Posterior ankle arthroscopic approach for the treatment of Raikin's 7-8-9 osteochondral lesions of the talus

Artroscopia posterior do tornozelo para o tratamento das lesões osteocondrais do talo 7, 8 e 9 de Raikin

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Keywords:
Talus/injuries; Ankle joint/surgery; Arthroscopy/methods; Osteochondral lesión

ABSTRACT

Objective: Osteochondral injuries of the ankle are relatively rare lesions that primarily involve the cartilage and subchondral bone of the talus, and are presented with a variable incidence ranging from 0.09 to 4%. The aim of our study is to show the clinical results of a consecutive case series of osteochondral lesions of Zones 7,8,9 (Raikin) of the talus treated by posterior ankle arthroscopy. We hypothesize that posterior ankle arthroscopy is an effective means to treat posterior talar osteochondral lesion. **Methods**: We analyzed prospectively the performance of 24 patients who underwent posterior endoscopic treatment of osteochondral lesions of the talus. The average period of follow-up was 26.2 months (18-84). The Ankle and Hindfoot AOFAS score was used and Patient satisfaction is evaluated. Complementarily Visual Analog Scale was used to evaluate the clinical behavior of patients. **Results:** The average AOFAS score improved from 45.5 to 85.29 points. All patients were satisfied with the surgical outcome and would choose surgical treatment again if needed. Two minor immediate postoperative complications (8,33%) were observed: 1 ecchymosis and 1 transitory hypoesthesia of the heel; 50% of the patients presented with induration and pain in the portals within 2 months after the surgery; 25% of patients was unable to resume their prior physical activity level. **Conclusion**: The posterior arthroscopic approach is a safe and effective therapeutic alternative for the treatment of the posterior talar osteochondral lesion. Resection of the fragment by arthroscopic approach is technically simple, reproducible and safe with few complications, thus reducing the time of return to sport and/or work activity in relation to open procedures.

Level of evidence: Level 4

Descritores:
Talus/lesões; Articulação do tornozelo/cirurgia; Artroscopia/métodos

RESUMO

Objetivos: Lesões osteocondrais do tornozelo são lesões relativamente raras que envolvem a cartilagem e o osso subcondral do talo em incidência variável de 0,09 a 4%. O objetivo de nosso estudo é apresentar os resultados clínicos de uma série de casos consecutivos de lesões osteocondrais do talo nas zonas 7, 8 e 9 de Raikin tratadas através da artroscopia posterior. Nossa hipótese sugere que a artroscopia posterior é meio efetivo para o tratamento das lesões osteocondrais do talo. **Métodos:** Analisamos prospectivamente os resultados de 24 pacientes que se submeteram ao tratamento endoscópico posterior de lesões osteocondrais do talo. O período médio de seguimento foi de 26,2 meses (18 ~ 24). O escore AOFAS para Tornozelo e Retropé foi utilizado e a satisfação do paciente foi avaliada. Complementarmente, a Escala Analógico-Visual da Dor foi utilizada para avaliar o comportamento clínico dos pacientes. **Resultados:** O escore AOFAS médio melhorou de 45,5 para 85,3 pontos. Todos os pacientes ficaram satisfeitos com os resultados cirúrgicos e se submeteriam ao mesmo tratamento novamente se necessário. Duas complicações pós-operatórias imediatas menores (8,33%) foram observadas: 1 equimose e 1 hipo-estesia transitória do calcanhar; 50% dos pacientes apresentaram endurecimento e dor nos portais artroscópicos nos dois meses depois da cirurgia. Vinte e cinco por cento dos pacientes não conseguiram reassumir suas atividades físicas pregressas. **Conclusões:** A abordagem artroscópica posterior é uma alternativa segura e eficiente para o tratamento das lesões osteocondrais posteriores do talo. A ressecção dos fragmentos através desta abordagem artroscópica é tecnicamente simples, reprodutível e segura com poucas complicações, reduzindo o tempo de retorno ao esporte ou às atividades de trabalho com relação aos procedimentos abertos convencionais.

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INTRODUCTION

Osteochondral injuries of the ankle are relatively rare lesions that primarily involve the cartilage and subchondral bone of the talus, and are presented with a variable incidence ranging from 0.09 to 4%.[1] It usually presents with pain and disability during sports activities. Some patients experience pain during activities of daily living.[2] Disputes still remain about the etiology and pathogenesis of these lesions.[1-4]

Ankle sprains and residual instability, are the most widely accepted etiology which has received various terminology, e.g. osteochondral lesions, osteochondral defects, trans chondral fractures, osteochondritis dissecans and intraarticular fracture.[3,4]

There are classifications based on plain radiograph, CT and MRI. Based on these classifications, different prospects of the lesion can be assessed and accurate surgical planning can be acchived.[4,5] Different treatment options have been proposed including conservative and surgical treatment. Surgical treatment can be either arthroscopic and open surgery including debridement with or without microfractures,[6,7] reduction and fixation of the fragment, osteochondral transplantation, mosaicoplasty, chondrocyte culture and transplantation,[8] among others.

The aim of this study is to evaluate the clinical results of a consecutive case series of posterior osteochondral lesions of the talus which were treated by posterior ankle arthroscopy. We hypothesize that posterior ankle arthroscopy is an effective and secure procedure.

METHODS

In 2007, Raikin et al. proposed a grid to classify the osteochondral lesions of the talus in which the talus is divided in nine quadrants.[5] Between December 2011 and April 2004, twenty four consecutive patients had surgical treatment of an isolated OCL of the posterior talus (Raikin's Zones 7 to 9). In all patients we performed a posterior ankle arthroscopy.[4] Four were female and twenty were male. Patients' mean age was 27 year-old (range, 16-44). The mean follow-up was 26.2 months (range, 18-84). The lesion was medial in 18 patients and lateral in 4 patients. Twelve lesions were at right feet and twelve were at left feet. The average duration of symptoms was 9.8 months (range, 2-19).

Inclusion criteria

All patients presented with ankle pain and dysfunction. The pain did not respond to conservative treatment for a minimum of six months. Fifteen patients presented with locking symptoms of the ankle and none had sign of posterior ankle impingement. All patients had limitation in sporting activities or even cannot participate the usual sports. Most had neither local tenderness nor swelling, and none had a positive anterior drawer test or a talar tilt test. The range of motion of the diseased ankle was comparable to the contralateral side. There was a reduction of sagittal motion of less than 5º in 20 patients.

The treatment approach depends on the patient's symptoms (duration, rest pain and/or pain on exertion) and the size and location of the defect. Whether they were large (about 15mm) and symptomatic and/or unstable we opted for surgical treatment (2 patients who remained in rehabilitation treatment for two months only). Intra-articular injections (e.g. corticosteriod, hyaluronic acid, etc.) were not utilized prior to surgery.

We excluded patients with previous surgery to the ankle, patients with Rheumatoid arthritis, joint impingement and/or ankle osteoarthritis.[9]

All patients were studied with pre and postoperative X-rays, (CT) (Figure 1) and MRI. All the lesions were located by the Raikin classification.[5] No lesion was sized more than 15mm in any of its axis. The lesions had average sagittal size of 9.16mm and average coronal dimension of 8.51mm.

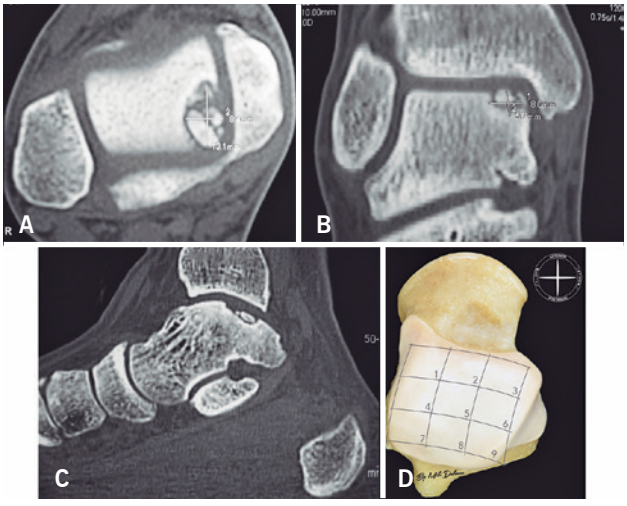

Figure 1. Axial, Coronal and Sagital CT view. Posteromedial osteochondral lesion at Raikin zone 7. Anatomic piece (courtesy Dr. Micki Dalmau, Barcelona University) with the Raikin & Elias grid over the talar cartilage

Clinical evaluation

The results were evaluated using the AOFAS clinical rating system for the ankle-hindfoot.[10] Four questions were also asked at the final evaluation:

1. Does the patient satisfy about the surgical outcome?
2. Will the patient undergo the procedure again?
3. Is there pain at the portal scars?
4. Has the patient returned to pre-injury physical activity level?

Complementarily visual analogue scale (VAS) was used to evaluate the clinical behavior of patients.

Surgical technique

The patient was in prone position and the operation was performed under spinal anesthesia. Posterior ankle arthroscopy was performed with the posteromedial and posterolateral portals.[4] The posterior intermalleolar ligament was identified and cut. This allowed approach to the posterior ankle joint through a trapezoidal window. The window was bordered by the FHL medially, the transverse ligament proximally, the posterior talo-fibular ligament laterally and the posterior talar process distally (Figure 2).

The lesion was identified and debrided, curettaged and finally microfractures were done (Figure 3). Post-operatively, the patients was advised on non-weight bear for 2 weeks and ankle mobilization was instructed. The patients would return to sports between 5 to 6 months post-operative.

RESULTS

The mean preoperative AOFAS score was 45.5 points (33-70) and the mean postoperative score was 85.29 (60-100). All patients satisfied with the outcome of operation and would undergo the same operation. The average VAS improved from preoperative 7.75 points to postoperative 1.54 points with an average improvement of 6.21 points. All the patients returned to sport activities but only 75% of the patients restored the pre-injury activity level (Table 1 and 2).

Complications

There were two postoperative complications: one patient presented a large ecchymosis and another presented a transient hypoesthesia of the heel because of injury to the calcaneal branch of the tibial nerve.

Twelve patients (50%) had induration and pain in the portals during the first postoperative two months. This situation is resolved spontaneously. A total of 6 patients were unable to regain the level of physical activity prior to the injury.

DISCUSSION

There is general consensus that symptomatic osteochondral lesion which fails to respond to conservative treatment is an indication for surgical intervention. The initial surgical treatment is regularly the arthroscopic resection of the fragment, curettage and microfractures. Studies of this surgical technique

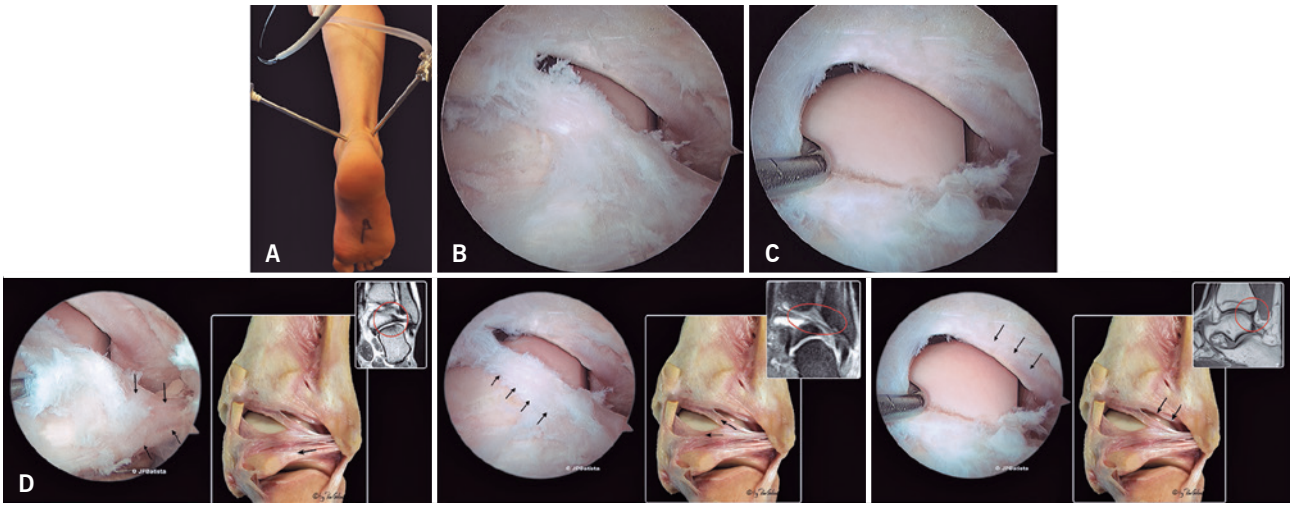

Figure 2. A) Images of posterior arthroscopic approach (Right ankle) through the classics posterolateral and postermedial portals; B) posterior ankle arthroscopic view showed the posterior intermalleolar ligament (PIL); C) cadaveric model of the posterior ankle shows that the PIL span between the medial and lateral malleoli. The window between PIL and the posterior distal tibiofibular ligament is lateral to the flexor hallucis longus (FHL) tendon and will be safe for instrumentation; D) the window was enlarged by retraction of the PIL medially. The PIL was finally resected to enlarge the window for instrumentation of the posterior ankle which is lateral to the FHL tendon. (Courtesy Dr. Pau Golanó Alvarez, Barcelona University)

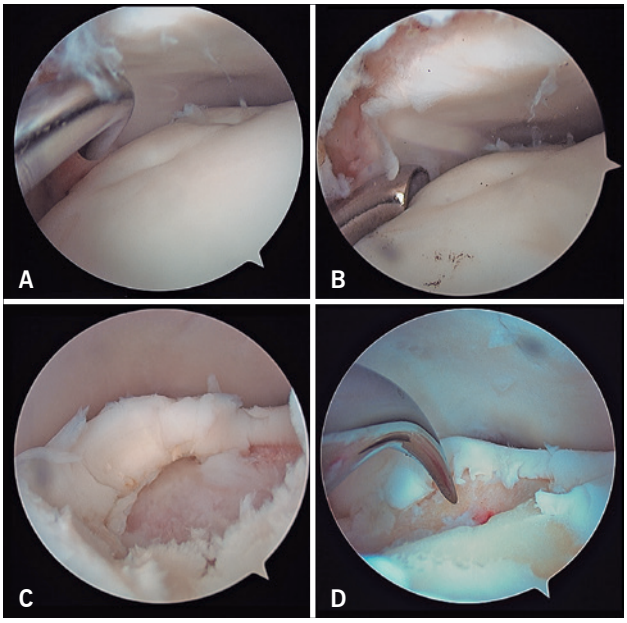

Figure 3. A) posterior ankle arthroscopic view showed an osteochondral lesion at Raikin zone 7; B) the lesion was palpated and resected; C) Microfractures of the bed by an arthroscopic awl

showed satisfactory results in over 85% of patients.[11-13] However, these studies only evaluate the results of anterior ankle arthroscopy. Anterior ankle arthroscopy may not be sufficient to access the lesions at Raikin's zones 7 to 9.

Posterior ankle arthroscopy is a better approach when treating these posterior lesions. This procedure, in prone position, is a widely adopted approach that can offer an excellent and secure arthroscopic view of the posterior ankle.[1,4,9,14,15]

Experience in posterior ankle arthroscopy and knowledge of anatomy of the posterior ankle play a fundamental role to a success treatment of the posterior osteochondral lesions. Two ligaments can be identified in the posterior ankle: the posterior tibiofibular ligament, with its superficial and deep fascicles (Transverse ligament) and the posterior talofibular ligament with its accessory intermalleolar ligament.[11] The posterior intermalleolar ligament is a ligament of the posterior tibiotalar joint that is present in 56-100% of population.[16,17] It is the source of pain in some cases of posterior impingement syndrome. The resection of this ligament creates a trapezoidal window for arthroscopic approach to the posterior ankle joint. This provides adequate access for treatment of osteochondral lesion located at Raikin zones 7, 8 and 9.

According to Zengerink and Van Dijk's study, the overall complication rate of hindfoot endoscopyis even less than that of the anterior ankle arthroscopy (2.3 vs 3.5%).[18] Ferkel et al. presented 612 anterior and posterior ankle arthroscopies with less than 9% of complications.[19] In our series, we had two complications (8.3%) which may be due to the complexity of the surgery and the small size of the case series.

Table 1. Distribution of the sample by Sex, Age, type and level of sport activities, FU and classification of Berndt & Harty and Raikin gride

N	S	Age	L	Sport	Etiology	PS (M)	FU (M)	Berndt y Hardy	Raikin
1	F	17	D	Handball	Atraumatic	11	22	3	4 y 7
2	M	29	D	Rugby	Sprain	10	14	2	4 y 7
3	M	30	I	Soccer	Sprain	8	16	1	4
4	M	17	D	Rugby	Sprain	14	44	4	4 y 7
5	M	18	I	Tennis	Sprain	9	53	3	4 y 7
6	F	28	I	Patin	Sprain	12	6	2	4 y 7
7	F	16	D	Tennis	Atraumatic	6	11	3	4
8	M	35	I	Basquet	Sprain	6	22	2	4 y 7
9	M	34	I	Rugby	Sprain	12	19	2	7
10	M	25	D	Soccer	Sprain	9	28	4	4 y 7
11	M	44	D	Soccer	Sprain	7	31	1	7
12	F	32	I	Running	Atraumatic	12	15	3	4 y 7
13	M	23	D	Soccer	Sprain	6	18	4	6
14	M	16	I	Soccer	Sprain	7	24	3	4 y 7
15	M	35	I	Soccer	Sprain	12	15	1	9
16	M	24	I	Soccer	Sprain	18	24	3	4
17	M	31	D	Soccer	Atraumatic	9	27	1	6 y 9
18	M	27	D	Soccer	Sprain	2	12	1	9
19	M	35	D	Running	Sprain	19	12	1	9
20	M	23	I	Soccer	Sprain	13	18	3	4 y 7
21	M	28	I	Soccer	Sprain	2	15	1	9
22	M	28	D	Soccer	Sprain	10	20	4	7
23	M	27	D	Soccer	Sprain	7	24	1	7
24	M	30	I	Soccer	Sprain	15	19	2	4 y 7

PS: previous symptom.

Table 2. The preoperative and postoperative AOFAS scores, VAS, size and type of treatment in patients treated through posterior arthroscopic approach

N	AOFAS pre	AOFAS post	VAS pre	VAS post	Size (mm)	Uni or Bi	Treat.
1	36	88	9	1	12 x 9,4	Unilateral	DCM
2	43	80	8	2	8,5 x 11,2	Unilateral	DCM
3	33	80	9	1	3,1 x 4,2	Unilateral	DCM
4	55	90	9	1	8,4 x 13,1	Unilateral	DC
5	44	60	7	3	13,2 x 10,5	Unilateral	DC
6	40	78	8	3	9,2 x 11,1	Unilateral	DCM
7	36	90	9	0	8,7 x 12,3	Bilateral	DCM
8	40	86	8	0	7,23 x 10,6	Unilateral	DC
9	48	88	8	0	10,3 x 8,3	Unilateral	DC
10	40	90	8	1	12,2 x 9,6	Unilateral	DC
11	36	74	9	1	7,8 x 6,4	Unilateral	DCM
12	33	93	9	0	14,6 x 9,9	Bilateral	DCM
13	58	100	6	0	8,4 X 9 ,1	Unilateral	DCM
14	54	83	7	1	11 x 9	Unilateral	DC
15	42	88	8	2	6,3 X 5,8	Unilateral	DC
16	57	88	6	3	10,3 X 8,7	Unilateral	DC
17	70	90	8	2	7,5 x 6	Unilateral	DC
18	58	93	6	3	6,5 X 5,9	Unilateral	DC
19	33	92	7	2	8,5 x 6,3	Unilateral	DC
20	56	90	6	0	11,4 x 9,5	Unilateral	DCM
21	44	74	8	2	7,4 X 5,2	Unilateral	DC
22	40	86	9	3	8,7 x 6,4	Unilateral	DC
23	63	88	6	3	8,6 X 7,3	Unilateral	DCM
24	33	78	8	3	10,2 x 8,5	Unilateral	DCM
			7,75	1,54167			

D: debridment; DC: debridment + curettage; DCM: debridment + curettage + microfractures.

In summary, resection of the posterior talar osteochondral lessions through posterior ankle arthroscopy is technically simple, reproducible and safe with few complications, thus reducing the time of return to sport and/or work activity in relation to open procedures.

CONCLUSIONS

The posterior arthroscopic approach is a safe and effective surgical option for the treatment of the posterior talar osteochondral lesion.

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