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Case Report

Nonoperative treatment of closed total talus dislocation without fracture: A case report and literature review

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ABSTRACT

Complete dislocation of the talus not accompanied by a fracture is a very rare injury. Most cases reported are open talus dislocations; closed dislocations are rarely seen. The functional prognosis is poor due to osteonecrosis of the talus which develops in the majority of cases.

We present a case of lateral dislocation of the left talus in a 29-year-old road accident victim, but no fracture could be detected in the talus and any of malleolus. Reduction of dislocation had been performed in emergency by external manipulation. At 1-year follow-up, the right ankle was pain free and stable. Motion was satisfactory: 15° dorsal flexion, 30° plantar flexion; the talus didn't show subluxation and avascular necrosis could not be detected.

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1. Introduction

A closed total dislocation of the talus from all its surrounding joints (talonavicular, tibiotalar, subtalar) not accompanied by a fracture (talus, navicular, calcaneus, malleoli) is an extremely rare injury caused by a high-energy trauma. Its exact incidence is unknown.¹ Closed total talus dislocations are rare.

The few case reports found in the literature and the non-existent guidelines add to the confusion regarding the

optional method of treatment. There are two major series of nine cases each by Detenbeck et al² and Coltart³ of total talar dislocation, with the majority being open type.

In this case report, we present a patient who sustained a high-energy trauma with a closed total dislocation of talus, without malleolar or talus fracture, treated conservatively with satisfactory functional results.

A literature review is attempted, to retrieve evidence on whether a closed or open approach should be chosen in order to minimize complications and augment possibilities for a favorable outcome.

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2. Case report

A 29-year-old woman sustained a twisting injury to his left foot while falling from the motorbike. This injury results in pain and total loss of mobility of his left ankle.

On arrival at the hospital, physical examination revealed a medially shifted hindfoot and a supinated forefoot. The overlying skin was tense, but intact (Fig. 1). There was no sensory or motor loss, but initial vascular assessment was difficult because pulses could not be felt and the capillary refill was borderline. There were no other injuries. X-rays (Fig. 2) revealed a lateral dislocation of the talus with no fracture. Manipulation of the ankle was performed under general anesthesia with image guidance. The technique used was similar to that used by Mitchell.⁴ One assistant supported the leg with the knee flexed at a right angle. Traction was given by grasping the heel and forefoot. Direct pressure with both thumbs was then exerted over the prominent lateral protuberance to rotate the talus 90° in the antero–posterior plane. The aim was to reduce the tibiotalar joint first. The talus was easily reduced in the tibiotalar joint with simultaneous spontaneous reduction of the subtalar and talonavicular joint and restoration of normal contour of the foot, repositioning of talar bone was obtained. The reduction appeared stable with manual manipulation and was confirmed radiologically in the operating room (Fig. 3). The time since injury at the time of closed reduction is 5 h. After reduction, pulses could be palpated clearly.

Computer tomography (CT) was obtained to rule out the presence of occult fractures, fracture fragments in the subtalar joint, and to confirm joint reduction. The tibiotalar, subtalar, and talonavicular joints remained concentrically reduced as demonstrated by CT scan (Figs. 4 and 5).

The reduction was maintained in a posterior splint for 1 week to monitor skin lesions, after an acrylic foot–thigh brace was put in place under neutral position of the foot, with the

Fig. 1 – Lateral dislocation of talus, skin tensed, foot in equinus and supination.

Fig. 2 – Antero–posterior and lateral radiograph of total lateral talar dislocation.

knee flexed at 30° with strict non-weight-bearing for 5 weeks. She initially had edema and mild pain that subsided by elevating the extremity; Radiographs were taken at weekly intervals for the first 3 weeks to rule out subluxation. An air cast boot was given at 6 weeks to allow partial weight-bearing and supervised physiotherapy. The patient was allowed to fully weight-bear without the air cast boot at 3 months post-injury. At the 1-year follow-up, motion was satisfactory: 15° dorsal flexion, 30° plantar flexion. There were no signs of avascular necrosis of the talus on conventional radiography (Fig. 6). The ankle was painless with a good mobility.

3. Discussion

The talus is predisposed to dislocation because it lacks muscular attachment and 60% of its surface is covered with cartilage. A closed total dislocation of the talus is defined as a dislocation of the talus from all surrounding articulations:

Fig. 3 – AP and lateral view after closed reduction.

Fig. 4 – CT sagittal view of foot following reduction of total talar dislocation. There is concentric reduction of subtalar, talonavicular, and tibiotalar joints on this view.

talonavicular, subtalar and tibiotalar.^{5–8} Level of dislocation is variable; it is often of medial pattern, but it would be anteromedial and rarely posteromedial.^{9,10} A total talus dislocation is a rare event, representing 2–10% of traumatic talus injuries and 54% of all cases reported are open talus dislocations.¹¹ It is often accompanied by fractures of the malleoli, talar body or talar neck.¹² Fabricus first described complete dislocation of the talus treated by talectomy in 1608.¹³

The mechanism of the injury is forced plantar flexion associated with either a forced inversion or eversion.^{6,8,14} Forced plantar flexion and inversion can result in an anterolateral total talus dislocation. The acting force causes a rotation of the talus of 90° in both the horizontal and vertical

Fig. 5 – CT coronal view of the foot following reduction of pantalar dislocation.

Fig. 6 – Antero-posterior and lateral radiograph of reduced total lateral talar dislocation after 1 year.

plane. The talus has no muscular or tendinous attachments, which should predispose it to dislocation.¹² The position of the talus deep in the ankle mortise and the strong ligamentous and capsular support protect the talus from dislocation, explaining the rarity of this injury. A strong force is required to produce a talus dislocation.¹¹ The talus is an essential biomechanical component in the hindfoot transmitting forces during weight-bearing. It is responsible for transmitting the whole weight of the body onto the foot through the subtalar, talonavicular and anterior talocalcaneal joint.¹⁵

There are no standard treatment guidelines. Actually, most authors underline the importance of a prompt conservative treatment.¹⁶ They treat by arthrodesis secondary septic and arthrotic complications. Reduction of talus dislocation has to be performed promptly to prevent skin and vascular complications.^{17,18}

Managing total talar dislocation by conservative treatment may be marked by some complications, the most serious being osteonecrosis. For some authors, this osteonecrosis cannot be avoided.^{16,19} It would be caused by lesion of capsuloligamentar and vascular structures of this area.¹⁶ In some cases, this complication did not occur; many hypotheses were proposed. Shahraree et al.²⁰ think that the persistence of some ligamentar attachments, especially the deltoid ligament, may explain the nonoccurrence of necrosis. The artery of tarsal sinus is a branch of posterior tibial artery which is the main vascular structure that supplies the nonoccurrence of osteonecrosis in some cases of anterolateral dislocations. Taymaz and Gunal¹ report a case of closed total talus dislocation treated by closed means with an excellent result. Gaskin and Pimple²¹ also report a good result of 2 case of closed anterolateral dislocation treated by simple reduction on a two year follow-up.

In our experience, simple traction with the help of an assistant was adequate. The reduction of the tibiotalar joint is the key to reduction. The neurovascular status and stability should then be assessed before applying a plaster and checking the reduction radiographically in the theater.

The good result in our cases may be possibly due to preservation of some capsular or ligamentous attachments or due to re-vascularization.

4. Conclusion

Total talus dislocation with loss of connection with the three joint facets is an infrequent injury that occurs after a high-energy trauma. Usually total talus dislocation accompanies other fractures of neighboring bones as malleolar fracture or talus fracture itself and usually it is an open injury. But we report a closed total talus dislocation without malleolar or talar fractures. Closed reduction always done under general anesthesia is what several authors recommend in the literature.

This injury frequently leads to degenerative changes in related joints, decreased range of motion of the ankle and avascular necrosis of the talar body. When avascular necrosis does not develop, it is maybe because of retained blood supply through deltoid branch or posterior process branch, but it remains to be investigated further.

Patient privacy

We obtained the patient's written informed consent for the purpose of print and electronic publication of this report.

Authors' contribution

All authors have read and agreed to the final version of this manuscript and have equally contributed to its content and to the management of the case.

Conflicts of interest

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

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