Endoscopic lateral decompression of calcaneo-fibular impingement: Case Report and literature Review

Karim Khezami *, Emir Bassalah, Mohamed Amine Bennour
Faculty of Medicine of Tunis, University Tunis El Manar, Department of Orthopedic Surgery, Habib Bougaffa Hospital, Bizerte, Tunisia

A R T I C L E   I N F O
Article history:
Received 18 January 2021
Received in revised form 8 February 2021
Accepted 9 February 2021
Available online 17 February 2021

Keywords:
Endoscopy
Calcaneus
Arthroscopy
Calcaneo-fibular impingement
Malunion

A B S T R A C T

INTRODUCTION AND IMPORTANCE: The calcaneo-fibular impingement syndrome is frequent after calcaneal fracture. The impinging lesion could be in bone and/or in soft tissue. The operative treatment aims to remove the impinging lesions either by open or endoscopic surgery.

CASE PRESENTATION: We report a case of a 33-year female patient with calcaneo-fibular impingement syndrome. The condition was managed using endoscopic bone resection, soft tissue debridement and peroneal tendons release.

CLINICAL DISCUSSION: Endoscopic treatment of calcaneo-fibular impingement syndrome has gradually been broadened as a safe, minimally invasive, and effective procedure. This endoscopic approach could reduce the wound complications associated with the open procedure and ensure early return to activity, better cosmetic and better patient satisfaction. The lateral approach could reduce nervous and tendinous complications associated with posterior approach.

CONCLUSION: The endoscopic surgery using lateral approach is a reliable and a minimally invasive technique to address calcaneo-fibular impinging. However, this procedure is less useful for advanced cases of calcaneal malunion (Stephens and Sanders II and III).

© 2021 Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

Calcaneo-fibular impingement syndrome is very frequent after displaced articular calcaneal fractures. The main symptoms are a lateral pain under the tip of the lateral malleolus. The lateral calcaneal decompression is an efficient procedure in the treatment of symptomatic calcaneal malunions. It could be associated or not to a subtalar joint fusion or a calcaneal osteotomy [1,3]. This procedure could be a good alternative to late subtalar fusion in patients with primarily lateral hindfoot pain.

We report a case of a lateral calcaneal decompression under endoscopic control. This study is reported in line with the SCARE checklist [4].

2. Case presentation

A 33-year-old female patient was initially hospitalized in our orthopedic department for an open fracture of left calcaneus Gustilo I (Sanders IIa). She fell from a 2 m-height. She was treated with debridement and suture without open reduction internal fixation (ORIF).

The patient had no past surgical history. Her family members were healthy. She didn’t use any kind of drugs.

The patient subsequently developed chronic pain in the hindfoot. She complained of difficulty shoe wearing and walking difficulties. She also complained of lateral hindfoot pain.

Physical examination found a slightly lowered ankle range of motion without instability. A recognizable superficial ankle pain could be provoked by compressing the anterolateral side of the ankle joint.

Radiological exploration showed post-traumatic sequelae of the calcaneum at the level of the fracture site coming into contact with the fibula without tenosynovitis. Magnetic resonance imaging (MRI) noted inflammatory changes in the external articular surfaces of the subtalar joint (Figs. 1 and 2).

Infiltration was performed without any notable improvement. We achieved a lateral calcaneal decompression under endoscopic control.

Surgery was performed under general anesthesia and intubation. It was carried out by the orthopedic surgery team of Habib Bougaffa Hospital. This procedure didn’t need advanced technical or logistical resources and could be attempted by average foot and ankle arthroscopists.

Patient was put in lateral position and pneumatic tourniquet is applied to the thigh. Two portals of entry are generally sufficient.

* Corresponding author.
E-mail addresses:
khezamikarim@gmail.com (K. Khezami), emir.bassalah@hotmail.com (E. Bassalah), med.amine.bennour@gmail.com (M.A. Bennour).

https://doi.org/10.1016/j.ijscr.2021.105649
2210-2612/© 2021 Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).
Anterolateral and posterolateral portals are established at the angle of Gissane. We started with the anterolateral approach. The entry point is was located opposite to the sinus of the tarsus, approximately 2 cm in front and 1 cm below the tip of the lateral malleolus in order to create a lateral working space. Otherwise, if we have started with the posterolateral portal at the level of the fibula, the procedure would have been more difficult. After, soft tissue and peroneal tendons were progressively peeled off of the lateral wall of the calcaneus to create a working area under the tip of the lateral malleolus. The 4.0-mm scope was then introduced through this portal. The posterolateral portal was performed under direct vision with a spinal needle and located 2 cm posterior and 1 cm
behind to the tip of the fibula. The debridement of soft tissue and fibrosis was performed with a 4.5 mm shaver introduced in posterolateral portal. Afterwards, a resection of the impinging bone from the lateral wall of the calcaneus around the lateral malleolus with a motorized burr was performed. At the end of the procedure, the peroneal tendons were checked to confirm there were released (Figs. 3 and 4).

On discharge, the patient received analgesic and anti-inflammatory agents and physiotherapy. No postoperative complications were noted. With a seven months follow-up, the patient was satisfied with the final result despite of a slight subtalar pain when walking. Kitaoka score for this patient has improved from 18 to 80.

3. Discussion

The calcaneo-fibular impingement is induced by posterolateral translation and an exostosis on lateral wall of calcaneus.

The first classification for calcaneal malunions was provided by Stephens and Sanders [5]. Malunions with a lateral wall exostosis and only marginal joint deterioration are classified as type I and treated with a lateral wall decompression. Zwipp and Rammelt distinguished 5 types of calcaneal malunions [11]. Type 0 (equivalent to Stephens and Sanders Type I) refers to any deformity without the presence of arthritis [11,12]. There are various surgical methods for the treatment of calcaneo-fibular impingement syndrome by open or endoscopic surgery.

The endoscopic treatment of calcaneofibular impingement was initially described by Lui [3]. This intervention reduces the risk of scar necrosis or painful recurrence due to fibrosis or adhesions around the fibular tendons, with an almost constant disappearance of the submalleolar pain and a marked functional improvement [2,6]. It is mainly indicated for lesions type I according to the classification of Sanders (Type 0 if the classification of Rammelt). For types II and III they require associated gestures or open surgery.

Bauer reported the original description of endoscopic lateral approach [2]. In his study seven patients suffering from a calcaneo-fibular impingement were treated with an endoscopic technique. Three patients were very satisfied with the final result, three were satisfied and one was not satisfied. In all the cases, the pain under the tip of the fibula disappeared and could not be found at palpation any more [2]. The final AOFAS score was higher after the procedure for all of the patients.

In our case we used an endoscopic approach with posterolateral and antero-lateral portal without osteotomy or arthrodesis. The result was satisfactory and the Kitaoka score has changed from 18 to 80.

Therefore we could say that the endoscopic decompression is a reasonable alternative to late subtalar fusion in patients with primarily lateral hindfoot pain; especially if the patient is young.

In fact, in symptomatic calcaneal malunions, a significant amount of pain is directly due to calcaneo-fibular impingement and peroneal tendinopathy. Subtalar fusion alone (in situ or with a bone-block correction) is not efficient to improve the function and relieve the pain and must be associated with lateral decompression (including soft tissue debridement and lateral calcaneal osteotomy [7,8].

Lui TH and al. [9] and Chu KM and al. [10] described an endoscopic management of calcaneofibular impingement and posterior ankle impingement syndrome with posterior ankle endoscopy (the posteromedial portal (PMP) and posterolateral portal (PLP)). The risks with this technic was sural nerve injury, peroneal tendon injury and FHL tendon injury. We believe that the posterior approach would be ideal for advanced calcaneal malunions.

4. Conclusion

Among the complication of malunited displaced intraarticular calcaneum fracture, we find calcaneo-fibular impingement syndrome. The main symptom is a lateral submalleolar pain. The endoscopic surgery using lateral approach is a reliable and a minimally invasive technique to address calcaneo-fibular impinging. However, this procedure is less useful for advanced cases of calcaneal malunion (Stephens and Sanders II and III).

Declaration of Competing Interest

The authors report no declarations of interest.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical approval

The study type is exempt from ethical approval.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Writing the paper, Study Concept: Khezami karim.
Data collection, Study Concept: Bennour Mohamed Amine, Emir Bassalah.
Supervision: Mohamed Amine Bennour.

Registration of research studies
Not applicable.

Guarantor
Dr Khezami Karim.

Provenance and peer review
Not commissioned, externally peer reviewed.

References
[1] G.W. Braly, J.O. Bishop, H.S. Tullos, Lateral decompression for malunited os calcis fractures, Foot Ankle 6 (2) (1985) 90–92, http://dx.doi.org/10.1177/107110078500600207.
[2] T. Bauer, J. Deranlot, P. Hardy, Endoscopic treatment of calcaneo-fibular impingement, Knee Surg. Sports Traumatol. Arthrosc. 19 (1) (2011) 131–136, http://dx.doi.org/10.1007/s00167-010-1149-6.
[3] T.H. Lui, Endoscopic lateral calcaneal osteotomy for calcaneofibular impingement, Arch. Orthop. Trauma Surg. 127 (2007) 265–267, http://dx.doi.org/10.1007/s00402-006-0194-0196.
[4] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, for the SCARE Group, The SCARE 2020 guideline: updating consensus surgical CAse REport (SCARE) guidelines, Int. J. Surg. 84 (2020) 226–230.
[5] H.M. Stephens, R. Sanders, Calcaneal malunions: results of a prognostic computed tomography classification system, Foot Ankle Int. 17 (1996) 395–401, http://dx.doi.org/10.1177/107110079601700707.
[6] M.P. Clare, W.E. Lee 3rd, R.W. Sanders, Intermediate to long-term results of a treatment protocol for calcaneal fracture malunions, J. Bone Joint Surg. Am. 87 (5) (2005) 963–973, http://dx.doi.org/10.1007/s10022-007-0279-8.
[7] N. Savva, T.S. Saxby, In situ arthrodesis with lateral-wall osteotomy for the sequelae of fracture of the os calcis, J. Bone Joint Surg. Br. 89 (16) (2007) 919–992, http://dx.doi.org/10.1302/0301-620X.89B16.18926.
[8] M.M. Romash, Reconstructive osteotomy of the calcaneus with subtalar arthrodesis for malunited calcaneal fractures, Clin. Orthop. Relat. Res. 290 (1993) 157–167, PMID: 8472443.
[9] T.H. Lui, Y.C. Siu, W.K. Ngai, Endoscopic management of calcaneofibular impingement and posterior ankle impingement syndrome caused by malunion of joint depressed-type calcaneal fracture, Arthrosc. Tech. 7 (2018) e71–e76.
[10] K.M. Chu, Th. Lui, Endoscopic lateral calcaneal osteotomy and peroneal tendon decompression with the patient in the prone position as management of subfibular impingement after calcaneal fracture, Arthrosc. Tech. 8 (2019) e1069–e1073.
[11] S. Rammelt, C. Marx, Managing severely malunited calcaneal fractures and fracture-dislocations, Foot Ankle Clin. 25 (2020) 239–256.
[12] J. Ketz, M. Clare, R. Sanders, Corrective osteotomies for malunited extra-articular calcaneal fractures, Foot Ankle Clin. 21 (1) (2016) 135–145.

Open Access
This article is published Open Access at sciencedirect.com. It is distributed under the IJSCR Supplemental terms and conditions, which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.