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COMPARATIVE ASSESSMENT OF THE OUTCOMES OF CALCANEOPLASTY FOR HAGLUND DEFORMITY AND ACHILLOBURSITIS

[1]*Irismetov Murodjon Ergashevich, [2]Ni Gennady Vitalievich, [3]Rajabov Kurbon Nurmamatovich, [4]Usmonov Farrukh Mahamadzhanovich and [5]Kadyrov Sanjar Sardorovich

[1]Physician, Department of Arthroscopy, Republican Specialized Scientific-Practical Medical Center of Traumatology and Orthopedics.

[2]Doctor of Medical Sciences, Professor, Director of the Republican Specialized Scientific-Practical Medical Center of Traumatology and Orthopedics.

[3]PhD, Head of the Department of Arthroscopy, Republican Specialized Scientific-Practical Medical Center of Traumatology and Orthopedics.

[4,5]PhD, Physician, Department of Arthroscopy, Republican Specialized Scientific-Practical Medical Center of Traumatology and Orthopedics.

***Corresponding Author: Irismetov Murodjon Ergashevich**

Physician, Department of Arthroscopy, Republican Specialized Scientific-Practical Medical Center of Traumatology and Orthopedics.

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ABSTRACT

Recent years have seen an increasing demand for solutions to the problem of posterior heel pain associated with Haglund deformity and Achilles bursitis. This study examines the etiopathogenesis and results reported by other authors. It describes 126 clinical cases with this pathology and provides a comparative assessment of the effectiveness of endoscopic versus open calcaneoplasty at 3, 6, and over 12 months post-operation. Outcomes, evaluated using the AOFAS scale in the preoperative and postoperative periods, demonstrate superior results in the main group. The improved method of endoscopic calcaneoplasty achieves favorable outcomes in 95.2% of cases.

KEYWORDS: Haglund deformity, Achilles bursitis, endoscopy, calcaneus, Achilles tendon, calcaneoplasty.

INTRODUCTION

According to the World Health Organization, heel pain affects 42.1% of the population and represents a significant issue in modern traumatology and orthopedics.[1,5,6,13]

Factors such as mechanical overload, joint biomechanics disturbances, and specific occupational activities may contribute to the development of heel pathology.[2,8,10,18]

In cases of impingement syndrome caused by the collision between a prominent calcaneal tuberosity and the Achilles tendon, accompanied by deep bursitis, P. Haglund recommended surgical intervention when conservative treatment proved ineffective. This surgical procedure involves smoothing the posterior-superior surface of the calcaneal tuberosity.[3,13,16]

Without treatment, the progression of the disease significantly reduces the quality of life due to constant pain and discomfort. In some cases, Haglund's disease may lead to cyst formation, degenerative changes, and an increased risk of Achilles tendon rupture due to the constant pressure from the bony prominence.[4,9,18,19]

Numerous studies suggest that the treatment of Haglund deformity and Achilles bursitis should begin with conservative methods. Surgical intervention is indicated for patients who fail to respond to conservative treatment lasting 3 to 6 months.[5,11,18]

In analyzing open surgical methods for treating Haglund deformity, various approaches have been utilized. Almost all studies, except one, included resection of the retrocalcaneal bursa. G.M. Kavalesky and A.P. Sereda compared open surgical techniques for treating Haglund syndrome and their outcomes.[2,3] Marginal resection and bursa excision using a medial approach were performed by Kardanova, Angermann, Brunner, Leitze, Sella, and Schneider.[6,7,8,9,10] Sammarco described a marginal resection technique with partial Achilles tendon detachment and refixation using anchor sutures.[11] Anderson utilized lateral and central trans-tendinous approaches with tendon refixation via anchor sutures for cases where enthesis detachment exceeded 50%, accompanied by tuberosity resection and retrocalcaneal bursa excision. The choice of surgical approach often depends on the deformity's location, which typically occurs in the posterolateral part of the calcaneal tuberosity.[12]

Endoscopic correction of Haglund deformity was described by Van Dijk, Leitze, Jerosch, Morag, Scholten, and Sterkenburg. The procedure involves using two portals, with the patient positioned either prone or supine. Studies employed Van Dijk's technique, involving a two-portal method at the junction of the upper edge of the calcaneus and the distal Achilles tendon. Adequate resection was deemed achieved when no contact occurred between the Achilles tendon and the calcaneal tuberosity.[13,14,15,16,17]

Comparisons between open and endoscopic resection have been conducted by numerous researchers. According to the AOFAS scale, treatment outcomes and rehabilitation durations in both groups were similar (87.5 vs. 79.3 points, p = 0.115). Additionally, endoscopic methods reduced the risk of complications: superficial infections occurred in 3% of cases in the endoscopic group versus 12% in the open group, sensory disturbances in 10% versus 18%, and postoperative scar hypersensitivity in 7% versus 18%, respectively.

Purpose

The aim of the study is to compare the outcomes of endoscopic and open calcaneoplasty in patients with Haglund deformity and Achilles bursitis.

MATERIALS AND METHODS

The study involved a retrospective and prospective comparative analysis of the effectiveness of different treatment methods for Haglund deformity and Achilles bursitis, including clinical and functional assessments and the identification of risk factors for specific complications and disease recurrence. The analysis was based on data from the treatment of 126 patients with Haglund deformity and Achilles bursitis.

- **Comparison group:** 64 patients who underwent open calcaneoplasty.
- **Main group:** 62 patients who underwent endoscopic calcaneoplasty.

The average age of patients in the overall cohort was 47.7 ± 6.7 years (range 32–65 years); in the main group, it was 46.3 ± 6.8 years, and in the comparison group, it was 49.0 ± 6.2 years (p = 0.769). The majority of patients in both groups were women. Bilateral foot involvement was observed in 88.9% (112 out of 126) of cases, while left-sided pain was reported in 74.6% (94 out of 126) of patients.

All patients underwent the following diagnostic methods: clinical examination, standard lateral radiography, MRI of the ankle joint, and endoscopic diagnostic evaluation.

For determining the angle of exostosis osteotomy, the Y. Tourne method was employed, where:

- **X:** Total length of the calcaneus from the most anterior to the most posterior point (excluding calcifications).
- **Y:** Length of the tuberosity from the most posterior edge of the talar articular surface to the apex of Haglund's prominence.

The X/Y ratio was 2.70 under normal conditions and 2.07 in cases of deformity. An X/Y ratio of less than 2.5 was considered a reliable indicator of Haglund deformity.

MRI studies in coronal and sagittal sections were used to determine the morphology of the Achilles tendon attachment area and to measure linear dimensions. Measurements from coronal slices were used to calculate the enthesis area and assess the condition of the Achilles tendon, particularly at its attachment site, identifying structural disturbances, soft tissue swelling, inflammation of the retrocalcaneal bursa, and Haglund exostosis.

Clinical assessments of foot and ankle disorders were conducted using the American Orthopaedic Foot & Ankle Society (AOFAS) scale. Preoperative scores ranged from 42 to 82 points in the comparison group, with an average of 65.9 ± 13.3 points. In the main group, the average AOFAS score was 65.9 ± 11.6 (range 35–80), with no statistically significant differences (p = 0.993).

Open calcaneoplasty involved resection of the prominent part of the calcaneus via lateral or posterolateral approaches. In contrast, endoscopic calcaneoplasty was performed using two portals, allowing a comprehensive evaluation of the posterior heel region, including the condition of the deep bursa. Both calcaneoplasty techniques involved interventions on the soft tissues, including excision of the bursa at the Achilles tendon's insertion site and resection of the deformity itself.

RESULTS AND DISCUSSION

Clinical and functional outcomes were collected from all 126 patients preoperatively, as well as during early and late postoperative periods.

In the comparison group, the average Visual Analog Scale (VAS) score decreased from 7.06 ± 1.45 to 4.81 ± 1.10. Patients reported heel pain ranging from 3 to 6 points, which was statistically significantly lower than preoperative levels (Figure 1).

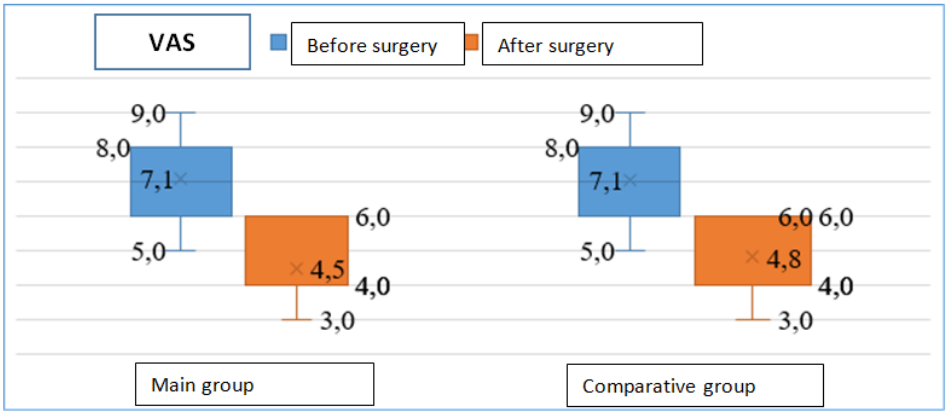

Figure 1: Dynamics of Pain Regression Based on VAS in the Early Postoperative Period.

The main group demonstrated a more favorable trend in pain reduction associated with Haglund deformity and Achilles bursitis, as confirmed by statistical analysis when compared to the comparison group (t = 2.09, p = 0.0351).

Functional Assessment Results

An analysis of the functional condition of the foot and ankle in the early postoperative period following surgical treatment for Haglund deformity and Achilles bursitis showed positive dynamics in each study group. A significant difference was observed between preoperative and postoperative AOFAS scores in both groups.

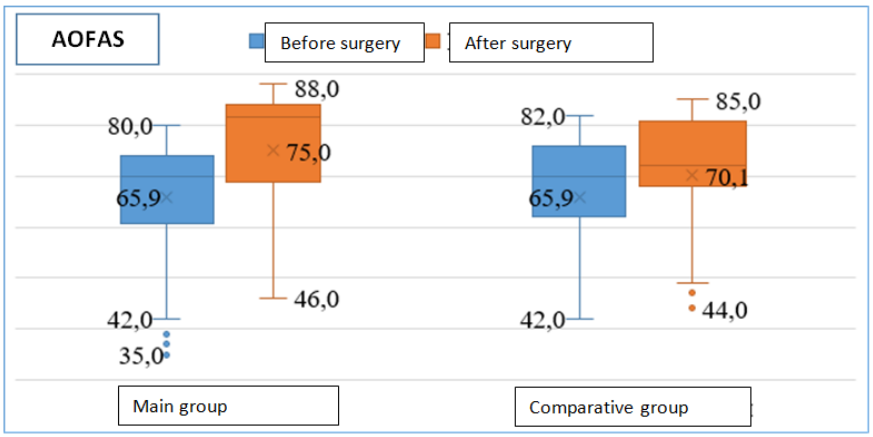

Figure 2: Dynamics of Regression of Functional Limitations Based on AOFAS.

Notable Findings in the Main Group

In the main group, where the developed endoscopic method was applied, statistically significant differences in AOFAS scores were observed compared to the comparison group (Figure 2). Specifically, while AOFAS scores in the comparison group increased from a mean of 65.91 ± 13.31 to 70.14 ± 13.09, the main group demonstrated higher scores upon patient discharge—75.02 ± 12.16 (t = 2.41, p = 0.016).

Thus, the functional condition of the foot and ankle joint, as measured by AOFAS, was rated as satisfactory by most patients immediately post-surgery, with a higher frequency of good outcomes in the main group.

Evaluation Using the Groulier Scale

Before discharge, patients' foot and ankle conditions were also evaluated using the specialized Groulier scale, which includes functional activity measurements such as walking distance. The mean scores differed significantly between the groups, with the main group achieving better outcomes—57.23 ± 13.83 points compared to 51.19 ± 14.58 points in the comparison group (t = 2.5, p = 0.0093).

POSTOPERATIVE COMPLICATIONS

- **Comparison group (open surgery)**
  - Early postoperative complications occurred in 18.8% of cases.
  - Complications included transient paresthesia around the wound (9.4%), superficial infection (4.7%), pronounced pain at the incision site (3.1%), delayed wound healing (4.7%), heel numbness (1.6%), hematoma (1.6%), complex regional pain syndrome (1.6%), and sural nerve neuropathy (3.1%).

- No cases of repeat or revision surgeries were reported.

- **Main group (endoscopic surgery)**
- Early postoperative complications occurred in 4.8% of cases (3 out of 62).
- Reported complications included sural nerve neuropathy (1.6%), heel numbness (1.6%), and pronounced pain at the portal site (1.6%).
- No repeat or revision surgeries were recorded during the hospital observation period.

Dynamics of AOFAS Scores

Analysis of AOFAS score dynamics revealed that:

- At 3 months post-surgery, the mean AOFAS score in the comparison group was 76.45 ± 17.06, significantly lower than the 83.03 ± 15.8 in the main group (t = 6.62, p = 0.027).
- As shown in Figure 3, statistically significant better outcomes were observed in the main group at both 6 months and 12 months post-surgery.

This indicates a high proportion of excellent and good results achieved with endoscopic surgery.

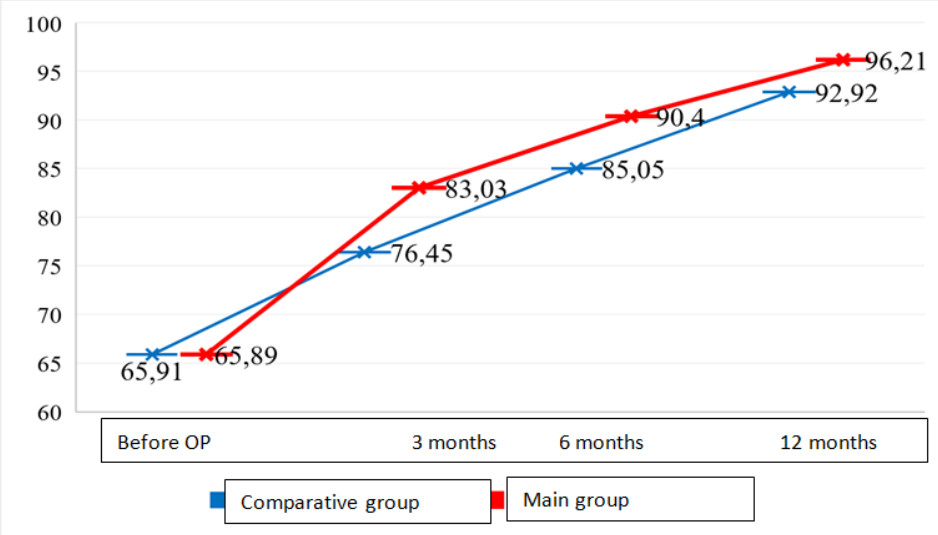

Figure 3: Functional Improvement Trends Based on AOFAS.

The long-term outcomes further support the efficacy of endoscopic calcaneoplasty, demonstrating sustained functional improvements over time.

CONCLUSIONS

The application of the proposed diagnostic and therapeutic algorithm for managing patients with Haglund deformity and Achilles bursitis, including the active use of endoscopic calcaneoplasty based on the developed technique, demonstrated superior outcomes across all study periods.

This approach led to a significant reduction in the frequency of early complications, from 18.8% to 4.8% (p = 0.025), and improved the functional condition of the foot and ankle joint.

The improvements were reflected in increased AOFAS scores, rising from 70.1 ± 13.1 to 75.0 ± 12.2 (t = 2.41, p = 0.016), as well as enhanced general condition scores, which increased from 51.2 ± 14.6 to 57.23 ± 13.83 (t = 2.5, p = 0.0093).

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