Unusual presentation of more common disease/injury

Posterior talar fracture with dislocation of both talo-navicular and subtalar joints: a variant type II of the Sneppens classification

Ilias Galanopoulos,¹ Quentin Fogg,² Neil Ashwood¹¹Department of Trauma and Orthopaedics, Burton Hospitals NHS Foundation Trust, Burton-on-Trent, UK²Laboratory of Human Anatomy, University of Glasgow, Glasgow, UK

Correspondence to Ilias Galanopoulos, galanop.ilias@gmail.com

Summary

A 63-year-old man fell from a ladder, thus causing an axial compression injury to the right ankle. Severe deformity was evident and the ankle could not be reduced by simple manipulation. The skin was tented and appearing critically contused. Radiographs revealed an oblique fracture of the posterior aspect of the talar body with dislocation of both the talo-navicular and subtalar joints, an injury previously not described in the literature. The fracture–dislocation was anatomically reduced within 3 h of presentation and stability achieved with two headless buried compression screws. CT scan confirmed anatomical reduction and the patient remained non-weight bearing in a cast for 6 weeks. One year postoperatively, the patient remains pain-free with no radiological signs of avascular necrosis of the talus. This injury is unique and despite its severity and soft tissue compromise good quality reduction and internal fixation resulted in an excellent clinical outcome.

BACKGROUND

Fractures of the talus are rare and serious injuries often leading to compromise of the soft tissue envelope and to disruption of bone vascularity.¹ Having extremely variable patterns of fracture makes their classification challenging.

Major fractures and dislocations of the talus and peritalar joints are uncommon but have serious consequences. Fractures of the talus rank second in frequency of all tarsal bone injuries. The incidence of fractures of the talus ranges from 0.1% to 0.85% of all fractures.²

Fractures of the talar head are rare and often difficult to visualise on routine radiographs. It is not uncommon, therefore, for fractures of the talar head to go unrecognised. Coltart³ reported only a 5% incidence of talar head fracture.

Talar neck fractures account for approximately 50% of all talar fractures. Talar body fractures occur less frequently than fractures of the talar neck.⁴ Because fractures of the talar body involve both the ankle joint and the posterior facet of the subtalar joint, accurate reconstruction of a congruent articular surface is required. We present a unique case of talar fracture which to the best of our knowledge has not been reported in the literature.

CASE PRESENTATION

A 63-year-old man presented to the accident and emergency department at 11 p.m. with a closed high-energy injury to his right ankle after falling from a ladder three or four rungs from the ground. He commented that he had been drinking and described landing on the dorsal surface of his foot. Physical examination revealed an obvious deformity of the ankle with the patient's foot lying supinated and adducted. The skin was tented and appeared critically contused due to the deformity. The foot pulses were present.

INVESTIGATIONS

Initial radiographs revealed a displaced oblique fracture of the posterior aspect of the talar body with associated dislocation of both talo-navicular and subtalar joints (figure 1).

TREATMENT

The ankle was manipulated following administration of analgesia in the accident and emergency department, but there was a block to reduction and the condition of the skin appeared to be deteriorating. The patient was taken to the operating room as an emergency at 2 a.m. prior to any further imaging in an attempt to preserve the soft tissue envelope, reduce the obvious talar injury and restore its vascularity.

The fracture–dislocation was approached antero-medially with the dorsalis pedis artery being seen kinked into the fracture site and the extensor tendons preventing reduction of the fracture and dislocations. Having mobilised the soft tissues anatomical reduction was achieved and fixation was obtained using two Acutrax headless screws.

Postoperative radiographs and CT scan (figure 2) confirmed satisfactory reduction and fixation of the fracture with excellent alignment of both the talonavicular and subtalar articulations.

The affected limb was immobilised in a non-weight-bearing below-knee cast for 6 weeks. After removal of the cast, the patient began a rehabilitation programme through physiotherapy. The soft tissue envelope had healed well with no wound problems.

OUTCOME AND FOLLOW-UP

A year following the injury, the patient remains free of pain and has returned to his previous daily activities without restriction. On examination, there was a mild

Figure 1 Initial x-rays performed in the A&E department after a below-knee back slab was applied.

restriction in the range of motion with 20° of active ankle dorsiflexion and 40° of plantarflexion. There were no radiological signs of avascular necrosis of the talus (figure 3).

DISCUSSION

The talus is the second largest tarsal bone of the foot. It forms the lower part of the ankle joint and comprises a head, neck and body. From above, at the ankle joint, it articulates with the tibia and fibula.⁵ From below, it connects to the calcaneum, and in front, with the navicular bone. It is through these articulations that the whole weight of the human body is transmitted to the foot.⁵

The head is anterior and articulates with the navicular bone. The inferior surface lies on the sustentaculum tali behind, and the calcaneonavicular ligament in front.

The neck of the talus has small vascular channels and lies posterior to the head, whereby the upper surface provides attachments to ligaments. The lower surface includes the sulcus tali, which together with the sulcus calcanei forms the sinus tarsi that is occupied by the interosseous talocalcaneal ligament.

Fractures of the talus are relatively uncommon,¹ but once they occur they are associated with life-long disability. There are four main categories of talar fractures. The most common of these are neck fractures with coexisting subtalar dislocation. Talar body fractures are extremely uncommon representing only 1% of all fractures and 13–20% of all talar fractures.

Most serious talar neck and body fractures are caused by hyper-dorsiflexion of the foot due to high-energy impact forces that can be caused by vehicle accidents or falling from heights.^{2 3 6}

Classification and preoperative planning of definite internal fixation require CT scanning. The most frequently used classification for talar bone fractures is that by Hawkins,⁷ which pertains to the frequent talar neck fractures. Talar body fractures can be classified into cleavage, crush and tubercle or process fractures (figure 4).

Sneppen *et al*⁸ stressed the importance of classifying and studying the various morphological types of talar body fractures with the goal of predicting the prognosis. They classified talar body fractures into five major types: type I, osteochondral or transchondral; type II, coronal-sagittal, horizontal, non-comminuted, shear; type III, posterior tubercle; type IV, lateral process; and type V, crush.

Delee's classification⁹ included coronal and sagittal variety of shearing fractures. There were four types; type A non-displaced fracture, type B fracture with displacement of the trochlear articular surface, type C fracture with displacement of the trochlear articular surface and subtalar dislocation and type D displaced fracture with subtalar and ankle dislocation.

The talar body fracture presented here cannot be described exactly using any of the above classifications and has not been previously described in the literature. The pattern of injury in this case involved the articular

Figure 2 Selected CT scan images to show the fracture reduction and fixation postoperatively.

Figure 3 Postoperative radiographs showing complete healing with no evidence of avascular necrosis.

posterior aspect of the talar body and not just the posterior process, which is quite unusual. This is made more unique with dislocation of talo-navicular and subtalar joints. It might be linked to a type II fracture after Sneppen *et al*,⁸ but differs from it with the articular surface involvement and the dislocation of the talonavicular and subtalar joints. It is important for clinicians to be aware that dislocations can occur around the talus in conjunction with a fracture at the body of the talus although less frequently than talar neck fractures.

The actual mechanism of injury in this case was quite common, but resulted in an extremely uncommon injury pattern (talar body fracture–dislocation) with a variant that has not been published in the literature so far. Despite the severity of the injury and two associated joint dislocations, good quality reduction and internal fixation resulted in excellent clinical outcome.

Learning points

- Owing to their uncommon frequency, the prognosis of the various types of talar body fractures is not entirely clear. Late results of talar fracture–dislocation depend on the adequacy of the initial treatment, the severity of the injury and the extent of vascular compromise.^{4 10} Most heal but mal-union of the fracture can lead to premature arthritis.
- Preoperative CT scan often improves preoperative planning by enabling better visualisation of the injury pattern. Unfortunately, owing to lack of out-of-hours CT facilities in our institution and rapid deterioration of the soft tissue envelope, surgery was undertaken on the basis of plain radiographs and a postoperative CT was performed to check the reduction.

Figure 4 Talar body fractures. Group I cleavage fractures (horizontal, sagittal, coronal). Group II process or tubercle fractures; Group III crush with compression/impaction.

- Recognition of this variant of talar fracture with dislocation is important to prevent further injury and could be added as a rare variant of type II of the Sneppen classification.

Competing interests None.

Patient consent Obtained.

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