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(CASE REPORT)

Trimalleolar fracture associated to a Lisfranc dislocation: A case about a rare association

H. Alami Harchali *, A. Taibi, M. Tabti and F. Boutayeb

Service traumatologie orthopédique A, CHU Hassan 2, Fès,Maroc.

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Abstract

Trimalleolar ankle fractures represent severe rotational injuries that frequently require operative management to restore joint stability and prevent long-term functional impairment. Lisfranc injuries, involving disruption of the tarsometatarsal joint complex, are less common and often underdiagnosed. The simultaneous occurrence of these two injuries is exceptionally rare and reflects a high-energy trauma mechanism combining rotational and axial forces.

We report the case of an 18-year-old male who sustained a high-energy motor vehicle accident resulting in a displaced trimalleolar ankle fracture associated with a Lisfranc dislocation. Clinical examination revealed significant ankle deformity and midfoot tenderness. Radiographs and computed tomography confirmed both injuries. The patient underwent single-stage surgical management consisting of open reduction and internal fixation of the ankle fracture, along with anatomical reduction and stabilization of the Lisfranc joint complex using Kirschner wires. Postoperative management included strict non–weight-bearing immobilization followed by progressive rehabilitation.

This case highlights the importance of systematic evaluation of the entire foot and ankle in high-energy trauma, as concomitant midfoot injuries may be overlooked. Early recognition and precise anatomical reduction of both lesions are critical to optimize functional outcomes and minimize long-term complications such as post-traumatic arthritis and chronic midfoot instability.

Keywords: Trimalleolar ankle fracture; Lisfranc injury; Tarsometatarsal dislocation; High-energy trauma; Midfoot instability

1. Introduction

Trimalleolar ankle fractures represent one of the most unstable forms of ankle injury and are typically associated with high-energy rotational trauma. These injuries often require surgical management to restore joint congruity and prevent long-term functional impairment (1). Lisfranc injuries, although less common, are frequently underdiagnosed, with reported missed diagnosis rates as high as 20–40% (2). They result from axial or twisting forces transmitted through the tarsometatarsal joint complex. The simultaneous occurrence of a trimalleolar fracture and a Lisfranc dislocation is exceptionally rare, with only a few cases reported in the literature (3,4).

2. Case Presentation

An 18-year-old male patient with no significant past medical history presented to the emergency department after sustaining a high-energy trauma (motor vehicle accident).

* Corresponding author: H. Alami Harchali

On physical examination, there was an evident deformity of the ankle with marked edema, ecchymosis, and tenderness over the medial and lateral malleoli. Palpation of the midfoot elicited intense pain, particularly along the tarsometatarsal joints.

Initial anteroposterior, lateral, and mortise ankle radiographs demonstrated a displaced trimalleolar fracture with widening of the ankle mortise. Foot radiographs suggested disruption of the Lisfranc joint complex. A CT scan was performed to better delineate fracture patterns and confirm the extent of the Lisfranc injury(4–6).

Emergency management included closed reduction and immobilization to reduce pain and protect soft tissues. The patient was then scheduled for surgical intervention. Open reduction and internal fixation (ORIF) of the trimalleolar fracture was performed using plate and k-wire. The Lisfranc dislocation was addressed in the same operative session, with anatomical reduction achieved and stabilization using K-wires, ensuring restoration of the tarsometatarsal alignment.

Postoperatively, the patient was placed in a non–weight-bearing cast/boot for 6 weeks..

Figure 1 Preoperative radiograph

Figure 2 Postoperative radiograph

3. Discussion

Combined trimalleolar ankle fractures and Lisfranc dislocations are exceptionally rare injuries. While each condition independently represents a significant disruption of joint stability, their simultaneous occurrence reflects the magnitude of force transmitted through both the ankle and midfoot. Most commonly, trimalleolar fractures arise from rotational or high-energy mechanisms, whereas Lisfranc injuries may result from axial loading applied with the foot in plantarflexion. The coexistence of these two injuries suggests a complex trauma mechanism involving both rotational and compressive components.

Early recognition is essential, as Lisfranc injuries are notoriously underdiagnosed, with studies reporting a misdiagnosis rate of up to 20–40%. In the presence of an obvious ankle fracture, attention may be diverted from the midfoot, especially when swelling and pain overlap. This case reinforces the importance of maintaining a high index of suspicion and performing systematic radiographic evaluation of the foot and ankle in all high-energy lower-limb traumas. Advanced imaging, especially CT scanning, plays a critical role in detecting subtle tarsometatarsal disruptions and defining the fracture configuration for operative planning.

Management typically requires surgical intervention to restore anatomical alignment and joint congruity. ORIF of the trimalleolar fracture is essential to regain ankle stability and reduce the risk of post-traumatic arthritis(7). Similarly, achieving precise reduction of the Lisfranc joint complex is crucial, as even minimal displacement can lead to chronic pain, midfoot collapse, and long-term functional impairment. Internal fixation using screws, plates, or temporary K-wires is commonly recommended depending on the injury pattern and surgeon preference.

Postoperative rehabilitation must be carefully structured, given the involvement of two major weight-bearing joints. Strict non-weight-bearing is generally required during the initial healing period to avoid displacement, followed by progressive mobilization under physiotherapy guidance. Close follow-up is necessary to monitor for complications such as hardware failure, infection, malunion, or complex regional pain syndrome.

4. Conclusion

This case highlights the diagnostic and therapeutic challenges posed by the rare association of a trimalleolar ankle fracture with a Lisfranc dislocation. Such a combination underscores the need for systematic and comprehensive evaluation of the foot and ankle in high-energy trauma, as concomitant midfoot injuries may easily be overlooked in the presence of overt ankle deformity. Advanced imaging modalities, particularly CT scanning, are invaluable for identifying subtle tarsometatarsal disruptions and guiding operative planning.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

The present research work does not contain any studies performed on animals/humans subjects by any of the authors.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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