UNCLASSIFIED TALAR NECK FRACTURE

a case report and a review of the literature

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Talar neck fractures are serious injuries associated with morbidity as a consequence of high energy impact. The Hawkins classification has been used to distinguish different types. John Duncan and colleagues, orthopaedic surgeons at the Royal Lancaster Infirmary, describe a rare variant of a talar neck fracture that does not fit the Hawkins classification and which to their knowledge has only been described twice before^(1,2).

CASE REPORT

A 35-year-old male motorcyclist was involved in a collision with a car. He was taken from the scene of the accident by paramedic ambulance to the local Accident and Emergency (A&E) department where he was assessed using advanced trauma life support principles (ATLS).

His only significant injury was that of an open (Gustilo Anderson Grade 3a) left talar neck fracture with associated disruption of the talo-navicular and subtalar joints. There was no neurovascular deficit present. He received prophylactic intravenous antibiotics in A&E for his open fracture dislocation. He was up to date with his tetanus immunisations.

He was taken to the operating theatre within six hours of arrival at hospital where he underwent urgent debridement and washout of his injury. The fracture dislocation was reduced with image intensifier assistance. The reduced fracture was held temporarily with two Kirschner wires.

Left talar neck fracture with associated disruption of the talo-navicular and subtalar joints

Definitive fixation was achieved using two partially-threaded cancellous screws passed from proximal to distal. Reduction and fixation was aided by using the open wound on the lateral aspect of the hindfoot.

Post operation, he completed a course of antibiotics and was immobilised in a below knee plaster of Paris cast. He was mobilised non-weightbearing. At six weeks his cast was removed and he commenced active mobilisation of his foot and ankle, but remained non-weightbearing. At two months he commenced partial weightbearing, progressing to full weightbearing at three months.

At latest follow up, five months post-op, he was mobilising comfortably fully weightbearing. He had little in the way of pain from his hindfoot, though there was some stiffness present in his ankle and subtalar joints. X-ray results at five months remained satisfactory with no radiographic evidence of non-union or avascular necrosis.

DISCUSSION

The talus is the second most common tarsal bone to be fractured after the calcaneum⁽³⁾. Around 50% of talar fractures affect the neck^(4,5).

The injury, also known as aviator's astragalus or 'rudder bar injury', was initially described in pilots. The commonest presentation now is following a fall or road traffic accident, often in young males. It is characteristically high energy and often open or associated with significant soft tissue injury^(6,7).

In 1970, Hawkins⁽⁷⁾ classified these fractures into three types based on the displacement of the proximal talar fragment in relation to the ankle and subtalar joints. Canale and Kelly⁽⁸⁾ added a further category to describe displacement of the talar head in addition to that of the body.

Hawkins classification of talar neck fractures with Canale and Kelly modification

I	Undisplaced talar neck fracture
II	Displaced talar neck fractures with disruption of the subtalar joint
III	Type II with disruption of the ankle joint
IV	Type III with disruption of the talonavicular joint

It can be seen that our patient's injury is not classifiable using this system as the ankle joint was not disrupted.

The characteristic mechanism of injury is forced dorsiflexion of the ankle joint, with the narrow talar neck impacting upon the anterior tibial crest, causing a fracture to occur at this level⁽³⁾. Further forces will cause displacement of the fracture and disruption of the surrounding joints⁽³⁾.

Presenting features include severe pain and swelling of the foot even in Type I injuries. Dislocation of the talar body causes a loss of normal hindfoot contours and may tent the skin, leading to ischaemia of the overlying skin. Type III, and to a lesser extent Type II, injuries may be associated with significant posterio-medial displacement of the talar body. These may compromise the posterior tibial neurovascular bundle. Distal tibial and calcaneal fractures may also be present.

The talar blood supply is a significant consideration in the management of talar fractures. Sixty per cent of the talar surface is covered by articular cartilage. No muscles attach onto the talus limiting potential sites of vascular perforation. The blood supply is mainly derived from the posterior and anterior tibial vessels and the perforating peroneal arteries⁽³⁾. These form an anastomotic sling of vessels in the tarsal sinus and tarsal canal, below the neck of the talus, sending branches to enter the neck area.

Peterson and Goldie⁽⁹⁾ showed that whilst the vascular sling is disrupted with fracture displacement, intraosseous branches of the arteries may also be harmed with non-displaced fractures. Recently reported rates for osteonecrosis were higher with open fractures and those with greater initial fracture displacement^(6,10).

The primary aim of treatment is to reduce and stabilise the fracture together with any disruption of surrounding joints. It is recommended that fracture reduction be performed as rapidly as possible to prevent any vascular compromise to the talus from being exacerbated. However, recent literature does not appear to show that this affects the rate of subsequent osteonecrosis^(6,10). Radiographic assessment of the injury should include anteroposterior, lateral and oblique views of the foot and ankle. Computerised tomography scanning may be considered to allow further assessment and management planning where circumstances permit.

Completely undisplaced closed fractures (Hawkins Type I) may be treated non-operatively. Displaced fractures require operative reduction and stabilisation. Vallier *et al*⁽⁶⁾ recommend closed reduction of closed displaced fractures, resorting to open reduction in circumstances where this is not possible. In closed injuries which require open reduction a medial incision around the hindfoot is often employed. In our case the pre-existing lateral wound was used. Open injuries require urgent operative treatment within six hours. Fixation of these injuries may need to be delayed in cases of severe wound contamination. Fixation can be achieved using partially-threaded cancellous screws. These are often passed from distal to proximal. Weightbearing should not be allowed for between 6 to 12 weeks^(6,10,11,12,13) until the fracture has united. Movement of the ankle and foot may be commenced sooner than this dependent upon stability of fracture fixation, degree of comminution or the state of the overlying soft tissues

Early complications include superficial and deep wound infections, wound dehiscence, and neurovascular compromise. Prompt considered treatment of the injury may help to minimise these. The longterm outcome for fractures deteriorates with increasing type of injury and is worse still

for open injuries⁽¹⁰⁾. Reported rates of osteonecrosis increase, as do rates of malunion and post traumatic arthritis^(10,11). Functional outcome has also been reported to be worse for injuries of a higher type⁽¹¹⁾. In those patients with very poor outcomes who are troubled with significant pain, further procedures in the form of arthrodesis may need to be considered.

Fractures of the talus are often associated with significant longterm sequelae. Prompt, considered management is required to try to minimise their impact. Patients who have suffered these injuries should be counselled about their severity and potential for longterm problems.

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