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Bilateral tarsometatarsal fracture-dislocations: a missed work-related injury

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ABSTRACT

Tarsometatarsal (Lisfranc) fracture-dislocation is an uncommon foot injury. Subtle injuries are more difficult to diagnose though they cause serious morbidity. Bilateral subtle tarsometatarsal injury has not been reported before. We report bilateral subtle tarsometatarsal dislocations that were caused by a work-related accident in a 25-year-old man. The injury was initially missed. Diagnosis was confirmed by computed tomography with curved reconstruction. Associated foot injuries are shown as a guide to the diagnosis.

Keywords: bilateral tarsometatarsal fracture-dislocations, foot injuries, Lisfranc fracture-dislocation, work-related accident

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INTRODUCTION

Fracture-dislocation of the tarsometatarsal (Lisfranc) joint is an uncommon foot injury.[1] 11% of such injuries are subtle.[2] Diagnosis can be difficult, especially in polytrauma patients. Up to 35% of these injuries are missed,[2] and since this leads to serious morbidity, care has to be taken in assessing any midfoot trauma. Tarsometatarsal joint injuries can be caused by either direct or indirect forces. The latter are due to overloading of a planter-flexed foot or forcible abduction of the forefoot.[3] Direct injuries are usually the result of crushing injuries of the foot.[4]

To our knowledge, bilateral subtle tarsometatarsal fracture-dislocations have not been previously reported. We describe the first case of bilateral subtle tarsometatarsal injury. Other associated injuries are highlighted as clues for diagnosing tarsometatarsal joint injuries.

CASE REPORT

A 25-year-old male factory labourer sustained a work-related injury. Both feet were trapped under the blade of a loaded forklift while standing on uneven ground. A detailed report of the mechanism of injury was difficult to obtain, due to a language barrier. He presented to the emergency department half an hour after the injury. He was haemodynamically-stable with no head, chest or abdominal injuries. His chief complaint was bilateral foot pain with inability to weight bear. His left foot was more swollen than the right. Tenderness was localised at the right midfoot, while it was diffuse over the entire dorsum of the left foot. Anteroposterior and oblique radiographs of both feet taken in the emergency department showed fractures of the base of the proximal phalanx of the left big toe and left calcaneal anterior process. The right foot pain was attributed to a small avulsion fracture of the right navicular bone. He was treated with a left ankle splint and a right foot elastic bandage. He was advised to avoid weight-bearing and sent to the specialist orthopaedic clinic the following day.

Fig. 1 Radiograph (anteroposterior view) of the both feet shows suspicious widening of the space between the first and second metatarsal bases. The left foot (left hand side) has a chip fracture lateral to the first metatarsal base (arrow) that is pathognomonic of Lisfranc injury and a fracture of the anterior calcaneal tuberosity (block arrow and circle in inset shows an oblique view). The right foot (right hand side) has avulsion fracture of the navicular bone (arrow).

Fig. 2 Curved reconstructed CT image shows the diastasis between the first and second metatarsal bases.

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On examination, maximum tenderness was found at the tarsometatarsal joints of both feet. Rotational test (stressing the second tarsometatarsal joint by elevation and depression of the second metatarsal head while fixing the first, provoked pain at the Lisfranc's joint)[5] was positive on the left side, while passive abduction and rotation of the forefoot were painful bilaterally. Radiographs from the emergency department showed suspicious widening of the space between the first and second metatarsal bases (Fig. 1). Computed tomography (CT) was done with curved reconstruction for both feet, and showed clearly the diastasis distance between the first and second metatarsal bases to be more than 2 mm (Fig. 2). The patient was admitted, and both feet were kept elevated for three days to allow subsidence of the swelling. He had closed reduction of both tarsometatarsal joints with percutaneous screw fixation. The left calcaneal anterior process was reduced through a small lateral incision and fixed with a K-wire.

Postoperatively, the patient was kept in bed with anticoagulation prophylaxis and elastic stockings for ten days. Mobilisation was initiated by wheelchair with bilateral below-knee casts. Partial weight-bearing was allowed after eight weeks. Patient could fully bear weight with bilateral arch support after three months. The calcaneal K-wire was removed after eight weeks. Tarsometatarsal screws were removed after six months. At 18 months follow-up, the patient demonstrated an excellent result with pain-free full weight-bearing and range of motion.

DISCUSSION

Up to 35% of fracture-dislocations of the tarsometatarsal joint are missed on initial radiographs and consequently, are mismanaged.[2] This may be due to other foot fractures that distract the attention of the managing physician, particularly if it is associated with more serious injuries in polytrauma patients. In the case presented, diastasis between the first and second metatarsal bases was overlooked on the initial radiographs. Normally, on anteroposterior radiographs, the medial aspect of the base of the second metatarsal aligns with the medial border of the middle cuneiform. On oblique films, the medial border of the fourth metatarsal aligns with the medial border of the cuboid. Additionally, the distance between the first and second metatarsal bases should not exceed 2 mm. However, other associated foot injuries might help to diagnose tarsometatarsal dislocation, if the latter is kept in mind during the initial assessment of the patient. In the case presented, a compressed fracture of the left calcaneal anterior process is often due to abduction injury of the forefoot that may have occurred as a result of reflex withdrawal of the feet or due to their position on the ground at the time of trauma. Abduction of the forefoot is coupled with a medial distracting force that could avulse the Lisfranc ligament. The latter is proven by the presence of a tiny chip of bone in the space between the first and second metatarsal bases (fleck sign) (Fig 1).[6] Similarly, the associated fracture of the right navicular bone is common with forefoot abduction injuries due to naviculocuneiform ligament avulsion. Cortical avulsion navicular fractures are considered a marker of other midfoot injuries.[7]

Radiological clues, in addition to clinical evidence (localised tenderness and positive rotational and stress tests), are helpful in reaching the diagnosis of a similar subtle Lisfranc injury. CT represents a useful tool in diagnosing foot injuries. However, in areas with complex anatomy, axial CT can be challenging to interpret.[8] We found curved reconstruction CT images to be very helpful in assessing such injuries as these show structures normally present at different anatomical levels in a single view, facilitating interpretation by non-radiologists.

Traumatic bilateral Lisfranc injury was reported once by Carter and Wilby.[9] However, it was part of a polytrauma caused by a road traffic accident. The injury was displaced and therefore easily picked up on initial radiographs. In the case presented, there is subtle diastasis between the first and second metatarsal bases which extends to the space between the medial and intermediate cuneiforms. Diastasis between medial and intermediate cuneiforms was also described to be very rare.[10] Subtle Lisfranc injuries represent 11% of all tarsometatarsal injuries,[2] and bilateral involvement, to the best of our knowledge, has not been reported before. This case demonstrates that other associated foot injuries can serve as a guide in the diagnosis of Lisfranc dislocation rather than distracting the attention of the managing physician.

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