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

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ABSTRACT

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 impingement. However, this procedure is less useful for advanced cases of calcaneal malunion (Stephens and Sanders II and III).

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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 hind-foot. 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 Bougatfa 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.

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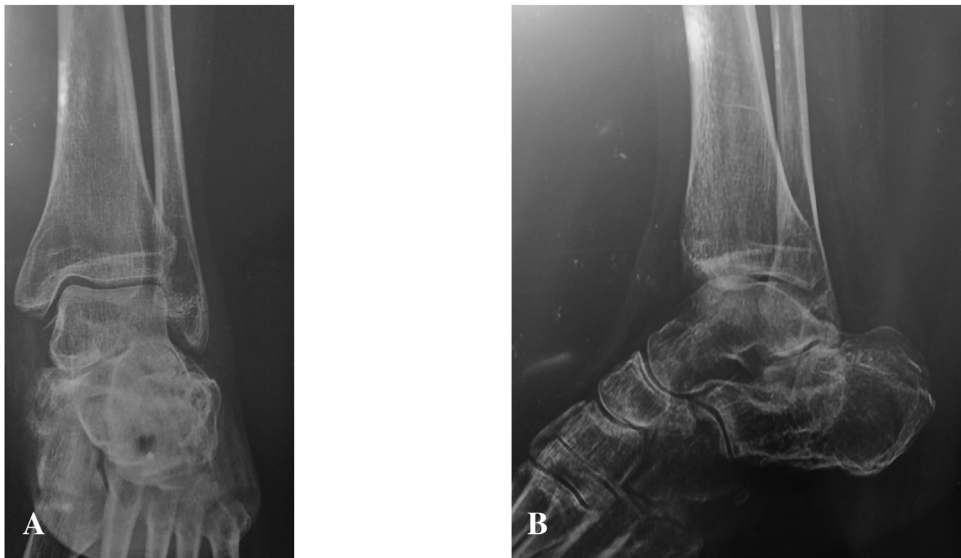


Fig. 1. A/B X RAY shows post-traumatic sequelae of the calcaneum.



Fig. 2. A and B Frontal 2D TDM reconstruction with assessment of the calcaneo-fibular impingement and lateral subtalar joint degenerative changes (Type I Sanders). C Axial image of magnetic resonance imaging (MRI) noted inflammatory changes in the articular surfaces of the subtalar externally.



Fig. 3. A. Patient is put in lateral position B. Two endoscopic portals postero-lateral and antero-lateral.

Anterolateral and posterolateral portals are established at the angle of Gissane. We started with the anterolateral approach. The entry point is 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

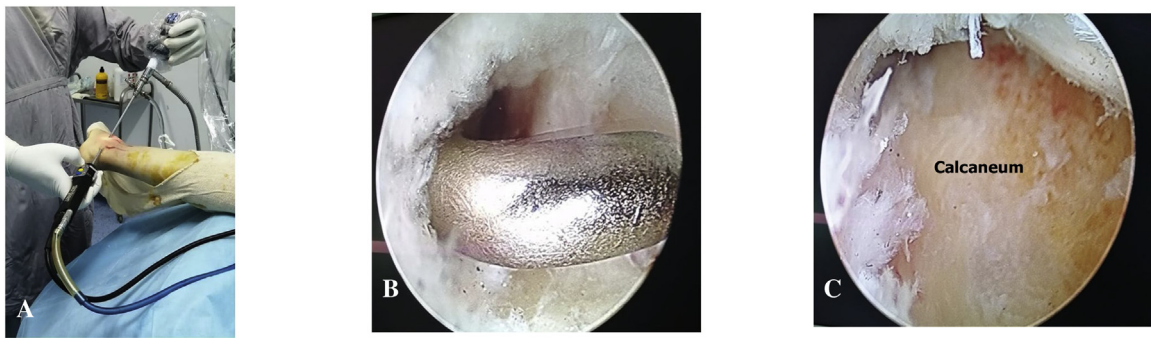


Fig. 4. A Two portals of entry are generally sufficient. B/C Arthroscopies images after decompression.

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 superolateral 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 postero-lateral 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 impingement. 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.

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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.

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Registration of research studies

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