

Lateral Subtalar Dislocation Associated with Cuboid Fracture. Prompt Diagnosis and Initial Management of This Rare Orthopaedic Manifestation at the Emergency Department

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Learning Point of the Article:

Great care should be given in hidden injuries like the one that we present, particularly in polytrauma patients, prompt close reduction could be the key to a successful treatment.

Abstract

Introduction: Subtalar dislocations are rare injuries, representing around 1% of all dislocations. Defined as talonavicular and talocalcaneal separation, occurs in medial, lateral, anterior, or posterior direction. They are more common in young men, usually as a result of high energy trauma and are associated with posttraumatic arthritis, especially when accompanied with peritalar fracture (a cuboid fracture in this case), so prompt recognition is necessary in order all these complications to be avoided.

Case Presentation: This study presents a rare case of subtalar dislocation associated with cuboid fracture in a young male adult as a result of a Motor Vehicle Accident (MVA) as treated in the Accident & Emergency (A&E) Department, and discuss the diagnostic protocols, the reduction technique and the initial management as performed. A 21-year-old man was transferred to the Emergency Department of our hospital after a MVA (driver of a motorbike). After the initial management of the patient according to the ATLS, deformity on the foot was observed and a lateral subtalar dislocation was suspected. Prompt closed reduction achieved, avoiding skin complications. The limb was immobilized in a bellow knee splint and plain radiographs confirmed the reduction. A CT scan was performed to evaluate entrapped intraarticular fragments or associated fractures and the patient was referred to the Orthopaedic department for final treatment.

Conclusion: Emergency and Trauma teams should be aware of these rare injuries during the initial management of a patient particularly a polytrauma one. Delayed diagnosis or misdiagnosis are common especially when more serious and life-threatening injuries are present in the same patient. Proper initial assessment of the patient and high incidence of suspicious is the key for an early diagnosis. When the suspected dislocation is confirmed, closed reduction, post reduction evaluation and immobilization is important to reduce complications as skin necrosis, neurovascular injuries, or post traumatic arthritis.

Keywords: subtalar dislocation, cuboid fracture, closed reduction

Introduction

Subtalar dislocations are rare injuries, which involve separations of talonavicular and talocalcaneal joints and represent around 1% of all dislocations [1]. Men in mid-30's are more frequently affected than women (6:1). They result from high energy trauma including motor-vehicle accidents and falls from heights in 50-80% of all cases [2]. Subtalar dislocations were described initially

by Judey and Defaurest in 1811 [3], but Broca classified them in 1853 as (1) medial dislocation; (2) lateral; and (3) the posterior dislocation [4] taking account the position of the foot in relation to the talus following the dislocation. The anterior dislocation was added later by Malgaigne and Buerger [5]. According to the above, four types of dislocations have been recognized in total. Medial dislocations are thought to be the most common

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Figure 1: Initial presentation of the patient. The right foot appears to be slightly deformed and locked in pronation without neurovascular deficits, skin lacerations (apart from a minor laceration on the great toe) or signs of compartment syndrome.

accounting for 80%, while lateral dislocations 17% [6] respectively. Posterior and anterior are rare injuries which account around 2,5 % and <1% [7]. Peritalar fractures such as fractures of the medial and lateral malleolus, talar neck, posterior process of talus, anterior process of calcaneus, and navicular have a reported rate of 50-100% [8]. However, lateral dislocations are frequently associated with cuboid fractures. In a lateral dislocation the foot is everted, and the deltoid ligament is firstly ruptured as the talar head pivots around the posterior process of the calcaneus, followed by the rupture of the interosseous ligament, the talo-calcaneal joint and finally the dorsal talo-navicular ligament [9, 10]. Around 25% of all dislocations are open with lateral dislocations been affected more often [4, 11].

Furthermore, neurovascular injuries can be identified in up to 70 % of lateral dislocations [12] and the physician should be ready to identify these potentially dangerous complications.

The keys in these kinds of injuries are the prompt diagnosis and the closed reduction [13] as soon as possible to reduce the rate of complications. When closed reduction is feasible and there are no other injuries, this dislocation may be treated conservatively [14].

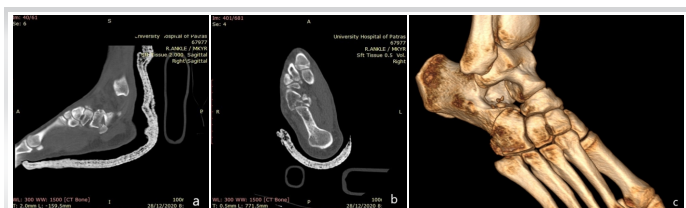


Figure 3: (a) Post reduction Computer Tomography (CT) scan on the sagittal plane. A complete intra-articular fracture of the cuboid can be identified. (b): Post reduction CT scan on the axial plane (c): Postreduction CT scan 3D reconstruction.

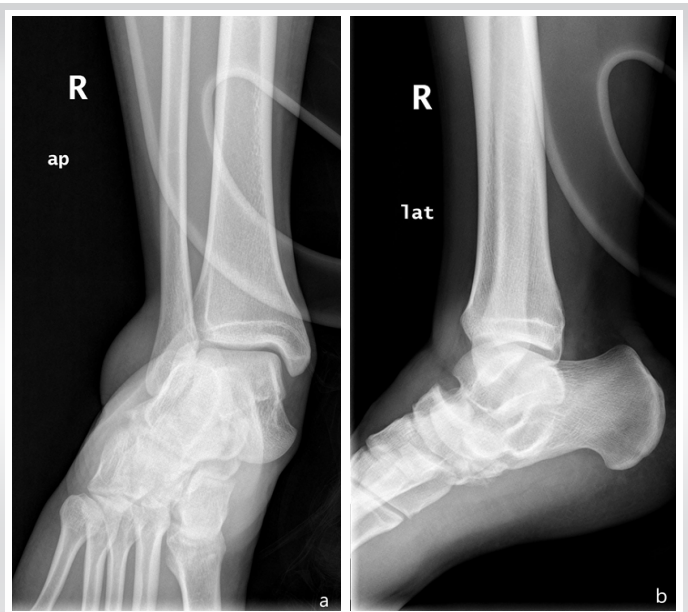


Figure 2: (a) Anteroposterior ankle X-ray of the involved lower extremity. A lateral subtalar dislocation was revealed with some evidences of osseous fragments, (b): Lateral ankle X-ray of the involved lower extremity.

Case Presentation

A 21-year-old man presented to the Emergency Department of our institute after an MVA. The patient despite the high energy trauma that underwent had no other obvious injuries and was only complaining about severe pain at his right foot. The initial trauma screening revealed a hemodynamically stable patient with no other injuries and after that the patient was carefully evaluated. The right foot was painful, slightly deformed and locked in pronation without neurovascular deficits, skin lacerations (apart from a minor laceration on the great toe) or signs of compartment syndrome (Fig. 1). A lateral subtalar dislocation was suspected initially according to the clinical presentation of the limb. Plain radiographs (anteroposterior and lateral views of the hindfoot, mortise view of the ankle) confirmed the suspicion, and moreover, osseous fragments were revealed (Fig. 2a, b). Written consent was given by the patient for the publication of this case on one of his follow ups visits, no approval by an institutional review board or ethics committee was needed for this report.

Following the radiographic confirmation, the patient was prepared for an emergency closed reduction under local anesthesia (intra-articular lidocaine 1 %) and adequate intravenous analgesia. The closed reduction was performed by two physicians of the Emergency Team. The patient was laid in supine position and the ipsilateral hip and knee were bent 90° so that the gastrocnemius muscle was relaxed. The reduction technique is a combination of traction at heel and counter-traction to thigh, dorsiflexion and further eversion of the foot. We prefer to apply medial pressure to the talar head in order to

stabilize the tibiotalar joint. The reduction maneuver is completed by inversion. After the successful reduction, the limb was assessed carefully for neurovascular deficits (dorsalis pedis and posterior tibial pulse, capillary refill, sensation to the bottom of the foot). No visible skin defects, or neurovascular deficits were identified, and the limb was immobilized with a below knee splint.

Post reduction radiographs and Computer Tomography (CT) scanning were ordered. The reduction was confirmed as successful by the imaging and a cuboid fracture was identified on the CT scan (Fig. 3a, b, c). Great care was given in the initial follow – up of the patient at the Emergency Department. The neurovascular status of the foot was monitored closely, and a potential compartment syndrome was excluded initially.

Discussion

We report a rare case of a lateral subtalar dislocation in combination with a fracture of the cuboid in a 21-years-old male as presented and initially treated at the A&E department. It is not our purpose to discuss the final treatment of this particular patient but to underline the importance of the prompt diagnosis and the initial management of this injury as it should be performed in the Emergency Department.

Subtalar dislocations are rare injuries and the lateral subtype account for only 17% of them. Therefore, the available literature consists mainly of case reports and small series.

Despite this rareness, these injuries should be suspected early in patients with this type of deformity presenting in A&E following high energy trauma, and particularly in unconscious and/or polytrauma patients where the incidence of misdiagnosis is higher. The emergency physician should be aware and carefully perform examination of the limbs especially in an unconscious patient. The final outcomes are often affected by several patient and injury related factors.

Close reduction is usually successful and should be performed as soon as possible under adequate anesthesia and analgesia. Delayed diagnosis is the main reason of early or late complications such as skin ulcerations, avascular necrosis, post traumatic arthritis which is mainly seen with open dislocations and associated fractures [15]. A post reduction CT scanning is recommended to verify the anatomic reduction, and to reveal associated fractures [16].

Consequently, the trauma team in the Emergency Department

should be vigilant for these injuries as they often have delayed or misdiagnosis. Early diagnosis, urgent closed anatomic reduction of a stable subtalar joint, accompanied with any other foot injuries are the keys in order good functional results to be achieved, but they do not prevent arthrosis in all the cases [1]. The reduction is in the majority of the cases successful [17, 18] and it is considered essential in reducing the complication rates in these rare injuries. With proper diagnostic approach, neurovascular evaluation, reduction and immobilization in the Emergency Department, patients can have a chance of a good clinical outcome even in complicated cases.

Conclusion

According to the literature, the best strategy for the treatment of closed subtalar dislocation is the urgent closed manual reduction as soon as possible. The reduction maneuver is straight forward and any physician working in the Emergency Department could easily adopted it. We strongly believe that the milestone for good clinical results in this kind of injury is the prompt diagnosis. Great care should be given during the clinical examination of the limbs particularly in polytrauma and/or unconscious patients. More serious and life-threatening injuries could easily disorientate the staff of the Emergency Department and as a result, rare injuries can be missed or delayed in diagnosis. Upon the recognition of a subtalar dislocation, the limb should be assessed carefully for neurovascular deficits (dorsalis pedis and posterior tibial pulse, capillary refill, sensation to the bottom of the foot) and signs of compartment syndrome. If there are no clinical signs of neurovascular deficits, the injury must be documented initially before the reduction attempt. In any other case that the limb is in danger, emergency reduction should be considered before the imaging.

Clinical Message

The trauma team in the Emergency Department should be vigilant for these injuries as they often have delayed or misdiagnosis. Early diagnosis and urgent closed reduction are the keys in order good functional results to be achieved. With a proper diagnostic approach, neurovascular evaluation, reduction, and immobilization in the Emergency Department, patients can have a chance of a good clinical outcome even in complicated cases.

Declaration of patient consent : The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient's parents have given their consent for patient images and other clinical information to be reported in the journal. The patient's parents understand that his 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

References

- Prada-Canizares A, Aunon-Martin I, Vil a Y Rico J, Vilá y Rico J. Subtalar dislocation: management and prognosis for an uncommon orthopaedic condition. *Int Orthop*. 2016;40:999e1007. doi.org/10.1007/s00264-015-2910-8.
- Rammelt S, Bartoníček J, Park KH. Traumatic Injury to the Subtalar Joint. *Foot Ankle Clin*. 2018 Sep;23(3):353-374. doi: 10.1016/j.fcl.2018.04.004.
- DeLee JC, Curtis R. Subtalar dislocation of the foot. *J Bone Joint Surg Am* 1982; 64(3):433-437
- Zimmer TJ, Johnson KA. Subtalar dislocations. *Clin Orthop* 1989; 238:190-4
- Malgaigne JF, Buerger CG. *Die Knochenbrüche und Verrekungen*. Stuttgart: Rieger, 1856
- Jungbluth P, Wild M, Hakimi M, et al. Isolated subtalar dislocation. *J Bone Joint Surg Am* 2010; 92(4):890-4 doi: 10.2106/JBJS.I.00490
- Horning J, Di Preta. Subtalar dislocation. *Orthopedics* 2009; 32(12):904-908 doi: 10.3928/01477447-20091020-17
- Harris AP, Ramirez JM, Johnson J, Waryasz GR. Lateral subtalar fracture- dislocation with maintenance of the talonavicular joint: case study, diagnosis and management *Am J Emerg Med*. 2016 Oct;34(10):2055.e3-2055.e5. doi:0.1016/j.ajem.2016.03.006
- Sharma S, Patel S, Dhillon MS, Subtalar Dislocations *J Am Acad Orthop Glob Res Rev*. 2021 Dec;5(12) doi: 10.5435/JAAOSGlobal-D-21-00295
- Sangeorzan A, Sangeorzan B, Subtalar Joint Biomechanics: From Normal to Pathologic *Foot Ankle Clin*. 2018 Sep;23(3):341-352. doi: 10.1016/j.fcl.2018.04.002
- Hoexum F, Heetveld MJ. Subtalar dislocation: two cases requiring surgery and a literature review of the last 25 years. *Arch Orthop Trauma Surg* 2014; 134(9):1237-49. doi: 10.1007/s00402-014-2040-6
- Fortin PT, Kou JX. Commonly missed peritalar injuries. *J Am Acad Orthop Surg*. 2009; 17(12):775-786 doi: 10.5435/00124635-200912000-00006
- Rammelt S, Goronzy J. Subtalar dislocations. *Foot and Ankle Clinics*. 2015; 23(3):253-264. doi: 10.1016/j.fcl.2015.02.008
- Wang HY, Wang BB, Huang M, Wu XT Treatment of closed subtalar joint dislocation: A case report and literature review *Chin J Traumatol*. 2020 Dec;23(6):367-371. doi: 10.1016/j.cjtee.2020.08.008.
- Arain AR, Adams CT, Haddad SF, Moral M, Young J, Desai K, Rosenbaum AJ. Diagnosis and Treatment of Peritalar Injuries in the Acute Trauma Setting: A Review of the Literature. *Adv Orthop*. 2020. Jan;3: 1852025. doi:10.1155/2020/1852025.
- Bibbo C, Lin SS, Abidi N, Berberian W, Grassman M, Gebauer G, Behrens FF. Missed and associated injuries after subtalar dislocation: the role of CT. *Foot Ankle Int* 2001;22(4):324-8 doi: 10.1177/107110070102200409
- Karampinas PK, Kavrouidakis E, Polyzois V, Vlamis J, Pneumaticos S. Open talar dislocations without associated fractures. *Foot Ankle Surg*. 2014;20:100e104.
- Weston JT, Liu X, Wandtke ME, Liu J, Ebraheim NE. A systematic review of total dislocation of the talus. *Orthop Surg* 2015;7:97-101.

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