Case Report

Closed posteromedial total talus and fibula dislocation without fracture

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ABSTRACT

Total dislocation of talus is an extremely rare injury. It can be found few reports about dislocations in distal tibiofibular joint without accompanying fibular or medial malleolus fracture. In this case we report about a young patient with high energy trauma who presents a close total talar posteromedial dislocation associated with a fibula posteromedial dislocation. We perform an open reduction temporarily fixed with K wires and finally with 2 trans-syndesmotic screws.

Introduction (complications)

Total dislocation of talus is an extremely rare injury [1]. It includes approximately 0,04% of whole human body dislocations and 2% of talus injuries [2]. These injuries are commonly open [3] and they are usually accompanied by any kind of fracture. Depending on whether it is a supination or a pronation movement, the displacement may be either anterolateral (the most regular) or anteromedial (less frequent) [4] being the posteromedial dislocation even more unusual [5]. In turn, it can be found few reports about dislocations in distal tibiofibular joint without accompanying fibular or medial malleolus fracture. So, the case of this patient who presented a combination of both injuries represents a unique fact in literature (Fig. 1).

Case report

The case hereby presented corresponds to a male patient of 23 years old, who after a fall from 15 m during a riot in the prison, he was admitted [1] to the Emergency Service. He showed pain, functional deficit and deformity in the left ankle area. He also presented two contusions in the medial aspect of the foot, which were observed and they had no relation to underlying tissues. Furthermore, the patient referred lower back pain and contusions in other body areas without alluding pain. No neuromuscular deficit was observed [2]. AP and lateral view X-rays revealed a closed posteromedial dislocation of talus, and a syndesmotic dislocation with fibular posteromedial displacement [3]. Besides, the CT scan revealed a medial dislocation of talus, calcaneocuboid partial dislocation and posteromedial dislocation of fibula affecting Volkmann's tubercle (Fig. 2).

At first, under sedation in emergency room, a closed reduction was attempted, but the result was not satisfactory. Subsequently, an open reduction of both injuries was performed. An extended medial talar approach was carried out, showing injuries of joint capsule, deltoid ligament, posterior tibial tendon split tear and spring ligament. Talus was attached to posterolateral soft tissues. The subtalar articular surface was found impacted into the medial wall of the calcaneus. Reduction was performed. Congruence with all joints

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Fig. 1. AP and lateral preop view. In this image we can see total talus dislocation and the distal syndesmosis medial dislocation.

Fig. 2. 3D CT scan. In this figure we see talar mortise impacted in the calcaneus (medial wall and sustentaculum tali).
Involvement was observed, except with the syndesmosis. Then, the talonavicular joint was fixed with a K-wire. After the joint reduction, a posterolateral fibular approach was carried out. After a careful dissection, the fibula was observed effectively impacted into Volkmann’s tubercle. Reduction was performed. Due to a malreduced syndesmosis [4], we proceeded to the extraction of the K-wire previously fixed. So, it was found, then, a total congruence with all joints involved. At the beginning, two K-wires were placed to keep the reduction. After verifying syndesmosis stability, these two K-wires were withdrawn and they were replaced by two transsyndesmotic screws and the deltoid ligament was reattached to the medial malleolus [5] (Fig. 3).

A plaster cast was applied for immobilisation for a period of 4 weeks [6]. After that the patient was allowed to PWB and mobilise the ankle in sagittal plane. At the 7 weeks point after surgery, he was lost to follow up as he was transferred to a different unit [7].

Discussion

The injury presented by this patient represented a combination of two [8] trauma injuries, which even isolated are extremely rare. So far, taking into account the researches made in different platforms and the questions formulated to several local associations, it has not been found any report of these two injuries together (Fig. 4).

Total dislocation of talus is nowadays increasingly common as a result of the change in trauma kinetics over the last years [9]. Hendin referred it as floating foot [5]. And, it is still rarer without any associated fracture [6,3]. The injury in the syndesmosis may be
evaluated, as Ramasamy did in his study in 2003, as an equivalent to Bosworth injury [8]. The mechanism involved in the injury of ankle medial structures including interosseous membrane injury producing a high fibular fracture was described by Maisounneave. In this case, there isn’t a proximal fracture (Fig. 5).

After a detailed analysis of the kind of trauma sustained, we deducted that according to Karachalios [9] the mechanism by which this injury occurred was external pronation + rotation, contrary to what was indicated by Perry [10] and Ramasamy [8]. Talar dislocation is commonly present when an axial trauma occurs, in which plantar flexion is accompanied by excessive inversion or eversion of subtalar joint. This causes a lateral dislocation in the case of excessive inversion, and a medial dislocation when an excessive eversion occurs.

By falling down with the ankle in plantar flexion and pronation, the axial trauma in the calcaneus, with eversion of subtalar joint, generated the rupture of medial structures of the subtalar joint and the ankle. Dislocation of talus constituted the first injury. Then, the trauma energy continued its course damaging the ankle anterolateral capsule, the anterior tibiofibular ligament and the interosseous membrane. As no fractures at a proximal level were observed, we inferred that the trauma energy ceased in the interosseous membrane. This rotational mechanism and the indemnity of the posterior structures produced a movement of talus towards the fibula in the posterior area. The mechanism by which this kind of injury occurred was explained in 1983 by Perry, who divided it in 7 stages. The reason of why this injury was not accompanied by a fracture in the fibular area would be the dissipation of energy. In the case of a PRE fracture, energy usually passes through the interosseous membrane, but in this case, it was spread out into two injuries (talar dislocation and ankle injury). That is why the quantity of energy ceased in the interosseous membrane without causing a fibular fracture.

Fig. 4. AP an lateral intraop view. Two K wires was inserted to maintain the syndesmosis reduction.
The diagnosis of this injury is usually reached after evaluating the X-ray, but it is also advised to add a 3D CT scan to evaluate possible injuries of posterior or internal malleolus which may not be noticed in the X-ray [8].

Treatment performed for both injuries is in agreement with the literature published [10]. At the beginning, we attempted a closed treatment of this injury, but it was not satisfactory. Then, we proceeded to an open treatment, first reducing the tibiotalar joint so afterwards all other joints could be reduced easily. Later, syndesmosis was reduced. In this way, we achieved a suitable reduction without visible instability and with a reduced syndesmosis in the notch.

AVN of talus is the most common long term complication of this type of injury (26%) [7]. Other complications like osteoarthritis and infection could be found.

Conclusion

Posteromedial dislocation of talus accompanied by a syndesmosis dislocation is an extremely rare injury. We think that these combined injuries are the result of the transmission of trauma energy along the limb. We recommend CT scan to evaluate concomitant injuries. We don’t recommend closed treatment because results being quite difficult due to the quantity of injuries of soft tissues that presents and may produce another injury. Double approach will be need. The key to success in this pathology is the tibiotalar joint reduction. In this way, the rest of the joints can be reduced easily. The rehabilitation progress will be defined for the syndesmosis injury, which may take longer periods of NWB that the talus dislocation.

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