International Journal of Academic Health and Medical Research (IJAHMR)
ISSN: 2643-9824
Vol. 9 Issue 2 February - 2025, Pages: 103-110

Panatalar extrusion associated with bimalleolar fracture revealing Müller-Weiss syndrome..

Mouad Miloudi [1*], El bachir Mghabar [1], Abid Hatim [1], Mohammed El Idrissi [1], Abdelmajid El mrini[1]

[1]Departement of Traumatology, Hassan II University Hospital, Fez, Morocco., Faculty of Medicine, Pharmacy, and Dental Medicine of Fez, University Sidi Mohamed Ben Abdellah, Fez, Morocco., FEZ, MAR.

***Corresponding Author:** Mouad Miloudi, Departement of Traumatology, Hassan II University Hospital, Fez, Morocco., Faculty of Medicine, Pharmacy, and Dental Medicine of Fez, University Sidi Mohamed Ben Abdellah, Fez, Morocco., FEZ, MAR.

Abstract: *Müller-Weiss syndrome (MWS) is a rare and complex condition characterized by progressive navicular bone fragmentation and midfoot deformity, often leading to chronic pain and functional impairment. This case report presents a unique instance of an open panatalar extrusion associated with a bimalleolar fracture in a patient with previously undiagnosed Müller-Weiss syndrome. A 60-year-old female presented with acute ankle trauma following a fall from 3 m height.Radiographic and CT scan studies revealed a bimalleolar fracture alongside talar extrusion and underlying MWS, evidenced by navicular fragmentation and talonavicular collaps). Surgical intervention included fracture fixation and talar reduction. This case highlights the diagnostic challenges of MWS in the setting of acute trauma and underscores the importance of considering rare underlying conditions in complex foot and ankle injuries. The management of such cases requires a multidisciplinary approach to address both acute trauma and chronic degenerative changes, aiming to restore function and prevent long-term complications.*

Keywords: case report, Müller-Weiss syndrome, Panatalar extrusion, Foot and ankle trauma

Introduction

Total talus dislocation occurs when the talus is entirely detached and dissociated from all surrounding joints namely the tibiotalar, talonavicular and subtalar joints. It is a rare injury and commonly results from a high-energy motor vehicle accident or fall from height. Total dislocation of the talus is usually associated with fractures of the malleoli or the talus itself. The mechanism of injury is thought to be due to excessive supination or pronation of the ankle joint resulting in either anterolateral or anteromedial dislocation with the former being more common [1]. This requires immediate reduction, (open or closed) to prevent further damage. Avascular necrosis and infection of the talus are the significant complications in this type of injury [2]. In some instances, the presence of concomitant conditions like Müller-Weiss syndrome (MWS) can further complicate the injury. MWS, a rare condition involving degenerative changes and avascular necrosis of the navicular bone, can influence the healing process and require specialized management. In this case, the combination of a total talus dislocation with fractures of the medial and lateral malleoli and the concurrent presence of MWS underscores the complexity of treatment and the need for a tailored, multidisciplinary approach.

CASE REPORT

A 56-year-old female presented to the emergency department following a fall from a height of approximately 2 meters. She complained of severe, instant pain in her right ankle. Upon arrival, she was alert and oriented but in acute distress due to the pain. She had no significant medical history and was not on any regular medication.

On physical examination, the patient was noted to have significant swelling and deformity of the right ankle. There was an open wound on the anterolateral side of the right ankle, with exposed talar cartilage, indicating a Gustilo-Anderson IIIa open fracture-dislocation(figure 1). The wound was contaminated with dirt, and the talus was visibly displaced through the skin. The foot was in an abnormally rotated position, with the talus dislocated anteriorly, indicating a total talus dislocation. Despite the obvious deformity, the neurovascular examination was normal.

Figure 1:clinical aspect

Plain radiographs showed an anterolateral dislocation of talus with a medial malleolus fracture(figure 2) .CT scans showed a tri-articular dislocation with total extrusion of the intact talus from the tibio-talar, talo-calcaneal and talo-navicular joints. There was an associated displaced medial malleolar fracture and a non-displaced tip of lateral malleolus fracture.the CT scans shows a navicular osteonecrosis with compression of the navicular bone and a properly aligned internal arch of the foot signing a Müller-Weiss syndrome at the 3 rd stage of maceira (figure 3).

Figure 2:preoperative radiographics

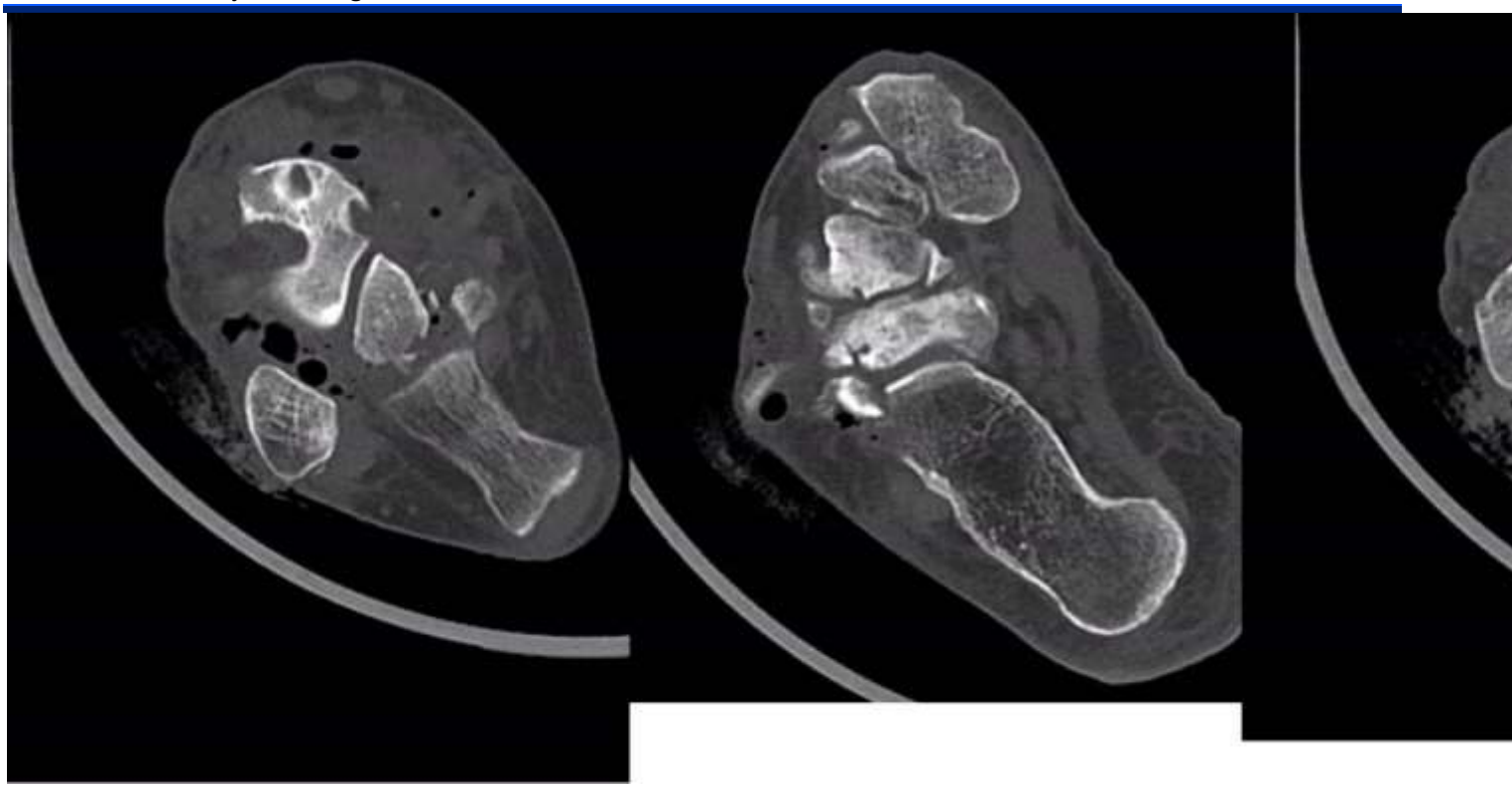


Figure 3:preoperative CT Scan

Broad-spectrum antibiotics were administered and the woundwas irrigated upon arrival at the Emergency Department; further wound debridement and joint washout were performed under general anaesthesia. The talus was merely attached by a single strand of remaining ligament and all other talar soft tissue attachments were torn. The talus was reduced but remained unstable. To address this, we temporarily stabilized the tibio-talar, talo-calcaneal, and talo-navicular joints using K-wires. Additionally, we stabilized the medial malleolus with a screw and a K-wire, and the lateral malleolus with a K-wire. The wound wasprimarily closed with sutures. The patient was admitted for intravenous antibiotic therapy and wound care.(figure 4)

Figure 4:postoperative radiographics

He was reviewed back in the clinic at follow-up intervals oftwo to four weeks. Repeated radiographs at six months post trauma showed no evidence of avascular necrosis of the talus and a united medial malleolus fracture. All surgical and traumatic wounds healed uneventfully without evidence of superficial or deep seated infection. The Kwires was removed 12 weeks postoperatively and physiotherapy commenced The patient has since been able to bear weight on the affected ankle with minimal tolerable pain (pain score, 1 of 10) and is on long term follow up in anticipation of post-traumatic arthritis.

The Müller-Weiss syndrome (MWS)) was not treated, as it was asymptomatic prior to the injury, and the patient opted against intervention.

Discussion

Total talus dislocation is an exceptionally rare injury, usually caused by high-energy trauma. Only a limited number of case reports and small case series have been documented, and there is no standardized treatment protocol for such injuries. Additionally, there is a lack of reliable data on the incidence rates of this condition. Kenwright and Taylor, for instance, reported just two cases of total talus dislocations out of fifty-eight major talar injuries, representing only 3% of cases. [3]

The talus is characterized by its unique blood supply, which is highly vulnerable to disruption during injury. Approximately 60% of the talar surface is covered by cartilage, leaving limited area for vascular perforation. The talar body primarily receives its blood supply from the tarsal canal artery, a branch of the posterior tibial artery, and the deltoid artery. The talar head is supplied by branches of the dorsalis pedis artery and the tarsal sinus artery, both originating from the anterior tibial artery. Additionally, a network of intraosseous arterial anastomoses exists, with the most significant being between the arteries entering the superior neck and the artery of the tarsal canal. These vessels provide a robust blood supply to the talar body. Capsular and ligamentous vessels

connecting the talus to the navicular, calcaneus, and tibia also contribute to its vascularization, with the talonavicular ligament being a major nutrient source [4]. The risk of avascular necrosis depends on the extent of arterial disruption and soft tissue damage. Revascularization of the talus is more likely in the absence of fractures or when prompt soft tissue reattachment is performed to restore blood flow [5].

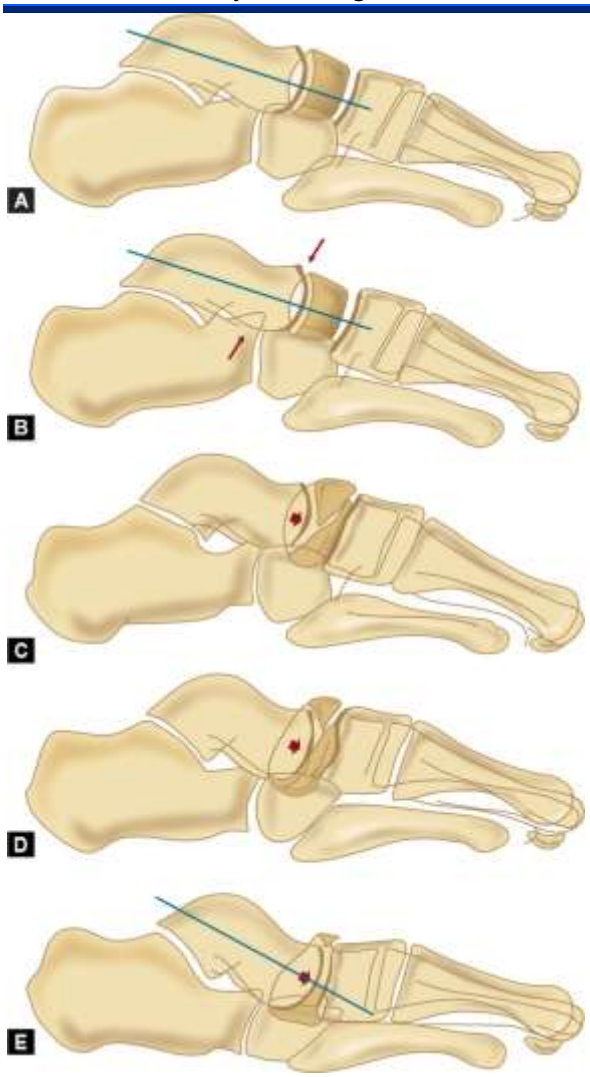
Evidence-based treatment protocols for open talar injuries remain scarce. Historically, treatment recommendations have evolved from amputation to talectomy with tibiocalcaneal fusion. However, recent case reviews suggest that wound debridement, early reduction, and fixation can lead to favorable clinical and functional outcomes. Relocation of the talus is advised if the wound is relatively clean and the talus remains attached, even by a small strand of soft tissue. Combining reduction and fixation with thorough wound debridement can help prevent infection, promote early revascularization, and preserve normal ankle anatomy. More extensive surgical interventions, such as talectomy and tibiocalcaneal fusion, should be reserved as salvage procedures.

Müller-Weiss disease is a condition that predominantly affects women, is often bilateral, and has a multifactorial etiology. Its pathophysiology remains a subject of debate. Müller [6].was the first to describe the condition in 1927, attributing it to mechanical compression of the navicular bone following trauma, leading to necrosis. Weiss [7].later proposed a vascular theory, suggesting that osteonecrosis results from the already precarious blood supply to the navicular bone.

Clinically, the diagnosis is suspected based on the gradual onset of mechanical pain in the midfoot, accompanied by a visible deformity on the dorsal aspect of the midfoot. Imaging studies reveal talonavicular osteoarthritis of varying severity, depending on the stage of osteonecrosis. The navicular bone takes on a comma-like shape due to lateral compression, eventually developing a dorsal protrusion and fragmentation[8].. Hetsroni et al. [9]. demonstrated abnormal force distribution in Müller-Weiss disease, with increased pressure in the midfoot leading to the collapse of the navicular bone.

A radiological classification system was proposed by Maceira [10]., dividing the disease into five stages based on the degree of collapse of the medial arch and compression of the navicular bone (Fig. 5):

- **Stage 1**: Normal radiographs; diagnosis confirmed by scintigraphy, CT, or MRI.
- **Stage 2**: Subtalar varus with a cavovarus foot.
- **Stage 3**: Compression of the navicular bone with a preserved medial arch.
- **Stage 4**: Collapse of the medial arch and equinus deformity, resulting in a flatfoot with varus.
- **Stage 5**: Exclusion of the navicular bone (navicular listhesis) with arthritic flatfoot.



Treatment varies depending on the stage of the disease:

- In **Stage 1**, conservative management is preferred, including physical rest, orthotics, or cast immobilization
- In more advanced stages, surgical intervention is often necessary . The goal is to restore a normal medial arch, typically through talonaviculocuneal arthrodesis with bone grafting, with or without internal fixation.

Fernandez de Retana et al. [11]., reported a case of Müller-Weiss disease treated with talonaviculocuneal arthrodesis without internal fixation, followed by cast immobilization for 10 weeks. Alternatively, Weinraub [12]., described the use of a locking plate for internal fixation, which eliminates the need for postoperative immobilization.

Conclusion

This case report illustrates the challenges of managing panatalar extrusion with a bimalleolar fracture in a patient with underlying Müller-Weiss syndrome (MWS). Successful treatment involved prompt surgical reduction, fracture fixation, and temporary stabilization, alongside meticulous wound care. The absence of complications like avascular necrosis or infection highlights the importance of early intervention. The decision to defer treatment for asymptomatic MWS, based on patient preference, underscores the need for individualized care. This case emphasizes the diagnostic challenges of identifying chronic conditions like MWS in acute trauma and the value of a multidisciplinary approach. It also contributes to the limited literature on such complex injuries, advocating for further research to refine treatment protocols and improve outcomes.

References

1- Leitner B. The mechanism of total dislocation of the talus. *J Bone Joint Surg* 1955; 37: 89-95

2- Weston JT, Liu X, Wandtke ME, Liu J, Ebraheim NE (2015)A systematic review of total dislocation of the talus. Orthop Surg 7: 97-101.

3- Kenwright J, Taylor RG. Major injuries of the talus. *J Bone Joint Surg.* 1970; 52(B): 36-48.

4- Bucholtz RW, Heckman JD, Court-Brown CM, Tornetta P, editors. Rockwood & Green's Fractures in Adults; 6th Edition. 2006

5- Newcomb WJ, Bray EA. Complete dislocation of the talus. *J Bone Joint Surg.* 1948; 30(A): 872-4.

6- Mueller W. Ueber eine eagenartige doppelseitige Veraenderungdes os naviculare pedis bairn Erwachsenen. Dtsch Z Chir 1927;1-2 : 84-9.

7- Weiss K. Ueber die Malacie des os naviculare pedis. ROFO 1929 ; 40 : 63-7.

8- Tosun B, Al F, Tosun A. Spontaneous osteonecrosis of the tarsal navicular in an adult: Mueller-Weiss syndrome. J Foot Ankle Surg 2011 ; 50 : 221-4.

9- Hetsroni I, Nyska M, Ayalon M. Plantar pressure distribution in patients with Muller-Weiss disease. Foot Ankle Int 28(2): 237-41, 2007.

10- Maceira E, Rochera R. Muller-Weiss disease: clinical and biomechanical features. Foot Ankle Clin N Am 2004 ; 9 : 105-25.

11- Fernandez de Retana P, Maceira E, Fernandez-Valencia JA. Arthrodesis of the talonavicular-cuneiform joints in Muller-Weiss disease. Foot Ankle Clin N Am 2004 ; 9 : 65-72.

12- Weinraub GM. Midfoot arthrodesis using a locking anterior cervical plate as adjunctive fixation: early experience with a new implant. J Foot Ankle Surg 2006 ; 45 : 240-3.