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Medial Swivel Dislocation of the Talonavicular Joint Due to High- Energy Trauma: A Case Report

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Learning Point of the Article:

It is rare for the talonavicular joint to dislocate entirely without the subtalar joint dislocating or the tarsal bones collapsing. Despite being a rare injury, favorable long-term outcome can be achieved with CT CT-based better assessment and closed management.

Abstract

Introduction: Medial swivel type of talonavicular dislocation is a very rare injury; caused by high high-velocity trauma. This injury occurs due to forceful adduction of the forefoot without inversion of the foot; causing talonavicular joint to dislocate medially while calcaneum swivels under the talus with intact talocalcaneal interosseous ligament and calcaneocuboid joint.

Case Report: We report a case of 38-years-old male who had medial swivel injury to his right foot, sustaining a high- velocity road traffic accident with no other injuries.

Conclusion: The occurrences, features, reduction maneuver, and follow follow-up protocol of medial swivel dislocation rare injury has have been presented. Even though it's it is a rare injury, good outcomes are still achievable with proper evaluation and treatment.

Keywords: Medial swivel dislocation, talonavicular joint, subtalar subluxation.

Introduction

Midtarsal dislocations of the foot and ankle are very rare injuries and occur mainly due to the high high-energy trauma. Incidence is estimated to be around 3.6/100,000/year [1]. Strong tendinous and ligamentous structures surrounding the bony components of the midfoot account for fracture-disclocations rather than pure dislocations [2]. Main and Jowett gave the classification for midtarsal injuries depending on the mechanism of injury [3]. Swivel type of injury refers to an isolated dislocation of the talonavicular joint with calcaneum getting swiveled beneath the talus, ie.that is, subtalar subluxation, with intact introsseous ligament and intact calcaneocuboid joint [3, 4, 5, 6]. These injuries are very rare and occurs due to severe adduction or abduction of the forefoot with the axis being an intact introsseous ligament [3].

We report a case of medial swivel dislocation of talonavicular joint without associated fracture caused by high high-energy trauma causing severe adduction of forefoot, its management, and its follow follow-up.

Case Report

A 38-year-old male patient presented to the emergency department with history of high- energy road traffic accident, with injury to his right foot. He had pain and swelling over the medial aspect of the foot with being unable to bear weight and

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Author's Photo Gallery


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Figure 1: Plain radiographs in anteroposterior (a) and oblique (b) views of the foot and anteroposterior (c) and lateral (d) views of the ankle joint showing talonavicular dislocation with subtalar subluxation and intact calcaneocuboid joint.

with typical equinovarus deformity.

Neurovascular deficit was not found. He denied of any past medical history of diabetes mellitus, inflammatory arthropathy, or any other medications. Routine radiographs of the ankle and foot in anteroposterior, lateral, and oblique views were taken which showed medial dislocation of the talonavicular joint with subtalar subluxation without any associated fracture (Fig. 1). Radiographs did not show any evidence of Charcot or inflammatory arthritis. CT scan was done which showed intact calcaneocuboid joint with no fracture; and subluxated subtalar joint with medial dislocation of the talonavicular joint (Fig. 2).

Under spinal anesthesia, close reduction was attempted by flexing the knee joint so as to relax the gastrosoleus complex, with ankle in maximum plantar flexion and axial traction given to the calcaneum with counter traction at knee joint. Deformity was first exaggerated by adducting the forefoot and then reduction attempted by forceful abduction of the forefoot and simultaneous medial pressure applied to the head of the talus and lateral pressure over the dislocated navicular; maintaining the traction and counter traction (Fig. 3). Successful reduction was appreciated by the click with correction of the deformity and confirmed under the image intensifier (Fig. 4). During the stress examination, the reduction was maintained; thus, no internal fixation was attempted and the leg was immobilized in below knee cast for 4 weeks (Fig. 5). After 4 weeks, the cast was removed and stability was again checked on stress views. Found to be stable, physiotherapy of the ankle and subtalar joint was initiated with partial weight- bearing. After 6 weeks post-trauma, full full-weight- bearing was started. At 1 year follow-up, the patient had full range of motion with no radiological evidence of instability, arthritis, or avascular necrosis (Fig. 6).

Discussion

The midtarsal joints includes the talonavicular and calcaneocuboid joints lying in a transverse plane. Main and Jowett [3] gave the classification for the midtarsal injuries depending on the mechanism of injury and displacement [3, 7]. Medial and lateral injuries were further classified as fracture, sprain, fracture-subluxation/dislocation, and swivel dislocation (Table 1).

The incidence of swivel injuries in their series was found to be 12% [3]; with medial being more common and easier to reduce than the lateral counterpart. Lateral injuries are found to be associated with the impacted fracture of the calcaneocuboid joint (nut cracker fracture) [8]. Swivel injuries differ from subtalar injuries as the deforming forces act more anteriorly in the former [7, 8]. Ip and Lui suggested that concomitant ligamentous injuries carry worse prognosis than pure dislocations [9]. Swivel injuries as a whole are more easy than dorsal or subtalar dislocations due to disruption of tough

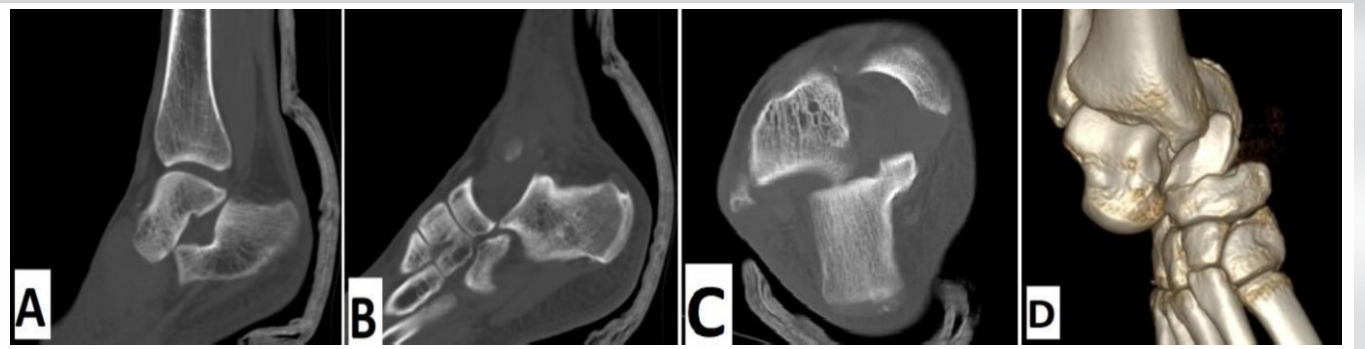

Figure 2: CT scan in sagittal cuts (a and b), axial cuts (c) and 3D reconstruction (d) showing talonavicular joint dislocation with subtalar subluxation.

Figure 3: Reduction maneuver showing the axial traction (a) on calcaneum, with the counter traction being provided at the knee both manually as well as by the frame. Initially the deformity is exaggerated (b) by adduction of the forefoot, followed by the reduction (c) by forcefully abducting the forefoot with simultaneous medial pressure on talar head and lateral pressure over the dislocated navicular.

Figure 4: pre-reduction (a) and post-reduction (b) clinical photos showing successful closed reduction.

ligamentous structures and loss of plantar ligament integrity in the later [10, 11]. Early diagnosis and prompt treatment helps to minimize difficult reduction, compartment syndrome, avascular necrosis of the talus, and post- traumatic arthritis [12].

Our case was a medial swivel dislocation of TNJ without any fracture. It is important to distinguish between the medial swivel injury and medial subtalar dislocation. Medial subtalar dislocation is reduced by traction and eversion of the ankle, while medial swivel dislocation reduces by traction and abduction of the forefoot with simultaneous lateral pressure over the head of the talus. Obstruction to close reduce subtalar dislocation can be due to interposition of the tendon of tibialis posterior or interlocking or impaction of the fracture fragment of talus or navicular; , which is not seen in swivel injuries. , While while causes of failure to close reduce swivel injuries include: 1) Buttonholing of the talar head through the extensor retinaculum or extensor digitorium brevis or talonavicular ligament or joint capsule, and 2) Interposition interposition of extensor digitorium brevis or deep peroneal nerve or dorsalis pedis artery or fracture fragments between the talus and navicular [13, 14].

Various treatment modalities have been advocated by the authors which includes: (1) closed reduction without internal fixation, (2) closed reduction with internal fixation, (3) open reduction with internal or external fixation, and (4) amputation. However, multiple attempts for closed reduction can compromise the surrounding soft- tissue structures and can lead to necrosis. [13]. Thus, most of the authors have advocated the use of open reduction and internal fixation so as as to prevent the risk of vascular compromise [10, 15, 16, 17]. Richter et al. advocates open reduction and internal fixation for all dislocations of TNJ to prevent the risk of vascular compromise [17]. Main and Jowett recommended closed reduction with or without k- wire fixation and immobilization for medial swivel injuries [3]. Williams et al. recommended closed reduction without internal fixation in a single case report of medial swivel injury due to low energy trauma [18]. Pehlivan et al. reported a single case of medial swivel injury managed with open reduction and percutaneous fixation with small residual functional deficit and lateral column pain only on long distance ambulation; on long long-term follow -up [19].

Figure 5: Post-reduction radiographs of the ankle and foot showing reduced talonavicular joint with stable subtalar and calcaneocuboid joint.

Figure 6: One-year follow-up radiographs of the ankle and foot showing stable talonavicular joint with no signs of arthritis or avascular necrosis of the talus.

Table 1: Main and Jowett classification of midtarsal injuries [3]		
Direction of deforming force	Resulting deformity/displacement	Prognosis
Medial	Fracture-sprains, fracture-subluxation/dislocation and swivel	Good
Longitudinal	Undisplaced or displaced fracture of the navicular, crush injury to navicular, and cuneiform or talus	Lateral: poor
		Medial: good
Lateral	Fracture-sprains, fracture-subluxation/dislocation, and swivel	Poor
Plantar	Fracture-sprains and fracture-subluxation/dislocation	
Crush	No constant pattern of injury	Variable
Dorsal	Not described	

Table 1: Main and Jowett classification of midtarsal injuries [3]

Some early complications include: (1) skin necrosis, (2) neurovascular deficit, and (3) compartment syndrome. These complications are found in 0-–10% of cases [20]. Some late complications include: (1) avascular necrosis of the talus, (2) osteoporosis, and (3) post- traumatic arthritis. Early diagnosis and prompt intervention help in preventing these complications. Also Furthermore, keeping the foot in non-weigh-t bearing is essential for good outcomes whether closed or open reduced [4,18,21].

Conclusion

Talonavicular dislocation of swivel type is a rare injury; caused by high high-energy trauma. Our case had medial swivel injury due to high- velocity trauma without associated fracture and was able to reduce it in a closed manner with the reduction maintained in stress views, and was thus not fixed internally and was immobilized. We recommend an attempt of closed reduction to have an anatomic reduction, failing to which open reduction should be attempted with or without internal fixation. The present case was reported due to its rarity and also because the dislocation was reduced by closed means with excellent outcomes.

Clinical Message

For an accurate diagnosis and treatment planning, a CT-based examination is needed. If a diagnosis is made early, closed reduction is the treatment that might be done. Relative longer time of immobilization requires for ligaments to heal.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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