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Case Report

A Comminuted Talar Fracture with Simultaneous Bimalleolar Ankle Fractures

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Abstract

Bimalleolar ankle fractures make up around 25% of all ankle fractures. Simultaneous fractures of the talus and ankle are rare, with very few cases reported in the literature. We report the case of a 50 years old female patient, previously healthy, who presented with simultaneous bimalleolar ankle and comminuted talar body fractures. Mechanism of fracture was axial compression with supination. Patient presented with severe edema and swelling treated by percutaneous fixation using mini-incisions. Follow-up was done up to two years showing satisfactory clinical and radiological results.

Keywords: *Talus; Ankle; Bimalleolar; Fracture; Trauma*

Introduction

Ankle fractures are a common injury whose incidence has been increasing over the past 50 years, especially in the elderly population [1]. Bimalleolar ankle fractures comprise approximately 25% of all ankle fractures [1].

With respect to ankle fractures, talar fractures have a much lower incidence, accounting for less than 1% of all bone fractures and usually affecting young patients [1]. Within talar fractures, the most commonly described are talar neck fractures. Talar body fractures are the result of high energy trauma. Patient often present with a combination of talar neck and body fractures, as well as associated talar body fractures and ankle fractures [2]. Usually ankle fractures combined with a talar body fracture imply either medial or lateral malleolus involvement [2]. We report the case of a simultaneous comminuted talar body fracture with severe comminution, articular sagittal split, with extension to the talar neck, associated with bimalleolar ankle fractures in a middle age female patient. The mechanism of trauma appears to be very rare. To our knowledge, similar case has not been reported in the literature. A few cases were reported regarding a bimalleolar and talus body fracture.

A similar case was reported by Elibrahimi., *et al.* which discussed the case of a 34-year-old male patient who presented with a sagittal talar body fracture combined with a bimalleolar fracture post motor vehicle accident. This patient was treated with an open reduction internal fixation (ORIF) of the talar body fracture as well as bimalleolar fracture applying 2 cannulated screws for the talus through a medial approach, followed by a prolonged non-weight bearing period, which led to complete healing of the fracture [3]. Similarly, a case reported by Verettas., *et al*. describes a similar case treated by ORIF after soft tissue edema subsided, with only mild osteoarthritic changes seen

after 3 years follow-up [2]. Another case was reported by Weatherall., *et al.* [1], treated initially by external fixation, followed by ORIF in a similar manner to Elibrahimi., *et al*. At 1-year follow-up, imaging showed very early degenerative changes of the ankle joint. No evidence of osteonecrosis was noted in any of the 3 reported cases. A normal range of motion in the sagittal plane as well as normal inversion and eversion were reported in all 3 cases.

Case Report

This is the case of a 50-year-old female patient who presented to the emergency room post-fall from a ladder onto her right lower limb, with a mechanism of axial compression in supination. Upon presentation, she had severe pain and soft tissue edema with limited range of motion.

In the emergency room, right ankle and foot radiographs were done which showed acute fracture of the lateral and medial malleoli, with articular surface incongruity and evidence of talar body comminuted fracture (Figure 1). Further evaluation of the talar comminution and fracture extension was seen on CT scan with multi-planar reformatting (Figure 2) and 3D reconstruction (Figure 3). A posterior immobilization cast was applied, and the patient was admitted to the orthopedics ward.

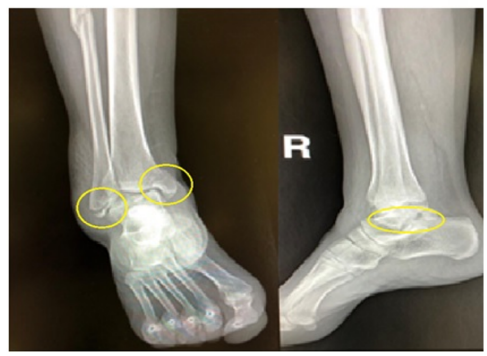

Figure 1: *Right ankle AP and lateral radiographs done in the ER showing bilateral malleolar fractures, with articular surface incongruity and evidence of talar body comminuted fracture.*

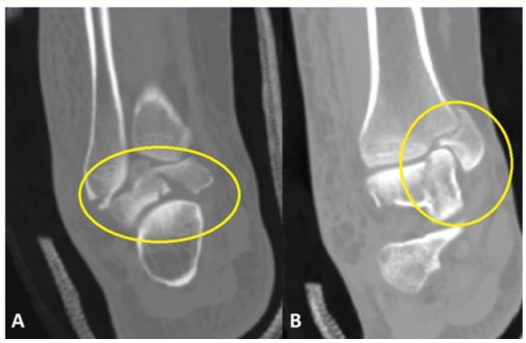

Figure 2: *A: CT scan of Right ankle coronal cuts showing comminuted talar body fracture with articular involvement and lateral malleolar fracture. B: CT scan of Right ankle coronal cuts showing medial malleolar fracture with talar neck fracture.*

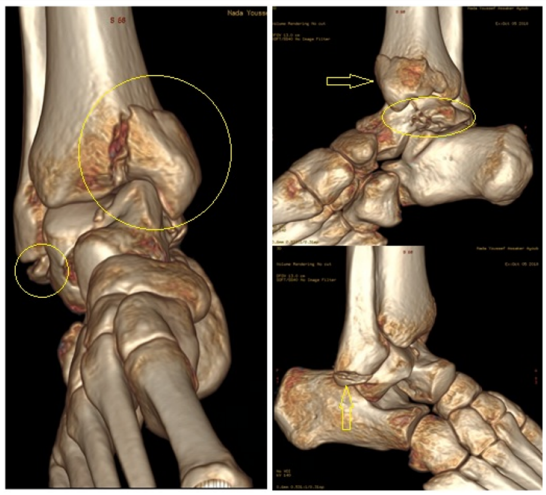

Figure 3: *3D reconstruction CT scan of the Right ankle showing bimalleolar fractures with comminuted talar body and neck fractures.*

Seven days after admission, the soft tissue edema subsided and was adequate enough for surgical management. In order to prevent further dissection of soft tissue and nonunion of fracture, or infection; decision was made to proceed with percutaneous fixation using mini-incision, where a lateral incision was made over the lateral malleolus and dissection was done until the fracture line was reached. The fracture was reduced and fixed with a hooked plate and 3 screws.

Medial malleolus was fixed percutaneously by 2 screws with joystick in order to fix the talar fracture with one percutaneous cannulated screw applied medially. Intraoperative fluoroscopy showed satisfactory results and alignment (Figure 4).

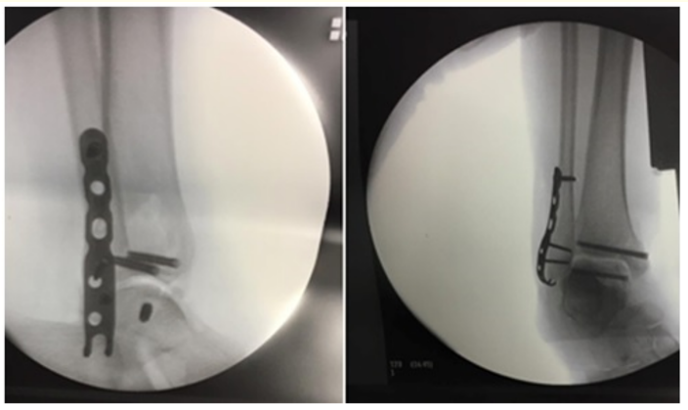

Figure 4: *Intra-operative AP/Lat fluoroscopy showing fibular hook plate with 3 screws, medial malleolus reduced with 2 screws and talus reduced and fixed with one percutaneous cannulated screw.*

At six weeks follow-up, radiographs were done (Figure 5) showing good alignment and bone healing. Patient had minimal pain with normal sensation and distal motor function. Cast was removed and she was start on regular physical therapy sessions with progressive return of range of motion.

Figure 5: *Post-operative X-ray done at six weeks before removal of cast showing healing of fractures and good bone alignment.*

At three months post-op follow-up, the patient had already started full weight bearing ambulation, with 40 degrees of plantarflexion, and 20 degrees of dorsiflexion. She was progressing with the help of physical therapy and home exercises, without any pain or complaints.

Follow-up at two years, X-rays show adequate alignment and good healing of the fracture with minimal osteoarthritic changes (Figure 6). Patient regained most of range of motion with no reported pain or other complaints. Patient has regained normal baseline dorsiflexion with minimal acceptable deficit on plantar flexion, not affecting any of her previous activities and lifestyle (Figure 7).

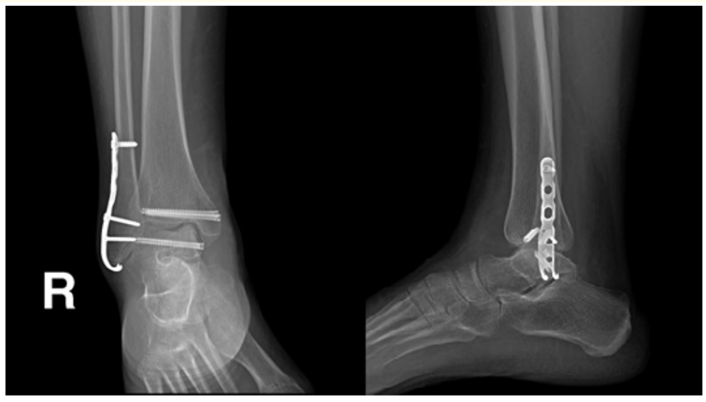

Figure 6: *Two years post-op follow up X-rays AP/Lat of Right ankle showing complete healing of fractures with minimal osteoarthritic changes.*

Figure 7: *A: Two years follow-up showing return to baseline dorsiflexion with no deficits seen with good alignment and symmetry, B: Two years follow-up showing satisfactory plantarflexion range of motion with minimal deficit compared to contralateral side.*

Discussion

Ankle fractures combined with a comminuted talar fracture are rarely reported, and to our knowledge, no similar case has been reported to this day. The only similar reports are of talar body fractures with combined bimalleolar fractures.

The mechanism of injury is not reported. Percutaneous treatment can be done without dissection in older people. Furthermore, headless screws can be used to prevent further irritation of the skin especially in thin patients.

Talar body fractures are usually produced by an axial compression of the talus between the tibial plafond and calcaneus [2,3]. In cases where a combined medial malleolar fracture is present, an additional inversion torque distributes this force to the medial structures, producing a vertical split of the talar body and creates the medial malleolar fracture [2,3]. This mechanism is in most concordance with the supination adduction injuries.

Displaced talar fractures need to be treated with accurate reduction and stable fixation as soon as possible since casting or external fixation would lead to a higher rate of complications later on. This technique would be the optimal way in order to ensure the best environment for the revascularization of the lateral part of the talar body [2]. In sagittal talar body fractures, the lateral part of the dome is devascularized, since the main blood supply of the body originates from the medial side through the deltoid branches arising from the artery of the tarsal canal [2,3]. Union of the fracture in such cases is extremely slow as it depends on a new blood supply growing into the avascular bone [2]. For this reason, we opted for percutaneous treatment to prevent further devascularization. Therefore, the ankle requires immobilization with little to non weight bearing up to 3 months or until union has occurred [2].

Avascular necrosis (AVN), or osteonecrosis, is the most common complication following displaced fractures of the talus, due to interruption of the blood supply to the sinus tarsi and the tarsal tunnel [4] and its incidence is high, especially when talar neck and body fractures are combined. The risk is lower when talar body fractures are combined with malleolar fractures since soft tissue attachments to the talar body fragment remain.

Most of the talar surface is covered with articular cartilage, and for this reason ankle and subtalar arthritis can result from chondral damage at the time of injury or due to abnormal joint mechanics. Post-traumatic osteoarthritis of the ankle and subtalar joint is a well-recognized complication of displaced talar fractures [4,5].

Conclusion

Comminuted talar body and neck with associated bimalleolar fractures is a rare pathology. Mechanism of injury is usually fall from height with supination and adduction of the ankle. Percutaneous fixation should be done in patients with severe edema or comminution. Also, headless screws should be preferably used in thin patients. Regardless of the type of treatment, progression to osteoarthritis is to be expected. The post-operative course is as important as the surgery itself, relying on patient compliance to progress with physical therapy and regular clinical follow-up.

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Conflict of Interest

The authors declare no conflict of interest regarding the publication of this article.

Informed Consent

Full consent from the patient was obtained for publishing this article and images.

Bibliography

1. Weatherall J and Schwarzkopf R. "Combined ankle and talus fractures--a case report". *Bulletin of the Hospital for Joint Disease* 71.2 (2013): 161-165.

2. Verettas DJ., *et al*. "Talar body fracture combined with bimalleolar fracture". *Archives of Orthopaedic and Trauma Surgery* 128.7 (2007): 731-734.

3. Elibrahimi A., *et al*. "A talar body fracture combined with bimalleolar ankle fracture". *Médecine Et Chirurgie Du Pied* 24.3 (2008): 117-118.

4. Radaideh AM., *et al*. "Talar Neck Fracture with Dislocation Combined with Bimalleolar Ankle Fracture: A Case Report". *American Journal of Case Reports* 19 (2018): 320-324.

5. Mnif H., *et al*. "Fracture dislocation of the talus combined with pilon or bimalleolar fracture: A report of two cases". *European Journal of Orthopaedic Surgery and Traumatology* 19.5 (2009): 361-365.

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