Open Total Talus Dislocation: A Case Report

Werasak Sutipompalangkul, M.D., Ph.D., Chaturong Pornrattanamaneeewong, M.D., Pichet Sangthongsil, M.D.,
Thossart Harnroongroj, M.D.
Department of Orthopaedic Surgery, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand.

ABSTRACT

Total dislocation of the talus is a rare and severe injury. We report a case of 18-year-old man who sustained a Gustilo type IIIA open total talus dislocation when he had a car accident. Immediate surgical debridement and putting the dislocated talus into an ankle mortise were accomplished under antibiotic coverage. The ankle was immobilized for 12 weeks, and weight-bearing was restricted for 3 months. At the 6-month follow-up, the patient had both ankle septic arthritis and avascular necrosis of the talus. After treatment with antibiotics for 8 months, the septic arthritis was resolved. Finally, at 12 month follow-up, the patient had a good plantigraded foot even though avascular necrosis of talus was presented.

Keywords: Total talus dislocation, infected open fracture, talus necrosis

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Total dislocation of the talus, closed or open, is a rare injury accounting for 0.06% of all dislocation and 2% of all talar injuries.1 The talus is predisposed to dislocation because it is the only bone in the lower extremity without muscle attachments and three-fifths of its surface is articular.2 In contrast, the rarity of this injury is probably the result of the position of the talus in the foot, its strong ligamentous support, and the amount of force required to produce its dislocation.3,4 Because the injury is rare, the literature consists of mainly case studies or small series with controversy regarding the best treatment option.2,3,5 Many surgeons recommend putting the talus into an ankle mortise to preserve function of the joint and length of the extremity. Others advocate primary arthrodesis because of the risk of infection, avascular necrosis (AVN).2 We present a case of an open total talus dislocation, Gustilo type IIIA, in a 18-year-old man who had car accident and who was treated with immediate saline irrigation, debridement, putting the talus into anatomic position and cast immobilization.

CASE REPORT

A 18-year-old man injured his right foot in a car accident. Two hours after the accident, he was taken to the emergency department of Siriraj Hospital. Clinical examination showed the foot was pronated, and externally rotated. A severe, deep, contaminated wound (8 x 4 cms) was present on the medial side with the talus in the center of the wound. The wound was dirty with sand, pieces of soil, and grass present in it. The whole body of the talus was extruded from the depth of the wound. The only soft-tissue attached to the dislocated bone was a 1 cm wide pedicle extending from the calcaneus to the posterior process of the talus. There was an osteochondral fracture (0.5 x 1 cms) on the lateral aspect of the talar head. Laceration of the posterior tibial artery and avulsion of flexor hallucis longus tendon were identified (Fig 1). Standard radiographs of the ankle showed a total talar dislocation without any bony fracture of the ankle. The diagnosis of the patient was a Gustilo type IIIA total dislocation of talus (Fig 2).

The patient was taken to surgery approximately 4 hours from the time of injury. Regional anesthesia by spinal block was performed. After thorough wound irrigation with saline 7,000 ml and debridement, the reduction was accomplished. Firm manual foot traction with countertraction on the leg, combined with direct digital pressure over the head of talus, aided in smooth reduction. The posterior tibial artery was treated by direct repair. Because of the dirt in the wound, the wound was not primarily closed. The patient was immobilized in a short-leg posterior plaster splint. The patient received tetanus immunization, a first-generation cephalosporin (Cefazolin), and an aminoglycoside...
Gentamicin) to prevent infection. Multiple debridement and vigorous intravenous antibiotic therapy with ciprofloxacin prevented development of a wound infection.

Seven days after the operation, the patient was able to walk non-weight bearing with crutches. No further closure was attempted, and the wound eventually healed by secondary intention. The short leg cast was removed at 12 weeks post injury, after which the patient began physical therapy. Six months post injury, the patient had pain in his ankle joint and X-ray at that time showed signs of avascular necrosis in the talus and septic arthritis of talonavicular, tibiotalar and subtalar joints. After treatment with oral antibiotics for 8 months (Fusidic acid-ciprofloxacin for 5 months then Cefdinir for 3 months), the septic arthritis was resolved (c-reactive protein < 3.02 mg/L). Finally, at 12 month follow-up, the patient had attained a good plantigraded foot and well aligned ankle-hindfoot (Ankle score = 77/100) even though avascular necrosis of talus was presented (Fig 3).

**DISCUSSION**

Fractures and fracture-dislocation around the talus are often high-energy injuries that frequently are associated with open wounds. According to Hiraizumi et al, 54% of all talar dislocation are open. Some of the reported cases of open talus dislocation with integrity of soft-tissue attachments indicate some mild to moderate functional disturbances. When the talus is available and replaced, the functional outcome depends on 2 factors: infection and avascular necrosis. In the series of Detenbeck and Kelly, 7 out of 9 patients developed infection, requiring late takedown and tibio-calcanean fusion. Palomo-Traver et al, however, reviewed all cases that have been published with adequate details and, after excluding the Detenbeck and Kelly cases, they reported an infection rate of 0% for closed dislocation and 27.3% for the open cases, whereas the risk of AVN was 20% and 18.2% respectively. Both infection and AVN are not so frequent and the latter even resolved with conservative treatment. Finally, they suggested that the talus should be repositioned unless the bone is totally extruded or grossly contaminated. In some cases of takedown, a talar body prosthesis or a rectus abdominis muscle graft have been used as spacers between the calcaneus and the tibia.

In view of the above-mentioned data and the rarity of this injury, it was decided to proceed to a reposition of the talus and treatment to avoid the complications of infection and AVN that would likely ensue. However, at the 6-month follow-up, the patient had both ankle septic arthritis and avascular necrosis of the talus. These worse results can be treated by a secondary takedown plus tibio-calcanean arthrodysis performed as a second stage. This procedure can eventually yield a remarkably satisfactory result.

Our patient had a complex problem: open talar dislocation with limited soft-tissue attachments and severe contamination. Approximately 60% of the surface of the talus is covered by articular cartilage, thus only a limited surface is available to provide adequate vascular perforation. The supporting vessels enter the talus through 5 locations: along the superior and inferior neck, along the medial and lateral surfaces of the body, in the tarsal canal, and over the posterior process. One of the major nutrient arteries of the talus enters through the dense superior talonavicular ligament, which extends as a broad band from the dorsal surface of the neck to the dorsal periphery of the navicular. If small strands of this strong ligament remain attached, avascular necrosis may be avoided. In the present case, it can be assumed with certainty that all blood supply was disrupted, especially the dorsal neck vessels. In addition, severe contamination was finally the cause of osteo-

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**Fig 1.** Gustilo type IIIA open total talus dislocation.

**Fig 2.** Radiographs at time of injury (Anteroposterior and lateral views).

**Fig 3.** Radiographs (Anteroposterior and lateral views) 12 months postinjury.
myelitis of the talus even after several vigorous debridements. It impacted upon the process of revascularization entering the talus by spreading the inflammatory process.\textsuperscript{21,22} Therefore, this may explain the avascular necrosis of the talus in this case even after putting the dislocated talus into an anatomic position.

In conclusion, severe contamination from a dirty environment and deterioration of blood supply of a total dislocated talus should be considered before putting the dislocated talus into an ankle mortise.

REFERENCES