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Original Research Article

OPEN RESECTION VERSUS ENDOSCOPIC CALCANEOPLASTY FOR HAGLUND'S DEFORMITY: A RETROSPECTIVE STUDY DONE AT A TERTIARY CARE HOSPITAL OF BIHAR

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ABSTRACT

Background: Our study aimed to compare the postoperative outcomes and the amount of osteotomy between open and endoscopic surgery to clarify the value of an endoscopic procedure for the treatment of Haglund syndrome. We hypothesized that endoscopic calcaneoplasty would result in higher patient satisfaction and lower complication rates compared with open surgical techniques. **Materials and Methods:** The study protocol was approved by the local ethics committee. A total of 46 patients with Haglund syndrome who had calcaneoplasty from October 2022 to September 2023 were included in this retrospective study. After applying the inclusion and exclusion criteria, 29 patients were included and were divided into 2 groups according to the preference of surgeons and patients: the endoscopic surgery group (n = 11) and the open surgery group (n = 18). The patients' characteristics, including age, sex, body mass index, time of follow-up, symptom onset, and history of corticosteroid administration, were recorded. SPSS 19 software (IBM Corp) was used for statistical analysis. **Results:** There were no significant patient or preoperative MRI differences between groups. The comparison of clinical outcome scores in the endoscopy and open groups indicated no statistically significant differences between the groups. Regarding complications, 2 patients in the open group reported temporary paresthesia around the incisional site, indicating sural nerve injuries; both fully recovered after 6 months of observation. No complications were reported in the endoscopy group. **Conclusion:** In our study, we included patients with Haglund syndrome and early-stage Achilles insertional tendinitis who only required retrocalcaneal debridement and calcaneoplasty.

INTRODUCTION

Haglund syndrome is a chronic disorder characterized by posterior heel pain, swelling, and morning stiffness. Pathologically it has posterosuperior calcaneal prominence (Haglund deformity), retrocalcaneal bursitis, and insertional Achilles tendinopathy. It usually affects middle-aged women and has bilateral involvement. Numerous factors are associated with Haglund syndrome, including Achilles tendon contracture, rearfoot equinus, compensated rearfoot varus and forefoot valgus, rigid plantarflexed first ray, cavus foot, and trauma to the apophysis in childhood.[1] Nevertheless, abnormal enlargement of the posterosuperior calcaneal prominence (Haglund deformity) impinging on the distal Achilles tendon is considered the most critical anatomic factor in Haglund syndrome. As the abnormal impingement continues, Achilles tendinitis may occur with tendon degeneration or rupture.[2,3]

Although response to nonoperative treatment is lower in impingement tendinitis than in non-insertional Achilles tendinopathy, nonoperative treatment should always be performed before considering surgery. If nonoperative treatment fails, surgical intervention with endoscopic calcaneoplasty or retrocalcaneal debridement is a reasonable choice. Complications have been reported in open retrocalcaneal debridement,[4] including wound

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problems, infection, scar irritation, paresthesia, Achilles tendon lesion, and deep vein thrombosis. Endoscopic calcaneoplasty through medial and lateral portals with the patient in the prone position was first reported by van Dijk et al,[5] in 2001. Thereafter, the endoscopic procedure, which showed higher patient satisfaction and lower complication rates than open surgical techniques, has become increasingly applied.[6-8]

Compared with open procedures, endoscopic calcaneoplasty has the many potential advantages like minimal incision with a low rate of wound problems, shorter recovery time, and precise decompression of impinged calcaneal tuberosity.[5,6] Moreover, the procedure prevents over-resection and injuring the Achilles tendon insertion. Although this technique has been attempted in Haglund syndrome with varying extents of Achilles tendon injury, relative contraindications exist, including extensively degenerative Achilles tendon (>50%), large ossification, and bony spur requiring open debridement and reattachment of the Achilles tendon insertion.[9] Nevertheless, endoscopic surgery is a technically challenging and time-consuming procedure, as it requires access to and visualization and removal of adequate bone from the calcaneal tuberosity, especially from medial to lateral corners. Thus, identification of the location of impingement and determination of the extent of excision are technically challenging.[10]

Our study aimed to compare the postoperative outcomes and the amount of osteotomy between open and endoscopic surgery to clarify the value of an endoscopic procedure for the treatment of Haglund syndrome. We hypothesized that endoscopic calcaneoplasty would result in higher patient satisfaction and lower complication rates compared with open surgical techniques.

MATERIALS AND METHODS

The study protocol was approved by the local ethics committee. A total of 46 patients with Haglund syndrome who had calcaneoplasty from October 2022 to September 2023 were included in this retrospective study. The inclusion criteria were posterior heel pain and swelling, as well as the MRI finding,[11,12,13] of retrocalcaneal exudation or bursitis, heterogeneous intratendinous hyperintensity <50% (grade 0, 1a, or 1b according to the Pomranz classification),[14] bone marrow edema in the posterosuperior calcaneal tuberosity, bony spurs on the Achilles insertion, and anteroposterior Achilles tendon thickness of 2 cm above the insertion measured in the horizontal view. In addition, the MRI had to be at least 6 months after the failed nonoperative treatment. The exclusion criteria were severe traumas or fractures, previous Achilles tendon surgery, Achilles tendon degeneration >50% (grade 2 or 3 by Pomranz classification) requiring reattachment or an augmentation procedure, congenital deformities, or ankle infection.[15]

After applying the inclusion and exclusion criteria, 29 patients were included and were divided into 2 groups according to the preference of surgeons and patients: the endoscopic surgery group (n = 11) and the open surgery group (n = 18). The patients' characteristics, including age, sex, body mass index, time of follow-up, symptom onset, and history of corticosteroid administration, were recorded.

The rehabilitation protocol was the same for both groups. A plastic brace was applied to immobilize the ankles in the plantarflexion position. At 2 weeks postoperatively, a removable walking boot was used, weightbearing walking was started gradually, and passive and active range of motion were performed for 2 to 4 weeks postoperatively depending on the extent of Achilles tendon debridement. At 4 to 6 weeks after the operation, the patients were allowed to walk without restrictions. At 8 to 12 weeks postoperatively, the patients were able to return to their preoperative activities fully unrestricted. Radiographic parameters were measured on lateral ankle radiographs taken preoperatively to determine the characteristics of Haglund deformity in each group, including the pitch line, Haglund height, Chauveaux-Liet angle, and Fowler-Philip angle.[2,13]

To determine any difference between the endoscopy and open groups, the patients' baseline characteristics, outcome scores, and radiological measurements were analyzed and compared by t test and Mann-Whitney U test. A P value <.05 was considered statistically significant. SPSS 19 software (IBM Corp) was used for statistical analysis.

RESULTS

The patient and MRI characteristics of the endoscopy and open groups are shown in Table 1. There were no significant patient or preoperative MRI differences between groups (Table 1).The comparison of clinical outcome scores in the endoscopy and open groups indicated no statistically significant differences between the groups (Table 2). Regarding complications, 2 patients in the open group reported temporary paresthesia around the incisional site, indicating sural nerve injuries; both fully recovered after 6 months of observation. No complications were reported in the endoscopy group. The operation duration was significantly different, at 65.4 ± 11.1 and 44.9 ± 10.5 minutes in the endoscopy and open groups, respectively (P ¼ .001).The results of the postoperative measurements to determine the degree of osteotomy in the endoscopy and open groups are shown in Table 3. All parameters for the measurement of the amount of calcaneal osteotomy showed no statistically significant differences between the groups.

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Table 1: Baseline clinical and radiological characteristics of patients from both the groups

	Endoscopy (11)	Open (18)	P-value
Patient characteristics			
a. Age (years)	35.5 ± 11.6	36.8 ± 12.9	>0.05
b. Gender (Male/Female)	9/2	13/5	>0.05
c. BMI (kg/m^2)	24.7 ± 3.5	25.8 ± 2.97	>0.05
d. Time of follow-up (months)	37.8 ± 15.4	40.7 ± 12.8	>0.05
e. Onset time of symptoms (months)	31.8 ±21.3	32.9 ± 22.8	>0.05
f. Corticosteroids administration (%)	9.43	9.65	>0.05
MRI characteristics			
a. Retrocalcaneal bursitis (N)	9	13	>0.05
b. Pomranz classification (0/1a/1b)	3/4/4	6/6/6	>0.05
c. Bone marrow edema (N)	10	14	>0.05
d. Calcification (N)	1	3	>0.05
e. Bony spur (N)	2	4	>0.05
f. Achilles tendon thickness (mm)	8.3 ± 1.4	8.9 ± 4.3	>0.05

Table 2: Post-operative clinical outcome of patients from both the groups using various scoring systems

	Endoscopy (11)	Open (18)	P-value
Visual Analog Scale for pain	1.4± 1.2	0.8 ± 1.1	>0.05
American Orthopedic Foot and Ankle Society's Ankle hindfoot scale	91.8 ± 7.9	95.7 ± 4.7	>0.05
Foot Function Index	3.7 ± 4.3	2.5 ± 2.1	>0.05
Tegner score	3.6 ± 2.1	2.9 ± 2.4	>0.05
Ankle Activity Score	4.9 ± 2.1	4.2 ± 1.4	>0.05
SF-36 domain			
Physical Functioning (PF)	86.7 ± 11.5	85.8 ± 8.6	>0.05
Role Physical (RP)	77.7 ± 24.7	73.6 ± 15.8	>0.05
Bodily pain (BP)	79.8 ± 17.8	77.6 ± 11.1	>0.05
General Health (GH)	76.8 ± 17.8	86.7 ± 12.6	>0.05
Vitality (VT)	81 ±11.8	83.6 ± 6.2	>0.05
Social functioning (SF)	89.7 ± 11.7	93.7 ± 5.2	>0.05
Role Emotional (RE)	81.2 ± 21.8	74.7 ± 9.4	>0.05
Mental Health (MH)	90.6 ± 12.6	97.8 ± 5.4	>0.05

Table 3: Post-operative radiological measurement for bony resection for both the groups

Radiological parameter	Endoscopy (11)	Open (18)	P-value
Calcaneal resection angle (deg)	24.8 ± 12.4	28.9 ± 9.6	>0.05
Calcaneal height ratio	0.4 ±0.2	0.1 ± 0.1	>0.05
Calcaneal resection ratio	0.6 ± 0.2	0.4 ± 0.1	>0.05
Post-operative pitch line (%)	9.4	11.8	>0.05
Haglund deformity height (mm)	4.9 ± 1.8	5.6 ± 2.7	>0.05

DISCUSSION

Haglund syndrome is a common cause of posterior heel pain. Such a treatment goal can be achieved by open surgical techniques and endoscopic surgery. Previous literature has reported that Haglund syndrome usually affects middle-aged women and has bilateral involvement, but according to our study, it is also common in young men. This result could be explained by more young men playing in demanding sports and willing to undergo surgical treatment.

Nevertheless, in the open procedure, an incision is made lateral to the Achilles tendons and adjacent to the sural nerve, which is vulnerable to injury. In our study, temporary paresthesia around the incision was reported in 2 patients who had an open procedure, which indicated sural nerve injuries, whereas no complication was reported in those who had an endoscopic procedure. This result suggested that endoscopic surgery is as effective as open surgery. Moreover, a comparison of postoperative outcomes and the amount of osteotomy between open and endoscopic surgery showed no significant differences.

However, an endoscopic procedure requires high technical knowledge, and the surgeons must be skillful and especially familiar with the anatomic relationships. In addition, evaluation of the learning curve of each surgeon revealed that a longer operative duration is required for endoscopic surgery compared with the open procedure (P = .001), and a C-arm fluoroscope may be needed intraoperatively to confirm the extent of endoscopic osteotomy. Moreover, the arthroscopic procedure costs more because the instrument used is not widely available.

Wiegerinck et al,[4] conducted a systematic review on endoscopic treatment of chronic retrocalcaneal bursitis. They evaluated 147 patients who underwent 150 procedures from 3 studies; the posterosuperior calcaneal process and retrocalcaneal bursa were resected in all patients. Postoperative outcomes were assessed, and they reported that 56% to 97% of patients rated their satisfaction level as excellent. The complication rate was extremely low, with only 1 major complication (0.7%) and 2 minor complications (1.3%). Moreover, most of the patients who underwent an endoscopic procedure had a smaller scar.

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CONCLUSION

In our study, we included patients with Haglund syndrome and early-stage Achilles insertional tendinitis who only required retrocalcaneal debridement and calcaneoplasty. Those with Achilles tendon degeneration >50% (Pomranz grade 2 or 3) were excluded because they require more complicated surgical options, such as reattachment or an augmentation procedure, and we believe that an open procedure would be more reasonable and promising for such cases.

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