A 72-year-old patient with bilateral Maisonneuve fractures

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Abstract

Maisonneuve fractures result from a disruption of the medial ankle structures and a proximal fibular fracture. Patient complaints can be misleading and there is a significant rate of delayed diagnosed injuries. We present a case of bilateral Maisonneuve fractures after a fall due to a syncopal collapse. A precise clinical examination led to this rare diagnosis. The injuries were treated with syndesmotic screw fixation, removal of hardware followed after 6 weeks. The patient was asymptomatic at three-months follow up. Patients with bilateral injuries undergoing standard surgical treatment can gain full recovery, but high suspicion in clinical examination is needed to detect this uncommon bilateral injury.

Introduction

Disruption of the medial ankle structures and a concomitant proximal fibular fracture was first described by Maisonneuve in 1840.[1] The classic injury pattern consists of a pronation of the forefoot and an external rotation.[2] Diagnosis can be delayed when focusing clinical and radiographic examination only on the ankle region. Surgical treatment includes reduction of the distal tibiofibular joint and syndesmotic screw fixation. To our knowledge we are the first to report the rare combination of bilateral Maisonneuve injuries. With a precise clinical examination the extent of injury was diagnosed and after standard operative treatment the patient regained his former level of daily activity. In this case report, we aimed to point out the management of bilateral Maisonneuve fractures. Those are rare, but the treating physician can rely upon surgical techniques, known from the treatment of unilateral injuries.

Case Report

A 72-year-old pensioner fell to the ground due to a syncopal collapse. The patient remembers an acute weakness in his legs and a twisted fall to the ground. Later on a manifestation of diabetes mellitus was diagnosed. Osteopenia was obvious in the radiographs. Concomitant fracture of the first lumbar vertebra was treated conservatively with pain medication and mobilization under guidance of physiotherapists.

The patient complained spontaneously about pain in both of his ankle regions. In the clinical examination the legs were investigated for contusion marks, the peripheral circulation, sensibility and muscle function was assessed. No disturbances were found and no neurological deficits were obvious. Bilateral pressure pain over the proximal, lateral lower legs was present. Radiographic findings ensured proximal fractures of both fibular bones (Figure 1). Dynamic stress radiographs were performed by leading the foot into supination and parallel fixing the ankle in place by the examiner. The distal tibiofibular joint was assessed for instability under fluoroscopy during this maneuver. Both ankles revealed a broadened medial clear space in this investigation. After discussion with the patient he was consented for surgery, which was performed on the next day.

A 2-cm incision over the distal part of the fibula was performed. Reduction of the distal tibiofibular joint was performed without difficulties and confirmed with fluoroscopic examination. Two 3.5-mm fully threaded cortical screws were implanted proximal to the syndesmotic complex. Both sides received analogue treatment (Figure 2). Post-operatively we recommended a partial weight-bearing of 20 kg weight-bearing on both sides in orthopedic boots for 6 weeks. Retrospectively we found out, that the patient refused to this procedure and had put on full body weight starting four weeks after surgery. The orthopedic boots were used for the total recommended period. Six weeks after primary surgery the screws were removed. The patient regained his normal level of mobilization and was without any pain at the three-month follow up (Figure 3). Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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Discussion

Maisonneuve fractures are characterized through disruption of medial ankle structures and a proximal fibular fracture.[1] Intra-articular cartilaginous lesions[3] or nerve injuries due to hematoma or fracture fragments[4] can be associated. The classic injury pattern contains a

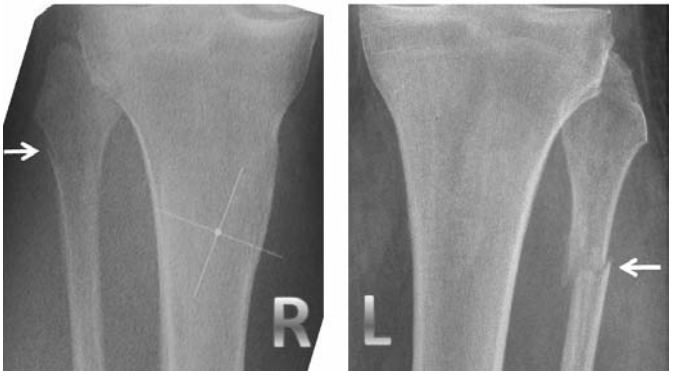


Figure 1. Pre-operative radiographs showing bilateral proximal fibular fractures; white arrows indicate the fracture lines.

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forefoot pronation and forced external rotation[5] as described in the Lauge-Hansen classification.[2] The mechanism of injury leads to a rupture of the distal tibiofibular syndesmosis, a structure ensuring the correct function of the mortise.[6] Due to the classical trauma mechanism a bilateral injury is highly unlikely. We performed an extensive literature review but could not retrieve a report about this entity in the available computerized databases (Medline, EMBASE and the Cochrane Central Register). However numerous injuries deviating from the classical fracture scheme are described, like the combination with lateral ankle dislocation, showing a triplane fracture pattern in the adolescent or in association with an additional distal fibula fracture.[7-9]



Figure 2. Post-operative radiographs showing the syndesmotic screws in place.



Figure 3. Follow-up radiographs: anteroposterior radiographic views of the ankle region after removal of hardware.

A precise clinical examination of the whole leg is mandatory to diagnose a Maisonneuve fracture. This fact is relevant to a greater extent in bilateral fractures. Main findings leading to the diagnosis in our patient were persistent pain in the ankle region and a pressure induced pain in the proximal lower legs. However, also dominant pain in the knee region with smaller pain above the ankle is found in some patients. Radiographs of the lower legs in two planes and dynamic stress fluoroscopic pictures ensured the diagnosis in the described case. In our explanation the body mass index of 33 (175 cm and 100 kg) and the preexisting osteopenia might have been relevant factors to induce bilateral Maisonneuve fractures. The accident injury mechanism with twisting the legs while falling to the ground is coherent to mechanism described in the literature.[5] In the presence of instability surgical treatment with syndesmotic screws is recommended,[10,11] whereas proximal fibular fractures do not require osteosynthesis.[12] Biomechanical studies suggest an optimal insertion point at 2 cm above the tibiotalar joint.[13] Percutaneous fixation methods[14] and the use of bioresorbable syndesmotic screws[15] are described. In cases of failed reduction an interposition of an osteochondral fragment has to be excluded,[16] arthroscopic assisted methods for removal are described.[17] Failure to diagnose and treat an instability of the distal tibiofibular joint is likely to lead to persisting pain and dysfunction in the ankle and subsequent development of osteoarthritis.[14]

Conclusions

Maisonneuve fractures have to be considered during the diagnostic workup of patients with pain in the ankle region. Bilateral fractures have to be suspected particularly in patients with concomitant risk factors like overweight and osteopenia. Extensive literature research did not reveal different procedures in bilateral Maisonneuve fractures. Our case demonstrates that patients with bilateral injuries undergoing standard surgical treatment can gain a full recovery.

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