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Case Report

A Missed Neglected Maisonneuve Fracture in an Elderly Male: A Case Report

Sajid Ansari[1]*, Mohit Dhingra[2], Sabeel Ahmad[1] and Aditya Singla[3]

[1]Junior Resident, Department of Orthopedics, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, India

[2]Associate Professor, Department of Orthopedics, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, India

[3]Senior Resident, Department of Orthopedics, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, India

***Corresponding Author:** Sajid Ansari, Junior Resident, Department of Orthopedis, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, India.

Received: May 07, 2019; **Published:** July 10, 2019

Abstract

Syndesmotic injuries are challenging in diagnosis and management as delays in treating the injury lead to poorer functional outcomes. In this case report, we discuss missed diagnosis and management of an untreated Maisonneuve fracture. The following case outlines an active 60-yr old male patient who presented with pain on the left ankle and lower leg after he met with a road traffic accident with twisting ankle injury about a month ago. The proper diagnosis is reliant on ankle and tibiofibular films, to include orthogonal views. The medial ankle ligamentous injury were missed at the 1st centre and was managed conservatively on the lines of isolated fibular shaft fracture. This case serves as a reminder to always examine joints above and below the injury site, obtain orthogonal views of a fracture, as well as have high index of suspicion of ligamentous injury around the ankle and unstable nature of syndesmosis injuries.

Keywords: *Maisonneuve Fracture; Syndesmotic Injuries; Ligamentous Injury*

Introduction

The Maisonneuve fracture was first described by the French surgeon in 1840 [2]. It consists of a proximal fibular fracture which is associated with failure of the deltoid ligament or medial malleolus and diastasis of the distal tibiofibular syndesmosis (Figure 1). It is uncommon and often deemed one of the most unstable ankle injuries.

With a pronation-external rotatory type injury to the ankle, as occurs in a Maisonneuve fracture, the talus rotates externally, creating a strain on the medial column of the ankle joint. This results in either a rupture of the deltoid ligament or a fracture of the medial malleolus.

As the talus impacts the fibula, it acts as a wedge with greater force anteriorly, resulting in rupture of the anterior tibiofibular and interosseous ligaments. The resultant torque created from the rotating talus abutting against the fibula causes disruption of the interosseous membrane, usually to the level of the fibular neck, with a concomitant spiral or oblique fracture at this level. This is the distinctive feature of a Maisonneuve fracture. With the above anatomic points in mind, one can appreciate that the talus can rotate externally with maintenance of the integrity of the posterior ligamentous structures. This concept is important in understanding the partial diastasis that often occurs with an external rotation injury [6]. However, continuation of the diastasis of the syndesmosis and is considered grossly unstable [7]. The distal tibiofibular syndesmosis is important for stability of the ankle mortise and thereby for weight transmission and walking. Therefore, anatomical restoration of the disrupted distal tibiofibular syndesmosis is essential [8].

Case Report

We present here a 60yr-old healthy male patient who presented to the orthopedics opd at AIIMS RISHIKESH with complains of pain in the left ankle and inability to bear weight on left lower limb since 1month after sustaining a direct hit to his left ankle as a result of road traffic accident by a two wheeler.

X-rays were done at an outside Centre where below knee POP slab was given in view of fibula fracture and the medial ligamentous injuries were missed. He was managed conservatively with below knee slab at an outside Centre immediate to the trauma. Following initial management patient presented to us after a period of 1 month with the above complains. VAS score was 4.

Upon examination, there was an old healing abrasion of ~2 cm below the medial malleolus and mild diffuse swelling over left ankle and tenderness diffusely over the ankle specifically to medial and lateral malleolus. There was a positive squeeze test.

He had no evidence to suggest neurovascular compromise.

Initial plain radiographs of the left ankle revealed lateral subluxation of the ankle joint with widening of the medial tibiotalar joint causing gap ~ 10 mm with frank syndesmotic diastasis and a comminuted fracture of fibula at the junction of middle and distal third (Figure 1 and 2).

Figure 1: *Anteroposterior radiograph of (A) ankle and (B) lateral and demonstrating a proximal fibula fracture, ankle diastasis with widening of the medial joint space, and loss of overlap of the tibia and fibula with comminuted fibular fracture at junction of middle and distal one third.*

Figure 2: *Lateral and oblique views, demonstrating a proximal fibula fracture, ankle diastasis with widening of the medial joint space, and loss of overlap of the tibia and fibula.*

MRI of the ankle was done to evaluate the ligamentous assessment and showed full thickness tear of deltoid ligament, anterior and posterior tibiofibular ligaments.

Linear intra articular fracture of posterior malleolus involving less than 25% of articular surface (Figure 3).

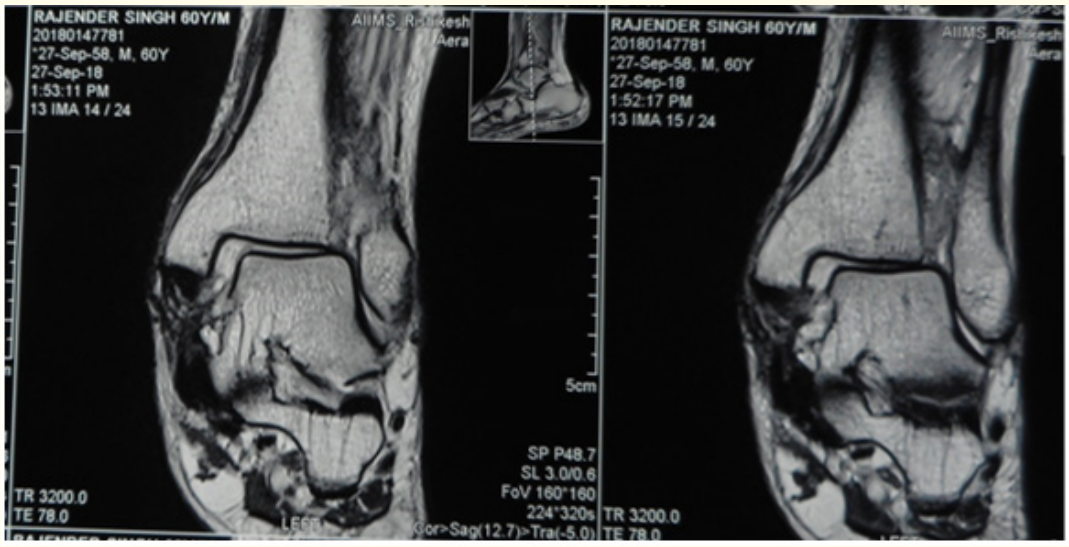
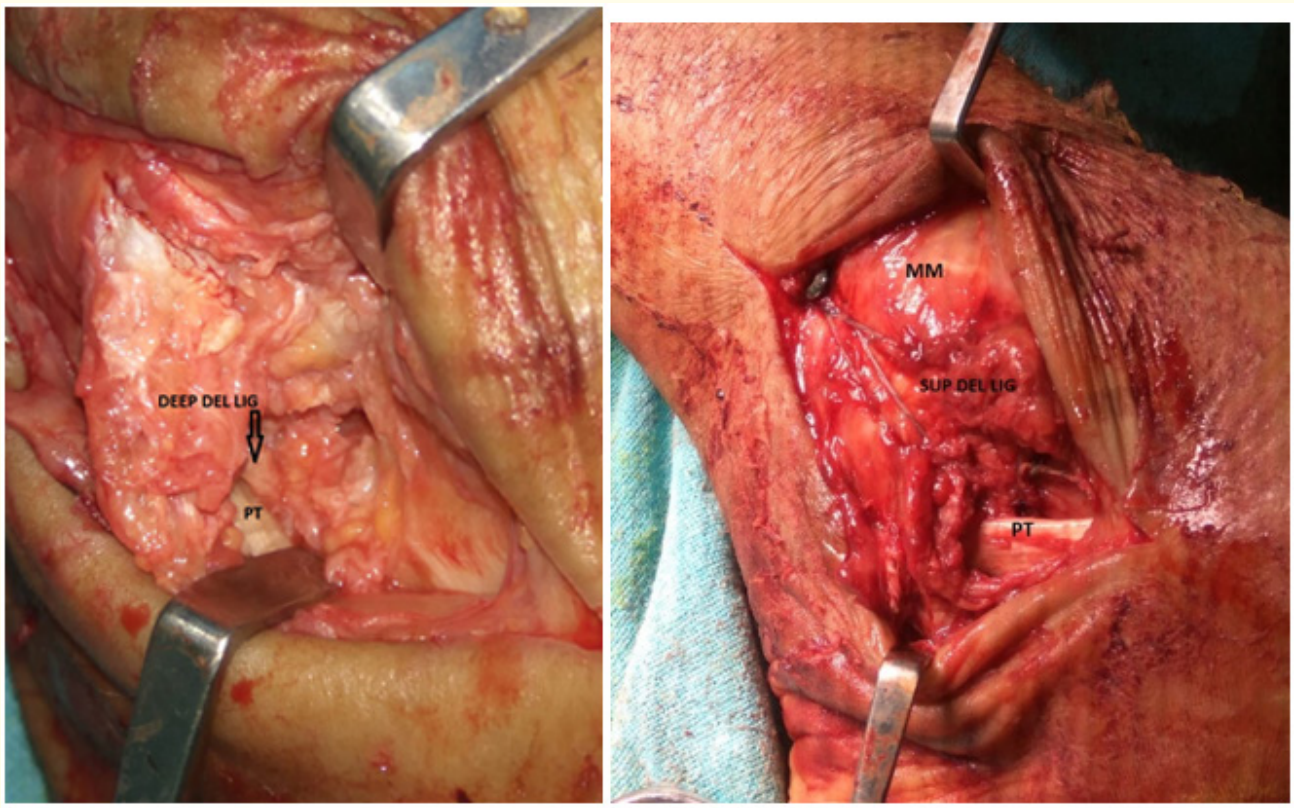


Figure 3: *MRI showing full thickness tear of deltoid ligament with interior and posterior talofibular ligaments.*

The patient's left lower extremity was placed in a non weight-bearing splint and 4 days later underwent an uncomplicated open reduction and internal fixation of the fibula with one third tubular plate and screw fixation of the syndesmosis along with deltoid ligament repair by the anatomical approach [1].

At surgery the fibula was opened, reduced anatomically and fixed via 11 hole one third tubular plate and fibular length was achieved. Maintaining fibular length resulted in partial correction of the ankle subluxation. Two syndesmotic screws were placed from lateral to medial side across the syndesmotic joint to reduce the syndesmotic joint. Through a curvilinear incision below the medial malleolus deltoid ligament exposed. Superficial fibers of deltoid ligament found partially intact. Deep fibers of deltoid ligament, the tibiotalar fibers were found to be avulsed with a talar osteochondral fragment (Figure 4).



A *B*

Figure 4: *Intra OP images showing avulsed fragment of deep deltoid ligament from the tibial attachment (A) and repair of the deep deltoid ligament with suture anchor taking purchase in distal tibia.*

With the help of a 3mm suture anchor which was anchored in the talus, fixation of the deltoid fibers was done taking purchase into a screw inserted at distal tibia just above the malleoli for this purpose. Deltoid repair was achieved.

Post operatively patient was put in compression dressing. Ankle range of motion started immediately and strict non weight bearing advised. At 6weeks ankle range of motion was started and at 8 weeks 15 degrees of dorsiflexion was achieved.

Figure 5: *Immediate post-operative radiograph showing satisfactory fracture reduction and fixation and reduction and stabilisation of the syndesmosis with adequate restoration of fibular length. Suture anchor in the talus for deltoid ligament repair.*

Discussion

Maisonneuve fractures consist of a medial malleolar fracture or medial ligament rupture, a disruption of the tibiofibular syndesmosis ligaments, and a spiral fracture of the proximal fibula. This injury was classically described by the French surgeon Jules Gilles Maisonneuve and is the result of external rotation force on a pronated, fixed foot [2]. Maisonneuve fractures are a commonly misdiagnosed injury and likely occur more often than previously assumed, with an estimated prevalence ranging from 0.7% to as high as 10% of ankle fractures [3]. Because the pattern of injury creates an unstable ankle joint, accurate diagnosis is critical and surgical fixation is almost always indicated. These fractures are frequently documented as a result of sport-related or other trauma [4]. Although no special physical exam is specific for a Maisonneuve fracture, a careful examination of the ankle and knee is warranted. Localized swelling, tenderness, and a positive squeeze test are all possible indicators of the injury, but the most sensitive test for ankle ligament stability is a fluoroscopic external rotation stress examination [5]. Because of the close relationship between the peroneal nerve and the proximal fibula, a sensory test of the dorsal foot should be conducted.

Due to the ring-like structure of the fibula, tibia, and their strong ligamentous connections, isolated fibula fractures are rare, except in cases of direct blunt trauma. Because of the strength of the syndesmosis ligaments, it requires a high energy injury or a substantial rotational force to disrupt them. This case departs from the normal in respect to a simple fall resulted in a syndesmosis injury. A careful evaluation of syndesmosis ligaments is always warranted, particularly in the setting of a known lower leg or ankle fracture.

Appropriate radiographic analysis includes review of the AP and lateral radiographs of the tibia and fibula as well as AP, lateral, and mortises views of the ankle [6]. These plain radiographs are used to assess the entire lower leg and the stability of the soft tissue and osseous structures alike. Radiographic evidence of a Maisonneuve fracture is characterized by findings in three different locations [3]. Widening of these anatomic spaces represents ligamentous injury and may require stress examination to become apparent if not seen in plain radiographic views.

An orthopedic referral is necessary for Maisonneuve fractures due to the unstable nature of syndesmosis injuries.

Surgical fixation is almost always indicated. In rare cases of partial disruption of the syndesmosis, the injury can be managed with casting. However, if there is a question of mortise or syndesmosis instability, then open reduction and internal fixation should be performed [4]. Although this case describes an often neglected fracture, it is also important to emphasize basic concepts in orthopedic care. Full-length radiographs are necessary when evaluating medial ankle injuries and these should be performed with two orthogonal views. Additionally, tibiofibular syndesmosis injuries involve a strong collection of ligaments between the distal tibia and fibula and restoring their association is the most important aspect of treating a Maisonneuve injury.

The operative goal in the treatment of ankle fractures is well established: to restore anatomy and stability for early movement and full functional recovery and prevent posttraumatic arthritis. However, the surgical approach specifically pertaining to the management of distal syndesmosis injuries in rotationally unstable ankle fractures continues to evolve. This is due to the realization that the rate of syndesmosis malreduction [5] has been unacceptably high in the past. The conventional reduction technique in use for decades - utilizing a large pointed reduction forceps - most likely forces the fibula out of the incisura, leading to iatrogenic malreduction. Attempts to avoid this problem by open reduction of the syndesmosis have not been uniformly successful. This has led to a paradigm shift in approach to these injuries, from conventional to a newer concept of anatomical repair [1].

Conclusion

Some patients with Maisonneuve fractures may complain only of ankle pain, as did our patient. It is important to always examine the proximal fibula in patients complaining of ankle pain, as this may be a more severe injury than initially suspected. This type of injury is significant because it is associated with an unstable joint that may require surgical repair, despite the often-benign appearance of the talus and the remainder of the ankle mortise.

Index of suspicion should be high for Maisonneuve injury. Neglected cases as in our patient can lead to sequele leading to poor outcome.

Funding Information

Nil.

Acknowledgment

Nil.

Disclosure

All Authors declare that they have nothing to disclose.

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Volume 10 Issue 8 August 2019