



Case report

Medial subtalar dislocation from a low-energy trauma. A case report and review of the literature



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A B S T R A C T

Introduction: Subtalar dislocation is a rare injury characterized by a simultaneous dislocation of the talocalcaneal and talonavicular joints. The most common type is caused by high-energy trauma with medial dislocation of the foot. This injury is frequently associated with fractures, but isolated dislocations are also reported.

Case presentation: We report a rare case of medial subtalar dislocation secondary to low-energy injury in a 61-year-old woman. Following X-rays and CT scan, prompt closed reduction was performed under sedation and, after reduction, X-rays showed a good realignment of the foot. The CT scan revealed an occult non-displaced fracture of the posterior part of the talus. The patient was managed conservatively by a non-weight bearing cast for four weeks, followed by a rehabilitation program. At follow-up, six months later, we observed a good clinical and radiographic result.

Discussion: The reported case confirms that the mechanism of injury is an important factor in predicting the final result, since subtalar dislocations secondary to a high-energy trauma are often associated with significant complications. We believe, in agreement with other authors, that a low-energy trauma generally doesn't produce long-term morbidity. Prompt reduction is very important in order to minimize soft tissue and neurovascular complications, although a CT is recommended to identify occult fractures.

Conclusion: Subtalar dislocations, caused by low energy trauma, if adequately reduced in the emergency room, generally heal with conservative treatment, reducing the risk of significant complications. However, since we report a single patient, further case analysis is needed to make solid conclusions.

1. Introduction

Subtalar dislocations are uncommon injuries characterized by simultaneous dislocation of talocalcaneal and talonavicular joints. This injury was first reported in 1811 by two different authors [1,2]. Medial dislocations represent the most common forms and are produced by an inversion force; they have also been called "basketball foot" or "acquired clubfoot" because of their similarity to the congenital clubfoot [3,4]; they account for about 80% of all cases [5]. Lateral dislocations, also called "acquired flatfoot", represent 15–20% of subtalar dislocations and generally occur after an eversion injury [6]. Posterior and anterior dislocations are extremely rare and account for about 3% of all subtalar dislocations [5]. Subtalar dislocations are usually the result of high-energy trauma and account for about 1% of all dislocations of the large joints [6–9]. The rarity of this injury can be attributed to the strong ligaments connecting the talocalcaneal joint. Frequently, subtalar dislocation occurs in the third decade of life and it is ten times more

frequent in men than in women [10]. In the majority of cases, subtalar dislocations occur after falls from significant height, road traffic accidents or during sports, as basketball games or football tackles [8–10]. These lesions may be isolated, but often they are associated to fractures of the talus, the malleoli or the fifth metatarsal bone [6,8]. We present a rare case of medial subtalar dislocation with an associated undisplaced fracture of the posterior part of the talus in a 61-year-old woman that occurred after low-energy ankle trauma, analysing the literature regarding this type of injury.

2. Case report

This paper is reported in line with the SCARE 2020 criteria [11].

A 61-year-old woman presented to the emergency department of our hospital with pain, swelling and ankle deformity that occurred after an inversion injury to foot (Figs. 1, 2). The injury occurred while walking and she was unable to stand or walk. The patient denied any other

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Fig. 1. Clinical and radiographic views of a closed medial subtalar dislocation of the right foot in a 61-year-old patient.

significant medical or genetic problems or psychosocial history and did not refer previous injuries to the ankle or ligament laxity. Physical examination revealed an evident medial dislocation of the ankle without neurovascular compromise, and no laceration of the skin was observed. Anteroposterior and lateral radiographs of the ankle showed a medial subtalar dislocation without apparent associated bone injuries, but a computed tomography scan, performed immediately after, revealed an occult undisplaced fracture of the talus (Fig. 2). Closed reduction under sedation with propofol and fentanyl was performed and post-reduction radiographs showed a good realignment of the foot (Fig. 3). Before the procedure, the patient was informed about the treatment perspective and possible risk and complications. The first author (VDL), who has considerable experience in the emergency room, performed the procedure. The patient was immobilized initially in a posterior splint for few days and subsequently, in a short-leg cast for four weeks. Both were well tolerated by the patient for the entire time. She started a rehabilitation program after cast removal and partial weight bearing was initiated. Full weight bearing was reached after 10 weeks. At follow-up, six months later, the patient was pain free, she had a full range of motion of the ankle and foot without any sign of ligament laxity; radiographs showed good alignment of the foot with no evidence of avascular necrosis (Fig. 4). The patient returned to her pre-injury activities in absence of joint instability.

3. Discussion

Subtalar dislocation is a rare entity in traumatology [6–9]; the most



Fig. 3. Radiographic examination of the subtalar joint after closed reduction and casting.



Fig. 4. The radiographic examination performed at follow-up, six months later, showed a stable anatomic reduction. The patient was pain free with ankle and foot range of motion comparable to the unaffected contralateral side.

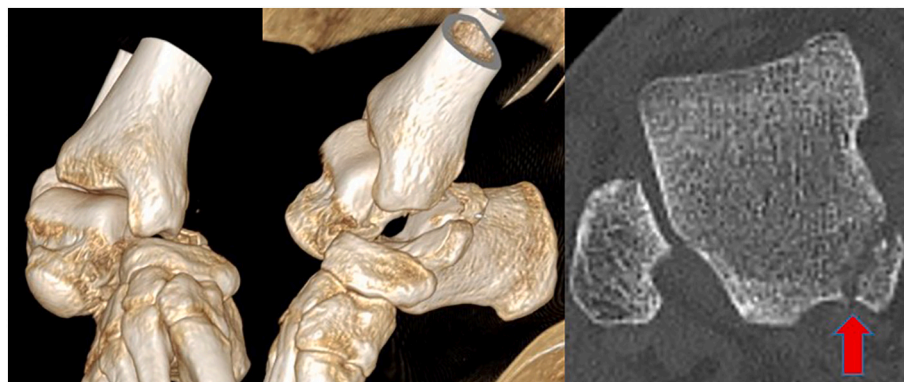


Fig. 2. CT of the ankle and the foot with 3D reconstruction confirmed the diagnosis, but showed an associated undisplaced fracture of the posterior part of the talar bone (arrow).

Table 1
Studies reporting cases of medial subtalar dislocation caused by low-energy trauma.

Papers	Age at trauma	Mechanism of injury	Associated lesions	Treatment	Final result
Jungbluth et al., JBJS AM, 2010	42y 86y 2 cases	Twisting injury of the foot during walking (both cases)	No	Closed reduction and casting for 6 weeks	Good
Brison et al., BMJ Case Rep, 2011	24y	Plantar flexion and inversion injury while climbing out of his car	No	Closed reduction and casting under anesthesia	Good (returned to his pre-injury functional status)
Pesce et al., J Emergency Med, 2011	37y	Inversion injury during military training exercise	No	Closed reduction and splinting under sedation	Good
McKead et al., BMJ Case Rep, 2015	18y	Inversion injury playing football	Non displaced fracture of the neck of the talus	Closed reduction and casting under general anesthesia for 6 weeks	Good

common form is the medial subtalar dislocation that accounts for about 80 of all cases [5] and generally occurs after a high-energy trauma, as reported by some authors [12–15]. Lasanianos et al. [12] in a retrospective study including 8 patients with medial subtalar dislocation, reported that all patients but one, had a high energy trauma (87.5%) (motor vehicle accident or fall from height). The remaining patient had an inversion injury caused by entrapment of the foot in a gap. Camarda et al. [13] in another retrospective study reported a series of 21 patients with a closed subtalar dislocation caused by motor vehicle accidents or falls from height. Ruhlmann et al. [14], reported 13 patients who had sustained isolated subtalar dislocations, after high energy trauma (fall from an elevated place, accident on the public road or trauma during sport). According with these studies, subtalar dislocation secondary to a high energy trauma is often associated with significant long-term complications such as ligament laxity, stiffness of subtalar joints and post-traumatic osteoarthritis. On the contrary, subtalar dislocation from a low-energy trauma is very rare. Byrd et al. [15] reviewed the literature on isolated subtalar dislocations published between 2007 and 2012. They described a total of 95 patients included in 21 studies, reporting four mechanisms of injury: motor vehicle collisions, falls from a height, sports injuries and low-energy trauma that represent less than 10% of all cases.

To the best of our knowledge, only five cases of subtalar dislocation following to a low-energy mechanism are reported in 4 studies [16–19] (Table 1). Jungbluth et al. [16] in a retrospective study from January 1994 to March 2007, reported the functional results of 23 patients with an isolated subtalar dislocation. Only in two of these the cause of the medial dislocation was an inversion injury of the foot which occurred while walk. Following a successful stable closed reduction, both patients were managed with immobilization in a short leg cast for six weeks. After that, progressive weight-bearing and aggressive physiotherapy was started. At the final follow-up, good clinical and radiographic results were observed in both patients. Other authors [17–19] reported in three studies, isolated cases of medial subtalar dislocation that occurred after low energy trauma in three different patients. All these injuries were treated conservatively with good final results. Brison et al. [17] reported a case of a 24-years old male caused by a forced plantar flexion and inversion injury while climbing out of his car treated by closed reduction and casting under anesthesia. The patient made full recovery and returned to his pre-injury functional status. Pesce et al. [18] reported a case of a 37-years old woman caused by a low velocity mechanism during military training exercises, treated by closed reduction under sedation with etomidate and fentanyl and immobilization by splint. CT scan did not show any associated skeletal injuries. McKead et al. [19] reported a case of an 18-year old male with a low energy trauma following a jump while playing football, treated by closed reduction and casting under general anesthesia. Two weeks after the injury, a CT scan revealed a non-displaced fracture of the neck of the talus, therefore a second short-leg cast was applied without weight-bearing for another four weeks, followed by weight-bearing aircast boot.

In our case the medial subtalar dislocation was secondary to a very low-energy injury and a good result was obtained with conservative

treatment after a prompt reduction. This suggests that an immediate reduction under sedation is crucial to avoid soft tissue and neurovascular complications. The mechanism of injury is an important factor in predicting the final result because low-energy trauma usually does not produce long-term morbidity in these injuries [12,20]. However, even in uncomplicated cases, after reduction, it is important to exclude occult fractures by a CT scan, as suggested by other authors [18–20]. The time of immobilization in uncomplicated medial subtalar dislocation is still a matter of controversy [12]. In our case we immobilized the limb with a short leg cast for four weeks to minimize joint stiffness and to facilitate the rehabilitation. At final follow-up, tibiotalar and subtalar range of motion were comparable to the contralateral side.

4. Conclusions

In conclusion, we believe that subtalar dislocations caused by low-energy trauma generally do not produce long-term morbidity in contrast to those caused by high energy injuries. Prompt reduction appears to be very important to minimize soft tissues and neurovascular complications and a CT scan is recommended to identify occult fractures. Conservative management seems to be the treatment of choice, however, since we report a single patient, further case analysis are needed to make solid conclusions.

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Ethical approval

The study was notified to the ethical committee of our hospital.; it does not need a specific ethical approval.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

CRedit authorship contribution statement

Vincenzo De Luna: conceptualization, writing, original draft
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Lidio Petrunaro: investigation
Marta Barosso: investigation
Fernando De Maio: writing, review & editing
Pasquale Farsetti: supervision

Guarantor

Prof. Pasquale Farsetti.

Declaration of competing interest

We certify that no benefits in any form have been received or will be received from a commercial party related to the subject of this article.

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