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A Rare Case of Closed Talar Body Fracture Associated with Medial Malleolus Fracture: A Case Report and Littérature Review

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Abstract **Case Report**

***Introduction*:** Ankle fractures are common, talar fractures are rare. The combination of talar body fracture with medial malleolus fracture is exceptionnal. ***Case presentation*:** We presented a case of a twenty seven years old male who sustained a closed trauma of the right ankle due to traffic accident. After stabilsation with back plastred splint, patient then underwent open reduction surgery of the medial malleolus using K-wires associated with tension band wiring and screw fixation of the talar fracture. ***Discussion*:** This report outlines the potential diffculties in diagnosting such an unuasual fracture combination. Trough this case, we aim to emphasize the importance of maintaining a high level of suspicion regarding potential underlying fractures in ankle injuries. ***Conclusion*:** Despite the exceptionnal combination of talar body fractures and medial malleolus fractures, medial malleolus fracture would preserve vascular branches of the deltoid ligament therefore limit the risk of necrosis and the medial approache of medial malleolus provides anatomical reduction of the talar fracture. The patient presented was able to fully recover to normal activity.

Keywords: Talar body, medial malleolus, frontal fracture, osteosynthesis, Case Report.

1. INTRODUCTION

Talar fractures are exceedingly rare, constituting 0.3% of all human bone fractures [1] and accounting for 2% of lower lumb fractures [2] and 3.4% of foot fractures [3]. Approximately 60% of talar fractures occur in the body of the talus [4] and are classified into five groups by Sneppen. The combination of a frontal talar fracture and a medial malleolar ankle fracture appears to be extremely uncommon. In this literature review, we delve into a case involving this unique association. This case report has been presented according to SCARE guidelines.

2. PATIENT INFORMATION

We presented a 27 years old maghrebin male, Mailman, 27.5 BMI, right handed, Single. The patient had no previous interventions or any surgical or medical history. He has no history of smoking, alcohol or drug use. He came to the ER of Mohammed VI UHC Marrakesh by ambulance. The chief complaint was right ankle pain due to traffic accident 4 hours before admission. He was riding his motorcycle and was hit by a car in his right side. The patient was thrown away and landed on his right foot.

3. CLINICAL FINDINGS

The initial inspection of the traumatic limb revealed a swollen ankle, no bruises and no open wound (Fig 1) with a visual analogue scale of foot and ankle (VAS FA) of 4 [5]. The physical examination of the right ankle revealed a small palpable deformity and excessive pain in the medial part of the ankle exaggerated with movement, no abnormalities in neurovascular distal examination. Then we proceeded with a closed reduction and immobilisation of the ankle using back cast in the emergency room.

Fig 1: Clinical Appearance of the Patient's Ankle

4. Timeline:

Time	Symptoms and Signs	Treatement
4 h prior to admission	Swelling, Pain and medial deformity of the right ankle. X Rays shows medial malleolus and frontal talar body fractures.	Analgesic drugs, closed reduction and immobilisation with a back cast.
16h after admission	Swelling, Pain	K-wire and tension band wiring in combination with talar screws

5. Diagnostic assessment and interpretation

The Laboratory examination found an microcytic hypochromic anemia associated with a low blood platelets level at 90000/mm3. These abnormalities did not cancel or delay the surgical indication, the rest of pre-operative tests were normal.

On the radiology examination, X-Ray of the right ankle AP Lateral showed a coronal talar body fracture associated with medial malleolus fracture

Diagnostic challenges : The lateral ankle X-ray quality make it difficult to confirm the talar fracture (Fig 2). A CT scan was requested but the financial situation of the patient did not permit it.

The final diagnosis is a coronal talar body fracture Sneppen 2 in combination with a medial malleolus tip avulsion post closed reduction and immobilisation using a back cast (Fig 2).

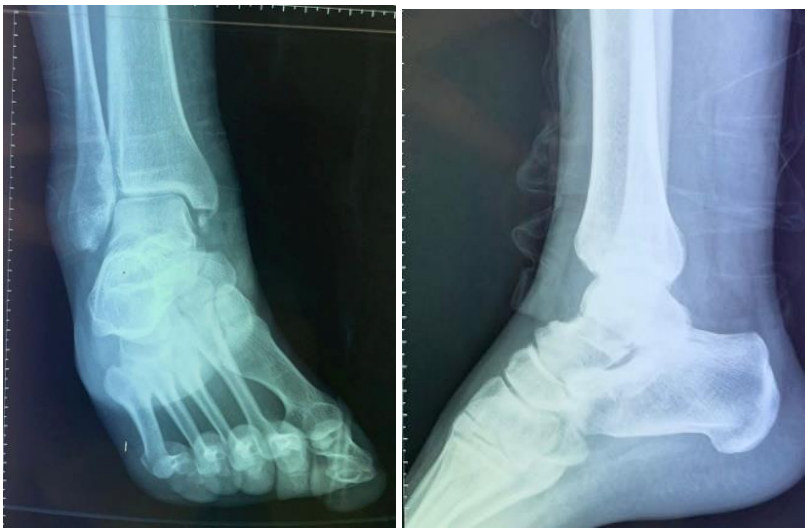

Fig 2: Right Ankle AP Lateral X-Rays showed medial malleolus fracture and Talar body fracture

6. Intervention

The surgery went under general anesthesia, patient ni supine position, tourniquet placed. Antero-medial approch was performed, through the fracture of the medial malleolus, the body talar fracture was reduced and fixed by two antero-posterior screws, then the tension band wiring (TBW) of the medial malleolus avulsion is realised (Fig 3). The time of the intervention was less than an hour.

Fig 3: Post-operative X-Rays of the right ankle showing talar screws and TBW of the medial malleolus

7. Follow up and outcomes

The post-op imaging revealed the reduction of the medial malleolus avulsion and compression of the talar body fracture. The patient remained hospitalised for 5 days in the department of Orthopedic Surgery A of the UHC of Marrakesh. A daily clinical examination was performed on the traumatized limb with a dressing change one day out of 3. We used amoxicillin clavulanic acid as main and only antibiotic for the first 48hours following the surgery. Standing was prohibited, the patient was very comprehensive and cooperating to the instructions of the medical staff. In 5 days we obtained a good surgical wound with no pus and no dehiscence. Contention by plaster boot was made for a period of six weeks. The patient was rehabitilised and fully recovered to anterior state before the injury.

8. DISCUSSION

Talar fractures, are complex injuries that require careful evaluation and management. They relatively low accounting for 0.3% of all bone fracture and 3.4% of foot fractures [10]. The association of talar body fractures with medial malleolus fractures present an exceedingly rare complex injury pattern caused by high-energy trauma, such as motor vehicle accidents or falls from height. This rarity, coupled with the complex anatomy of the talus, makes these fractures difficult to diagnose accurately and treat effectively.

According to Sneppen, there is 6 types of talar fractures [6]: Type A compression fracture, Type B Coronal shearing fracture, Type C Sagittal shearing fracture, Type D fracture in the posterior tubercule, Type E fracture in the lateral tubercule, Type F Crush fracture. Later on, the B and C type merged in to one type (B) (Fig 4).

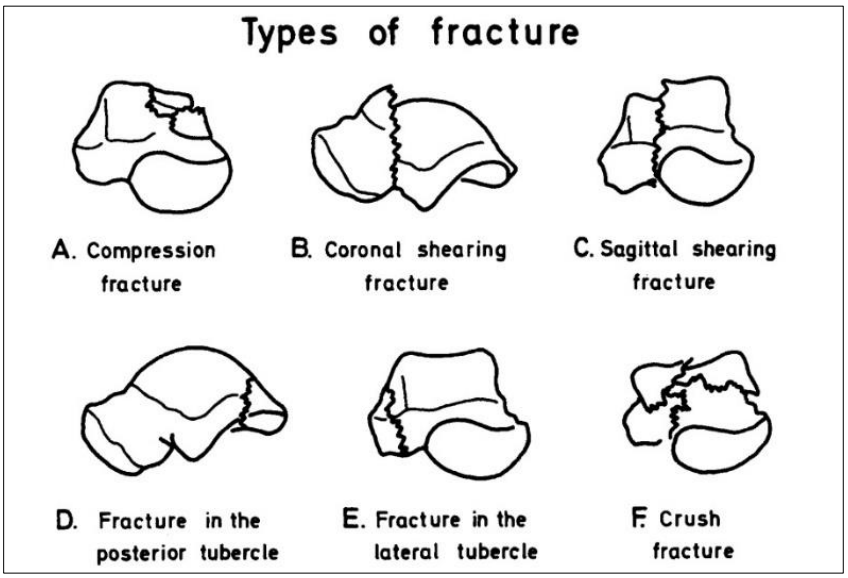

Fig 4: Types of Talus fractures according to Sneppen & Al [6]

Talar body fractures are intra-articular by definition, they include fractures of the talar dome, lateral and posterior processes, and shear and crush injuries of the talar body. The majority of talar body fractures are displaced and will require operative treatment to restore fracture fragments and joint alignment. Fractures of the talar body often result from an axial load on a dorsiflexed foot in high energy accidents [7]. This is in accordance with the findings in our patient.

The goal of treating talar body fractures is to restore congruity of the tibiotalar and talocalcaneal joints, ensuring proper alignment and stability. While conservative management is suitable for nondisplaced fractures, the majority of talar body fractures are displaced, necessitating operative treatment to realign the fracture fragments and restore joint integrity [7].

In their study on talar body fractures, Sneppen *et al*., examined a series of 21 patients, of whom 18 underwent closed treatment while three underwent open reduction and internal fixation (ORIF). Their findings revealed a concerning rate of talar malunion, observed in 60% of the patients. Additionally, they noted a high incidence of posttraumatic arthritis affecting both the ankle and subtalar joints, with 95% of patients reporting moderate to severe complaints. Based on these results, they suggested that achieving anatomic reduction with stable fixation can greatly enhance the postoperative outcome for patients with talar body fractures.

Various surgical approaches, including the anteromedial, posteromedial, anterolateral, and posterolateral approaches, are described for the management of talar body fractures. In some cases, a dual approach may be necessary based on the fracture pattern. The anteromedial approach, like in our case, is the most commonly used, involving an incision made medial to the tibialis anterior tendon, which can be extended proximally if a malleolar osteotomy is required. The anterolateral approach uses an incision between the tibia and fibula, but lateral to the extensor digitorum longus. Care must be taken to maintain sufficient skin bridge when combining this approach with the anteromedial approach to prevent skin necrosis. The posterolateral approach involves an incision just lateral to the Achilles tendon, creating an interval between the peroneal muscles and flexor hallucis. Protection of the peroneal artery and saphenous nerve is essential during this approach. Isolated process fractures and osteochondral fractures can be treated directly through surgical exposure and internal fixation or through arthroscopic reduction [8].

The presence of a medial malleolus fracture in conjunction with a talar body fracture in the coronal plane can be considered advantageous since it may serve as a protective mechanism by preserving blood supply through the intact deltoid ligament branches of the posterior tibial artery to the talar body (Fig 5). Consequently, the risk of avascular necrosis of the talus is reduced in cases of associated medial malleolar fractures [9].

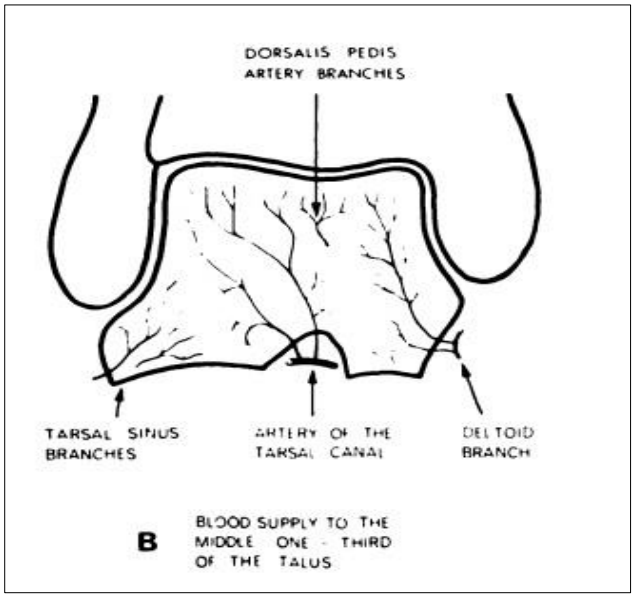

Fig 5: Diagram to show blood supply of the talar body including the deltoid branch

According to Mulfiger & Al, in a study including 14 specimens, the deltoid branch originated from posterior tibial artery in nine specimens, in two of which it was duplicated [9].

Our patient had a good post operative outcome and the objective of the surgery was achieved. The articular surface restored and medial malleolus avulsion fixed. Many authors recommand a post operative immobilisation with non weight-bearing of 6-8 weeks. These fractures are slow to unite rates of osteonecrosis

of as high as 40% have been reported after talar body fractures [8], monitoring at regular intervals is required [11].

9. CONCLUSION

Talar body fractures are rare, association with medial malleolus fractures are exceptionnal. Open reduction and internal fixation with screws combined by tension band wiring (TBW) is the best surgical treatment. Medial malleolus fracture is a positive association in this case, it gives the surgical exposure of the talus provided by malleolus osteotomie and lower the risk of osteonecrosis due to deltoid branches preservation. The outcome of the treatment was excellent because the patient was able to fully recover to normal activity.

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