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Case Report

MISSED MEDIAL MALLEOLUS FRACTURE WITH DELTOID LIGAMENT INJURY AND INSTABILITY, TREATED NON OPERATIVELY - A CASE BASED DISCUSSION & LITERATURE REVIEW

[1]Dr. Karanveer Singla, [2]Dr. Abhishek Samuel, [3]Dr. Noel Sukhjit Singh, [4]Dr. Max K Shibu, [5]Dr. Prabjeet Kaur Sohanpal.

[1]Senior Resident, Department of Orthopaedics, Government Medical College & Hospital, Chandigarh, Punjab, India.

[2]Associate Professor, Department of Orthopaedics, Christian Medical College and Hospital Ludhiana, Punjab, India.

[3]Professor, Department of Orthopaedics, Christian Medical College and Hospital Ludhiana, Punjab, India.

[4]Senior Resident, Department of Orthopaedics, Christian Medical College and Hospital Ludhiana, Punjab, India.

[5]MBBS, Christian Medical College and Hospital Ludhiana, Punjab, India.

Corresponding Address

Dr. Abhishek Samuel, Associate Professor, Department of Orthopaedics Christian Medical College and Hospital Ludhiana, Punjab, India.

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ABSTRACT

BACKGROUND

Missed isolated medial malleolus fracture with deltoid ligament injury with instability is a rare case scenario. In order to prevent post traumatic arthritis & non union, anatomical restoration of the ankle mortise anatomy by operative measures is recommended.

AIM

This study aims to describe the management of missed medial malleolus fracture with deltoid ligament injury with instability.

CASE DESCRIPTION

We describe a missed medial malleolus fracture with deltoid ligament injury with instability who presented with pain, deformity & wound over the left ankle region. He was diagnosed to have Herscovici Type B medial malleolus fractures with deep deltoid ligament injury. He was planned for arthroscopic evaluation integrity and tension band wiring of medial malleolus and suture anchor repair of deltoid ligament. But surgery was postponed and the short leg cast was applied, owing to Covid-positive status and restrictions during those times. After 3 months of short leg cast, evaluation revealed a stable ankle joint with united medial malleolus.

CONCLUSION

If surgery is delayed or cannot done due to any unforeseen circumstances in Herscovici Type B medial malleolus fractures with deep deltoid ligament injury with instability, it can be treated initially in a short leg cast for 3 months, then on re-evaluation if instability is persisting, surgical fixation should be planned. All polytrauma patients who show even the slightest signs like mild

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tenderness should be screened clinically and radiologically for ankle injuries, so that they are not missed.

CLINICAL SIGNIFICANCE

Restoration of the anatomy of ankle joint reflects positively on the body function.

KEYWORDS

Missed, Medial Malleolus, Deltoid Ligament Injury, Instability.

BACKGROUND

Incidence of isolated medial malleolus fracture with deltoid ligament rupture and presence of instability is relatively not common in comparison to other ankle fractures.[1] Medial deltoid ligament being the primary structure for ankle stability,[2] acts as a resistance to isolated fracture of the medial malleolus.[3] When displaced, anatomical restoration of the ankle mortise anatomy by operative measures is must to prevent post traumatic arthritis and non-union.[4] Also it has been reported by Nakajima et al that missed medial malleolus fractures are associated with higher risk of post traumatic ankle arthritis.[5]

Herscovici et al[4] classified medial malleolus fractures into four types. Type-A fractures were avulsions of the tip of the malleolus, type-B occurred between tip and level of the plafond, type-C were at level of the plafond and type-D extended vertically above this level.

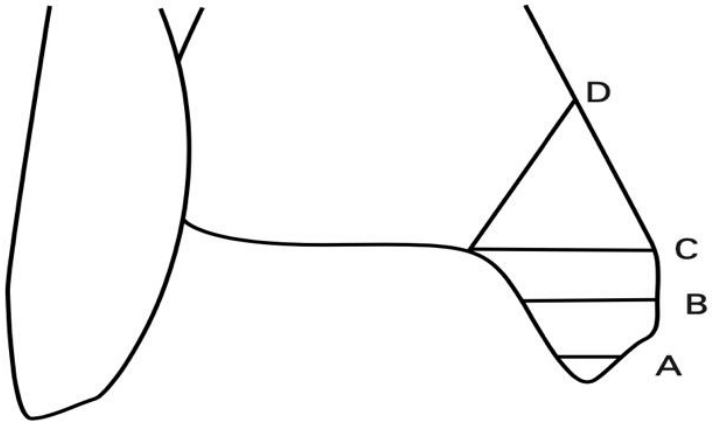

Figure 1: Diagram showing the classification used to describe isolated fractures of the medial malleolus.

Alshalawi et al., 2018 in their study on medial ankle stability concluded that persistent symptoms, instability, deformities, limitation of sports and personal activities are indications for surgical repair of deltoid ligament.[6]

Acute deltoid ligament injury was classified by Hintermann[7] into three types according to site of injury:

I - type I, proximal insertion rupture, 72% of injuries
II - type II, middle ligament rupture, 9% of injuries
III - type III, distal ligament insertion rupture, 19% of injuries

CASE Description

A 38 years old male, labourer by profession presented to our emergency department following a history of road traffic accident. The patient received first-aid treatment at a local hospital, and was referred to our tertiary care center for further management. At that time of presentation the patient complained of severe facial pain and examination revealed a sutured lacerated

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wound over the medial aspect of left ankle, upon further evaluation the patient was diagnosed to have left condylar fracture of mandible. Therefore, he was taken up for maxillo-mandible fixation by plastic surgery and was discharged. During postoperative rehabilitation, upon mobilization, he complained of pain associated with instability and deformity in the left ankle with a limp.

However, an initial radiograph of left foot from the local hospital did not reveal any bony injury. Moreover, his left ankle was not evaluated radiographically at that time.

Two weeks following the injury, he presented to our Orthopaedic Out-Patient Clinic and his complaints were addressed. On examination, the patient was walking on the lateral border of left foot with a varus deformity. Local examination revealed a superficial and unhealthy wound over the medial malleolus of the left ankle. Further examination showed bony tenderness over the medial malleolus and instability of the left ankle in eversion. He also complained of "giving way of the ankle" frequently. Standard ankle radiographs [AP, Lateral and Mortise] were suggestive of comminuted left medial malleolus fracture with talar tilt and medial clear space opening up {Herscovici type B]. His AOFAS ankle-hindfoot score[8] was 24.

Considering the deformity and an unhealthy superficial wound, initially for the correction of deformity a short leg POP cast with a window for dressings was applied. The patient was advised non-weight bearing ambulation/ gait training. Regular dressings were done, wound healing was satisfactory. Six weeks following injury, POP cast was removed. He was re-examined and the eversion talar tilt test was positive, suggesting joint instability.

Six weeks following injury, magnetic resonance imaging [MRI] of right ankle was done, which was suggestive of avulsion fracture at the anterolateral aspect of cuboid bone and injury of deep fibers of deltoid ligament. In view of joint instability and MRI findings, he was planned for surgical management. He was planned for ankle arthroscopy to evaluate integrity of deltoid and TBW of medial malleolus and suture anchor repair of deltoid ligament. In view of Covid 19 pandemic, Covid RT-PCR testing was done preoperatively and the patient came out to be Covid positive with high viral load. Surgery was postponed and short leg cast was applied again taking proper Covid 19 precautions and the patient was sent into quarantine.

We followed the recommendations[9] for surgery for Covid patients at that time which were that, once the quarantine period is over, Covid RT-PCR is negative and inflammatory markers are within normal limits, the patient will be planned for surgery.

The patient improved in three weeks and met the mentioned criteria. However due to government imposed COVID-19 restrictions, he was unable to follow-up in the out-Patient clinic for another 3 weeks. Therefore, after a total of 3 months of short leg cast, clinical and radiographic evaluation was conducted prior to planned procedure which revealed a stable ankle joint with united medial malleolus. His AOFAS ankle-hindfoot score improved to 92 from 24.In view of satisfactory clinical and radiological parameters,and improved AOFAS score, the patient was not taken up for surgery and was started on full weight bearing. He was followed up after 8 months and had no complaints of pain or Instability. His radiographs were also satisfactory.

9 months following injury, the patient was comfortable, had no pain, was doing all his activities of daily living and had no complaints while performing his job.

DISCUSSION

Missed medial malleolus fracture being uncommon only 2 case reports have been published in literature[5,10] and our case also presented in the similar manner with no complaints of pain during the initial evaluation. This can be attributed to masking of pain at the medial malleolus

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by a greater injury elsewhere in the body [in our case facial injury which was more painful]. Once his pain in the facial region subsided he started complaining of pain in the ankle.

The need for open reduction in management of fractures of medial malleolus is not debated. As the ruptured deltoid ligament gets curled up in the medial ankle interval, thus prevents ankle reduction, leading to ankle instability and medial interval pain.[3] It has been observed that lateral talar shift occurs only after complete tear of superficial and deep parts of deltoid ligament.[11] Herscovici type B and C fractures are amenable to fixation by screws.[12] There are recent advances suggesting newer techniques for managing different trauma injuries.[13] similarly for medial malleolus fracture with deltoid ligament instability arthroscopic repair using suture anchors and fracture fixation is advocated. Among other techniques, tension band wiring along with a tricortical, monoblock, inlay, illiac crest bone graft has been advocated recently, to be as effective as a compression screw in neglected non union of medial malleolus [14]. Arthroscopy has been advised as a diagnostic aid in verifying medial ankle instability.[7,15] Hintermann advocated repair and reattachment of the injured ligaments for all the three types of medial ankle instability.[7] Maynou et al. advised exploration and ligament repair in patients with medial interval more than 3 mm.[16] In a comparative analysis of arthroscopic and radiographic assessment of ankle injury in patients with medial malleolar fractures (SER stage 4), about a quarter also have an associated disruption of the deep deltoid ligament.[17] At a mean follow-up of 13 years after operative treatment of a SER 4 ankle fracture patients with partial or complete rupture of the medial deltoid ligament tended to have a better result than those with a medial malleolar fracture.[18] Jeong et al in the MR imaging analysis found the observed injury pattern of the deltoid ligament was complex and the most common tear site of the superficial deltoid ligament was the medial malleolar attachment.[19]

In our case as per literature we had planned diagnostic arthroscopy followed by fixation of medial malleolus along with repair of deltoid ligament, but surgery was postponed owing to Covid-positive status of the patient and the short leg cast was reapplied.

After 3 months of cast stabilization, his ankle was stable clinically and united radiologically.

Clinical Significance

Our review of literature based on our case concludes that

I. SER 4 and Herscovici Type B medial malleolus fractures with deep deltoid ligament injury with instability should be operated with fixation of fracture and deltoid ligament repair as the long term outcome is better in those who were operated. Ours was a one off case which got better non operatively.
II. If patient is not fit for surgery due to comorbities or other issues then he can be treated initially in a short leg cast for 3 months, then re-evaluation should be done and if instability is persisting or if there is radiographic evidence of opening up of mortise, then surgery should be planned. We recommend a larger prospective study in such patients.
III. Missing any fracture in a specialized clinical setting should be avoided. And in order to circumvent missing medial malleous fractures, all the trauma patients should essentially undergo clinical and radiological assessment of the ankle even when their is slightest of clinical signs like mild tenderness.

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