

Isolated Comminuted Tarsal Navicular Fracture: A Case Report

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Abstract

Navicular bone fractures of the foot are rare, but can have serious consequences because of the essential role of the talonavicular joint. A classification system was devised on the basis of the direction of the fracture line, the pattern of disruption of the surrounding joints, and the direction of displacement of the foot.

Keywords: Navicular bone fracture; Sprain; Ankle

Introduction

Navicular bone fractures of the foot are rare [1], but could have serious consequences because of the essential role of the talonavicular joint [2]. A classification system was devised on the basis of the direction of the fracture line, the pattern of disruption of the surrounding joints, and the direction of displacement of the foot. In a Type-1 injury, the fracture line is in the coronal plane and there is no angulation of the fore part of the foot. In a Type-2 fracture, the primary fracture line is dorsal-lateral to plantar-medial, and the major fragment and the fore part of the foot are displaced medially. In a Type-3 injury, there is a comminuted fracture in the sagittal plane of the body of the tarsal navicular, and the fore part of the foot is laterally displaced [1]. We report a case of 43 years old patients with a isolated comminuted tarsal navicular fracture in the left foot secondary to an ankle sprain.

Case Report

A 43 years old patient referred to our Emergency Department in the night for an ankle sprain due to an accidental falling down stairs occurred at home. Radiographic exams in her left foot revealed an isolated comminuted tarsal navicular fracture. Anterior posterior view (Figure 1a) and oblique view (Figure 1b) showed the comminution of the navicular bone fracture. No other dislocations or lesions were present. Clinically the foot was swollen, patients referred inability to walk, deep pain in midfoot, no nervous or vascular lesions were present. Patients was healthy, she usually did not use drugs, no previous surgery in her history.

The orthopedic surgeon asked for a CT scan to be performed directly in the emergency department to well define single bone fragments' position (Figure 2a); 3D reconstruction was very helpful in the planning (Figure 2b).

It was considered an emergency to surgically treat for reduction and synthesis as soon as possible. Patients had dinner just two hours before and, in agreement with the anesthetists, the surgery was planned for the next early morning.

Patient was positioned supine in the operating table, in spinal anesthesia: a tourniquet was applied to the thigh. According to the AO principles, a dorsomedial approach to the midfoot was performed between the tibialis anterior tendon and extensor hallucis longus tendon. Once down to the periosteum, the tibialis anterior was retracted medially and the extensor hallucis longus tendon laterally: navicular bone was exposed.

After debridement and reduction of the fracture, a subsequent synthesis by 2 cannulated screw (4 mm of diameter and 60 mm of length) were obtained (Figures 3a and 3b). A cast was applied and not weight bearing was allowed for 4 weeks.



Figure 1a: Anterior posterior view.

At the last follow up (90 days after surgery), patient was asymptomatic, no pain referred, no swollen and a normal gait was present. X-ray showed a satisfactory results.

Discussion

Even if navicular bone fractures of the foot are rare, a correct management of these lesions is mandatory because talo-navicular

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Figure 1b: oblique view.



Figure 2b: 3D reconstruction was very helpful in the planning.



Figure 2a: By CT scan, radiologist underlined the dislocation of the navicular bone from its location due to the comminution of the fragment.



Figure 3a: After debridement and reduction of the fracture, a subsequent synthesis by 2 cannulated screw (4 mm of diameter and 60 mm of length) were obtained.



Figure 3b: After debridement and reduction of the fracture, a subsequent synthesis by 2 cannulated screw (4 mm of diameter and 60 mm of length) were obtained.

joint is very important: loss of this joint can result in loss of 90% or greater of complex hindfoot motion/circumduction [3]. At first, an accurate clinical evaluation of the foot is necessary. Radiological exams are fundamental to a correct understanding of the bone quality, the fragments' position and eventual dislocations. A CT scan must be performed: the usual simple CT scan views on three planes already provide more information than standard X-rays and, in addition, a 3D reconstructions from CT scan images is essential in treating this series of navicular fractures [2]. We used two cannulated screws to synthesize the fracture: we considered it the best choice because is less traumatic

for periosteum and for soft tissue and because provide the same stability to the fragments than plate. A debate is present in literature regarding the choice of the right internal fixation: Before the study by Sangeorzan et al. [1] reporting 20 cases of internal fixation by screws and pins, only four other cases of internal fixation of the navicular had been reported. Recently, techniques including supplementary wires [4] temporary bridging by plate on the medial column [5] or external fixation [6] have been published as case reports. The only series with internal plate fixation reported 24/30 cases over a 6-year period [7]. What is clear is that the surgeon experience is fundamental in the right approach to these lesions and.

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