

Isolated Dislocation of the Medial Cuneiform Bone: A Case Report

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Citation: Froberg L, Kampp Holm J, Schmal H (2018) Isolated Dislocation of the Medial Cuneiform Bone: A Case Report. Ann Case Rep: ACRT-199. DOI: 10.29011/2574-7754/100099

Received Date: 26 July, 2018; **Accepted Date:** 08 August, 2018; **Published Date:** 16 August, 2018

Abstract

Isolated dislocation of the medial cuneiform bone is a rare injury and difficult to diagnose. Nevertheless, the diagnosis of the injury is important since delayed treatment can lead to necrosis of the cuneiform bone and, if left untreated, lead to deformity and non-union. Present case reports the progress of a 22-year-old man presented in the emergency room with midfoot pain after an attempt to do a double somersault. Initial plain radiography suspected Lisfranc dislocation between the 1st and 2nd metatarsals. An additional computed tomography showed a type A2 injury of the cuneonavicular joint. The patient was treated with open reduction and internal fixation. Six months postoperatively the patient had a normal gait, normal range of motion and had no need of regular analgesics.

Keywords: Classification; Cuneonavicular; Injury; Lisfranc; Midfoot; Reduction; Tarsal

Introduction

Isolated dislocations of the medial cuneiform are rare injuries, and few have been presented in published studies [1-6]. Since especially single fractures or dislocation of the cuneonavicular joint are difficult to diagnose [7], imaging including Computed Tomography (CT) scan of the foot is necessary to confirm the diagnosis and to plan for the surgical treatment. Recently a classification system for injuries of the cuneiform bones joint was developed, finding that the clinical outcome was correlated with the number of involved cuneiforms and the fracture-dislocation pattern [7].

Case Report

A 22-year-old man came to the emergency department with a swollen, discoloured and sore right foot, after an attempt to do a double somersault. The symptoms were located dorsally on the 1st and 2nd metatarsals. Normal neurovascular function of the foot was noted. Antero-posterior view radiograph of the foot showed increased distance between the 1st and the 2nd Tarsometatarsal (TMT) joints (Figure 1). An additional CT scan was applied showing a

type A2 injury [7], with a subtle increase in the distance between the medial and intermediate cuneiform bones, and multiple small (<5 mm) avulsions between the medial and intermediate cuneiform bones as well as medially to the base of the 2nd metatarsal bone (Figure 2).



Figure 1: Antero-posterior radiograph of the right foot, showing suspected Lisfranc dislocation between the 1st and 2nd metatarsals.



Figure 2: Computed tomography scan of the right foot, showing a type A2 injury of the cuneonavicular joint.

Under general anaesthesia open reduction and internal fixation was carried out. A longitudinal incision centering the 1st TMT joint was made. The dislocated medial cuneiform was identified and reduced. Temporary fixation with K-wire was applied to the intermediate cuneiform and the navicular respectively, and two 3.5 mm cannulated positions screws were inserted. Perioperative radiography showed successful reduction of the medial cuneiform. Postoperatively, a below-knee removable splint was applied for 6 weeks, allowing a maximum weight bearing of 15 kg and non-weight bearing exercises. Removal of the screws was planned 12 weeks postoperatively.

At 6 weeks follow-up, the patient reported no pain or discomfort and a decrease in the swelling of the foot. Radiography of the foot showed that the screw to the navicular bone was broken, but no displacement of the medial cuneiform. The below-knee removable splint was reapplied for further 6 weeks and fully weight bearing allowed.

12 weeks postoperative both cannulated screws were broken, and the proximal parts removed. During dynamic radiography stability was tested and found intact.

At the final follow-up 6 months after injury, the patient had a painless foot with normal range of motion. The patient's gait was normal without need for supporting devices. He was able to resume gymnastics, though at a lower level than before due to rigidity of the talocrural joint and general swelling of the foot during physical activity. He attended physiotherapeutic rehabilitation and had no need of regular analgesics.

Discussion

Fractures and dislocations of the cuneiform bones are rare injuries to the midtarsal foot. The injuries are usually caused

when excessive energy is applied directly or indirectly to the midfoot. Direct Lisfranc injuries often occurs in traffic collisions or when landing on the foot after a fall from a significant height [8], while indirect injuries are caused by a sudden rotational force on a plantar flexed forefoot [9]. The accident mechanism of the presented case was rather indirect, since strong forces dorsiflexed the medial foot, while the rest was rigorously plantarflexed while landing. However, the diagnosis should be kept in mind in patients while examining the foot injuries in general. This is also important regarding the soft tissue component of the injury, which is more pronounced in case of direct contusion or crush. These trauma mechanisms are associated with an increased incidence of foot compartment syndromes [10].

A CT scan was performed with three-dimensional reconstruction to determine the direction of dislocation and the displacement of the fracture, and to prevent overlooking another dislocation or fracture. Previous studies have reported on the delayed diagnosis of cuneiform dislocations [11,12]. Especially single fractures or dislocation of the cuneonavicular joint are difficult to diagnose in contrast to complex injuries [7]. Conventional non-weight bearing radiography of the foot, supplemented by weight bearing views may demonstrate widening of the interval between the first and second metatarsal. However, the sensitivity of these radiographs is respectively 50% and 85% [13]. Hence, imaging including CT scan of the foot is necessary to confirm the diagnosis and to plan for the surgical treatment.

Dislocations of the cuneiform bones have been treated in a variety of methods, ranging from open or closed reduction, with or without fixation [14], as well as immediate arthrodesis has been suggested to avoid long-term arthrosis of the involved joints [15].

Some investigators have reported early osteoarthritis of the cuneonavicular joint after fracture dislocations but not after isolated dislocations or fractures [16,17]. Recently a classification system for injuries of the cuneonavicular joint has been developed, suggesting that the short-term and midterm clinical outcomes are influenced by the number of cuneiform bones involved and the fracture-dislocation pattern [7]. The injury in present case was classified as type A2 and in concordance with Mehlhorn et al. [7] the patient had a good clinical outcome regarding pain and range of motion.

Conclusion

Fractures and dislocations of the cuneiform bones are rare injuries, often caused when excessive energy is applied to the midfoot. The injuries might be difficult to diagnose, and CT scan of the foot is often necessary to confirm the diagnosis and to plan for the surgical treatment. In present case a type A2 dislocation of the medial cuneiform occurred. At 6 months follow-up the patient had a good clinical outcome which is in accordance with the

classification system describe by Mehlhorn et al. [7].

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