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Surgical resection of haglund's deformity by Achilles tendon splitting approach

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Abstract

Background: Patrick Haglund in 1927 was the first one to describe Haglund's deformity. This type of deformity is also known as retro-calcaneal exostosis. It is one of the causes of posterior heel pain. Several methods have been described for treatment including conservative measures and surgical measures.

Aim of Study: The aim of this study is to evaluate results of surgical resection of Haglund's deformity by Achilles's tendon splitting approach.

Patients and Methods: In this prospective study, 21 cases with Haglund's deformity were treated with surgical resection through Achilles's tendon splitting approach.

Results: These cases were assessed according to AOFAS score, the functional results were graded as excellent in thirteen patients (61.9%), good in seven patients (33.3%), fair in one patient (4.8%), with no poor results. The excellent and good results were categorized as satisfactory ones while the fair results were said to be the unsatisfactory ones. Thus, satisfactory results were seen in 20 patients (95.2%), and the unsatisfactory ones were found in 1 patient (4.8%).

Conclusion: This study proves that central splitting technique for the surgical treatment of Haglund's deformity is an effective treatment with good exposure of retrocalcaneal space, with reduced risk of vascular and nerve injury, and acceptable outcome.

Keywords: Haglund's deformity, Achilles's tendon, splitting approach

Introduction

Patrick Haglund in 1927 was the first one to describe Haglund's deformity ^[1]. This type of deformity is also known as retro-calcaneal exostosis. It has no definitive aetiology, but various probable causes such as a tight Achilles tendon, a high arch of the foot, and heredity factors have been suggested. It is acknowledged by pain in the back of the heel which is more persistent after rest. Pain could be due to associated Achilles's tendonitis and retro-calcaneal bursitis ^[1, 3, 4]. It is common in both genders with female predominance, and usually affects young patients, particularly during the third and fourth decade.

Diagnosis of Haglund's deformity is based on factors like history, clinical findings, and radiographic changes. In a lateral radiograph, a bony prominence at the posterosuperior part of the calcaneal tuberosity is seen in these patients, and it could be associated with a calcaneal spur and heterotopic bone formation at the insertion of the Achilles tendon ^[6-8].

A Magnetic Resonance Imaging (MRI) scan shows posterosuperior calcaneal spurring with impingement on the Achilles tendon, and may be associated with synovial thickening and collection of fluid in the retro-calcaneal bursa with thickening of the insertional fibres of Achilles tendon and edema in the adjoining retro-Achilles fat pad ^[9].

Conservative measures include reassessment of the shoe of the patient and heel pads. Casting may be used for pain reduction and ice bags to reduce swelling. Anti-inflammatory drugs, stretching exercises, and physiotherapy may relieve tension from the Achilles tendon. If conservative treatment is not effective then surgical treatment options are used ^[10-13]. Numerous surgical options are available for excision of bony prominence with or without Achilles tendon debridement and excision of the retro-calcaneal bursa ^[14-16].

Patients and Methods

a) Patients

This study included 21 patients (13 males, 8 females and their ages range from 32-56 years with an average of 42) who were treated between August 2020 and August 2021 (including follow-up period) at Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry by surgical resection through Achilles tendon splitting approach.

The period of follow-up ranged from 6 to 12 months with an average of 8.6 months.

Clinical examination

General examination

Blood pressure, pulse, temperature, respiration and other body systems were assessed for all patients.

Local examination

Tenderness seen at the back of heel, swelling at back of heel, soft tissue conditions and distal circulation and deformity.

The inclusion criteria were patient aged from 20 to 60 years old and failure of conservative treatment more than six months. The exclusion criteria were patients older than 60 years old, patients with peripheral neurovascular diseases, and poor soft tissue and skin conditions.

b) Method

- Pre-operative I.V antibiotics (Ampicillin/ Sulbactam) were given 30min to one hour before surgery.
- The patient was placed in prone position and a tourniquet was used.
- An incision put centrally over the Achilles tendon, approximately 8cm proximal to the Achilles tendon insertion and extending distally to the glabrous skin, an incision was made directly down to the para-tendon.
- A central tendon splitting approach was performed.
- The degenerative portion of the tendon was carefully excised, and tendon continuity was tested.
- Inflamed bursa and scarred or fibrosed fat were removed from above the retrocalcaneal space to define the Haglund's deformity.
- Complete excision of the bony prominence was done using a hand osteotome in an oblique fashion from posterior to anterior.
- After smoothing of the margin, the final shape of the calcaneus was confirmed using a fluoroscopic image.
- The tendon was augmented to the insertion with suture anchors. The paratenon was also repaired with absorbable suture, and the skin was closed with nonabsorbable suture.
- Blow knee cast in equines position for two weeks then another two weeks in neutral position.



Fig 1: Pre Op. image of Haglund deformity.



Fig 2: Central tendon splitting approach



Fig 3: Degenerative portion of tendon was removed



Fig 4: Tendon was augmented to the insertion with suture anchors.

Post-operative management

- Patients were monitored for any clinical changes and discharged home after 48 hours with instructions.
- Subcutaneous enoxaparin (Clexane) for five days then oral anticoagulant (Rivaroxaban) for nine days, may increase duration for high-risk patients.
- Patients were allowed to start partial weight bearing after four weeks then full weight bearing after another four weeks.
- Immobilization for six weeks if greater than 50% of the tendon insertion is dissected or as augmentation procedure.
- Physiotherapy to regain gastrocnemius-soleus strength.

Results

Follow up period ranged from six to twelve months with a mean of 8.6 ± 1.2 months. The patients were followed up until complete improving and regaining normal ankle function.

A. Clinical (functional) results

1. AOFAS score

According to AOFAS score, the functional results were graded as excellent in thirteen patients (61.9%), good in seven patients (33.3%), fair in one patient (4.8%) with no poor results. The excellent and good results were considered as satisfactory ones while the unsatisfactory included the fair results. Therefore, satisfactory results were found in 20 patients (95.2%) and the unsatisfactory ones were found in 1 patient (4.8%).

The mean AOFAS scores improved from 56 to 89.5 preoperatively.

2. Pain

The pain was assessed according to AOFAS questionnaire. 15 patients had no pain, five patients had mild (occasional) pain, and one patient had moderate (daily) pain.

Table 1: Final Results Satisfactory

Excellent	Good	Total
13	7	20
61.9%	33.3%	95.2%

Table 2: Unsatisfactory

Fair	Poor	Total
1	0	1
4.8%	0	4.8%

Table 3: Pain Severity Incidence

Pain	N	%
No	15	71.4
Mild	5	23.8
Moderate	1	4.8

Discussion

Haglund deformity is commonly described as a prominence of the postero superior part of the calcaneus. It is one of the common causes of posterior heel pain^[13].

The goal of treatment of Haglund deformity is removing the calcaneal prominence and the inflamed surrounding soft tissues^[15].

Despite the variety of treatment options which have been suggested for this deformity, including conservative treatment, surgical resection of Haglund deformity either open or arthroscopic, the optimal treatment of Haglund deformity remains controversial. Open procedures have the optimal advantage as they provide an appropriate exposure and allow adequate removal of inflamed tissues and calcaneal prominence; however they are associated with concerns like skin and wound problems. Minimally invasive techniques have become popular as they overcome this problem but they often result in inadequate removal^[17, 18].

Several different approaches have been used for the surgical treatment of Haglund's deformity which have their own advantages and limitations.

This study included 21 patients with Haglund deformity who were treated between August 2020 to August 2021 at Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry with the surgical resection through Achilles tendon splitting

approach.

All the cases were assessed according to AOFAS (American Orthopaedic foot and Ankle Society), scoring system and the clinical results were graded as excellent, good, fair and poor as follows.

Thirteen patients (61.9%) had excellent results, eight patients (33.3%) had good results and one patient (4.8%) had fair result with no poor results. The excellent and good results were considered as satisfactory and the unsatisfactory ones included the fair results. Thus, satisfactory results were found in 20 patients (95.2%), and the unsatisfactory ones were found in 1 patient (4.8%). Follow up ranged from 6 to 12 months with an average of 8.6 months for all patients.

The results were closely similar to the one achieved by Nunley JA *et al.*,^[19] where they treated 27 patients with 29 surgical procedures (two patients had bilateral surgery). AOFAS hind foot scores were considered as good to excellent in 96% of the patients.

The results in our study were better than those achieved by Xia Z *et al.*,^[20] they treated 22 patients (22 heels) through tendon splitting approach with a mean age of 59.2 ± 7.3 years and a mean follow-up duration of 15.1 ± 4.6 months. Satisfaction rate was 77.3% of patients.

One more study done by McGarvey *et al.* achieved even better results where the satisfaction rate was 82%.^[21] They treated 22 heels in 21 patients through tendon splitting approach with a mean age of 54.4 years (30 to 77 years) and a mean follow-up duration of 33 months. In this study the AOFAS score improved from a mean of 56 points preoperatively to 89.5 points post-operatively. These results closely matched with that achieved by Johnson *et al.*,^[22] where they treated 22 patients. The AOFAS score improved from a mean of 53 points preoperatively to 89 points postoperatively.

Comparing with surgical resection of Haglund deformity through lateral approach, the satisfactory results in this study were better than those achieved by Sella *et al* where they treated 13 patients (16 heels).

Their results after 42 months follow-up period were 13 as good (81.25%) and 3 poor (18.75%) results.

The results in this study were similar to that achieved by Sammarco *et al.*^[18] they treated 39 heels with Haglund deformity through medial approach. The results were 50% excellent, 47% good results, and 3% fair with a mean follow-up duration of three years.

The results were nearly matched with that achieved by Ortmann *et al.* where^[23] 30 patients (32 heels, two bilateral) were treated through endoscopic bony and soft-tissue decompression of the retrocalcaneal space with a mean age of 51 years (range 22 to 75 years), and a mean follow-up duration of 35 months (range 3 to 62 months). According to AOFAS there were 26 patients (86.7%) who had excellent results, three patients (10%) had good results and one patient (3.3%) had poor result.

In the study, pain was assessed according to AOFAS questionnaire where 15 patients (71.4%) had no pain, five (23.8%) patients seen with mild (occasional) pain, and one patient (4.8%) had moderate (daily) pain. These results were lower than that achieved by Nunley *et al* where they reported 96% as pain free. This could be due to short follow-up period. On comparing with the study done by McGarvey *et al.*^[21] where the results were as follows- 13 (59.1%) patients had no residual pain, three (13.6%) patients described no change and only slight alteration from pre-operative pain, two (9.1%) patients actually felt worse after surgery and four (18.2%)

described pain in the same area, but assuming a less severe character.

In this study, age was observed to have statistically insignificant effect on the end results. This along with the study done by Johnson *et al.*, who reported no significant correlation between the age of the patient and the final end result, p -value=0.35 ($p>0.05$ statistically insignificant), and this against the study done by McGarvey *et al.*, who reported that patients over the age of 50 had poor results with the central splitting surgical techniques.

In this study, factors associated medical condition, sex and occupation were found to have statistically insignificant effect on the final end results.

Sammarco *et al.*,^[18] reported that one patient of 39 patients who were treated through medial approach had superficial wound infection that was successfully treated with antibiotic. McGarvey *et al.* also found one patient of 22 patients who was treated using the tendon splitting approach had superficial infection that were resolved with oral antibiotics. Johnson *et al.*,^[22] also reported two patients of 22 patients who had superficial partial wound dehiscence that were resolved with dressing and did not require reoperation.

No major complications were seen in this study. Comparing to the study done by Ortmann *et al.*,^[23] where they found one patient of 30 patients who was treated through endoscopic bony and soft tissue decompression of the retrocalcaneal space who had Achilles tendon rupture three weeks postsurgery.

Conclusion

Haglund's disease is a challenging condition to treat. Conservative methods should be tried in all cases before taking decision of surgery. The results of the current study suggest that Surgical Resection of Haglund's deformity by Achilles Tendon Splitting Approach produces outcomes that justify surgical intervention in cases of Haglund's disease not responding to adequate conservative therapy. Adequate bony resection is also critical for satisfactory outcome.

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