Acta Orthop. Belg., 2011, **77**, 838-842

CASE REPORT

Closed total talus dislocation : a case report

Steven HEYLEN, Thierry DE BAETS, Patricia VERSTRAETE

From the Algemeen Ziekenhuis (AZ) Turnhout, Campus Sint-Elisabeth, Turnhout, Belgium

Total dislocation of the talus is caused by a high-energy trauma, that dislocates the talus from all its surrounding articulations. Most cases reported are open talus dislocations ; closed dislocations are rarely seen. Complications include avascular necrosis, post-traumatic osteoarthritis and infection. The vascularisation of the talus is delicate and the soft tissue attachments surrounding the talus are important for the blood supply. Closed talus dislocations, closed reduction and careful surgical dissection in case of open reduction respect more soft tissue attachments and potentially reduce the incidence of avascular of necrosis. We describe the case of a 46-year old male patient who sustained a closed total dislocation of the right talus associated with small fractures of the lateral and medial malleolus. The talus could not be reduced by closed means. The malleolar fractures were treated by open reduction and internal fixation.

Keywords : talus ; dislocation ; closed.

INTRODUCTION

A closed total dislocation of the talus is defined as a dislocation of the talus from all its surrounding articulations caused by a high-energy trauma. Closed total talus dislocations are rare. No standard treatment protocol exists regarding treatment of these rare traumatic injuries. We report the case of a 46-year-old male patient who sustained a closed total dislocation of the right talus with limited fractures of the lateral and medial malleolus.

CASE REPORT

A 46-year-old man was brought to the emergency room after a fall from an elevated scaffold. Upon arrival his right ankle was swollen, with considerable tension of the lateral skin of the ankle, but no open wound. No motor or sensory loss was present and there were no signs of vascular impairment. Plain radiographs and CT scans revealed a total anterolateral dislocation of the talus with small fractures of the lateral and medial malleolus (Fig. 1 & 2). The patient was brought to the operating room, where under general anaesthesia the talus could not be reduced by closed means. An anterolateral incision was made. The fractured fragment of the distal fibula was retracted, exposing the talus which could then be reduced manually. The reduction was stable. The cartilage on the lateral aspect of the talus appeared intact. The medial malleolus fracture was approached through a standard medial

■ S. Heylen, MD, Orthopaedic registrar.
University Hospital Antwerp, Antwerp, Belgium.
■ T. De Baets, MD, Orthopaedic surgeon.
AZ Turnhout, campus Sint-Elisabeth, Turnhout, Belgium.
■ P. Verstraete , MD, Orthopaedic surgeon.
AZ Turnhout, campus Sint-Elisabeth, Turnhout, Belgium.
Correspondence : Steven Heylen, AZ Turnhout, campus Sint-Elisabeth, Rubensstraat 166, 2300 Turnhout, Belgium.
E-mail : heylensteven@yahoo.com

No benefits or funds were received in support of this study

Fig. 1. — Radiographs on admission, showing total talus dislocation. A : A-P view ; B : lateral view.

Fig. 2. — Computed tomography (CT-scan) image on admission, showing total talus dislocation of right ankle.

incision. On examination the capsule and all ligaments surrounding the talus were torn, except anteromedially. The distal fibula and medial malleolus were treated by cerclage wire and pinning (Fig. 3). A below-the-knee cast was applied in neutral position. Enoxaparine 40 mg once daily was administered for venous thromboembolism prophylaxis. No weight bearing was allowed for six weeks. A slight patch of skin necrosis on the lateral side of the ankle was treated conservatively. Approximately two weeks after surgery, the patient complained of increasing pain at the right ankle, which was swollen and red. Ice applications and elevation of the right foot were prescribed and flucloxacilline 3×500 mg/day was given. Two weeks later the antibiotic was stopped, as both clinically and biochemically (C-reactive protein) inflammation had significantly improved. Six weeks after trauma the cast was removed and a range of motion walker was prescribed. The foot was in equinus, and extension of the ankle was limited. Partial weight bearing was

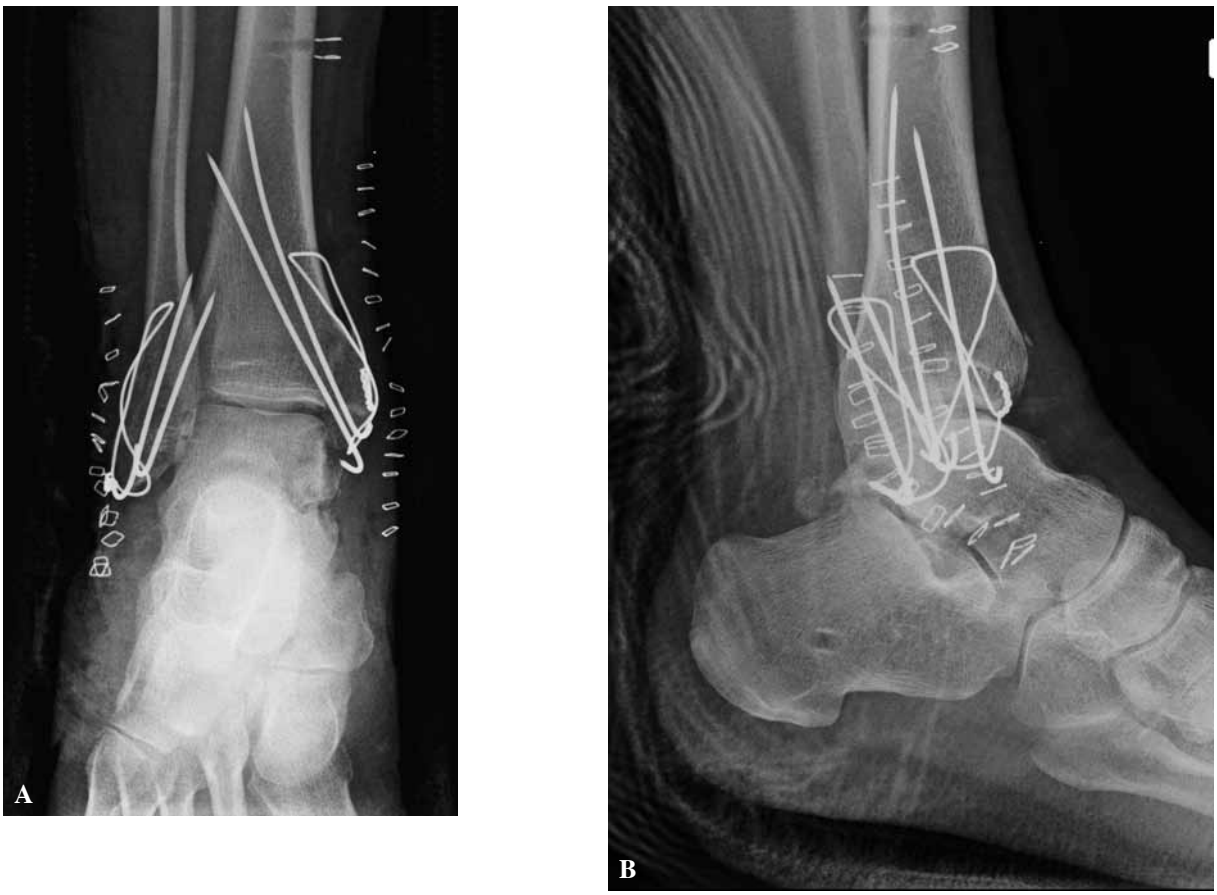

Fig. 3. — Postoperative radiographs of right ankle showing reduced talus and internal fixation of lateral and medial malleolus with cerclage wires and pinning. A : AP view ; B : lateral view.

allowed gradually increasing to full weight bearing at approximately nine weeks after surgery. Physiotherapy to improve the range of motion of the ankle and hydrotherapy were prescribed. The range of motion walker was set to 20° extension of the ankle joint. Despite venous thromboembolism prophylaxis (enoxaparine 40 mg once daily) the patient developed a deep venous thrombosis nine weeks after surgery. He received enoxaparine 100 mg once daily for three months. Four and a half months after surgery he was able to walk long distances without pain or swelling of the ankle. Work was resumed. Clinical investigation revealed maximal plantar flexion and extension of the ankle beyond neutral. Nine months after surgery cerclage and K-wires were removed from the lateral and medial malleolus. One year after trauma, plantar flexion was normal. Extension of the ankle reached neutral position and was slightly reduced compared to the contralateral side. There were no signs of avascular necrosis of the talus on conventional radiography , but there were slight degenerative signs of the tibiotalar joint (Fig. 4). The ankle was painless with a good to excellent mobility.

DISCUSSION

A closed total dislocation of the talus is defined as a dislocation of the talus from all surrounding articulations : talonavicular, subtalar and tibiotalar (*1,11,15*). The dislocation is classified according to the position of the talus. Anterolateral dislocations are more common than anteromedial (*13*). A high-energy trauma, such as a fall from a height or

Fig. 4. — Postoperative AP radiograph of right ankle one year after trauma showing slight tibiotalar osteoarthrosis. No evidence for avascular necrosis of talus.

motor vehicle accident is the usual cause. It is described as the end stage in a continuum from subtalar dislocation to subtalar with talonavicular dislocation and finally dislocation of the talus from all its surrounding articulations (*11*). 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 (*9*). It is often accompanied by fractures of the malleoli, talar body or talar neck (*13*).

The mechanism of the injury is forced plantar flexion associated with either a forced inversion or eversion (*1,8,15*). 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 plane. The talus has no muscular or tendinous attachments, which should predispose it to dislocation (*13*). 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 (*9*). 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 trough the subtalar, talonavicular and anterior talocalcaneal joint (*14*).

Talus dislocations can be complicated by posttraumatic osteoarthritis, avascular necrosis and infection, when open (*1*). Posttraumatic osteoarthritis can be the result of revascularisation and collapse of the talus and small osteochondral fractures of the tarsal bones.The incidence of posttraumatic avascular necrosis of the talus is reported to be as high as 90%. The risk for avascular necrosis is highest in the first year after the initial total or subtotal talus dislocation and diminishes rapidly after this period (*2*). Serial radiographs should be performed for several months after the initial trauma to monitor possible signs of avascular necrosis (*3*). Magnetic resonance imaging is the most specific and sensitive to detect early avascular necrosis of the talus (*3*). About 60% of the talus is covered by cartilage, limiting the area for blood vessels to penetrate (*1,12*). The blood supply to the talus enters the bone trough the capsular and ligamentous attachments (*8,11*). The dorsalis pedis artery, the artery of the sinus tarsi and of the tarsal canal are most important (*8*). The main artery supplying the body of the talus is the artery of the tarsal canal, a branch from the posterior tibial artery, which reaches the talus through the inferomedial soft-tissue attachments (*15*). It supplies most of the talar body and undersurface of the talar neck. It gives off a branch which penetrates the deltoid ligament and supplies the medial wall of the talus. The head and neck are supplied mainly by the dorsalis pedis artery and the artery of the sinus tarsi. There is an extensive network of intraosseous anastomoses within the talus which is complete in only 60% of patients. In some cases of anterolateral dislocations, the soft-tissue attachments remain intact, which may – in combination with a complete network of intraosseous anastomoses within the

talus - be the reason for the non-occurrence of avascular necrosis in this type of dislocations in some patients (*7*). Condes *et al* found that the prognosis improves when one of the malleolar ligaments is preserved (*2*). Even in case of collapse the talus may revascularise in up to 18% of cases. Schiffer *et al* report that revascularisation of the talus is possible and conclude that reconstruction should be attempted in all cases of talus injuries regardless of the severity of injury (*10*).

The optimal treatment of closed total talus dislocations is a subject of debate. Recently several authors have reported favourable outcomes after closed reduction of total talus dislocations (*5,6,9,11, 12,15*). Hence, closed reduction should always be attempted before resorting to surgical measures and endanger the soft tissue attachments surrounding the talus and its delicate blood supply.

REFERENCES

1. **Burston JL, Isenegger P, Zellweger R.** Open total talus dislocation : clinical and functional outcome : a case series. *J Trauma* 2010 ; 68 : 1453-1458.
2. **Condes JM, Fernández ED, Martinez EJ.** Subtotal talus dislocation. *Foot Ankle Surg* 2003 ; 9 : 45-49.
3. **Fleming J, Hurley KK.** Total talar extrusion : a case report. *J Foot Ankle Surg* 2009 ; 48 : 690.e19-e23.
4. **Fortin PT, Balazsy JE.** Talus fractures : evaluation and treatment. *J Am Acad Orthop Surg* 2001 ; 9 : 114-127.
5. **Hadji M, Galli M, Moalla R *et al*.** [Conservative treatment of talar dislocation : a case report.] (in French). *Rev Chir Orthop Reparatrice Appar Mot* 2004 ; 90 : 285-288.
6. **Hidalgo Ovejero AM, Garcia Mata S, Heras Izaguirre J *et al*.** Posteromedial dislocation of the talus : a case report and review of the literature. *Acta Orthop Belg* 1991 ; 57 : 63-67.
7. **Hiraizumi Y, Hara T, Takahashi M *et al*.** Open total dislocation of the talus with extrusion : a report of two cases. *Foot Ankle Int* 1992 ; 13 : 473-477.
8. **Montoli C, De Pietri M, Barbieri S *et al*.** Total extrusion of the talus : a case report. *J Foot Ankle Surg* 2004 ; 43 : 321-326.
9. **Papanikolaou A, Siakantaris P, Maris J *et al*.** Successful treatment of total talar dislocation with closed reduction : a case report. *Foot Ankle Surg* 2002 ; 8 : 245-248.
10. **Schiffer G, Jubel A, Elsner A *et al*.** Complete talar dislocation without late osteonecrosis : clinical case and anatomic study. *J Foot Ankle Surg* 2007 ; 46 : 120-123.
11. **Sharifi SR, Ebrahimzadeh MH, Ahmadzadeh-Chabok H *et al*.** Closed total talus dislocation without fracture : a case report. *Cases J* 2009 ; 2 : 9132.
12. **Taymaz A, Gunal I.** Complete dislocation of the talus unaccompanied by fracture. *J Foot Ankle Surg* 2005 ; 44 : 156-158.
13. **Van Opstal N, Vandeputte G.** Traumatic talus extrusion : case reports and literature review. *Acta Orthop Belg* 2009 ; 75 : 699-704.
14. **Wagner R, Blattert TR, Weckbach A**. Talar dislocations. *Injury* 2004 ; 35 : S-B36-S-B45.
15. **Xarchas KC, Psillakis IG, Kazakos KJ *et al*.** Total dislocation of the talus without a fracture. Open or closed treatment ? Report of two cases and review of the literature. *Open Orthop J* 2009 ; 3 : 52–55.