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Case Series

Endoscopic calcaneoplasty with flexor hallucis longus transfer for the management of Haglund syndrome

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ABSTRACT

Haglund syndrome consists of a triad of posterosuperior calcaneal exostosis (Haglund deformity), retrocalcaneal bursitis, and insertional Achilles tendinopathy. Endoscopic resection of this prominence along with flexor hallucis longus (FHL) transfer is a novel technique for the treatment of Haglund syndrome. The purpose of this study is to evaluate the outcome of 10 patients presenting with Haglund disease treated by an endoscopic Haglund resection and FHL transfer. In this study, from April 2023 to August 2024, we have taken up 10 patients presenting with heel pain, diagnosed as insertional Achilles tendinopathy (IAT) with Haglund's based on clinical findings of tenderness along Achilles tendon 2 cm proximal to the point of insertion and radiographs, with failed conservative treatment. The American Orthopaedic Foot & Ankle Society (AOFAS) ankle/hindfoot scale was used preoperatively and postoperatively to measure the functional results. A mean of 71.2 preoperative AOFAS-hind foot score which showed a significant improvement postoperatively to 3 (VAS), 82 (AOFAS) at the end of 1.5 months, 2 (VAS), 96 (AOFAS) at the end of 4 months and 1 (VAS), 97 (AOFAS) at 6 months respectively. Endoscopic calcaneoplasty with FHL transfer is a minimally invasive technique which has led to a significant improvement in preoperative and postoperative AOFAS scores and has resulted in faster recovery times with less complications.

Keywords: Haglund syndrome, Achilles tendinopathy, Flexor hallucis longus transfer

INTRODUCTION

Insertional Achilles tendinopathy (IAT) is a pathological condition that presents as pain at the back of the heel. Individuals with IAT commonly report stiffness, particularly after prolonged rest, and worsening pain during physical activity. These symptoms can interfere with daily activities, work responsibilities, and athletic participation by Chimenti et al.[1] This condition is commonly linked to a bony enlargement of the calcaneum known as Haglund's exostosis. These two are components of Haglund's syndrome by van Dijk et al.[2]

In 1928, Patrick Haglund was the first to describe an enlargement of the posterosuperior aspect of the calcaneus. This condition now bears his name—Haglund's syndrome. It is characterized by heel pain resulting from mechanical irritation that leads to inflammation of the retrocalcaneal and/or supracalcaneal bursae. These bursae may become swollen, thickened, and may adhere to the adjacent Achilles tendon by Sella et al.[3]

IAT is a condition characterized by degenerative changes at the point where the Achilles tendon inserts into the calcaneus. These pathological alterations typically involve disruption of the normal parallel arrangement of collagen fibers, a loss of tendon integrity, fatty infiltration, increased glycosaminoglycan (GAG) content, and neovascularization. Collectively, these changes lead to tendon thickening and abnormal imaging findings, which are indicative of IAT by Klauser et al and Movin et al.[4,5]

The clinical diagnosis of chronic achillodynia resulting from IAT is primarily based on patient history and physical examination. However, in cases where the diagnosis is uncertain, imaging techniques such as radiographs, ultrasonography (USG), and magnetic resonance imaging (MRI) are commonly employed to rule out alternative diagnoses and provide additional information regarding the extent of tendon damage. These imaging modalities also help guide treatment planning and predict prognosis (Lu et al; USG, MRI Surgery Findings Comparison).[6] Management options span a wide spectrum, beginning with conservative therapies including rest, physiotherapy, orthotic devices, anti-inflammatory medications, extracorporeal shock wave therapy, and injections. In cases where these measures are ineffective, surgical intervention may be warranted by Chimenti et al.[1]

Chronic Achilles tendinopathy - whether or not accompanied by tendon rupture - is increasingly observed across a wide age range. While many patients respond positively to conservative treatments, a subset continues to experience symptoms. In cases where non-operative approaches fail and a direct debridement of the tendon is also insufficient, several tendon augmentation techniques have been explored by Wapner et al.[7] Although tendon augmentation has been studied in the context of chronic ruptures, there is a lack of literature specifically evaluating the functional outcomes of flexor hallucis longus (FHL) tendon transfer in Indian patients with tendinopathy, despite the technique being well-established by Silver et al.[8]

These are the recognized benefits of using FHL tendon for augmentation by Hahn et al.[9] Anatomical proximity to the Achilles tendon, simplifying the harvest process; sufficient length and width for augmentation; a well-vascularized muscle belly that supports integration with bone and tendon; strong plantar flexor only next to triceps surae by Silver et al; favourable biomechanical alignment in terms of neuromuscular activation and contractile vector relative to the Achilles tendon.[8]

These factors have led many surgeons to adopt an open posterior approach for FHL augmentation, often combined with debridement and calcaneoplasty. However, this method is expensive—requiring multiple suture anchors—and is associated with wound healing complications, extended recovery time, and delayed return to normal activity. This increases the disability-adjusted life years (DALY) for affected individuals.

The introduction of endoscopic access to the retrocalcaneal space by van Dijk et al has enabled minimally invasive approaches that facilitate faster postoperative recovery and early return to activity.[10] In our tertiary care, government-funded institution, many patients come from economically disadvantaged backgrounds and rely on daily wages. Prolonged rehabilitation is often not feasible for them due to financial constraints and the inability to afford work absenteeism.

Given this context, we employed a minimally invasive surgical strategy combining endoscopic calcaneoplasty with FHL tendon transfer in patients with recalcitrant IAT. This study aims to evaluate the functional outcomes of this approach in our patient population.

Figure 1: Haglund deformity of the right calcaneum.

CASE SERIES

From April 2023 to August 2024, we evaluated patients with heel pain. 10 patients diagnosed as IAT with Haglund's based on clinical findings of tenderness along Achilles tendon 2 cm proximal to the point of insertion and radiographs, and failed conservative treatment were taken up for study. All 10 patients with an average age of 61.6 were active non-athletic low wage labourers. Patients presented to us with history of pain for 8.3 months on an average and were treated by various conservative and indigenous methods like massages, physiotherapy, steroid injections, local irritant application, herbal and other indigenous medication.

All patients in our study were subjected to MRI to note the degeneration of tendon and were classified (Pomeranz classification). Based on abnormal intratendinous signals on t1 and t2 images as follows:

In grade I, I-a shows a uniformly low signal on t1-weighted images and a higher signal on t2-weighted images; I-b less than 50% of the tendon shows increased signal intensity.

Grade II was more than 50% of the tendon shows increased signal intensity.

Grade III indicates a complete rupture with the tendon retracting.

All patients were reviewed with clinical scores visual analogue score (VAS) and American Orthopaedic Foot and Ankle Score (AOFAS). Patients diagnosed as having

grade IB and II tendon degenertation on MRI were taken up for endoscopic calcaneoplasty with FHL transfer.

Inclusion criteria

Inclusion criteria were patients of age group 45 to 80 yrs with heel pain; patients diagnosed as having grade I-b, II tendon on MRI were taken up for endoscopic calcaneoplasty with FHL transfer.

Exclusion criteria

Exclusion criteria were patients with non-insertional Achilles tendinopathy; patients who underwent other foot and ankle surgery; patients with congenital or post traumatic lower limb deformities; patients with grade 0, I-a tendo Achilles on MRI; patients with generalised conditions like peripheral vascular disease, rheumatoid arthritis.

Technique

Patient was placed in prone position with foot hanging 8 inches away from the edge of the table enabling the surgeon to dorsiflex the ankle with their torso while the other leg is flexed at the knee joint to keep it away from the operating field. Lateral view of the heel was procured, with the help of an image intensifier, the Haglund's lesion demarcated with a k-wire. Distal part of tendoachilles is traced and marked, curved handle of the hemostat is placed superficially contouring along the superior border of calcaneum and marked under image intensifier guidance. High thigh torniquet is inflated after exsanguination. Posterolateral portal is marked and made in between the inferolateral margin of tendo Achilles, and closer to the inferomedial curvature of the marked calcaneal border. Posteromedial portal placed in the corresponding area medially with the help of a needle under vision.

4 mm scope is passed through posterolateral and posteromedial portals alternatingly and thorough debridement of the retrocalcaneal bursa is done with a shaver. With the help of a bone burr the bone above the k wire is removed till whole length of the glistening k wire is visualised, thus ensuring complete resection of the lesion. Resection is confirmed under image intensifier, ensuring smooth margins at the superior border of the calcaneum under Achilles tendon.

FHL identified just medial to the talus at the level of ankle joint. Debridement of soft tissue and pulley done in the medial gutter. FHL isolated and confirmed by full flexion of great toe and plantar flexion of foot. FHL tagged by passing an absorbable suture into the tendon approaching from medial to lateral direction using arthroscopic mini scorpion carefully to avoid injuring the neurovascular structures medial to the FHL. The tendon is further pulled proximally to gain additional length for harvesting. Arthroscopic scissors used and approached similarly with opening from medial to lateral direction and transected in full tension. Tendon pulled from posteromedial portal and whip suturing done. A guide wire is drilled into the calcaneum 2 cm anterior to the posterior border of tuberosity directed vertically anterior to posterior from proximal to distally exiting from the heel at the junction of heel skin and arch, through the postero-central portal created over the retrocalcaneal area. Sizing of the graft done and accordingly tunnel made with a 4 mm drill bit in view of cancellous nature of calcaneum by Batista et al.[11] Guide wire is replaced with nitinol wire in the tunnel and the marked tendon is passed through the tunnel and held in tension with foot in neutral position. Metallic interference screw of 6 to 7 x 25 mm placed and advanced into the tunnel over the nitinol wire. Graft placement and tension is confirmed arthroscopically and under c-arm.

Figure 2: Marking of anatomical landmarks and portals.

Figure 3: Intraoperative fluoroscopy of the Haglund exostosis which needs to be excised was marked with k-wires.

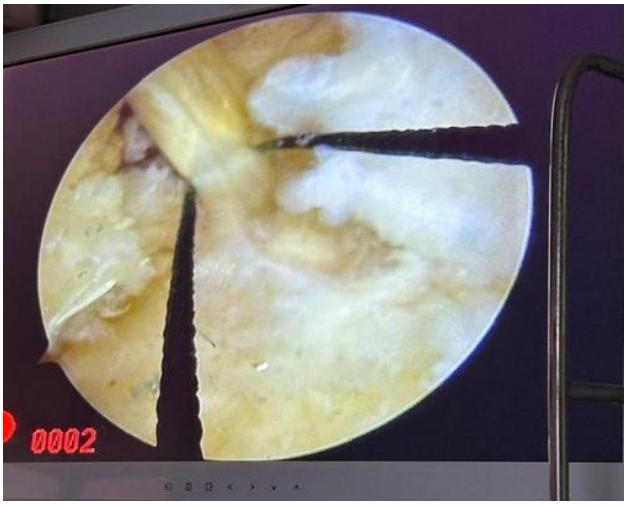

Figure 4: Identification of FHL tendon.

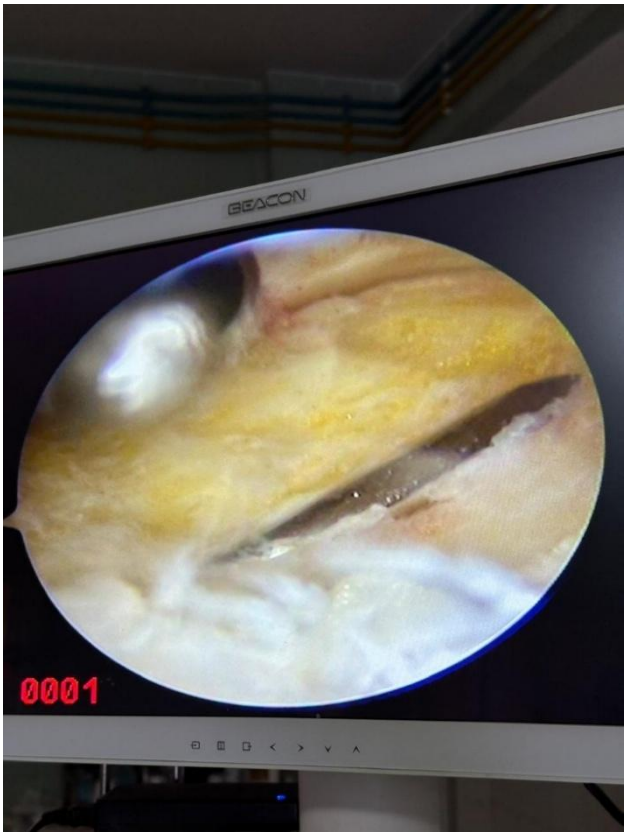

Figure 5: Excision of calcaneal prominence with burr.

Postoperatively, the leg is immobilised in a below knee slab till suture removal for 10-14 days. Active ankle range of movements are started from 2 weeks. Weight bearing and tendon strengthening exercises are started at 3 weeks. Partial to full weight bearing is started as tolerated from 3 weeks with heel rise of 2 cm gradually weaning it to 1 cm and flats over next 2 weeks. Patient can return to normal activities from 5th week.

Endoscopic calcaneoplasty with FHL transfer was done in 10 patients from April 2023 to August 2024. Patients were analysed with preoperative and postoperative VAS and AOFAS scores, radiographs for a mean follow up of 7.3 months.

Figure 6: Isolation of FHL tendon.

Figure 7: Fixation of FHL tendon to calcaneum with interference screw.

All our patients were evaluated preoperatively & postoperatively with radiographs. Hypertrophic bursal projection beyond Pavlov's parallel lines was found in 6 of our patients. Fowler's angle was showing a central tendency of 67 degrees. The computed mean of Chauveaus-Leit's (CL) angle was 14 degrees among our patients. Intratendinous calcifications were found in 4 of our patients. All patients had adequate resection angles on radiographs postoperatively.

Figure 8: Intraoperative fluoroscopy image of interference screw.

13 patients were evaluated preoperatively with MRI to assess the degeneration of Achilles tendon. One patient was staged as Grade 0, one patient was staged as IA, 4 patients staged as grade IB, and 6 patients were staged as Grade II.

All our patients were non-athletic, having chronic achillodynia for nearly 8 months with preoperative VAS of 6 on an average and a mean of 71.2 preoperative AOFAS-hind foot score which showed a significant improvement postoperatively to 3 (VAS), 82 (AOFAS) at the end of 1.5 months, 2 (VAS), 96 (AOFAS) at the end of 4 months and 1 (VAS), 97 (AOFAS) at 6 months respectively.

In our study, patients started weight bearing at around 4.2 weeks and returned to normal activity at the end of 5.3 weeks. Postoperatively 2 out of 10 patients had weak flexion of great toe for 1 month which improved gradually to normal power at the end of 2 months. No wound complications were observed in our study. One patient had no pain relief at the end of 2 months mark but improved gradually by 4months with heel rise. One patient had heel pain on weight bearing from 2nd month improved with modified foot wear. One patient had weak great toe flexion for 2 months post operatively which improved on subsequent follow ups, same patient reported pain at the retrocalcaneal area at 4th month which improved with analgesics. 3 patients had portal site pain more on lateral portal.

DISCUSSION

Chronic Achillodynia is a complex condition often linked to repetitive strain, with overuse being the most prevalent contributing factor. Individuals with IAT frequently report discomfort both during movement and at rest, along with increased passive dorsiflexion and reduced strength in plantarflexion. Although non-surgical treatments are typically the first line of management, operative procedures may become necessary if symptoms persist. Long-standing cases can lead to pathological changes such as fibrotic scarring, degeneration of collagen fibers, calcific deposits, and partial tendon tears. While localized debridement may offer symptomatic relief, it fails to correct tendon elongation or restore structural integrity in chronic ruptures. To address these deficits, FHL tendon transfer has emerged as an effective surgical option, demonstrating improvements in both pain and functional outcomes by Silver et al.[8] These transfer techniques are intended to re-establish tendon length, augment the repair with additional tissue, and enhance muscular contribution to plantarflexion by Wapner et al.[7]

In our study radiographic parameters like Fowler's angle, Pavlov's lines and CL angle were found to diagnose but not quantify the disease severity similar to Lu et al study and Sundararajan et al study.[6,12]

Table 1: Postoperative return to normal activities and weight bearing in our study versus other studies.

Study	Weight bearing	Return to normal activities
Mc Garvey et al[17]	12 weeks	20 weeks
Batista et al[11]	3-4 weeks	5 weeks
Our study	3-4 weeks	5 weeks

Table 2: Complications of open and endoscopic procedure compared to our study versus other studies.

Study	Complications
Open FHL transfers	
Ahmed et al[18]	15.6% - wound related
Alhaug et al[19]	30% - wound related
Endoscopic FHL transfers	
Basita et al[11]	10.7% - portal pain
Our study	13% - portal pain

Role of MRI in establishing the severity of disease has been studied previously in Nicholson et al in a study of 83 patients for 3 years and recommended patients with greater intratendinous degenerative signals needed surgical intervention by Nicholson et al.[13] We have graded patients based on degeneration on MRI according to Pomeranz classification and taken up 10 out of 13 patients with grade 1b (4) and grade ii (6) for surgery. Rest of the 3 patients were managed with endoscopic calcaneoplasty alone.

We have faced difficulty in reaching the retrocalcaneal area when we initially used the standard posterior ankle portals from the portals used later marked using image intensifier as close to the retrocalcaneal spur as possible. Identifying and harvesting FHL with lower portals is challenging but learning curve flattens with consistency.

Patients showed a remarkable improvement in AOFAS scores postoperatively from an average of 71.2 preoperatively to 96 on an average on par with Gerstner et al in non-insertional Achilles tendinopathy and similar to Hahn and et al study of FHL transfer in chronic Achilles tendinopathy and ruptures, showing improvement from 64 to 92.[9,14]

Complications we witnessed in our study are weak flexion of great toe in the initial 1 month which gradually improved at the end of 2 months in 2 of our patients, Xu et al reported similar weakness of FHL in post operative patients which recovered on follow ups.[15] As compared to open FHL transfers which reported 30% to 52% wound complication rates including wound dehiscence, superficial wound complications, deep vein thrombosis, we did not see any wound complications in our study by Bohu et al.[16]

Postoperative pain on weight bearing was reported by one patient relieved on modified foot wear. One patient who had reported late after 4 months of surgery with retrocalcaneal pain, when evaluated on USG was found to have edema treated with NSAIDs and responded well, probably due to scar inflammation.

Notable difference was 8 weeks early return to daily activities in our study due to accelerated rehabilitation in view of minimal invasiveness as compared to 12 weeks in open surgery. None of the patients in our study group were actively involved in sports.

Limitations

Technique has a steep learning curve which flattens with persistence. Limited sample size. Need for randomized controlled studies.

CONCLUSION

Study on endoscopic calcaneoplasty with FHL transfer typically highlights the high success rate and low complication rate of the procedure. The endoscopic approach is often preferred over open techniques due to its minimally invasive nature, resulting in faster recovery times and fewer complications such as infections and skin issues. Additionally, the FHL transfer provides a vascularized tendon with a strong viable muscle, which enhances the healing process and improves functional outcomes.

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