Int J Burn Trauma 2023;13(5):185-190
www.IJBT.org /ISSN:2160-2026/IJBT0151119

Case Report

Medial swivel dislocation of talonavicular joint: a case report and literature review

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Received May 7, 2023; Accepted September 14, 2023; Epub October 15, 2023; Published October 30, 2023

Abstract: Midtarsal dislocations of the foot are rare injuries. Most descriptions of these injuries state that they develop due to high-energy trauma. We present a case of low-energy trauma leading to a medial swivel dislocation of the talonavicular joint, which was reduced by a closed method and immobilized in a cast. A 48-year-old non-diabetic male with no rheumatoid symptoms or any steroid injection suffered low-energy trauma to his right foot and presented to the emergency department with pain, tenderness and with his foot adducted. On X-rays and NCCT, it was found to be medial type swivel dislocation of the Talonavicular joint with a fractured base of the fifth metatarsal and talar head impaction fracture with talocalcaneal joint subluxation. Closed reduction under sedation was done successfully, which was stable on stressing under fluoroscopy, so the foot was immobilized in a cast without internal fixation. Talonavicular dislocations are rare injuries, with most of them requiring open reduction and internal fixation. Low-energy trauma can also lead to talonavicular dislocations, which, if stable after reduction, can be immobilized in a cast without internal fixation.

Keywords: Swivel type, talonavicular dislocation, closed reduction, low energy injury

Introduction

Talonavicular dislocation of the foot is an extremely uncommon injury. Midfoot fractures and ligamentous disruption frequently accompany them. Nearly all descriptions of these injuries state that they develop due to high-energy trauma, which severely disrupts the ligamentous elements in the midfoot. There is often an obvious deformity and swelling of the foot with significant pain, and the talar head is frequently palpable. Diagnosis can be made based on plain foot radiographs by looking at the talonavicular joint. In medial dislocations, the navicular is medial to the talar head on the AP view; in lateral dislocations, the navicular is laterally displaced on the AP view [1]. Various treatment options are available such as closed reduction without any fixation, open reduction with internal fixation, and reduction with external fixation. Closed reduction is efficient for pure dislocations and has a good outcome when anatomical reduction is achieved [2].

Few studies have discussed the closed reduction and successful outcome of these injuries [3-5]. Here, we describe a case of low-energy injury that resulted in a medial swivel dislocation of the talonavicular joint, together with a fractured base of the fifth metatarsal and talar head impaction fracture with talocalcaneal joint subluxation, which was reduced by a closed method. To the best of our knowledge, we could not find this combination of injuries in the literature.

Case report

The 48-year-old male patient, who was 165 cm tall and weighed 68 kg, arrived at our emergency room complaining of severe pain in his right midfoot after suffering an injury from ankle inversion while descending the stairs. He had no rheumatoid arthritis history or symptoms, and the affected foot never received any steroids or other injections. An unusual bony prominence with swelling and tenderness was found

Figure 1. Clinical picture of the patient showing unusual bony prominence with swelling over the medial aspect of his right foot and with his forefoot adducted.

on the medial aspect of the right foot and the forefoot was adducted (**Figure 1**). Other sites lacked tenderness, and the distal neurovascular status was preserved. No open injury was present, and ankle joint and toe movements were normal. On radiographic examination, medial navicular dislocation was noted in the right foot (**Figure 2A**, **2D**, white arrow), but the calcaneocuboid joint was intact (**Figure 2A**, **2C**, yellow arrow), and there was no associated navicular body fracture. Also, there was subluxation of the talocalcaneal joint (**Figure 2B**, **2C**, red arrow) with a 5th metatarsal base fracture (**Figures 2A**, **3B**, black arrow). However, on NCCT, it was revealed that there was an impaction fracture of the head of the talus (**Figure 2D**, blue arrow). So, the patient was diagnosed as a case of medial swivel dislocation of the talonavicular joint, together with a fractured base of the fifth metatarsal and talar head impaction fracture with talocalcaneal joint subluxation. Under sedation, the closed reduction was performed in the emergency room by flexing the knee (relaxing the Achilles tendon musculature), accentuating the deformity and correcting it, facilitated by digital pressure on the talar head [6]. Stressing under fluoroscopy revealed that it was stable (**Figure 3A**, **3B**). Due to the apparent stability in our case, no more K-wire fixation was attempted, and the foot was immobilized in a boot cast (**Figure 4**) for six weeks, and the patient was kept non-weight bearing. After 6 weeks cast was removed, and he was allowed to mobilize full weight bearing as tolerated and was referred for physiotherapy. Even though this kind of injury is expected to cause severe soft tissue and ligament disruption, further imaging was not conducted due to the stability of reduction achieved. At the 7th month follow-up, he had no residual pain or any instability in the foot, and the radiograph showed no loss of reduction (**Figure 5A**, **5B**). The AOFAS midfoot score was 95, and the VAS score was 2 at the 7th month of follow-up.

Discussions

Dislocations of the midtarsal joint, which consists of the talonavicular and calcaneocuboid articulations, are a highly uncommon injury because of the strong periarticular ligamentous support at this joint. According to estimates, there are 3.6/100000 cases of this injury yearly. The medial and lateral longitudinal columns of the midfoot are disrupted in TNJ dislocation, which often follows high-energy trauma [7-9]. It is also believed that a greater disruption would be necessary to result in an isolated dislocation without navicular body fracture [7-9]. The foot turns medially along the axis of the intact talocalcaneal ligament (which prevents subtalar dislocation). However, many case studies concluded that low-energy trauma, as in our case, can also result in such an injury. It is rare to have an isolated talonavicular joint dislocation without concurrent talocalcaneal joint dislocations or bone fractures due to the strong ligamentous and bony framework supporting the midtarsal joints [10]. An essential aspect of treatment success is that between 75% and 90% of TNJ dislocations are accompanied by concurrent injuries, including fractures of the navicular, talus, cuboid, calcaneus, and metatarsal bones [4, 10-13]. In our case, medial swivel dislocation was associated with the 5th metatarsal base fracture, talar head impaction fracture, and talocalcaneal joint subluxation. This combination of injuries has not been described elsewhere to the best of our knowledge. According to Ip and Lui, coexisting fractures alone have a better prognosis than concomitant ligamentous injury [14]. For a good outcome, it is crucial to restrict the patient from bearing any weight after achieving reduction and stabilization [15].

In accordance with the direction of the exerted deforming stress and the midtarsal joint's dis-

Figure 2. (A) Xray of the right foot - anteroposterior and oblique view. (B) Xray of the right ankle - anteroposterior, mortise and lateral view. (C, D) NCCT of right foot and ankle. Medial navicular dislocation in the right foot (A, D, white arrow), the calcaneocuboid joint was intact (A, C, yellow arrow). Subluxation of the talocalcaneal joint (B, C, red arrow), 5th metatarsal base fracture (A, black arrow), talar head impaction fracture (D, blue arrow).

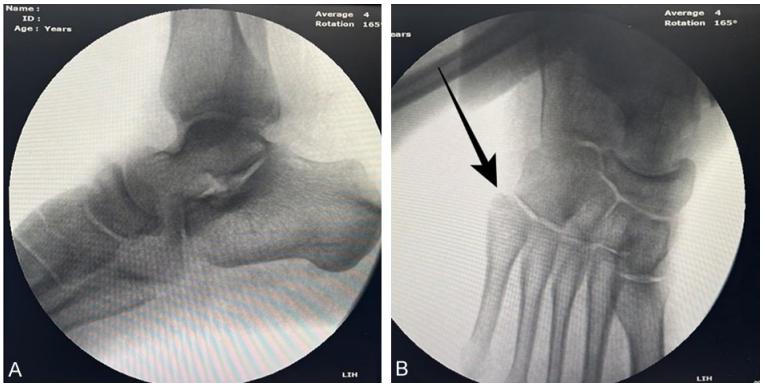

Figure 3. (A) Lateral view; The reduction was stable under fluoroscopy, so additional k-wire fixation was not done. (B) Anteroposterior view showing fracture of the fifth metatarsal base.

Figure 4. Post-reduction X-ray of the right foot - anteroposterior and oblique view.

placement that ensues, Main and Jowett created a system for classifying midtarsal injuries into five different types (longitudinal impact injuries, medial, lateral, plantar displacement, and crush injuries) [3]. Medial TNJ dislocations account for up to 80%, while lateral ones account for 17% [16]. In medial displacement, they described medial swivel dislocation as a form of injury where the tibiotalar and calcaneocuboid joints are preserved as the force is distal to it. However, the navicular is medially or laterally displaced from the talus, and the calcaneum swivels under the talus, with the talocalcaneal ligament being its axis [3, 17]. There is often an obvious deformity and swelling of the foot with significant pain. On the dorsum of the foot, between the EDL and EHL tendons, the talar head is frequently palpable in cases of medial talonavicular dislocations. The digits can sometimes appear dorsiflexed due to the relationship of the talar head with the EDL tendon. The lateral border of the foot appears shorter than the medial border in lateral talonavicular dislocations. The digits may appear plantar-

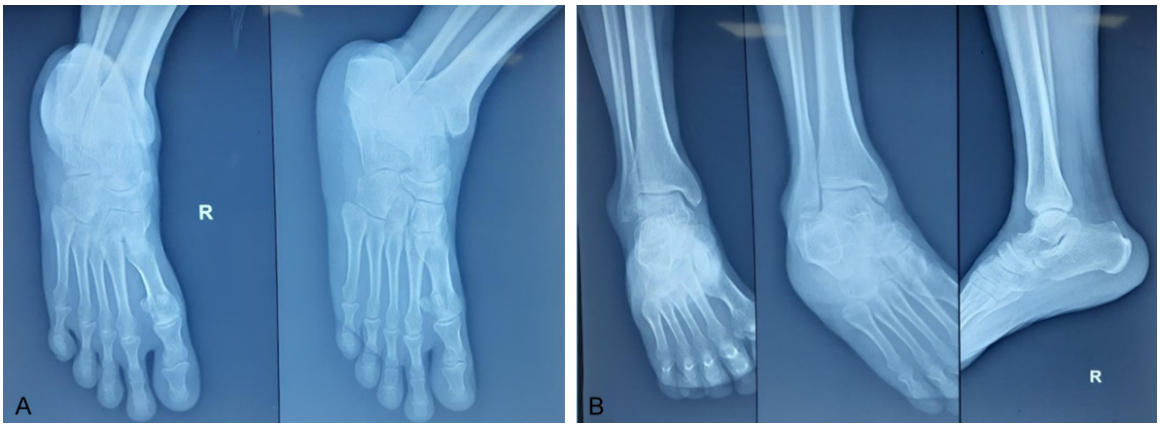

Figure 5. Radiographs at the seven-month follow-up. The reduction was maintained as seen on an X-ray of the right foot (A) and right ankle (B).

flexed, and the talar head is palpable medially [1]. Diagnosis can be confirmed based on plain AP and Lateral radiographs of the foot by looking at the talonavicular joint. In cases of medial dislocations, the navicular is medial to the talar head on the AP view, and the talus head is superior to the navicular on the lateral view. In lateral dislocations, the navicular is laterally displaced on AP view, and the talar head appears inferior to it on lateral view. If any doubt persists NCCT foot with 3D reconstruction can be done [18].

Based on radiographs and NCCT, ours was a medial swivel dislocation. CT-Scan was done to check for associated injuries as recommended by other authors [13]. Impacted fracture of the calcaneocuboid joint usually accompanies lateral swivel dislocation [19]. In our case, an impaction fracture of the talar head was identified on NCCT (**Figure 2D**, blue arrow). Williams et al. [4] were the first to report this type of fracture and explained the mechanism as the talus's capsular avulsion during dislocation or the navicular impacting the talar head during displacement. Richter et al. evaluated 110 Chopart joint dislocations and divided them into four categories based on the type of treatment given: closed reduction without any internal fixation; open reduction with added internal fixation; optional additional external fixation; and amputation. Nineteen patients (17%) in his study consisted of pure Chopart joint dislocation and were treated by closed reduction without internal fixation and did not show bad outcomes. A similar result was seen in our case. They found that all groups saw good results when an initial anatomical reduction was achieved [2]. Closed reduction was efficient for pure dislocations where anatomical parameters could be restored, but for all other cases, an initial open reduction was much more beneficial [2, 10]. The skin should be checked for impending skin compromise or open wounds. A neurovascular examination is performed initially and after manipulation attempts [18].

As recommended in multiple prior papers, the closed reduction should be the first management option [3, 5, 7]. But the majority are highly unstable and need open reduction with or without internal fixation [7, 8, 20]. In our case, the dislocation was easily reducible and stable, as seen on stress fluoroscopy and did not require further stabilization. Also, he had no residual pain or instability in his foot and was allowed to mobilize full weight bearing as tolerated after cast removal at 6th week and was referred for physiotherapy.

In another case report by Garofalo et al., a 24-year-old male with a dislocation of the talonavicular joint and an undisplaced navicular fracture underwent closed reduction. Two years after the accident, he was effectively employed as a manual labourer, and clinical evaluation revealed no pain or movement restriction [21].

Pehlivan et al. documented a case of medial TNJ dislocation necessitating open reduction after an unsuccessful closed reduction, the reason being cited as buttonholing of the talar head through the extensor retinaculum [12]. Other reasons might be interposing structures

(like flexor digitorum longus tendons, extensor digitorum brevis muscle), concurrent fractures, and late presentation [16]. Prompt intervention is essential to avoid complications in these types of dislocations which may be divided into early (skin necrosis, compartment syndrome, deep infection and neurovascular compromise varying from 0 to 10%) and late (tarsal bone avascular necrosis, arthritis) [22].

We believe our study is an important contribution to the existing literature since very few researchers have studied the closed reduction results for this particular form of dislocation. Additionally, our case illustration will be helpful to orthopaedic surgeons who come across similar cases in future. These injuries are extremely uncommon and even more uncommon in low energy injuries, so they are likely missed if one is unaware and may lead to irreversible complications. Our study has several limitations. Only a single patient is reported here, and the follow-up period was short, so a study with a larger sample size and longer follow-up is required to better understand the mechanism of injury and establish a proper treatment protocol for Talonavicular dislocations.

Conclusion

Talonavicular dislocations are uncommon injuries that are currently poorly understood. These injuries usually result from high-energy mechanisms but can also occur due to low-energy trauma. A correct injury diagnosis is required to determine the best course of treatment and reach a favourable prognosis.

Disclosure of conflict of interest

None.

Abbreviations

TNJ, Talonavicular joint; AOFAS, American Orthopaedic Foot and Ankle Society; NCCT, Non-contrast Computed Tomography scan.

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