Open Fracture Dislocation of the Talus With Total Extrusion: A Case Report

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Case Report

Open Fracture Dislocation of the Talus With Total Extrusion

A Case Report

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Abstract: *Open fractures with complete extrusion of talus are high-energy injuries. While treating these injuries, union of the fracture, vascularity of the body, and possibility of infection are main issues predicting less favorable outcomes. At present, there are no recommended treatment protocols for the management of such injuries. Early debridement, wound care, anatomic reduction, and adequate fixation are key factors in the management of compound injuries of the talus. There are few reports in the literature on successful reimplantation of talus when it is completely extruded. Encouraging functional outcomes of reimplantation of extruded talus suggest that excision of the talus with or without tibiocalcaneal fusion should be kept as a salvage procedure. We report a case of a farmer who sustained fracture of the talar neck. Both head and body fragments were completely extruded from the wound on the anterolateral aspect of the ankle. The patient was treated 18 hours postinjury. Thorough debridement of wound and bony fragments was done. Talus was reimplanted and fixation was performed with Kirschner wires. At 3-year follow-up, satisfactory functional outcome was noted with AOFAS (American Orthopaedic Foot and Ankle Society) score of 83 and MOXFQ (Manchester–Oxford Foot Questionnaire) scale score of 23. The purpose of presenting this case is to demonstrate the successful outcome of reimplantation of talus.*

Level of Evidence: *Therapeutic, Level IV: Case study*

Keywords: talus; open fracture dislocation; total extrusion; K-wire fixation; open talar fracture; reimplantation

Open talar neck fracture dislocations with extrusion of fragments are associated with less favorable outcomes.[1] Till date there are no definite guidelines in the literature to manage these injuries. Reimplantation of extruded talus may cause limb-threatening complications of infection or avascular necrosis and arthritis. Because of unsatisfactory outcomes, Marsh et al[2] recommended primary excision of the talar body in patients with talus extruding through the wound. Conversely, Smith et al[3] reported satisfactory results of reimplantation of extruded talus with less infection rate.

> "Some of the most important factors showing good results in an open fracture of the talus are early debridement, perfect reduction, and adequate fixation."

They strongly recommended reimplantation of talus whenever possible to maintain normal hindfoot mechanics.[3] Our experience with the present case also shows good results with replacement of talus. Some of the most important factors showing good

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Figure 1.

Clinical photographs of the ankle showing wound on anterolateral aspect and the extruded fragment of talus. The body fragment had thin soft tissue attachment, whereas the head was without soft tissue attachment.

results in an open fracture of the talus are early debridement, perfect reduction, and adequate fixation.

Here, we report a case of completely extruded fractured talus that was reimplanted successfully and followed up for 3 years.

Case Report

We report a case of a 60-year-old nondiabetic male patient who had a road traffic accident while traveling on a 2-wheeler. The talus was extruded through the wound on lateral aspect of the ankle. The patient was taken to a nearby clinic where wound washing with normal saline was performed and an injectable antibiotic was administered. He was referred to our hospital the next day. The patient presented to our hospital almost 18 hours after the initial injury.

Clinical examination revealed a wound on anterolateral aspect of the ankle through which 2 parts of the fractured talus were almost extruded out (Figure 1A and B).The wound

Figure 2.

Anteroposterior and lateral radiographs of the ankle joint showing total dislocation of the fractured fragments. Note the contamination by mud particles.

measured 7 × 3 × 3 cm. The body of the talus had an attachment of thin soft tissue near its posterior part while the head was without any soft tissue attachment. There was contamination of the wound with mud particles. Both anterior and posterior tibial pulsations were palpable with no neurodeficit. There were no other associated musculoskeletal injuries. Radiographs were taken, and they revealed a fracture at the neck of the talus and fragments extruded out of the ankle mortise.A small fragment of bone was seen in the ankle mortise (Figure 2A and B). It was found intra-operatively to be a part of posterior tuberosity of the talus. A computed tomography (CT) scan examination and analysis of the ankle would have been appropriate and relevant in demonstrating the fracture pattern but was not available in our hospital, and we did not want to waste time by sending the patient for a CT scan to a diagnostic center. The severity of the injury and the available options of management were explained to the patient and his relatives. One option was reposition of the talus back into the ankle mortise with fixation and the other option was excision of the talus. Broad-spectrum intravenous antibiotics and tetanus prophylaxis were immediately administered.

The patient was then taken into the operation theater. Spinal anesthesia was administered. A tourniquet cuff was applied on the patient's thigh in the supine position but was not inflated. The original wound was extended and thorough debridement was carried out. No pulse lavage was used. A curette was used to clear off mud particles from the cancellous areas of the talus.

Vascularity of the foot was adequate so decision was made to replace the talus back into the ankle mortise. To avoid the risk of infection, minimum implantation was planned. The body and neck of the talus were repositioned in the wound and manipulated with the help of K-wires used as joysticks to achieve reduction. Fixation was then performed using a 3-mm Steinmann pin passing from the calcaneus through the body of talus into the distal tibia. Another 2.5-mm K-wire was inserted from the navicular bone into the body of the talus thereby fixing the fractured neck. Both these implants were kept outside the skin (Figure 3A-C). The wound was closed with skin sutures without drain tube and a below-knee posterior slab was applied.

The patient was admitted postoperatively to the hospital for 7 days during which 3 wound check dressings were performed. The foot maintained adequate vascularity, and there were no signs of infection. The patient was given broad-spectrum antibiotics intravenously for 7 days and was then discharged. He was given oral antibiotics for 2 weeks. The patient was advised to return for follow-up every week. The wound healed well within 6 weeks, and there was no need of any soft tissue coverage procedures (Figure 4A and B).The patient was kept non-weightbearing for 3 months. There was no pin tract infection. Radiographs were taken every month (Figure 5A and B), and both implants were removed after 2.5 months. After removal of the implants, below-knee slab was continued for 2 weeks. The patient was then advised to be partially weightbearing with a walker 3 months postsurgery, and fully weightbearing without a walker 5 months postsurgery.

Figure 3.

Fixation of the talus with a Steinmann pin and Kirschner (K) wire. The Steinmann pin was passed from the calcaneum and talus into the distal tibia, and the K-wire was passed from the navicular through the head of talus into the body of talus.

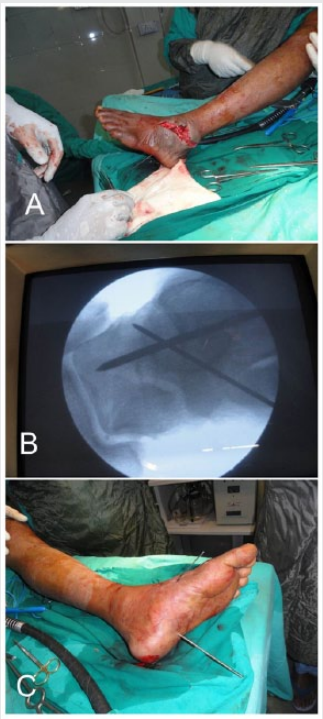


Figure 4.

The wound on the anterolateral aspect healed well in 6 weeks.

Figure 5.

Follow-up anteroposterior and lateral radiographs obtained 2.5 months with Kirschner wires in situ.

Figure 6.

Clinical photographs at 3-year follow-up showing good movement at the ankle joint.

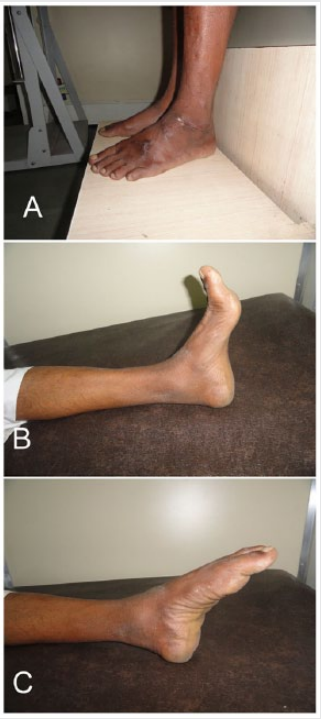


Figure 7.

Follow-up radiographs taken after 1 year showing union of the fracture with mild arthritic changes.

Results

The patient can now walk comfortably without pain. He is a farmer and can do his routine work in the field without pain and difficulty. He can work without restrictions and has returned to his preinjury performance. Good clinical range of motion at the ankle is noted. Dorsiflexion of 15° and plantar flexion of 30° from neutral position are noted clinically (Figure 6A-C). Fracture healing was noted radiologically 3 months after injury without any signs of infection. This patient has been followed up for more than 3 years (Figure 7A and B). Radiographs and magnetic resonance imaging performed 3 years after injury show no evidence of avascular necrosis; however, ankle and subtalar arthritic changes were noted (Figures 8 and 9).

The AOFAS (American Orthopaedic Foot and Ankle Society) score was 83 and MOXFQ (Manchester–Oxford Foot Questionnaire) scale score was 23 at 3 years' follow-up.

Discussion

Open fracture dislocations with extrusion of talus are rare injuries. Infection and avascular necrosis of talus are known complications of these injuries. If talus is repositioned back, it may become avascular and cause disabling arthritis. Serious infections developed during reimplantation and fixation may prove limb threatening. Because of unsatisfactory outcomes, Marsh et al[2] recommended primary excision of the talar body in patients with talus extruding through the wound.

Figure 8.

Follow-up radiograph obtained at 3-year follow-up showing no evidence of avascular necrosis. Ankle and subtalar arthritic changes were noted.

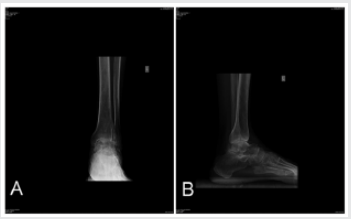
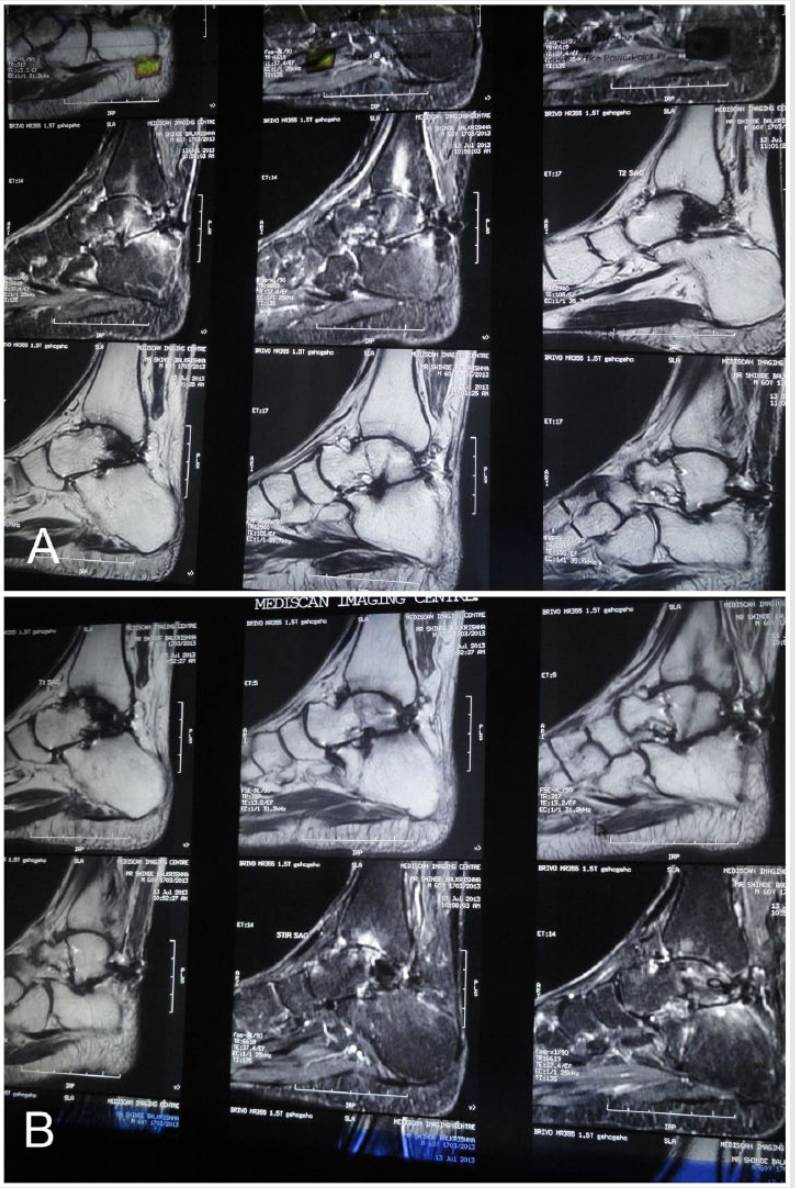


Figure 9.

Magnetic resonance image at the 3-year follow-up confirms the absence of avascular necrosis.



Infection rate of 38% was noted in their series.[2] Few other studies reported infection rates of 15% to 24%.[5,6] Smith et al[3] in 2006 reported less infection rates and favorable outcomes of reimplantation of talus. They recommended reimplantation of talus as a relatively safe option with a minimal risk of infection, preserving most of normal ankle anatomy.[3] Few other studies also reported successful outcome of reimplantation of talus.[7-9]

Magnan et al[10] reported use of metal prosthesis in cases of open injuries with extruded talus. This may also be an option to preserve ankle biomechanics.

It is always preferable to retain the talus for normal mechanics of the ankle. Results of reimplantation of talus are definitely good if infection is avoided; hence main goals of treating open fracture dislocation of talus with extrusion are (*a*) prevention of infection, (*b*) anatomic reduction, and (*c*) adequate fixation. Early and thorough debridement of soft tissues and bony fragments is the key step. This is followed by repositioning of talus and then fixation. K-wires alone, K-wires augmented with external fixator, screws, or plates are the implant options for fracture fixation. Soft tissue preservation should be considered during reduction and implant selection.

In our case, we did thorough debridement of the wound and the extruded talar fragments. Talus was repositioned, reduced with K-wires as joysticks and fixed without adding to the soft tissue insult. We decided to use only K-wires for fixation to avoid infection, as the patient had reported late to us. Anatomic reduction of fracture, satisfactory repositioning of the talus in the ankle joint and absence of infection resulted in satisfactory outcome in our case. Fixation with 2 K-wires proved to be adequate till bony union of fracture. Although it is a joint-violating fixation, it was adequate for stability avoiding soft tissue stripping. We also agree that addition of external fixator would have augmented the fixation.

The purpose of presenting this case is to share the successful outcome of reimplantation of the extruded and fractured talus. The patient is a farmer

and on healing he is able to work in the fields without disability.

Open injuries with extrusion of talus are rare high-energy injuries. Successful clinical results in our case support the proposition of reimplantation of extruded talus in these injuries. Excision of talus and tibiocalcaneal fusion can be kept as salvage procedure. FAS

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