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Case Report

Unusual ankle fracture: A case report and literature review

Atif Mechchat*, Soufiane Bensaad, Mohammed Shimi,
Abdelhalim Elibrahimi, Abdelmajid Elmrini

Department of Orthopaedics and Trauma Surgery B4, UH Hassan II-Fez, Morocco

ARTICLE INFO

Article history:

Received 1 April 2014

Accepted 9 May 2014

Available online 7 June 2014

Keywords:

Talar body

Sagittal fracture

Medial malleolus

Screw

ABSTRACT

Fractures of the talus are uncommon, and talar body fractures in the sagittal plane are still rarer. The aim of its treatment is urgent anatomic reduction to restore congruency of the ankle and to reduce the risk of avascular necrosis by preserving any remaining blood supply. We report the case of a body talar fracture in sagittal plane associated with fracture of the medial malleolus in a young adult; the mechanism of the fracture was plantar hyperflexion, internal rotation and axial compression. We perform an open reduction and stabilization with two screws for the talus and screw the medial malleolus. At 14 months following the injury patient had good range of movement with little pain. The mechanism is discussed along with a literature review.

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1. Introduction

Fractures of the talus have a relatively low incidence, accounting for 0.3% of all bone fractures and 3.4% of fractures of bones in the foot. These injuries affect the neck of the talus more frequently than its head or body. Because of the combined traumatic mechanism, sagittal fracture of the talar body is extremely rare. The major complications are the development of avascular necrosis or post-traumatic arthritis. But medial malleolar fracture may preserve the blood supply from the deltoid ligament branches.

2. Case report

A 26-year-old postman fell whilst walking in a forest, sustaining a hyper plantar flexion and internal rotation injury to

his right ankle. He presented to the Accident and Emergency department with a grossly swollen and deformed right ankle. The skin was intact, with a minor abrasion over the lateral malleolus. There was no neurovascular deficit. Radiographs demonstrated a displaced vertical fracture of the neck of the talus extending through the body with vertical fracture of the medial malleolus and medial talar shift (Fig. 1(a and b)). Six hours after presentation open reduction was performed primarily through an anteromedial approach (Fig. 2), a medial malleolar osteotomy was not necessary as this was already fractured giving adequate access, as described by Rammelt and Zwipp.¹ The deltoid ligament was protected. The lateral half of talar dome was found rotated posteriorly along with some small loose fragments. These were removed and the fracture was fixed with two AO cancellous lag screws under fluoroscopy. The medial malleolus was fixed with malleolar cancellous screw and K-wire (Fig. 3). He remained non-weight bearing for 6 weeks where upon the frame and K-wires were

* Corresponding author. Tel.: +21 2661934246.

E-mail addresses: atif.mechchat@hotmail.fr, mechchattraumato@gmail.com (A. Mechchat).

<http://dx.doi.org/10.1016/j.jcot.2014.05.003>

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Fig. 1 – (a) Anterior-posterior and (b) lateral radiographs at time of presentation.

removed. Left ankle was kept in a below-knee non-weight bearing plaster for 6 weeks. Radiographs at 6 weeks demonstrated Hawkins sign (Fig. 4). The plaster was removed and the patient was kept non-weight bearing for another 6 weeks, followed by progressive weight bearing and physiotherapy. The range of movement continues to improve, the current range is: plantar flexion 20°, dorsiflexion 10°, inversion 20°, and eversion 10°. At 14 months follow up, a functional assessment using the AOFAS (American Orthopaedic Foot and Ankle Society) rating scale showed a score of 87 out of 100

points. Ankle radiographs showed minimal post-traumatic osteoarthritic changes of the ankle joint, no collapse of the talar body and no joint incongruity (Fig. 5(a and b)).

3. Discussion

Fractures of the talus have a relatively low incidence accounting for 0.3% of all bone fractures and 3–6% of all foot fractures.^{2,3} Talar body fractures of the talus are uncommon accounting

Fig. 2 – Per operative view through medial approach.

Fig. 3 – Anterior-posterior and lateral radiographs post reduction.

Fig. 4 – Hawkins sign: decreased subchondral bone density in the dome of talus.

for 7–38% of all talus fractures.⁴ Sneppen et al⁵ defined fractures which occur in the vertical plane as shearing fractures. They defined fractures whose plane is close to the sagittal plane as sagittal shearing fractures. S. Inokuchi et al⁶ described sagittal

fractures which run from the lateral, not the medial, entrance of the sinus tarsi to the sulcus of the flexor hallucis longus on the inferior surface of the talus. We could find only few cases in English literature with similar injury.^{7–9}

The fracture pattern in our case suggests axial loading while the foot is in plantar hyperflexion associated to an inversion seems to distribute forces to the medial structures, producing a vertical split of the talar body and the medial malleolar fracture.^{7,10} Such a force would result in severe soft tissue and ligamentous damage around the talus, which can result in a severe vascular injury.

Our case demonstrated Hawkins sign at 6 weeks post injury, which is a sign of remodelling and is highly predictive of revitalisation of the talar body: radiolucent zone at in the subcortical bone of the talar dome.¹¹ Avascular necrosis is a complication that would be expected following such an injury pattern, but injuries associated to medial malleolar fracture are less likely to develop avascular necrosis. This is due to preservation of the deltoid ligament and the associated deltoid branch of the posterior tibial artery supplying the talar body.¹² Union of the fracture in such case is extremely slow as it depends on a new blood supply growing into the avascular bone,⁷ therefore the fracture needs protection for a long time and non-weight bearing is recommended for 3 months or until union has occurred. Post-traumatic arthrosis varies from 16 to 100% after talar body fractures.¹³ Malunion can produce significant alteration in load across the ankle and subtalar joints and result in arthrosis.¹³ Anatomic and stable reduction of talar body fractures is of paramount importance for obtaining a reasonable functional outcome.¹⁴ The reported case should have a good prognosis as it was closed and underwent immediate operative reduction with early signs of revascularisation.

4. Conclusion

Talar body fracture associated to ankle fracture is a very rare, usually high-energy injury, characterized by a high incidence of complications and poor prognosis. But the malleolar fracture that allows adequate visualisation, anatomical reduction and appropriate fixation of the fracture can give us hope to reduce complications, and may improve the final outcome.

Level of evidence: IV

Fig. 5 – Lateral (a) and anterior-posterior (b) X-ray after removal of the screw fixation.

Authors' contribution

S.M is the surgeon in charge of the patient and helped with editing the report. S.B and M.A (corresponding author) wrote the original report and performed a literature review. All authors have read and approved the final manuscript.

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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