure.

Discussion

The complicated condition painful heel syndrome may have a number of underlying causes. Studies have shown that the development of this disease involves basic pathogenetic processes involving intraosseous pressure and venous congestion [16]. Numerous surgeons have used calcaneal drilling to treat painful heel syndrome surgically [17–19]. There have been numerous ways described. By drilling three holes in the medial cortex of the calcaneal bone, Santini et al. [20] were able to accomplish calcaneal decompression. Using an arthroscopic technique, Osama et al. [17] made up to 6 holes in the inferior cortex. In order to achieve calcaneal decompression, we drilled three to six holes into the inferior cortex. No new incision was necessary; we just used the same one for spur debridement.

A calcaneal spur is not the cause of the painful heel syndrome, according to the authors of several studies on plantar heel pain; rather, it is the result of a pathology. A calcaneal spur is described in 16% of the population who do not have painful heel syndrome and is present in 50% of individuals with a painful heel [21,22]. Following surgery, we discovered a recurring calcaneal spur in 2 patients. While the other patient was pain-free, one of these patients experienced a sore heel. As a result, it is impossible to determine if a calcaneal spur is the sole reason for heel pain. The majority of surgeons concur that excision of the spur has favourable outcomes in pain alleviation and postoperative patient satisfaction [23-25], despite the fact that the surgical indications for spur resection in the literature are not yet clearly defined. In patients who underwent spur excision, we noticed a reduction in discomfort and high levels of patient satisfaction (excellent: 46.6%, very good: 40%).

There have been reports on open, mini-open, and arthroscopic plantar fasciotomy techniques. The open plantar fascia release surgery is a well-liked technique, but it involves a significant amount of dissection and a wide incision, takes a longer recovery period, and carries the risk of uncomfortable scar tissue [4,21].

Expert surgeons have assessed arthroscopic plantar fascia release as a technique with a high success rate. At the arthroscopy portals, problems like excruciating pain and nerve compression are however possible [27,28]. In a study by Bazaz et al. [24], the author discovered that open surgery provided much superior pain relief, but arthroscopic release produced a quicker recovery and quicker return to preoperative activity levels. With our minimally invasive technique, recovery took an average of 10 weeks, and excluding one patient, no wound site problems were noted. It's still up for dispute how much of the plantar fascia should be removed.

Initially supporting total discharge, Barret et al. [29] later demonstrated that releasing one-third of the lateral plantar fascia would not have an impact on the calcaneocuboid locking mechanism. Less than 40% fascial relaxation, according to Cheung et al. [31], will have a modest impact on bone stability and typical foot biomechanics. In our situations, a third of the plantar fascia's medial portion was freed. None of the patients had any signs of lateral column symptoms or bone instability at the end of the follow-up.

In particular when treating painful heel syndrome brought on by intramuscular hypertension, Thomas et al. [32] found that a combined percutaneous calcaneal drilling and minimally invasive

fasciotomy approach lowered the recurrence rate and boosted success. A controlled, partial resection of the plantar fascia can reduce risk of problems and improve patient satisfaction. 86.6% of the participants in the current study said the result was excellent or very good. There were no signs of painful tissue scarring or nerve entrapment/ compression.

Conclusion

Percutaneous calcaneal drilling, spur removal, and minimally invasive plantar fascia release were combined to treat resistant painful heel condition, and the early results were quite positive. In further studies carried out with bigger patient groups and with a low complication rate and high patient satisfaction level, the success of this combined strategy will be more fully characterised.

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