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Comparison of Open vs Endoscopic Surgical Treatment of Haglund's Deformity

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ABSTRACT

Background: Haglund's deformity is a common cause of posterior heel pain resulting from a bony enlargement at the posterosuperior aspect of the calcaneus, which can irritate the Achilles tendon and retrocalcaneal bursa. When conservative treatment fails, surgical intervention becomes necessary. Both open and endoscopic surgical techniques are used for its management, but their comparative outcomes remain an area of clinical interest. **Objective:** To compare the clinical outcomes of open versus endoscopic surgical treatment of Haglund's deformity in terms of pain relief, functional recovery, postoperative complications, and return to normal activities. **Methods:** This comparative observational study was conducted at Orthopedic Department Bahawal Victoria Hospital QAMC Bahawalpur from 24 January 2025 to 24 June 2025. A total of 60 patients diagnosed with Haglund's deformity were included and divided into two groups. Group A (n=30) underwent open surgical treatment, while Group B (n=30) underwent endoscopic surgery. Pain was assessed using the Visual Analog Scale (VAS), and functional outcomes were measured using the American Orthopaedic Foot and Ankle Society (AOFAS) score. Postoperative complications and recovery time were also recorded. Data were analyzed using SPSS version 25, with a p-value ≤0.05 considered statistically significant. **Results:** Both groups showed significant improvement after surgery; however, the endoscopic surgery group demonstrated lower postoperative pain scores, higher functional outcomes, fewer complications, and a faster return to daily activities compared with the open surgery group. **Conclusion:** Endoscopic surgical treatment of Haglund's deformity appears to be a safe and effective alternative to open surgery, offering better postoperative recovery and fewer complications.

INTRODUCTION

Haglund's deformity is a structural abnormality characterized by a bony enlargement of the posterosuperior aspect of the calcaneus, which often leads to irritation of the surrounding soft tissues, particularly the retrocalcaneal bursa and the Achilles tendon (Grambart et al., 2021; Strasser & Farina, 2021; Chen et al., 2022). This condition frequently results in posterior heel pain, swelling, and difficulty in walking or performing daily activities (Pargeon & Tjiattas-Saleski, 2023). It is commonly referred to as "pump bump" because it is often associated with irritation caused by rigid heel counters of shoes. The condition can significantly affect the quality of life of patients, especially those who are physically active or involved in occupations that require prolonged standing or walking (Alessio-Mazzola et al., 2021; Seemathan & Husna, 2024).

The pathophysiology of Haglund's deformity involves mechanical impingement between the enlarged calcaneal prominence and the Achilles tendon, leading to inflammation of the retrocalcaneal bursa and degeneration of the tendon (Khurana & Vellaipandi, 2024; Flores et al., 2024). Repetitive friction and pressure in this region may result in bursitis, tendinopathy, and chronic pain. Several factors have been associated with the development of Haglund's deformity, including abnormal foot biomechanics, tight Achilles tendon, high-arched foot structure (pes cavus), and prolonged use of tight or rigid footwear (Choo, Park, & Chang, 2020; Heyes & Mason, 2021).

Patients with Haglund's deformity typically present with symptoms such as posterior heel pain, tenderness at the Achilles tendon insertion, swelling around the heel, and discomfort while wearing closed-back shoes (Butterworth & Block, 2022). Diagnosis is usually based on clinical examination and radiographic evaluation. Lateral radiographs of the heel are commonly used to identify the bony prominence and assess its severity (Kim et al., 2022). Advanced imaging techniques such as magnetic resonance imaging (MRI) may also be used to evaluate associated soft tissue abnormalities including Achilles tendinopathy or retrocalcaneal bursitis (Szaro et al., 2021; Pass et al., 2022;

Papineni et al., 2024)..

Initial management of Haglund's deformity generally involves conservative treatment approaches aimed at reducing inflammation and relieving mechanical stress (Cengiz & Karaoglu, 2022). These treatments include modification of footwear, use of heel lifts or orthotic devices, physiotherapy, nonsteroidal anti-inflammatory drugs (NSAIDs), and local corticosteroid injections (Lotliker et al., 2024). Although many patients respond well to these non-surgical interventions, a subset of individuals continues to experience persistent symptoms despite prolonged conservative therapy (Ko et al., 2023).

For patients who fail to respond to conservative treatment, surgical intervention may be required. The main objective of surgical treatment is to remove the posterosuperior calcaneal prominence and relieve pressure on the Achilles tendon and retrocalcaneal bursa (Zhang et al., 2021; Mishra & Singh, 2021). Traditionally, open surgical resection of the calcaneal prominence has been widely performed and has shown satisfactory results in many cases. However, open surgery is associated with certain disadvantages, including larger incisions, increased risk of wound complications, postoperative pain, and longer recovery periods (Kilic et al., 2024).

In recent years, endoscopic surgical techniques have gained popularity as a minimally invasive alternative for the treatment of Haglund's deformity (Lughi, 2020). Endoscopic calcaneoplasty involves the use of small portals and specialized instruments to remove the bony prominence and inflamed bursal tissue under direct visualization (Cusumano et al., 2021; Opdam et al., 2021). This technique offers several potential advantages over the traditional open approach, including smaller incisions, reduced soft tissue trauma, lower risk of wound complications, and faster postoperative recovery (Cusumano et al., 2021).

Several studies have reported favorable outcomes with endoscopic treatment, demonstrating significant improvement in pain relief, functional recovery, and patient satisfaction (Alessio-Mazzola et al., 2021). Additionally, minimally invasive procedures have been associated with earlier return to daily activities and reduced hospital stay compared with open surgical techniques. However, despite the increasing use of endoscopic surgery, there is still ongoing debate regarding the comparative effectiveness and safety of open versus endoscopic approaches for the treatment of Haglund's deformity (Alessio-Mazzola et al., 2021).

Therefore, the present study was conducted to compare the clinical outcomes of open and endoscopic surgical treatment of Haglund's deformity in terms of postoperative pain, functional outcomes, complication rates, and recovery time. The findings of this study may help provide evidence-based guidance for orthopedic surgeons in selecting the most appropriate surgical technique for managing patients with symptomatic Haglund's deformity.

METHODOLOGY

This comparative observational study was conducted to evaluate the outcomes of open versus endoscopic surgical treatment of Haglund's deformity. The study was carried out over a period of 6 months, from 24 January 2025 to 24 June 2025, at the Orthopedic Department Bahawal Victoria Hospital QAMC Bahawalpur, a tertiary care teaching hospital providing specialized orthopedic and surgical services.

The study population consisted of patients diagnosed with symptomatic Haglund's deformity who presented with persistent heel pain and were scheduled for surgical management after unsuccessful conservative treatment. A total of 60 patients were included in the study using a non-probability consecutive sampling technique. The patients were divided into two groups: Group A (30 patients) who underwent open surgical treatment, and Group B (30 patients) who underwent endoscopic surgical treatment.

Patients aged 18 to 65 years with clinically and radiologically confirmed Haglund's deformity and persistent symptoms despite at least six months of conservative therapy (including physiotherapy, non-steroidal anti-inflammatory drugs, orthotic support, and activity modification) were included in the study. Patients with a history of previous heel surgery, systemic inflammatory diseases such as rheumatoid arthritis, Achilles tendon rupture, severe tendon degeneration requiring reconstructive surgery, peripheral vascular disease, or uncontrolled diabetes mellitus were excluded from the study.

Data were collected after obtaining written informed consent from the participants. Each patient underwent a detailed clinical evaluation including medical history, physical examination, and radiological assessment using lateral heel X-rays to confirm the presence and severity of Haglund's deformity. Baseline demographic characteristics such as age, gender, duration of symptoms, and affected side were recorded using a structured data collection form.

In Group A, patients underwent open surgical resection of the posterosuperior calcaneal prominence through a standard posterior or lateral approach. In Group B, patients underwent endoscopic calcaneoplasty, which involved the use of two small portals and arthroscopic instruments to remove the bony prominence and inflamed retrocalcaneal bursa. All procedures were performed by experienced orthopedic surgeons under standardized surgical and postoperative care protocols.

Postoperative outcomes were evaluated during follow-up visits over a 12-week period. The primary outcomes included pain intensity measured by the Visual Analog Scale (VAS) and functional outcome assessed using the American Orthopaedic Foot and Ankle Society (AOFAS) score. Secondary outcomes included postoperative complications such as wound infection, nerve irritation, and delayed healing, as well as the time required to return to normal daily activities.

All collected data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Quantitative variables were expressed as mean and standard deviation, while categorical variables were presented as frequencies and percentages. The independent sample t-test was used to compare continuous variables between the two groups, whereas the Chi-square test was applied for categorical variables. A p-value of ≤0.05 was considered statistically significant.

Ethical approval for the study was obtained from the Institutional Ethical Review Committee of Department of Orthopedics, Bahawal Victoria Hospital Bahawalpur, Pakistan. The study was conducted in accordance with ethical principles, and confidentiality and anonymity of all participants were strictly maintained throughout the research process.

RESULTS

A total of 60 patients diagnosed with Haglund's deformity were included in the study. The patients were divided into two groups: Group A (Open Surgery, n = 30) and Group B (Endoscopic Surgery, n = 30). Demographic characteristics, clinical outcomes, and postoperative complications were compared between the two groups.

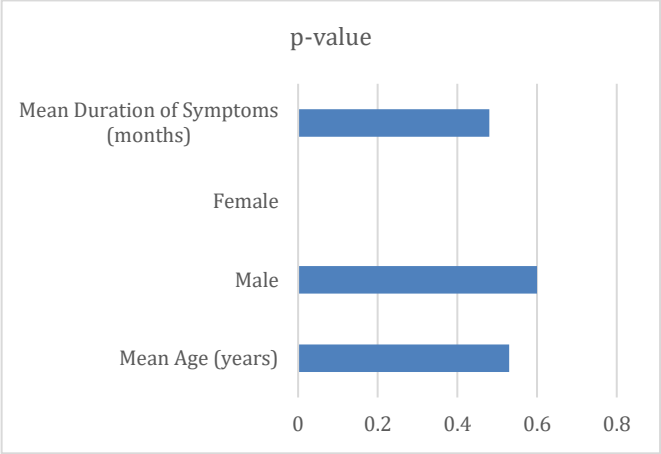
The mean age of patients in Group A was 41.2 ± 9.6 years, while in Group B it was 39.8 ± 8.7 years, showing no statistically significant difference ($p > 0.05$). The gender distribution showed that 18 (60%) patients in Group A were male and 12 (40%) were female, whereas in Group B 16 (53.3%) were male and 14 (46.7%) were female. The baseline demographic characteristics between the two groups were comparable.

Table 1

Demographic Characteristics of Patients

Variable	Group A (Open Surgery) n=30	Group B (Endoscopic Surgery) n=30	p-value
Mean Age (years)	41.2 ± 9.6	39.8 ± 8.7	0.53
Male	18 (60%)	16 (53.3%)	0.60
Female	12 (40%)	14 (46.7%)	
Mean Duration of Symptoms (months)	11.4 ± 3.2	10.8 ± 3.5	0.48

Figure 1



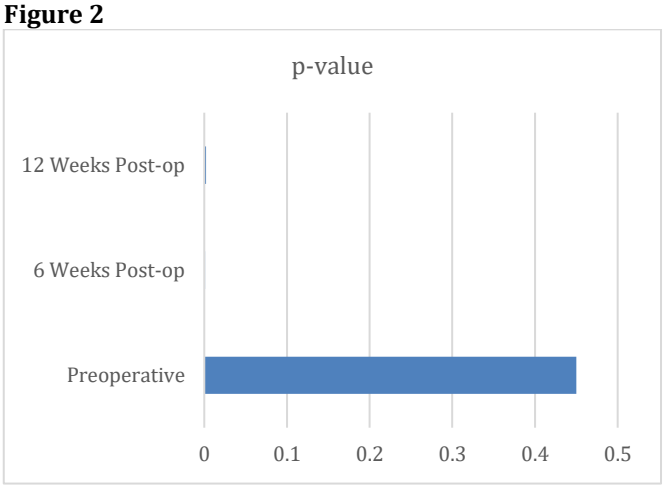
Postoperative pain scores were assessed using the Visual Analog Scale (VAS). The mean preoperative VAS score was similar in both groups. However, at 12 weeks postoperatively, the endoscopic group demonstrated significantly lower pain scores compared with the open surgery group.

Table 2

Comparison of Pain Scores (VAS)

Time Point	Group A (Open Surgery)	Group B (Endoscopic Surgery)	p-value
Preoperative	7.8 ± 1.1	7.6 ± 1.2	0.45
6 Weeks Post-op	3.9 ± 1.0	2.8 ± 0.9	0.001
12 Weeks Post-op	2.6 ± 0.8	1.7 ± 0.6	0.002

Figure 2



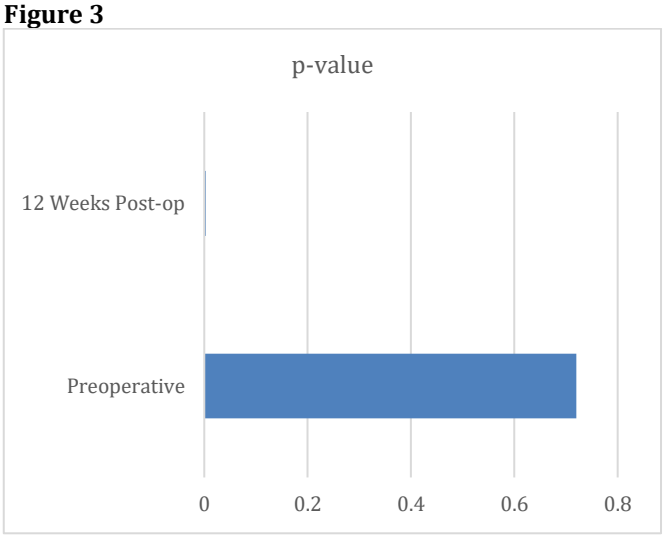
Functional outcomes were evaluated using the American Orthopaedic Foot and Ankle Society (AOFAS) score. Both groups showed significant improvement after surgery; however, patients in the endoscopic group had slightly better functional outcomes at the final follow-up.

Table 3

Functional Outcome (AOFAS Score)

Time Point	Group A (Open Surgery)	Group B (Endoscopic Surgery)	p-value
Preoperative	55.4 ± 8.3	56.1 ± 7.9	0.72
12 Weeks Post-op	82.6 ± 6.4	88.3 ± 5.7	0.003

Figure 3



Postoperative complications were also recorded and compared between the two groups. The open surgery group showed a higher complication rate, particularly wound-related problems, while the endoscopic group had fewer complications.

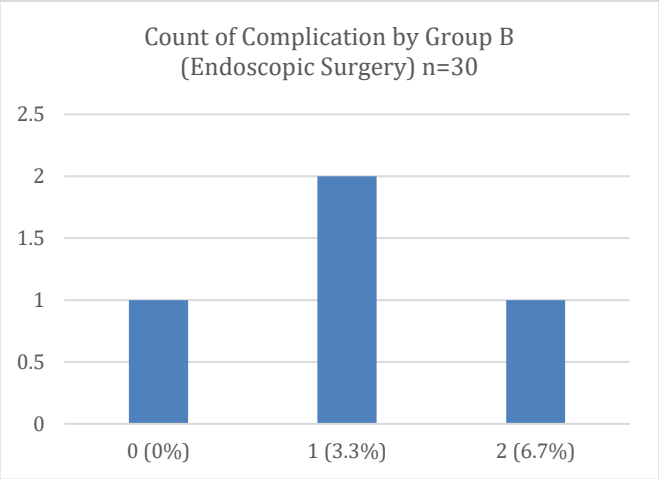
Table 4

Postoperative Complications

Complication	Group A (Open Surgery) n=30	Group B (Endoscopic Surgery) n=30	p-value
Wound Infection	3 (10%)	1 (3.3%)	
Nerve Irritation	2 (6.7%)	1 (3.3%)	
Delayed Wound Healing	3 (10%)	0 (0%)	

Total Complications	8 (26.7%)	2 (6.7%)	0.04

Figure 4



The time required to return to normal daily activities was shorter in the endoscopic surgery group (6.2 ± 1.4 weeks) compared with the open surgery group (8.5 ± 1.9 weeks), and this difference was statistically significant ($p < 0.05$).

Overall, the results demonstrated that endoscopic surgical treatment of Haglund's deformity resulted in lower postoperative pain, improved functional outcomes, fewer complications, and faster recovery compared with the open surgical approach.

DISCUSSION

Haglund's deformity is a common cause of posterior heel pain, characterized by a bony enlargement at the posterosuperior aspect of the calcaneus that leads to irritation of the surrounding soft tissues, particularly the Achilles tendon and retrocalcaneal bursa (Grambart et al., 2021; Strasser & Farina, 2021). Surgical intervention is considered when conservative treatments fail to relieve symptoms (Chen et al., 2022). The present study compared the outcomes of open versus endoscopic surgical treatment of Haglund's deformity, focusing on postoperative pain, functional outcomes, complications, and recovery time. The findings demonstrated that endoscopic surgery provided better postoperative outcomes and faster recovery compared with the open surgical approach (Alessio-Mazzola et al., 2021; Lughi, 2020).

In the present study, the demographic characteristics between the two groups were comparable, with no significant differences in age, gender distribution, or duration of symptoms. This similarity between groups helps ensure that the observed differences in outcomes were primarily related to the type of surgical technique used rather than patient-related factors. Similar demographic patterns have also been reported in previous studies investigating surgical treatments of Haglund's deformity, where the condition commonly affects adults between the third and fifth decades of life (Pargeon & Tjiattas-Saleski, 2023).

Pain reduction is one of the most important indicators of successful surgical treatment. In this study, both surgical approaches significantly reduced postoperative pain; however, the endoscopic group demonstrated significantly lower Visual Analog Scale (VAS) scores at 6 and 12 weeks postoperatively compared with the open surgery group. This finding may be attributed to the minimally invasive nature of endoscopic surgery, which results in less soft tissue trauma and faster healing (Alessio-Mazzola et al., 2021; Opdam et al., 2021). Previous research has also shown that endoscopic calcaneoplasty results in lower postoperative pain and improved patient comfort compared with traditional open techniques (Cusumano et al., 2021).

Functional outcomes assessed using the American Orthopaedic Foot and Ankle Society (AOFAS) score also showed significant improvement in both groups, with higher postoperative scores in patients who underwent endoscopic surgery. The improved functional outcomes observed in the endoscopic group may be due to the preservation of surrounding tissues and reduced postoperative stiffness. These findings are consistent with the study conducted by Rızvanoğlu et al. (2024), who reported that endoscopic treatment allowed patients to regain normal ankle function more rapidly compared with open surgical procedures.

Another important aspect evaluated in the present study was the rate of postoperative complications. The results indicated that the open surgery group experienced a higher rate of complications, including wound infection, delayed wound healing, and nerve irritation (Restuccia et al., 2021; Kilic et al., 2024). In contrast, the endoscopic group demonstrated fewer complications, likely due to smaller incisions and less tissue disruption (Alessio-Mazzola et al., 2021). These results align with previous literature, where open surgical procedures were associated with higher risks of wound complications due to the relatively large incision in the posterior heel region (Lughi, 2020).

Furthermore, the time required for patients to return to normal daily activities was significantly shorter in the endoscopic surgery group compared with the open surgery group. This finding highlights one of the major advantages of minimally invasive surgical techniques (Alessio-Mazzola et al., 2021; Opdam et al., 2021). Earlier studies have also reported faster rehabilitation and earlier return to work in patients undergoing endoscopic calcaneoplasty (Cusumano et al., 2021).

Despite these promising findings, the present study has some limitations. The study was conducted at a single tertiary care hospital with a relatively small sample size, and the follow-up duration was limited to 12 weeks, which may not fully capture long-term outcomes and recurrence rates. Future research with larger multicenter studies and longer follow-up periods is recommended to further validate the effectiveness and safety of endoscopic surgical techniques for the treatment of Haglund's deformity (Alessio-Mazzola et al., 2021).

Overall, the findings of this study support the growing body of evidence suggesting that endoscopic surgery is a safe and effective alternative to open surgical treatment for Haglund's deformity, offering advantages such as reduced postoperative pain, improved functional recovery, fewer complications, and faster return to daily activities (Lughi, 2020; Opdam et al., 2021).

CONCLUSION

This study compared the clinical outcomes of open and endoscopic surgical treatment for Haglund's deformity in terms of pain relief, functional recovery, postoperative complications, and return to normal activities. Both surgical approaches resulted in significant improvement in patient symptoms and functional scores after surgery. However, the findings demonstrated that endoscopic surgery provided superior outcomes compared with the open surgical technique. Patients treated with the endoscopic approach experienced lower postoperative pain, better functional improvement, fewer wound-related complications, and a shorter recovery period. In addition, the minimally invasive nature of endoscopic surgery allowed patients to return to their daily activities earlier than those who underwent open surgery.

Therefore, endoscopic calcaneoplasty appears to be a safe and effective alternative to traditional open surgery for the management of Haglund's deformity. Nevertheless, further studies with larger sample sizes and longer follow-up periods are recommended to confirm these findings and evaluate long-term outcomes.

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