

A prospective study of surgical excision of calcaneal spur for relief of chronic heel pain

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Abstract

Introduction : Plantar calcaneal spur is characterized as the bony outgrowth of calcaneal tuberosity and may occur in approximately 15% of the general population and in a higher proportion among the elderly, obese, heel pain and plantar fasciitis patients and irregular foot biomechanics. The objective of this study is to determine the subjective and functional outcome of calcaneal spur excision with regard to chronic heel pain after failure of conservative treatment and plantar fascia release surgery and to assess potential complications after surgery. **Methods :** After obtaining informed consent, 30 patients attending the inpatient and outpatient facilities of the orthopaedics department of the tertiary care center Kolar, India with diagnosis of calcaneal spur as the clinical suspect and confirmation with radiology, were taken for the study. There were regular blood investigations. The seriousness of the disorder was measured by Visual Analog Scale for the pain and subjective rating by Roles Maudsley Score. The functional outcome of the operation was measured before and after surgery by the Ankle and Hind Foot Scale. **Results:** The study population of 30 patients was primarily female (60 percent). The period of symptoms in all patients with failed conservative management and plantar fascia release surgery was more than six months. Thirty patients were subjected to a plantar spur excision approach. All thirty patients had a six-month follow up period. The pain score of the preoperative Visual Analog Scale was 7.07±0.82 and the mean Visual Analog Scale score was 3.60±0.56 at six months follow up. The mean preoperative Ankle and Hind Foot scale was 56.73±3.92 and 83.40±4.59 respectively at six months. Roles Maudsley Score with a good result (significant improvement before treatment). **Conclusion:** Spur excision can be successful in chronic heel pain relief in patients with ineffective conservative management and failed plantar fascia release surgery. A secure operation with minimal complications is heel spur surgery. To further validate the research, a majority of studies in larger groups of populations are required.

Keywords: calcaneal spur, surgical excision.

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Introduction

As a common concern, Orthopaedics surgeons face painful heel syndrome. It is referred to as calcaneal tuberosity pain and tenderness over the inferomedial component [1]. The specific etiology of pain remains unclear. The pathology of painful heel syndrome is implicated in several etiological variables. Some of them include plantar fasciitis, increased plantar fascia thickness, calcaneal periostitis, increased intraosseous pressure, calcaneal spur involvement and first branch lateral plantar nerve trapping [1-3]. More than 90% of patients respond well to conservative therapy, including shoe modifications, physiotherapy, extracorporeal shock wave treatment, local steroid injection [4,5]. For several heel spur patients, heel spur surgery is often the last mode of the treatment. Typically, heel spur surgery is considered only after conventional treatment methods have failed. The aim was to measure the subjective and functional outcome of spur excision with regard to chronic heel pain after failed conservative management and plantar fascia release surgery by Visual Analog Scale and subjective rating by Roles Maudsley Score and Ankle Hind Foot Scale functional outcome and assessment of potential complications after surgery.

Materials & methods

This prospective interventional research was performed at our tertiary treatment center in Kolar, India by the Department of Orthopaedics from February 2018 to February 2020 with a minimum follow up duration of six months. Thirty patients were included in the study after approval by the institutional ethics committee. All the operations were conducted in a single hospital setting. Patients aged 45 to 65 years, both genders, plantar heel spur, chronic heel pain after six months of unsuccessful conservative treatment and release of plantar fascia, Visual Analog Scale pain greater than five and exclusion criteria includes tarsal tunnel syndrome, tendonitis, arthritis, seronegative arthritis, foot ankle deformities such as subtle cavus foot deformity. The plantar calcaneal spur was recruited for analysis based on clinical suspicion and confirmation by radiography. Plain foot and ankle radiograph - Anteroposterior and lateral views taken. Hemoglobin, bleeding time, coagulation time, random blood sugar, serum urea, serum creatinine, C reactive protein, serology tests and erythrocyte sedimentation rate were analyzed. The use of Roles Maudsley Score assesses the seriousness of the disorder. The evaluation by Ankle and Hind Foot Scale of the functional outcome of the surgery predicted prior and later surgical operation. The collected information was coded and entered into an excel format document. All quantitative variables were expressed in terms of mean, standard deviation and confidence interval. The magnitude of the mean difference between the groups was calculated by the student t test and the p value <0.05 was considered statistically significant.

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Surgical technique

The procedure was carried out with general anesthesia and the patient was under tourniquet, longitudinal incision of the medial skin two cm incision above and parallel to the plantar surface of the foot, beginning proximally at the anteromedial boundary of calcaneal tuberosity and extending distally four to five centimeters. The attachment of the plantar fascia was proximally separated from the tissues surrounding it using blunt dissection and sharply severed approximately one cm from its bony insertion. A portion proximal to the heel spur, resected with an osteotome if present [6].

Results

Thirty patients in which majority of the sample population is female (60 percent). The mean age distribution was 52 years old. In all patients with ineffective conservative treatment and plantar fascia release surgery, symptom period was above six months. The spur form in all thirty patients was B (plantar heel spur). For the spur

excision, all 30 patients underwent a plantar approach. For wound care and recovery purposes, the average hospital stay period was 5.8 days (five to seven). All thirty patients underwent six months of follow up. Pre and post operative radiographs are shown in Figures 1 and 2. Before surgery, the Visual Analog Scale pain score was 7.07+/-0.82 and the mean Visual Analog Scale was 3.60+/-0.56 at the end of six months of follow up. Before surgery and at the sixth month, the mean Ankle and Hind Foot Scale was 56.73+/-3.92 and 83.40+/-4.59 respectively. Mean Ankle and Hind Foot Scale shown in line graph figure 3. Roles Maudsley Score showed positive results (significant improvement before treatment). Table 1 indicates statistically significant p value <0.01 after spur excision on the Visual Analog Scale, Ankle Hind Foot Scale and Roles Maudsley Score. Four patients had delayed wound healing and eventually healed well. Two patients had surgical wound site infection.

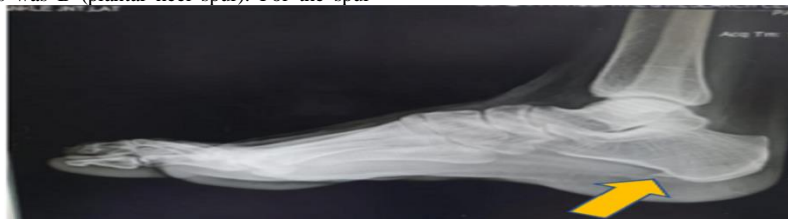


Fig 1: Plain radiograph of right ankle and foot- lateral view showing plantar heel spur

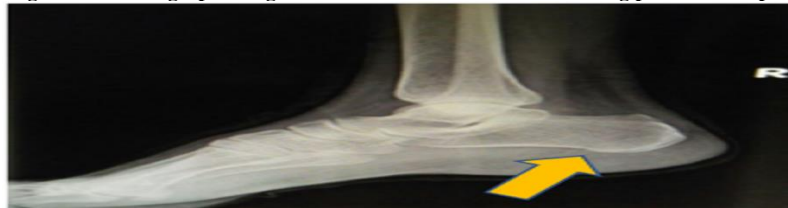


Fig 2: Six months old post operative plain radiograph of right ankle and foot: lateral view following spur excision

Table 1: p value statistically significant (<0.01) following spur excision on Visual Analog Scale (VAS), Ankle Hind Foot Scale (AFO) and Roles Maudsley Score (RMS)

| | | Paired Differences | t | p value |
|--------|--------------------|---|---------|---------|
| | | 95% Confidence Interval of the Difference | | |
| | | Upper | | |
| Pair 1 | PRE VAS - POST VAS | 3.830 | 19.511 | 0.000 |
| Pair 2 | PRE AFO - POST AFO | -24.417 | -24.243 | 0.000 |
| Pair 3 | PRE RMS - POST RMS | 2.038 | 13.293 | 0.000 |

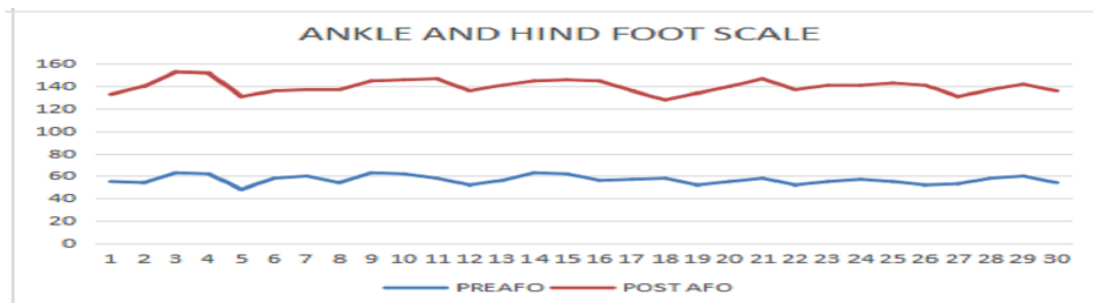


Fig 3: Line graph showing mean ankle and hind foot scale before and after surgery

Discussion

Plantar calcaneal spur is characterized as the bony outgrowth of calcaneal tuberosity and may occur in approximately 15% of the general population and in a higher proportion among the elderly, obese, heel pain and plantar fasciitis patients and irregular foot

biomechanics [1,2]. Plantar calcaneal spur is assumed to occur due to traction from the plantar fascia or intrinsic foot muscles, most of which are considered to be deeper to the plantar fascia surrounded by fibrocartilage [3,4]. Its prevalence in the young to middle aged population is 11-21 percent [4]. A bony outgrowth greater than two millimeters, according to literature, constitutes a spur, clearly

differentiated from simple cortical irregularities [5]. Other terms such as calcaneal periostitis, plantar fasciitis, painful calcaneal spur, calcaneodynia, tuber calcanei pain, runner's or policeman's heel and stone bruise have previously characterized the syndrome [7]. Type A spur are superior to the long spur's plantar fascia insertion. Type B spur those that occur and cause extreme pain within the plantar fascia [8]. Syndrome of subcalcaneal pain, usually manifested as heel pain and worse during morning arousal and after extended sitting periods. The only clinical finding is tenderness of palpation in the antero-inferior part of calcaneal tuberosity [2]. It mostly affects people of middle aged and is related to the presence of a spur on the undersurface of calcaneal tuberosity on plain radiographs. The connection between the calcaneal spur and the chronicity of heel pain remains an assertion. However, several studies have documented that calcaneal spur and painful heel syndrome are closely related. Irving DB et al stated that the calcaneal spur is the second most common association with plantar fasciitis after increased body mass index [2]. In their research Wainwright AM et al found that the calcaneal spur was found to be greater in plantar fasciitis patients when compared with control groups [8]. There is no clear understanding in the literature about signs for spur resection. However, several surgeons have recommended the elimination of the spur to reduce pain and increase patient satisfaction with surgery [9,10]. In certain cases, conservative approaches such as rest, non-steroidal anti-inflammatory medications, orthodontic instruments, casting and corticosteroid injection are successful in treating this condition [9]. Variants of plantar fascia release, proximal fasciotomy with or without simultaneous spur resection and musculature removal from the undersurface of the calcaneus, which is referred to as the Steindler technique, are commonly used. Their success rate and incidence of complications, however, differ considerably in the reports published [11-14]. Systemic, regional and other local conditions that can manifest as calcaneal pain should be excluded [2,7]. An appropriate duration of conservative care at least six months should also be given before surgery. However, pain severity and lack of reaction to conservative modalities can sometimes indicate earlier surgical intervention. For cases which are refractory to conservative interventions, surgical treatment is suggested. Several open surgical procedures for painful heel syndrome are identified. The plantar fasciotomy procedure can be performed alone or in combination with other procedures, such as calcaneal drilling, calcaneal spur resection and release of nerve capture [7-10]. The chronicity of plantar heel pain pathogenesis is complicated and affected by several variables. Many biological and anatomical local variables may predisposed to chronic painful heel syndrome [6]. Increased bone pressure and congestion of calcaneal vessels are known to be a component of pathogenesis in painful heel syndrome. The analysis by Behounek MI et al showed a mean Visual Analog Scale Score of two and a mean Ankle and Hind Foot Scale of 88, but no mention of the Maudsley score's subjective ranking. Paresthesia and complications at the surgical site were noted [13]. Shazly OE et al study showed a mean Visual Analog Score of six and did not mention the Roles Maudsley subjective rating and functional rating using the Ankle and Hind Foot scale, delayed wound healing and complications at the surgical site in their study [14]. With an ageing population, a related rise in degenerative bone disorders and a global increase in obesity, the plantar calcaneal spur will become a worsening problem in the future [15]. In our sample, the mean Visual Analog Score was three and the mean Ankle and Hind Foot Scale was 83 and Roles Maudsley Score subjective rating showed positive patient results. Two patients had surgical wound site infection and four patients were well healed after delayed wound healing. It is however, only suggested after the conservative options for treatment and plantar fascia release surgery have been exhausted. In our

research, the patients had better functional and clinical results with calcaneal spur after spur excision following failed conservative management and surgery for plantar fascia release.

Limitation of the study: The key drawbacks of the analysis were the use of a limited sample size in a single center. The present research did not have a control group. In order to further evaluate the effects and complications of calcaneal spur following spur excision, large randomized controlled trials are needed. In our study, Computed Tomography scan, Magnetic Resonance Imaging scan and nerve conduction study were not performed to determine the outcomes of our surgery.

Conclusion

Spur excision can be successful in chronic heel pain relief in patients with ineffective conservative management and failed plantar fascia release surgery. A secure operation with minimal complications is heel spur surgery. To further validate the research, a majority of studies in larger groups of populations are required.

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