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Research Article

THE OPERATIVE TREATMENT OUTCOMES OF CHRONIC HINDFOOT PAIN WITH POSTERIOR ANKLE ENDOSCOPY

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Abstract: *The purpose of this study was to assess the outcome of hindfoot endoscopy and to show the availability of this technique by short- to mid-term outcomes on 27 consecutive patients. A case series of 27 patients, mean age 19-63 (mean37.6), 15 males and 12 females, diagnosed and treated for chronic hindfoot pain were included for the study between 2010-2016. All these patients were initially treated conservatively. If conservative treatment is insufficient to alleviate symptoms, posterior ankle endoscopy is performed. Patient data included age, gender, the location and the pattern of the foot, follow-up, the time delay from symptom onset to operation, surgeries, the length of hospitalization, the pain scores (AOFAS, VAS), time to return to work, and complications. Of the 27 patients, 8 had posterior ankle impingement syndrome, 7 had isolated flexor hallucis longus (FHL) tenosynovitis, 2 had a loose body, 3 had subtalar joint arthrosis, 1 had Achilles tendinitis and 6 had peritendinitis. Symptom duration until the operation was 6-22 months (mean 13.2 months). The patients who underwent arthroscopic surgery resumed their work a mean time of 2-6 months (mean 2.5 months) after the surgery. All patients returned to their previous lives without any limitation or recurrence. Mean follow-up 46.5 months (21-96 months). AOFAS score was preoperative 44-63 (mean 51.4) and postoperative was 92-100 (mean 96.37). The VAS score was preop 5-8 (mean 6.4) and postop 0-2 (mean 0.62). One patient had a partial arterial injury that was repaired, and four patients had mild joint stiffness. Functional and clinical evaluations following hindfoot endoscopy revealed that all patients were very satisfied. Thus, posterior ankle endoscopy is an effective and rewarding treatment method in the case of continuing chronic hindfoot pain after failed non-surgical treatment modalities.*

Keywords: *Hindfoot, posterior ankle, endoscopy*

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1. Introduction

Acute or repeated compression of soft tissues between the tibia posterior plafond and calcaneus during plantar flexion of the ankle causes PAIS symptoms [1,2]. If there are bony parts such as the os trigonum, bony impingement occurs [1]. PAIS is a clinical disease characterized by posterior ankle pain during plantar flexion. In the forced hyper plantar flexion test, if the patient experiences pain at the moment of impaction, the test is positive. Doing the test passively by the doctor and bringing the patient's foot to hyper plantar flexion is very important for the diagnosis. Soft tissue pathologies (such as flexor hallucis longus tenosynovitis, Achilles tendinitis, retrocalcaneal bursitis), or bone and chondral defects (such as tarsal coalition, osteochondritis), or neurovascular pathologies (such as sural nerve compression and tarsal tunnel syndrome) may cause posterior ankle pain [3].

In the posterior ankle and subtalar pathologies, the two–portal posterior ankle arthroscopic approach was first described by van Dik [3]. The surgical technique quickly gained popularity among orthopedists due to its simplicity and applicability. In recent years, advances in arthroscopy have increased with the development of arthroscopic devices and the development and introduction of new thinner and more functional arthroscopic devices.

With these developments, closed approach preferences increased in hindfoot pathologies and successful series was started to be published consecutively in hindfoot endoscopy. In this study, we wanted to share the mid-term results of our patients who underwent surgery with the endoscopic hindfoot.

2. Material and Methods

Twenty-seven patients, mean age 19-63 (mean 37.6), 15 males and 12 females, diagnosed and treated for chronic hindfoot pain were included for the study between 2010-2018. In our hospital, conservative treatment methods are applied to patients as the first treatment. If conservative treatment is insufficient to alleviate symptoms posterior ankle endoscopy is performed. Patient data included age, gender, the location and the pattern of the foot, follow-up, the time delay from symptom onset to operation, surgeries, the length of hospitalization, the pain scores (AOFAS, VAS), time to return to work, and complications.

After the patients were examined, direct radiography and MRIs were taken. Patients had increased posterior and posterior medial ankle pain when the ankle was in plantarflexion. Patients with previous operations, acute cases, and patients with additional pathology of the forefoot were excluded from the study.

The patients were operated on the operating table in prone position and under spinal anesthesia. Since there was no additional pathology related to the forefoot, no portal was needed except for classical medial and lateral portals. There were no intraoperative and early postop complications. Cephalosporin was given prophylactically. Clinical and radiographic follow-up was performed routinely in all patients at the 2nd, 6th, and 12th weeks and 12th months after surgery.

In all patients, passive-active home exercises, elevation, and ice application are started from postop 1 day. Patients are included in the physical therapy and rehabilitation program starting from the 1st month based on their general condition.

Numerical data obtained in the study are shown as mean ± SD, (min-max), categorical data as frequency and percentage values.

Ethical Statements

The study was approved by the Ethics Committee of Dicle University Faculty of Medicine (325/22.10.2020). All data were obtained without a personal identification document and made in accordance with the Declaration of Helsinki regulation.

3. Results

Of the 27 patients, eight had posterior ankle impingement syndrome, seven had isolated flexor hallucis longus (FHL) tenosynovitis, two had a loose body, three had subtalar joint arthrosis, one had Achilles tendinitis and six had peritendinitis. Symptom duration until the operation was 6-22 months (mean 13.2month). The patients were discharged after an average of 1.2 days (range1-2 days) and gradual mobilization started within the first week.

The patients who underwent arthroscopic surgery resumed their work a mean time of 2-6 months (mean 2.5 months) after the surgery. All patients returned to their previous lives without any limitation or recurrence. Mean follow-up was 46.5 months (21-96 months). AOFAS score was preoperative 44-63

(mean 51.4) and postoperative was 92-100 (mean 96.37). The VAS score was preop 5-8 (mean 6.4) and postop 0-2 (mean 0.62) (Table 1). One patient was re-operated due to repeated swelling. A. Tibialis Posterior was found to be damaged and the artery was repaired. Four patients had mild joint stiffness.

Table 1. Patient and treatment data

Cases	Age	Pain full foot	SOMS time Month	AOFAS Pre op	AOFAS Final	VAS Pre op	VAS Final	Return to work	Follow up-month	COMP
1	29	R-Os Trigonum	13	55	96	6	1	2 M	54	
2	38	R-tenosynovit	15	48	98	6	0	3M	35	
3	24	L-Achilles Tendinitis	11	44	94	7	1	3M	28	
4	29	R-Os Trigonum	6	63	98	5	0	2M	47	
5	39	R-Subtalar arthrosis	8	56	98	6	0	2M	55	
6	56	R-Achilles Tendinitis	11	59	94	6	1	3M	62	
7	44	R-Os Trigonum	7	54	100	5	0	6M	37	
8	38	L-tenosynovit	7	49	94	7	2	3M	66	mild stiffness
9	22	L-Os Trigonum	14	44	100	8	0	2M	51	
10	29	L-Subtalar arthrosis	11	58	96	6	1	2M	52	
11	63	R-Os Trigonum	12	61	100	5	0	2M	39	
12	29	L-Subtalar loose body	12	48	100	7	0	2M	19	
13	61	R-tenosynovit	18	46	94	7	1	3M	47	
14	25	R- Os Trigonum	19	48	100	7	0	2M	42	
15	24	L-Os Trigonum	17	45	100	8	0	2M	43	
16	57	L-Achilles Tendinitis	13	51	94	6	1	3M	59	
17	62	R-Subtalar arthrosis	12	54	94	6	1	2M	96	
18	23	R-tenosynovit	9	53	92	5	2	3M	84	mild stiffness Arterial injury
19	33	L-Achilles Tendinitis	7	46	94	8	1	2M	76	
20	32	R-tenosynovit	11	45	94	8	1	3M	29	
21	48	R-Achilles Tendinitis	17	48	95	7	1	3M	32	

Table 1 Continued.

Cases	Age	Pain full foot	SOMS time Month	AOFAS Pre op	AOFAS Final	VAS Pre op	VAS Final	Return to work	Follow up-month	COMP
22	43	R-tenosynovit	14	44	92	8	1	2M	37	mild stiffness
23	35	R-Subtalar loose body	16	54	100	6	0	2M	21	
24	29	R-Os Trigonum	12	59	100	7	0	2M	30	
25	19	L-Achilles Tendinitis	17	55	92	6	1	3M	45	
26	41	L-tenosynovit	22	51	94	5	1	3M	49	mild stiffness
27	45	L-Os Trigonum	26	50	100	5	0	2M	22	

AOFAS: American Orthopaedic Foot and Ankle Society; VAS: visual analog scale; SOMS: Symptoms; COMP: Complications

4. Discussion

In this study, the posterior endoscopic procedure used in the treatment of PAIS gave satisfactory results. Although there is a small group of patients in our study, it contains important results data related to arthroscopic technique. A comprehensive clinical examination was performed to diagnose PAIS and diagnostic imaging was requested in all patients. Usually, isolated flexor hallucis longus tenosynovitis, Achilles tendinitis, and peritendinitis pathologies are usually treated non-operatively. When conservative treatment for PAIS failed, the traditional treatment was ankle arthrotomy. Complication rates after open surgery are higher (24%) [4]. Compared to open surgery, arthroscopic surgery has advantages such as less postoperative pain, fewer signs of infection, less rehabilitation time, and less blood loss. In the posterior ankle and subtalar pathologies, the two–portal posterior ankle arthroscopic approach was first described by van Dik [3]. We believe that endoscopic ankle surgery is easier to see and treat existing pathologies in the ankle than open surgery. Arthroscopic treatment results in PAIS lesions have been reported in many studies [5,6]. Williams and Ferkel reported good or excellent results in 86% of patients [7]. We have reached similar results in this study. In our study, all patients did not have any complications or recurrences and returned to previous ambulatory levels with satisfactory scores in all outcome measures.

Unlike other patients, athletes may need to return to sports quickly, so surgical treatment can be done at the beginning or early stage of the treatment process. In patients with FHL tenosynovitis, conservative treatment takes a long time and usually does not completely improve the patient's symptoms. Patients are operated on to excise the inflammatory soft tissue and bone protrusion, and achieve a full plantar flexion without any compression. FHL tenosynovitis is common in professions that require enforced plantar flexion, such as football and ballet dancers. It may also because FHL tenosynovitis in os trigonum, simple cysts, flexor digitorum accessories muscle and dorsal talar spurs [8]. Os trigonum is seen in 7-14%of adults [9]. The osseous part of the os trigonum may have cartilage around its circumference, making it appear smaller on radiographs than the actual size [10]. Os trigonum excision causes a decrease of FHL tenosynovitis in hindfoot endoscopy [11]. When examining FHL tenosynovitis surgically, both superomedial and inferomedial quadrants should be examined completely; otherwise, the diagnosis of tenosynovitis may be overlooked. Miyatomo et al. [1] in series of patients with posterior ankle pain in 63% of patients, Scholten et al. [12] in 63% of patients, Tahir et al.[13] observed 100% FHL tenosynovitis in their series of 60 patients. We detected FHL tenosynovitis in all

patients with os trigonum, but unlike other studies, we detected FHL tenosynovitis without os trigonum in 55.5% of the patients in our study.

Synovial osteochondromatosis (loose body) is the formation of hyperplastic cartilage nodules in the joint synovium or cavity [14]. Its classical treatment is to remove loose bodies and total synovectomy with arthrotomy. After an open surgical approach, long-term immobilization, wound problems are shown [14]. The arthroscopic approach results in fewer complications than the open technique. There were three loose body cases in our study and we performed loose body excision and total synovectomy without any complications.

In the literature, the excellent outcome rate from arthroscopic resection of osteophytes for tibiotalar arthrosis is 72 to 98% [15]. Similar to knee osteoarthritis, arthroscopy should be the first choice for patients with low-grade degenerative ankle osteoarthritis (egg, locking, effusion, bone stroke) with mechanical symptoms. van Dijk mentioned that the ongoing complaints in patients treated with arthroscopy are caused by other ankle structures that are injured after trauma [3]. In our study, there were three cases of low-grade osteoarthritis and we applied surgical treatment 100% successful outcome without any complications.

Spennacchio et al. [16] classified the complications of PAIS surgery into two groups as minor and major. Minor complications (< 7percentage) are superficial infections, temporary stiffness, temporary numbness, or paraesthesia. Major complications (<2%) are deep wound infections, permanent pain, or other problems that require reoperation. Due to the closeness of the medial neurovascular bundle to the posteromedial portal and the posterolateral portal of the sural nerve, there is a risk of neurovascular structures injury in the posterior arthroscopy. Feiwell and Frey showed that the tibial nerve was approximately 7.5 mm from the posteromedial port, and the sural nerve was 6.0 mm from the posterolateral portal [17]. Good anatomy knowledge and experience are required to reduce complications during posterior arthroscopy. Enlarged arthroscopic portal or preoperative steroid injections increase the likelihood of developing infections. Nickisch et al. found a complication rate of 8.5% in 189 patients [18]. Blázquez et al. [19] in their retrospective study, found a 12% complication rate. The complication rate of our study is 18%. In our study, no infection was observed in patients. Four of our patients had mild stiffness. The patients were taken to the physical therapy program and treated. One patient was re-operated due to repeated swelling. A. Tibialis Posterior was damaged and the artery was repaired.

5. Conclusion

Functional and clinical evaluations following hihdfoot endoscopy revealed that all patients were very satisfied. Thus, posterior ankle endoscopy is an effective and rewarding treatment method in skilled hands in the case of continuing chronic hindfoot pain after failed non-surgical treatment modalities.

Ethical Statements: The study was approved by the Ethics Committee of Dicle University Faculty of Medicine (325/22.10.2020). All data were obtained without a personal identification document and made in accordance with the Declaration of Helsinki regulation.

Conflict of interest: The authors declare that they have no conflict of interest.

Authors' Contributions: The authors declare that their contribution to the work is equal.

The compliance to the Research and Publication Ethics: This study was carried out in accordance with the rules of research and publication ethics.

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