CASE REPORT

Bilateral talus fracture dislocation: is avascular necrosis inevitable?

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SUMMARY

Bilateral simultaneous fracture dislocation of the talus is a very rare injury. It occurs usually following high-velocity injuries. We report a 45-year-old man who presented with bilateral talar fracture dislocation following a heavy stone falling on him. On his right side, he had open talus dislocation with lateral process fracture and on his left side he had closed talar neck fracture dislocation. He underwent immediate debridement and external fixator application for his right side and open reduction and internal fixation for his left talus. At the end of 34 months' follow-up, he was able to walk up to 2 km without pain. His ankle range of movements were restricted bilaterally. Radiographs revealed bilateral avascular necrosis with right side showing complete collapse. We present this case for its rare presentation of bilateral talar fracture dislocation with bilateral avascular necrosis with sequential radiographs.

BACKGROUND

Simultaneous bilateral talar fracture dislocation is a very rare injury usually occurring secondary to high-energy injuries. Management of these injuries is a challenge as they ultimately lead to avascular necrosis (AVN) and post-traumatic arthritis. We report a rare case of bilateral talar dislocation that gradually evolved to bilateral AVN.

CASE PRESENTATION

A 45-year-old man, a carpenter by occupation, presented to our accident and emergency unit after a large stone had fallen on him 12 hours earlier. He had sustained closed injury to both his thighs, left ankle and open injury to his right ankle. He had nasal bleeding. On examination, he was conscious and his vitals were stable.

He had swelling, tenderness, deformity and abnormal mobility of both thighs and left ankle (figure 1). On his right ankle, he had a 10×4 cm transverse lacerated wound just below the medial malleolus with the talus lying completely outside the skin, almost devoid of soft tissue attachment (figures 1 and 2). He was not able to perform active toe flexion on his right side. He had sensory blunting on the sole of his right foot. His dorsalis pedis artery was palpable bilaterally. Posterior tibial pulsations were not palpable on the right side but they were felt on his left side.

INVESTIGATIONS

Blood investigations revealed haemoglobin of 9.2 gm/dL. Plain radiographs revealed anteromedial dislocation of the talus with lateral process fracture

Figure 1 Clinical photograph of bilateral ankle showing open dislocation of the talus with talar head protruding through the medial wound on the right side and the deformed ankle on the left side.

on the right side (figures 3 and 4). The left side showed a Hawkins's type III fracture dislocation of the talar neck (figure 5). He also had bilateral femoral shaft fracture.

TREATMENT

In the emergency room, he underwent thorough wound wash and his lower limbs were immobilised with splints. He was adequately resuscitated and taken to the operating room. Under general anaesthesia, he underwent debridement of the wound of his right ankle. Intraoperatively, the posterior tibial nerve was found stretched. The posterior tibial artery was lacerated. The talus was reduced. The reduction was unstable and hence stabilised with a medial joint spanning external fixator (figures 6 and 7). The vessel was ligated. The wound was closed without tension.

Figure 2 Clinical photograph of the right ankle after reduction of the dislocation showing the lacerated posterior tibial artery.

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Figure 3 Plain radiographs of both ankles' anteroposterior view showing talar fracture dislocation on both sides.

The left talus was approached through anteromedially. A medial malleolar osteotomy was done. Tibialis posterior and flexor digitorum longus tendons were lengthened by Z-plasty. The body of talus was dislocated out of ankle mortise postero-medially and was stretching the posterior neurovascular bundles. The talus was reduced and reduction was checked under image intensifier. The talus was fixed with two cannulated cancellous screws posterior to anterior (figures 8 and 9). The wound was closed with a drain. A posterior below knee splint was applied.

In view of prolonged anaesthesia, femoral fixation was deferred and the patient was shifted to the intensive care unit. Two days later open reduction and internal fixation of both the

Figure 5 Plain radiograph of the left ankle showing Hawkin's type III fracture dislocation of the neck of talus.

Figure 4 Plain radiograph of the right ankle lateral view showing dislocation of the talus.

Figure 6 Immediate postoperative anteroposterior plain radiograph of the right ankle showing the reduced talus with lateral process fracture on external fixator.

Figure 7 Immediate postoperative lateral view of the right ankle with external fixator.

femurs were done. The ankle drains were removed 3 days post-operatively. The wounds went on to heal without any secondary procedure. There was no evidence of any active infection. Sutures were removed at the end of 2 weeks. Below knee cast was applied for the left ankle.

Two months later, the patient underwent bone grafting of both the femurs as the radiographs showed a gap at the fracture site. The right ankle external fixator was also removed and a

Figure 9 Immediate postoperative lateral view of the left ankle showing well reduced fracture dislocation.

below knee splint was applied. Both the splints were removed after 4 months of index surgery. The patient was gradually started on partial weight bearing at the end of 4 months and gradually progressed to full weight bearing 6 weeks later with axillary crutches.

OUTCOME AND FOLLOW-UP

By the end of 7 months, the patient was walking without support. He was on regular follow-up every 3 months. At 1 year follow-up he reported of occasional pain of his right ankle. Radiographs revealed united fracture of the left talus with mild sclerosis of the body of talus ([figure 10](#)). The right side talus also showed sclerosis but no collapse ([figure 11](#)). Both femurs united well. He was advised to continue physiotherapy. At 2 years' follow-up, the left talar body showed sclerosis and right

Figure 8 Immediate postoperative anteroposterior plain radiograph of the left ankle showing reduced talus and fixation with cancellous screws.

Figure 10 Plain radiograph of the left ankle with sclerosis of the talar body at one year follow-up.

Figure 11 One year follow-up plain radiograph of right ankle showing minimal sclerosis of the talar body on the superior aspect without any signs of collapse.

talus showed complete vascular necrosis with collapse of the talar body (figures 12 and 13).

At 34 months' follow-up, the patient was able to walk up to 2 km without pain. He had pain in the right ankle more than the left on prolonged walking. His right ankle range of movements was 15° plantarflexion and 10° dorsiflexion. The posterior tibial nerve sensation improved to 80% of normal. On the left side, he had 30° of plantar flexion and dorsiflexion and 10° of inversion and eversion. Radiographs revealed AVN of the right talus with complete collapse. The left talus showed fracture union with sclerosis of the talar body suggestive of AVN (figures 14 and 15). He had returned to his preinjury job.

DISCUSSION

The talus is the only tarsal bone without any muscular attachments; however, it has strong ligamentous attachments to the adjacent bones. About 60% of the talar surface is covered with cartilage predisposing it to circulatory problems.¹ The blood supply to the talus is from the artery of the tarsal canal, artery of sinus tarsi and deltoid branches. Fracture—dislocation of the talus usually occurs as a result of high-energy injuries. This is because considerable force is needed to dislocate the talus from its surrounding joints, namely the tibiotalar, subtalar and talonavicular joints. Since it is a high impact injury, it is usually

Figure 13 Lateral radiograph of both ankles showing collapse of the talar body on the right side and sclerosis of the talar body on the left side at two years' follow-up.

accompanied by multiple fractures. Two per cent of all lower limb injuries and 5–7% of all foot injuries have associated talus fracture.²

Bilateral simultaneous talar fracture dislocation is very rare and only two such reports are mentioned in the English literature.^{2,3} Sayegh *et al*³ in 2009 described bilateral talar body fracture dislocation in a 29-year-old patient who was treated immediately. At 28 months' follow-up, the patient had post-traumatic arthritis on both sides with no signs of AVN. In 2013, Taraz-Jamshidi *et al*² reported a 25-year-old man with bilateral open fracture dislocation of the talus. At 2 years' follow-up, he had developed AVN on one side. Our patient developed AVN on both sides. The open complete dislocation side is severely affected compared with the closed fracture dislocation side, probably because of severe soft tissue disruption on the open side. We have shown radiographs of the serial progression of the AVN up to collapse. In 1963, Jensen *et al*⁴ described a case of bilateral talar dislocation of unknown aetiology.

AVN is a well-known complication following talar fracture dislocation. Steroid therapy, chronic alcoholism, systemic lupus erythematosus and pancreatitis are a few medical conditions that

Figure 12 Anteroposterior plain radiograph of both ankle showing fragmentation and collapse of the right talus at two years' follow-up.

Figure 14 Anteroposterior radiograph of both ankles showing collapse of the right ankle.

Figure 15 Lateral view of both ankles showing complete collapse of the right talar body and sclerosis of the left talar body.

can cause AVN. Bilateral avascular necrosis of talus have been reported following strenuous physical activity.⁵ The precarious blood supply to the talus that is damaged following trauma is the primary reason for AVN. Talar neck fractures are responsible for 90% of traumatic AVN. Hawkins⁶ has reported the incidence of AVN as 91% for type III injuries. If AVN occurs in talar neck fractures, the body of talus becomes sclerotic and then collapses. The other most common complication is post-traumatic arthritis, which occurs secondary to initial trauma causing cartilage damage, AVN and non-anatomical reduction.

Management of talar dislocation is a continuing challenge even to experienced orthopaedic surgeons. This is because of the rarity of these types of injuries and, therefore, there is no established treatment protocol. Treatments suggested are closed or open reduction and stabilisation, primary arthrodesis and talectomy. Timely management along with thorough debridement, meticulous soft tissue handling, minimal soft tissue

stripping, anatomical reduction, adequate stabilisation and post operative rehabilitation should be followed to minimise complications. Arthrodesis should be reserved for later limb salvage.

Learning points

- ▶ Simultaneous bilateral talar fracture dislocation is a very rare injury.
- ▶ Both osteonecrosis and post-traumatic arthritis are common complications of talar fracture dislocation.
- ▶ Prognosis is usually poor despite the best efforts.

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