Proceedings of the International Conference of Community Health and Medical Sciences, Vol. ,1 Issue. 1, 2023, pp. 211-219

ISSN 3021-677X online
DOI: https://doi.org/10.17501/3021677X.2023.1125

MEDIAL MALLEOLUS FRACTURE WITH INFERIOR TIBIAL FIBULA LIGAMENT INJURY: CASE REPORT

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Abstract: The medial malleolus and Distal Inferior Tibia Fibula ligaments are part of the structure that supports the stability of the ankle. Medial malleolus fracture with an injury or rupture of the inferior tibial and fibular ligament have not been much discussed at this time. There is still debate about the management of medial malleolus fractures, as well as injuries to the inferior tibial and fibula ligaments. Some opinions tend to carry out surgical intervention for "displaced" medial malleolus fracture with an injury to the inferior tibial fibula ligament rupture because these two organs are supporters of ankle stability and as a nonoperative result that leaves symptoms of Chronic Ankle Instability (CAI). Open reposition internal fixation of medial malleolus fractures and injury or rupture of the inferior tibial and fibula ligaments are options for treatment ankle instability and arthritis. In this case, a 36-year-old man was crushed on his right ankle by a forklift machine. After a physical examination and X-Ray of the ankle, he was diagnosed with a displaced medial malleolus fracture with an injury to the dextra inferior tibia fibula ligament. Open reposition internal fixation were performed on the medial malleolus and distal tibia fibula. Post operation, deformity and alignment was corrected. X-Ray of ankle medial malleolus and distal tibia fibula well positioned.

Keywords: medial malleolus, inferior tibia fibula ligament, fracture, ligament rupture, ORIF

Introduction

The medial malleolus which is the distal end of the tibia which was once believed to be the main stabilizer of the ankle has been the subject of conflicting clinical and biomechanical data for decades. Although the relevant surgical anatomy has been understood for almost 40 years, the optimal treatment of medial malleolar fractures remains unclear. injuries occur separately or as part of an unstable bimalleolar or trimalleolar fracture configuration.1Traditional teaching recommends open reduction and fixation of medial malleolar fractures that are part of an unstable injury.[1] The risk of chronic instability (CAI) often occurs with nonoperative management.[2]

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In 2005-2014, the incidence of medial malleolus fractures was 955 cases, which means that it covers 10% of the total ankle fracture incidence, which is around 168 cases per 100,000 people per year.[2,3] Usually caused by twisting of the body when the leg is resting on the ground or due to a wrong step which results in excessive pressure (overstressing) on the ankle joint. Movement at the ankle joint only occurs in one direction, namely plantar flexion and dorso flexion. Abduction adduction movements and forced internal and external rotation can cause tears of the deltoid ligament and inferior tibial and fibular ligaments as well as fractures of the medial malleolus which are generally intra-articular fractures.[4,5] Data on the incidence of medial malleolus fractures accompanied by injuries to the inferior tibial fibula ligament rupture are still not found.

Operative management is the main choice in cases of unstable medial malleolus fractures such as medial displacement or avulsion fractures, medial malleolus fractures with rupture of the inferior tibial fibular ligament, medial malleolus fractures with syndesmosis subluxation or inferior tibial fibular joints, medial malleolus fractures accompanied by lateral malleolus fractures (Fig. Weber C and some Weber B) trimalleolar fractures, medial malleolus fractures with ankle dislocation or talar subluxation.

Case Report

A 36-year-old man came to the hospital on November 17, 2021, with complaints that his right ankle could not be moved because he was crushed by a vortex while working. Pain in the back of the right leg with a pain scale of 6, like being stabbed and continuous. The patient admitted that he had never had a history of trauma to his right leg and other parts of his body.

From the physical examination, the general condition of the patient appeared to be in pain, vital signs were stable. On examination the vital signs were normal. Examination of local status on the right ankle swelling (+), deformity (+) in the medial malleolus, tenderness (+), crepitus (-). Movement pain (+) range of motion on dorsiflexion, plantar flexion, eversion and inversion, good sensibility, warm axillae.

Radiological examination on November 17, 2021, in the form of an X-Photo of the AP/Lateral right ankle joint, impression: there is a fracture of the right tibial medial malleolus, poor alignment, Subluxation of the right distal tibio-fibular joint. (Figure 1)

Figure 1. X-Photo of the AP/Lateral right ankle joint (Pre-Operation)

The patient was diagnosed with a closed fracture of the displaced medial malleolus with subluxation of the right inferior tibio-fibular joint. The ORIF debridment of the medial malleolus and the right inferior tibio-fibularis was performed. From the results of the operation that had been performed, alignment was improved and no subluxation of the distal tibio-fibularis joint was seen (Figure 2).

Figure 2. X -Ankle joint right AP/Lateral post Debridment ORIF right medial malleolus

Figure 3. Post operation Debridment ORIF right medial malleolus and bandage installation

Results

Postoperative dorsiflexion and plantar flexion ROM is maximal, the ankle is stable for ankle mobilization and temporary non weight bearing. Surgical scars are improving, educating patients and their families about management, complications of surgery and prognosis. Recommended for ankle mobilization.

Discussion

That the incidence of medial malleolus fractures is 10% of ankle fractures. The mechanism of fracture of the ankle is usually caused by many factors such as excessive rotation of the ankle, chronic ankle instability related to chronic ligament disorders or biomechanical problems in the ankle due to repeated injuries, patient age, bone quality, position of the foot at the time of injury, and impact. Malleolus fractures are usually preceded by twisting of the talus causing rupture of the ligaments so that the malleolus is pushed and covered by ligaments that are still intact. This process is usually caused by an unexpected event in the form of a hard impact, falling from a height, or getting the foot stuck in a small concavity but the body's ejection remains forward causing excessive external rotation or internal rotation.

The ankle is made up of 3 joints namely the talocrural joint, the subtalar joint and the distal tibiofibular joint. These three joints work together to control the movement of the back of the foot so that it can move plantarflexion-dorsiflexion, inversion-eversio and endorotation-exorrotation. The combination of these three types of movements can then form pronation, movements (dorsiflexion-eversion-exortation) and supination (plantarflexion - inversion - endorotation).[7.]

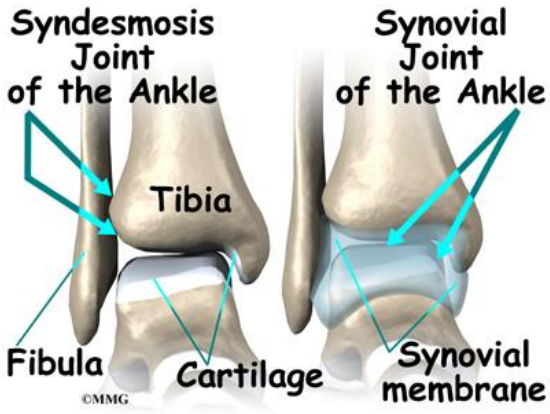

Figure 4. The joints that make up the ankle

1. Articulatio Talocruralis (Upper Jumping Joint)[7]

The talocrural joint is formed by the distal ends of the tibia and fibula bones and the upper part of the talus. The ligaments at the talocrural joint consist of:

a. Medial or Deltoid Ligament

This ligament is a strong ligament with its apex attached to the end of the medial malleolus. While the inner fibers are attached to the medial surface of the corpus of the cord and the superficial fibers are attached to the medial part of the talus, the sustentaculum of the cord, the plantar calcaneonavicular ligament and the tuberosity of the navicular bone.

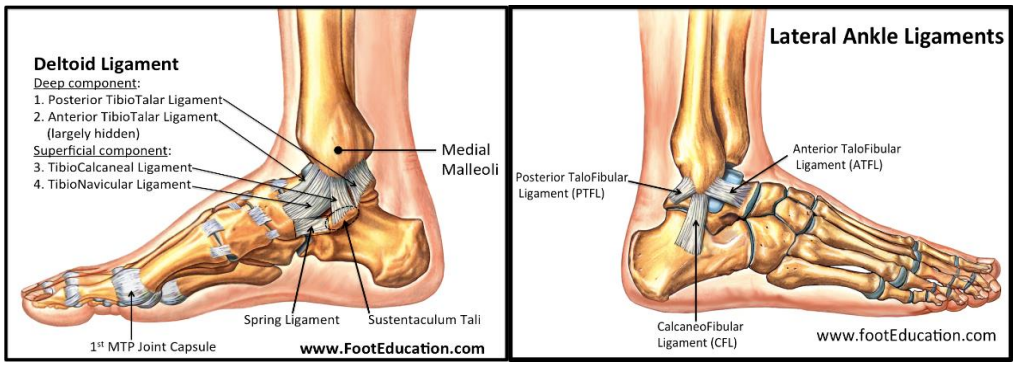

Figure 5. Ankle joint (A) medial view (B) lateral view

b. Lateral ligament

The lateral ligament is weaker in strength than the medial ligament and is composed of three bands:
• Anterior talofibular ligament, runs from the lateral malleolus to the lateral surface of the talus.
• The calcaneofibular ligament, running from the tip of the lateral malleolus downwards and backwards towards the lateral surface of the calcaneus.
• Posterior talofibular ligament, runs from the lateral malleolus to the posterior tubercle of the cord bone.

2. Articulatio Subtalaris (Lower Jumping Joint)[7]

This joint is formed by the talus and calcaneus, this joint allows the lower leg which has an axis of motion in the form of a longitudinal axis to perform endorotation and exrotation movements, this movement in the lower leg is then forwarded to the foot which has an axis of motion in the form of a transverse axis which is slightly tilted so as to allow supination movements to occur and pronation of the feet. The subtalular joint consists of two joints separated by the interosseum talocalcaneal ligament into the anterior subtalaris and posterior subtalaris joints. The interosseum talocalcaneare ligament functions to resist the medial shift of the talus. During supination, the anterior part of the ligament is stretched and when pronated, the ligament is relaxed.

3. Distal Tibiofibular Joint[7]

The third joint that forms the ankle is the junction of the tibia and fibula which is a syndesmosis so that movement is limited. This joint is stabilized by a thick interosseous membrane and the anterior and posterior tibiofibular ligaments. This distal tibiofibular joint syndesmosis is necessary for the stability of the roof of the talocrural joint. The resulting injury usually involves the anterior inferior tibiofibular ligament during eversion.

In medial malleolus fractures, there are two types of injuries that can cause the fracture based on anteroposterior radiological images and the mechanism that occurs (figure 6), namely an abduction injury that results in avulsion of the medial malleolus below the joint line with the fracture line (type A and type B), parallel to the direction joint (type C) and an adduction injury resulting in a fracture of the medial malleolus at the joint line with the fracture line oblique to the cranial direction (type D). In

an abduction injury, the medial malleolus is pulled apart by the medial ligament, whereas in an adduction injury, the medial malleolus is pushed apart by the talus bone.

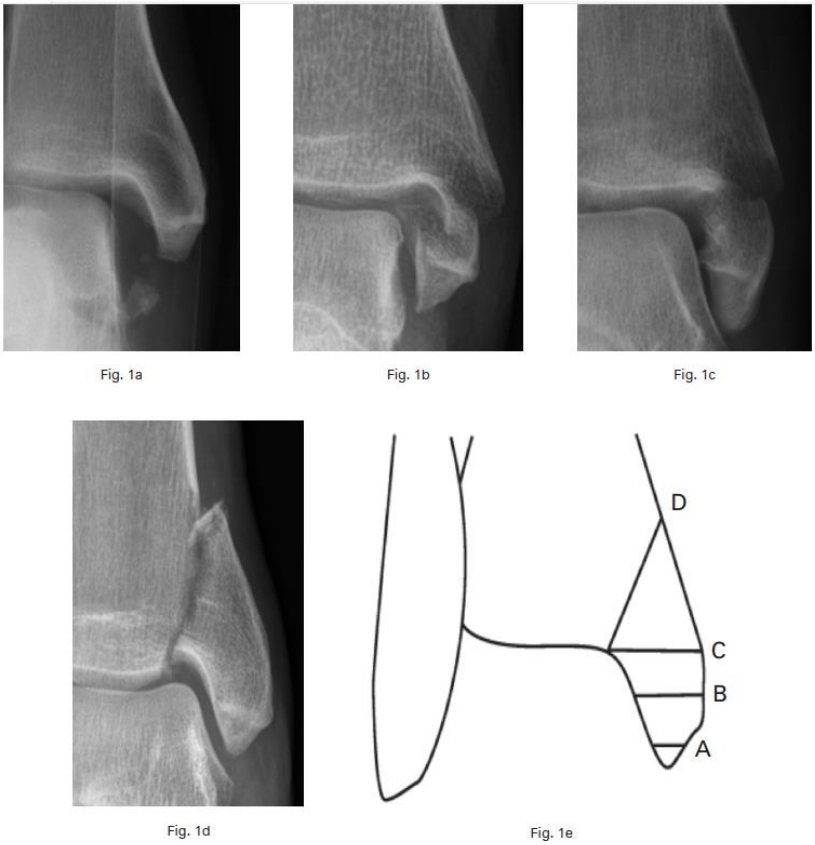

Figure (6.a to 6.d) Radiological examples for each type of Herscovici medial malleolar fracture.
Figure (6.e) Classification illustration

In this case, there was a medial malleolus avulsion fracture accompanied by distal talofibular subluxation due to rupture of the distal tibial fibula ligament so that ORIF is the main choice in its management. Medial malleolar fractures were fixed using a lack screw and K-Wire and distal fibula tibia screw fixation.[8] Non-union, instability and chronic arthritis are possible complications, especially due to unstable fixation.[9,10] Ruptured ankle ligaments including the tibial ligament Inferior fibula grades I, II, and III can be treated without surgery but some cases cause chronic ankle instability[11,12]. Indications for surgery are carried out individually. According to David A. Porter grade I, and III ligament injuries recommended surgical intervention.[13]

Conclusion

In 2005-2014, the incidence of medial malleolus fractures was 955 cases, 10% of the total ankle fracture incidence, which rates around 168 cases per 100,000 people per year. Ankle fractures often occur in patients who have had traffic accidents or fallen.[11] In medial malleolus fractures there are two types of injuries that can cause the fracture, namely abduction injuries which result in avulsion of the medial malleolus below the joint line with the fracture line parallel to the joint and adduction injuries which causes a fracture of the medial malleolus at the joint line with the fracture line oblique in a cranial direction. The medial malleolus and the distal tibia fibula ligament are parts that support the stability of the ankle/ankle joint so that if an avulsion (unstable) medial malleolus fracture occurs, management is necessary so that anatomical repositioning can return to the inferior/distal tibial ligament rupture without a medual malleolus fracture. done conservatively, but in part it causes chronic instability, especially accompanied by a medial malleolus avulsion fracture, so it is better to do internal fixation. stable, thus requiring open reduction internal fixation (ORIF).[10] After surgery, the results obtained were the anatomical position of the medial malleolus and no subluxation was seen in the distal tibia-fibular joint in the hope of obtaining ankle stability to prevent chronic ankle instability.

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