

Closed Navicular Dislocation - Management and Outcome - A Case Report

Ramkinkar Jha¹, Saksham Tripathi^{2*}, Raman Kant Aggarwal³ and Mohd Irfan Bandy⁴

¹Head of Orthopedics, Unit 3, Artemis Hospital, Gurugram, India

²Fellow, Medanta Hospital, The Medicity, Gurugram, India

³Senior Director - Shoulder, Elbow and Upper Limb Asurgery, Medanta- The Medicity Gurugram, India

⁴Consultant, Unit 3, Dept of Orthopedics, Artemis Hospital, Gurugram, India

*Corresponding Author: Saksham Tripathi, Fellow, Medanta Hospital, The Medicity, Gurugram, India.

DOI: 10.31080/ASOR.2023.06.0675

Received: December 01, 2022

Published: January 09, 2023

© All rights are reserved by Saksham Tripathi, et al.

Abstract

Navicular dislocations are a rare injury and pose a challenge for the surgeon in the emergency department and the operating room. We report a case of a 41-years old male patient who presented with completely closed dislocation of navicular and was treated by open reduction and fixation of the naviculocuneiform and calcaneocuboid joints. At 12 months follow up, the patient had no deficits in activities of daily living.

Keywords: Navicular Dislocation; Calcaneocuboid; Naviculocuneiform

Introduction

Midtarsal joint dislocations are rare and dislocation without fracture are rarer. The lower incidence is due to the stability provided by the geometry and orientation of the tarsal bones in the mid foot along with the strong ligaments [1]. The navicular bone is an important component of the medial longitudinal arch. Isolated dislocation of the navicular bone without fracture of the body is rare [2]. A concept of interdependence of the medial and lateral longitudinal columns of the foot in rendering the stability of the foot has been proposed in which it has been claimed that isolated dislocation in 1 column without disrupting the bony and ligamentous anatomy of the adjacent column is impossible [3]. We report a rare case of completely closed navicular dislocation with comminuted intra-articular fracture of the calcaneum and associated subluxation at the calcaneocuboid joint in a 41-year-old male patient who was successfully treated by open reduction of the naviculocuneiform joints and calcaneocuboid joint, and stabilization using Kirschner wires.

Case Presentation

A 41-year-old male presented to our Level IV trauma centre with a history of road traffic accident, with direct impact over the foot while riding a two wheeler. Patient presented with swelling and deformity on the medial aspect of the foot. The neuro vascular examination was unremarkable. Radiological examination in the form of Xrays and CT scan revealed complete inferior dislocation of the navicular with medial displacement, comminuted intra-

articular fracture of the calcaneum and sub-luxed calcaneo cuboid joint. (Figure 1,2) The patient was immobilised in a slab, and PRICE management started. Monitoring for compartment syndrome and skin necrosis was done overnight.

Figure 1

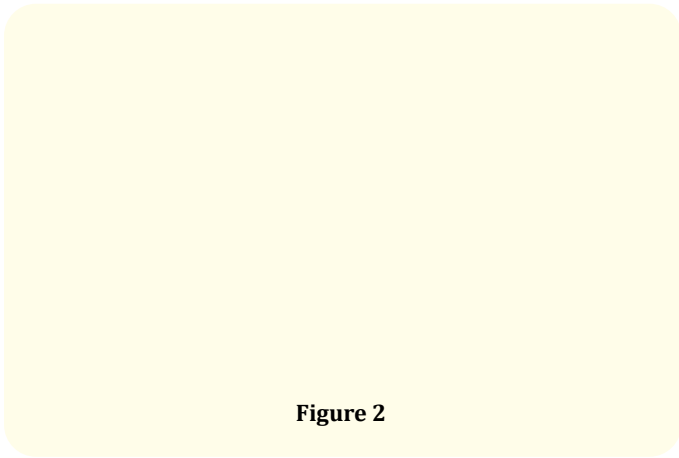


Figure 2

Patient was taken up for surgery the next morning after all radiological investigations. Attempt to reduce the navicular in a closed fashion by abduction and pronation of the foot was done. The navicular was still subluxating, so fixation of medial and lateral column using K-wires was done. The calcaneocuboid stability and the naviculocunieform pillar were stabilised with K wires in ante-grade and retrograde fashion. The chopart joint was stabilised with calcaneocunieform stabilisation. K wires used were 1.8 mm Kirshner wires. (Figure 3) The stability of the construct was checked under image intensifier and immobilised in a below knee splint for 6 weeks. Patient remained non-weight bearing with adequate rehabilitation of the hip and knee.

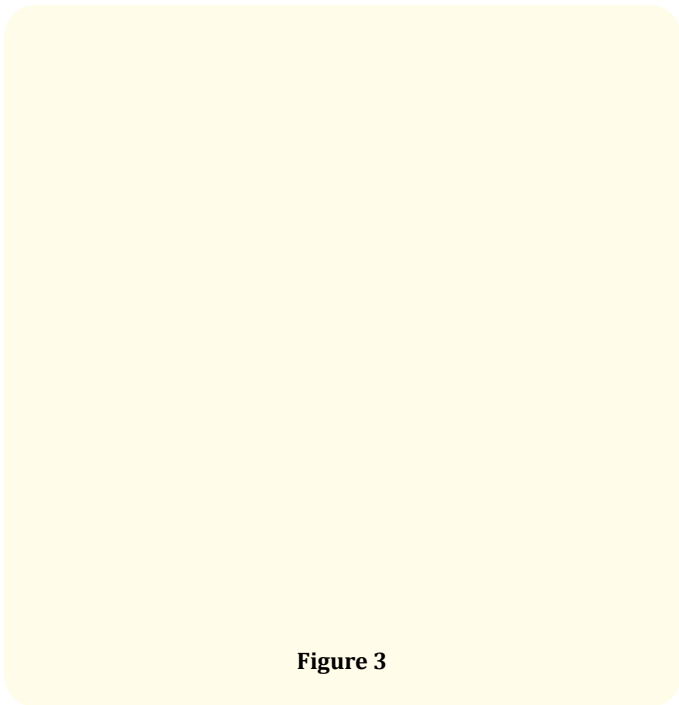


Figure 3

K wires were removed at 6 week follow up navicular found to be stable. (Figure 4) Patient was advised to undergo physiotherapy of the ankle and the foot, and started non-weight bearing in an air cast.

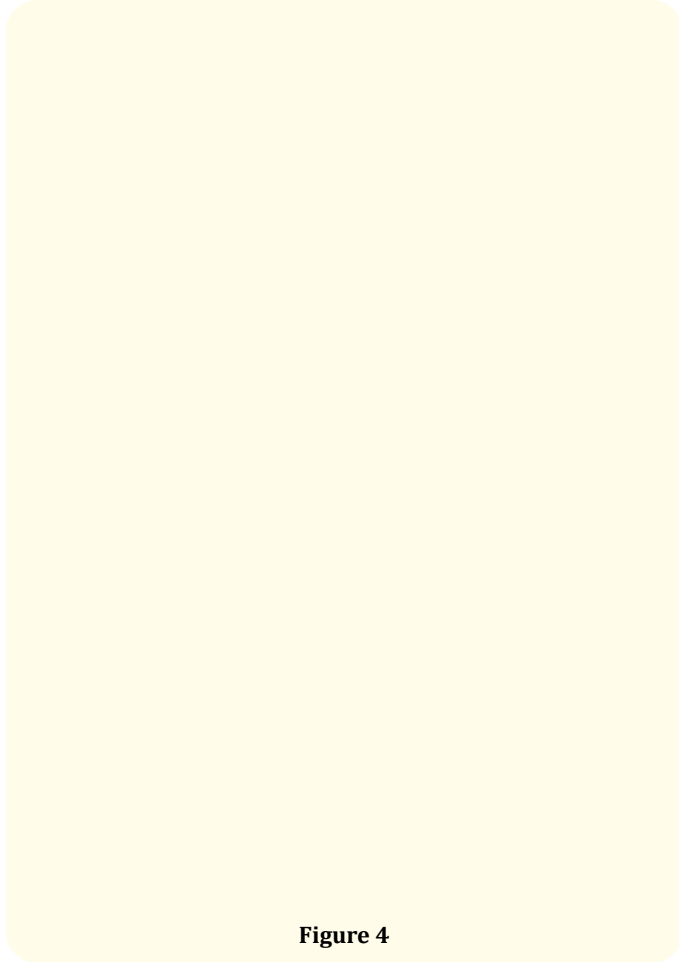


Figure 4

Partial weight bearing was started after 8 week with gradual progression to full weight bearing.

He regained full range of motion and painless gait at the final follow up of 1 year.

Discussion

Navicular dislocations without fracture of the navicular are not a common injury. In our review of the published data, we found only 15 reported cases. Isolated navicular dislocation without injury to the other bony and soft tissue structures or association with open injuries is rare. The reason for the rarity of this injury is related to the strong dorsal and volar ligamentous attachments and the rigid bony support surrounding the navicular [2,4]. The specific

mechanism is still not completely understood, and various mechanisms that have been described include transient midtarsal dislocation with a concomitant direct blow to the navicular; transient midtarsal dislocation with subsequent relocation of the forefoot forcing the navicular to dislocate, and dislocation of the talus at the ankle and talonavicular joints followed by disruption of the naviculocuneiform joint [3,4]. The force on the foot that causes navicular dislocation is thought to be one of pronation-abduction, with the most common direction of dislocation being medial [3], with dorsal inferior subluxation being rarer. [5] The direction of the force and the position of the foot is thought to be the deciding factors for the ultimate type of dislocation. In the present case, the patient had an injury with direct impact on the bone with an iron rod while riding a two wheeler. The direct impact on the navicular should have caused fracture as well, but there could have been transient dislocation of the foot in pronation and abduction and subsequent reduction. This mechanism could also explain the associated injury of the cuboid and calcaneus, considering the abduction force applied to the midfoot and the location of the bifurcate ligament, which likely avulsed fragments from the cuboid and calcaneus.

It has been proposed and very much accepted that a tarsal navicular dislocation cannot occur without bony or ligamentous damage to the lateral column of the foot. Because this injury inevitably involves both columns, and stabilization of both medial and lateral columns to produce a good outcome has been recommended [3].

This philosophy was applied to our treatment regimen and both the lateral and the medial column was stabilised. Anatomical reduction is important even if opening up of the talonavicular joint is needed [6,7].

Avascular necrosis as a complication is proposed in case the tibialis posterior tendon attachment is not preserved in these dislocations [3].

Earlier literature shows the use of k wires to upto 6 months [5], but with higher incidence complications like stiffness and arthrofibrosis [8].

Conclusion

The treatment principles of combined midfoot injuries include making early correct diagnosis, maintaining an appropriate lateral and medial column length, maintaining the appropriate relationship between the forefoot and hindfoot to ensure a plantigrade foot, preserving motion in the talonavicular joint and cuboid-metatarsal articulation if possible, using stable internal fixation to maintain the anatomic reductions or primary arthrodeses, and allowing an adequate period to achieve bone and soft tissue healing [1]. These

principles were followed, and a satisfactory outcome was achieved at the end of 1 year follow up.

Bibliography

1. SJ Pinney and BJ Sangeorzan. "Fractures of the tarsal bones". *Orthopedic Clinics of North America* 32.1 (2001): 21-33.
2. R Vaishya and JH Patrick. "Isolated dorsal fracture-dislocation of the tarsal navicular". *Injury* 22.1 (1991): 47-48.
3. MS Dhillon and ON Nagi. "Total dislocations of the navicular: are they ever isolated injuries?" *The Journal of Bone and Joint Surgery. British Volume* 81.5 (1999): 881-885.
4. MN Pathria., et al. "Isolated dislocation of the tarsal navicular: a case report". *Foot Ankle* 9.3 (1988): 146-149.
5. KG Freund. "Isolated dislocation of the tarsal navicular". *Injury* 20.2 (1989): 117-118.
6. BJ Main and RL Jowett. "Injuries of the midtarsal joint". *Journal of Bone and Joint Surgery. British Volume* 57.1 (1975): 89-97.
7. N Datt., et al. "Medial swivel dislocation of the talonavicular joint". *Indian Journal of Orthopaedics* 43.1 (2009): 87-89.
8. JP Simon., et al. "Fracture dislocation of the tarsal navicular". *Acta Orthopaedica Belgica* 59.2 (1993): 222-224.