

Hindfoot Endoscopy: Correlation of the Preoperative Indications with the Perioperative Endoscopic Findings

Ardayak Endoskopisi: Preoperatif Endikasyonların Perioperatif Endoskopik Bulgular ile Korelasyonu

A.Meriç ÜNAL*

*: Süleyman Demirel
Üniversitesi Tıp Fakültesi
Spor Hekimliği Anabilim
Dalı ISPARTA

Yazışma Adresi:
Yrd. Doç. Dr. Meriç ÜNAL
Süleyman Demirel
Üniversitesi, Tıp Fakültesi,
Spor Hekimliği Anabilim
Dalı / ISPARTA
abdmunal@yahoo.com
Phone: 05454751535

Öz

Amaç: Bu çalışmanın amacı, ardayak endoskopisi ile tedavi edilen patolojilerin değerlendirilmesi ve kombine patolojilerin oranları ve tiplerinin belirlenmesidir. Çalışmanın ikinci amacı ise operasyon öncesi ve ardayak endoskopisi sırasında saptanan bulguların değerlendirilmesidir.

Hastalar ve Metod: 2010-2015 yılları arasında ardayak endoskopisi uygulanan 77 hastanın 81 ayak bileği değerlendirmeye alınmıştır. Tüm hastaların demografik bilgileri, preoperatif fizik muayene ve radyolojik bulguları ve operasyon notları gözden geçirilmiştir. Operasyon öncesi tüm hastalara standart ayak bileği fizik muayene testleri uygulanmıştır. Yine tüm hastaların yüklenmede ayak bilek ön-arka ve yan direkt radyografileri alınmıştır. Manyetik rezonans görüntüleme ise direkt radyografide belirgin kemik sıkışması olan hastalar hariç tüm hastalara uygulanmıştır. Ardayak endoskopisi tüm hastalara genel ya da spinal anestezi altında pron pozisyonunda van Dijk ve ark. tarafından tanımlanmış olan standart posteromedial ve posterolateral portaller kullanılarak uygulanmıştır.

Sonuçlar: Bu olgu serisinde en sık saptanan preoperatif endikasyonlar fleksör hallucis longus tendinopatisi (%27.1), ayak bileği posterior sıkışma sendromunun önemli bir sebebi olan semptomatik os trigonum (%22.2) ve insersiyonel aşıl tendinopatisi (%20.9) olarak bulunmuştur. En sık saptanan endoskopik bulgular ise sırası ile fleksör hallucis longus tendinopatisi (%33.3), semptomatik os trigonum (%19.3) ve retrokalkaneal bursit (%16.2) olarak saptanmıştır. 16 hastada preoperatif kombine patoloji saptanmıştır. 32 hastada ise ardayak endoskopisi sırasında preoperatif endikasyonlara yeni bir endikasyon eklenmiştir.

Çıkarımlar: Ardayak endoskopisinin en sık endikasyonları ayak bileği posterior sıkışma sendromu ve aşıl tendon çevresi patolojileri olarak belirtilebilir. Operasyon sırasında saptanabilecek yeni endikasyonlar ve nadir durumlar konusunda uyanık olmak gerekmektedir.

Anahtar Kelimeler: Ardayak endoskopisi, ayak bileği posterior sıkışma, endikasyonlar, aşil tendinopatisi, fleksör hallusis longus tendinopatisi
Kantı Düzeyi: IV, Olgu serisi

Abstract

Background: The aim of this study was to review the disorders treated with hindfoot endoscopy and investigate the detected ratio and type of combined pathologies. The second aim was to evaluate the preoperative and peroperative findings before and at the time of hindfoot endoscopy.

Patients and Methods: 81 hindfoot endoscopies of the 77 patients performed between 2010-2015 were reviewed. Demographic informations, preoperative physical and radiological findings and operative data of all patients were noted. Preoperative physical examination for hindfoot was performed in a standart fashion for all patients. Weight-bearing anteroposterior and lateral radiographs were taken for all patients. Magnetic resonance imaging(MRI) was performed to all patients except obvious prescence of bony impingement. The hindfoot endoscopy was performed to all patients at prone position under either spinal or general anesthesia with standart posteromedial and posterolateral portals described as Van Dijk et al.

Results: In this case series; the most detected preoperative indications were flexor hallucis longus tendinopathy(27.1%), symptomatic os trigonum(22.2%) as a cause of posterior ankle impingement and insertional achilles tendinopathy(20.9%). The most detected endoscopic findings were flexor hallucis longus tendinopathy(33.3%), symptomatic os trigonum(19.3%), and retrocalcaneal bursitis (16.2%).16 patients(19.7%) had preoperatively detected combined pathologies. In 32 patients (39.5%), a new indication was added to preoperative indication.

Conclusion: Posterior ankle impingement and

peri-achilles pathologies are the most seen indications for this technique. It is important that we all must aware of perioperatively detected new indications and rare conditions.

Keywords: Hindfoot endoscopy, posterior ankle impingement, indications, posterior ankle arthroscopy, achilles tendinopathy, flexor hallucis longus tendinopathy

Level of Evidence: Level-IV case series

Introduction

With the technical developments in arthroscopic surgery, many joints and death spaces have become visualized in closed manner and the first anterior ankle arthroscopy was performed by Watanabe in early 1970's(1). Because of the difficulty of visualization of posterior compartment of the ankle and hindfoot region because of its deep anatomy, endoscopic posterior ankle approach had become a necessity. In 2000, Van Dijk et al. first described the posterior endoscopic approach to the hindfoot region in prone position via posterolateral and posteromedial portals(2). By the introduction of this new technique, several articular and periarticular structures at the posterior ankle region became easily visualized and several known disorders became curable endoscopically instead of open techniques(2). New disorders and indications for hindfoot endoscopy also be defined after the introduction of the technique.

Since the hindfoot endoscopy defined, indications and treatment of hindfoot pathologies increased by years. The indications are basicly divided into two main parts as articular and periarticular pathologies(3). The most common periarticular pathologies are posterior ankle impingement, flexor hallucis longus(FHL) tendinopathy, os trigonum (may be evaluated as a part of impingement) and achilles tendinopathy. The articular pathologies are osteochondral defects of posterior talus, osteoarthritis, talar bone cysts and bone tumors.

There are also some pathologies rarely seen in hindfoot region such as pigmented villonodular synovitis, chondromatosis, loose bodies, retrocalcaneal bursitis, accessory flexor digitorum longus tendon and frozen ankle (3,4,5,6). Additionally the combination of these pathologies such as FHL tendinopathy with symptomatic os trigonum or Haglunds deformity with retrocalcaneal bursitis can also be seen but the ratio and the types of combinations were not well known.

We have three questions considering the above discussed issues. At the first sight what are the most treated disorders with hindfoot endoscopy? Second is the preoperative indications change peroperatively. The last one is the ratio and type of the combined pathologies seen in hindfoot region.

Considering the above questions the prior aims of the present study is to review the disorders treated with hindfoot endoscopy and investigate the detected ratio and type of the combined pathologies. And latter is to evaluate the preoperative and peroperative findings before and during the hindfoot endoscopy.

Patients and Methods

81 hindfoot endoscopies of the 77 patients which were performed between 2010-2015 retrospectively evaluated. Patients demographics, preoperative physical and radiological findings and the operative data were investigated from the patients medical files.

Preoperative physical examination for hindfoot was performed in a standart fashion in all patients. Palpation of posterior talar process and hyperplantarflexion tests were performed. Posteromedial and posterolateral deep ankle pains were evaluated with the palpation of posterior parts of medial and lateral malleolus. Achilles tendon was also palpated from musculoskeletal junction to calcaneal insertion in all patients in order to evaluate achilles

tendinous part disorders and insertional achilles tendinopathy.

Weight-bearing anteroposterior and lateral radiographs were taken for all patients. Magnetic resonance imaging(MRI) was performed in all patients except obvious presence of bony impingement. Computed tomography was performed to one patient that had a bone cyst at distal posterior tibia.

The hindfoot endoscopy was performed to all patients at prone position under either spinal or general anesthesia with standart posteromedial and posterolateral portals described as Van Dijk et al(2). In cases of retrocalcaneal bursitis, an additional low posterolateral portal was used in case of necessity. All surgeries were performed by a single arthroscopic surgeon.

In all cases, after the endoscopic determination of the FHL tendon which is an important anatomical landmark for starting hindfoot endoscopy, a diagnostic endoscopy was performed to confirm the preoperative indication(s) and to detect any pathology besides the preoperative diagnosis.

Results

81 ankles of the 77 patients(29 male, 48 female) were treated with hindfoot endoscopy. 44(54.3%) of 81 ankles were left and 37 (45.7%) were right. The mean age of the patients was 51.2 years(range 13-82 years).

In this case series; mostly detected preoperative indications were FHL tendinopathy(27.1%), os trigonum(22.2%) as a cause of posterior ankle impingement and insertional achilles tendinopathy(20.9%). The rarest indications were distal posterior tibial bone cyst(one patient), foreign body at hindfoot region(one patient) and osteochondral lesion of talus(one patient). All preoperative indications were listed at Table-1.

Mostly detected endoscopic findings were os trigonum(19.3%), FHL tendinopathy(33.3%), and retrocalcaneal bursitis(16.2%). The rarest findings were foreign body at hindfoot(one

patient), distal posterior tibial bone cyst(one patient), tibialis posterior nerve adhesion(one patient) and flexor digitorum accessorius longus tendon(one patient). All peroperative endoscopic findings were listed at Table-2.

16 patients(19.7%) had preoperatively detected combined pathologies. Among these patients 37.5% of the cases had FHL tendinopathy with symptomatic os trigonum and 18.7% had Haglunds deformity with retrocalcaneal bursitis as combined pathology preoperatively(Table-3).

In 2 patients(2.4%), preoperative indications were changed in peroperative endoscopic evaluation. In these patients preoperative indication of insertional achilles tendinopathy was changed to FHL tendinopathy peroperatively. In 32 patients(39.5%), a new indication was added to preoperative indication. The mostly added indications to primary preoperative indication were FHL tendinopathy (53.1%), loose bodies(15.6%) and retrocalcaneal bursitis(15.6%)(Table-4).

Table-1: Primary preoperative indications of hindfoot endoscopy

Preoperative Indications	Case (Total:81)	Case %
FHL tenosynovitis	22	27.1
Symptomatic os trigonum	18	22.2
Insertional achilles tendinopathy	17	20.9
Retrocalcaneal bursitis	12	14.8
Haglunds deformity	6	7.4
Peroneal tendinopathy	3	3.7
Tibial bone cyst	1	1.2
Osteochondral lesion of talus	1	1.2
Foreign body	1	1.2

Table-2: Peroperative endoscopic findings during hindfoot endoscopy

Endoscopic Findings	Total:129	Case %
FHL tenosynovitis	43	33.3
Symptomatic os trigonum	25	19.3
Retrocalcaneal bursitis	21	16.2
Insertional achilles tendinopathy	15	11.6
Haglunds deformity	7	5.4
Loose bodies	5	3.8
Peroneal tendinopathy	4	3.1
Osteochondral lesion of talus	3	2.3
Subtalar arthrosis	2	1.5
Tibial bone cyst	1	0.7
Foreign body	1	0.7
Flexor digitorum accessorius longus tendon	1	0.7
Tibialis posterior nerve adhesion	1	0.7

Table-3: Preoperatively detected combined pathologies for hindfoot endoscopy

Preoperative Combined Pathology	Case (Total:16)	Case %
FHL tendinopathy / Symptomatic os trigonum	6	37.5
Haglunds deformity / Retrocalcaneal bursitis	3	18.7
FHL tendinopathy / Peroneal tendinopathy	1	6.2
FHL tendinopathy / Haglunds deformity	1	6.2
Peroneal tendinopathy / Symptomatic os trigonum	1	6.2
Symptomatic os trigonum / Osteochondral lesion of talus	1	6.2
Insertional achilles tendinopathy / Retrocalcaneal bursitis	1	6.2
Insertional achilles tendinopathy / Symptomatic os trigonum	1	6.2
Insertional achilles tendinopathy / Haglunds deformity	1	6.2

Table-4: Peroperatively added pathologies to primary preoperative indication of hindfoot endoscopy

Endoscopically Detected New Pathology	Case (Total:32)	Case %
FHL tendinopathy	17	53.1
Loose bodies	5	15.6
Retrocalcaneal bursitis	5	15.6
Subtalar arthrosis	2	6.2
Osteochondral lesion of talus	1	3.1
Tibialis posterior nerve adhesion	1	3.1
Flexor digitorum accessorius longus tendon	1	3.1

Discussion

The most detected primary preoperative indication was FHL tendinopathy and the second one was os trigonum. Both indications may be evaluated as a part of posterior ankle impingement syndrome. Our youngest patient was 13 and the oldest patients was 82 years old. It showed us, this technique can be performed in very wide range of age starting from childhood.

Only in two cases, our preoperative indication was changed peroperatively but the changed indication was also treated with hindfoot endoscopy also. We did not need to change our technique in these two cases. In nearly half of the patients new pathologies detected peroperatively besides primary indications. FHL tendinopathy, loose bodies and retrocalcaneal bursitis were the most added indication to our primary indication. It was thought that these newly added peroperative indications were difficult to detect preoperatively but it was not clinically important because they all could be treated at the same time with primary pathology with hindfoot endoscopy.

Combined pathologies also can be seen in hindfoot endoscopy cases. These conditions can be detected preoperatively or perioperatively. In 16 cases we could detect combined pathologies preoperatively but more than this, in 32 cases we detected at least one more pathology than preoperative primary pathology in endoscopic examination. This suggests us, it is very important to evaluate the patient preoperatively and also perform hindfoot endoscopic examination very carefully to avoid misdiagnose.

Oğut et al. performed 60 hindfoot endoscopy to 59 patients in their series. Nearly two thirds of their cases were men and the mean age of the patients was 36.9 (16-65)years. More than 50% of their indications were posterior ankle impingement, isolated FHL tenosynovitis and osteochondral lesion of talus. For one talus fracture case they performed hindfoot endoscopy. They also noted that FHL synovitis may be higher than expected previously reported(4).

Spennacchio et al. reported a systematic review about evidence-based indications for the hindfoot endoscopy. They reviewed 22 articles of posterior ankle impingement, 4 FHL tendinopathy, 4 osteochondral defects, 9 subtalar joint osteoarthritis and one or two articles of the other rare causes. There was no level I or II studies used in this review. Considering their review hindfoot endoscopy is an effective technique for treatment of several articular and periarticular pathologies of hindfoot such as osteochondral lesions, bone cysts, FHL tendinopathy, os trigonum, achilles tendinopathy. And additionally, posterior ankle impingement and osteochondral lesions of talus were the most seen indications(3).

De Leeuw et al. divided indications into two parts as articular and periarticular indications. In their review, the main articular site indications were loose bodies, posttraumatic calcifications, avulsed fragments, osteophytes, synovitis, osteochondral lesions and

chondromatosis. For periarticular site; posterior ankle impingement, FHL tendinopathy, retrocalcaneal bursitis, achilles tendinopathy, peroneal tendinopathy and neurovascular pathologies could be detected(5).

Compatible with the literature our most detected indications(FHL tendinopathy and symptomatic os trigonum) were also two components of posterior ankle impingement (7,8,9,10,11). It was emphasized that FHL tendinopathy was also seen more than expected. This study also supports this argument.

Different from literature we had younger and older patients(4,12,13). Our youngest patient had a foreign body at the hindfoot region, it is also a very rare condition and our oldest patient had posterior ankle bony impingement, he had severe problems with walking. In this case series osteochondral lesions of posterior talus had lower percentage from literature findings (3,4). The cause of the lower incidence of talar osteochondral lesions may be the lower activity levels of our patients than in the other series (7,8,10). Insertional achilles tendinopathy, Haglunds deformity and retrocalcaneal bursitis occupied more area in our primary indication list. We try to treat all these pathologies with hindfoot endoscopy. We also had very rare indications like flexor digitorum accessorius longus tendon, foreign body, tibialis posterior nerve adhesion, distal posterior tibial bone cyst. All these rare pathologies were also treated with hindfoot endoscopy.

Hindfoot endoscopy provides higher success for many kind of hindfoot pathologies with a very low morbidity. Today, this technique become the primary treatment option not only for frequent pathologies like posterior ankle impingement, peri-achilles tendon disorders, FHL tendinopathies and also for rare pathologies like bone cysts, foreign bodies, accessory tendons (2,3,4,6,8,10).

There are several limitations of this study. First of all, study design is retrospective. This is a

case series study so there are no comparable groups(endoscopic surgery vs open surgery) to evaluate peroperative indications. One last limitation; it is a single surgeon experience, there may be differences between surgeons to evaluate the degrees of pathologies. Detailed evaluation of the large variety of indications and the large number of cases demonstrate the strenght of the study.

Conclusion

With the technical developments, arthroscopic procedures has become very popular for articular and periarticular pathologies. Hindfoot endoscopy is one of the new members of these procedures. With completing the learning curve, most of the pathologies of hindfoot can easily be solved with hindfoot endoscopy. Today, posterior ankle impingement and per-achilles pathologies are the most seen indications for this technique. It is important that we all must aware of perioperatively detected new indications and rare conditions.

References

- 1- Watanabe M. Selfoc-arthroscope (Watanabe no 24 arthroscope). Monograph. 1972 Teishin Hospital, Tokio
- 2- van Dijk CN, Scholten PE, Krips R. A 2-portal endoscopic approach for diagnosis and treatment of posterior ankle pathology. *Arthroscopy*. 2000 16:871–876
- 3- Spennacchio P, Cucchi D, Randelli PS, van Dijk NC. Evidence-based indications for hindfoot endoscopy. *Knee Surg Sports Traumatol Arthrosc*. 2016 Apr;24(4):1386-95.
- 6- Unal M, Ercan S, Baykal B, Alfidan S. Flexor digitorum accessorius longus tendon as unusual cause of flexor hallucis longus tendon impingement. *Medicina dello Sport* 2017 June;70(2):222-6
- 7-Abdelatif NMN. Combined arthroscopic management of concurrent posterior and anterior ankle pathologies. *Knee Surg Sports Traumatol Arthrosc*. 2014 22:2837–2842
- 8- Calder JD, Sexton SA, Pearce CJ. Return to training and playing after posterior ankle arthroscopy for posterior impingement in elite

- professional soccer. *Am J Sports Med.* 2010 38:120–124
- 9- Corte-Real NM, Moreira RM, Guerra-Pinto F. Arthroscopic treatment of tenosynovitis of the flexor hallucis longus tendon. *Foot Ankle Int.* 2012 33:1108–1112
- 10- Galla M, Lobenhoffer P. Technique and results of arthroscopic treatment of posterior ankle impingement. *Foot Ankle Surg.* 2011 17:79–84
- 11- Guo QW, Hu YL, Jiao C, Ao YF, Tian DX. Open versus endoscopic excision of a symptomatic os trigonum: a comparative study of 41 cases. *Arthroscopy* 2010 26:384–390
- 12- Ahn JH, Kim Y-C, Kim H-Y. Arthroscopic versus posterior endoscopic excision of a symptomatic os trigonum: a retrospective cohort study. *Am J Sports Med.* 2013 41:1082–1089
- 13- Bojanic I, Bergovec M, Smoljanovic T. Combined anterior and posterior arthroscopic portals for loose body removal and synovectomy for synovial chondromatosis. *Foot Ankle Int.* 2009 30:1120–1123