

MEDIAL MALLEOLAR FRACTURE ASSOCIATED WITH DELTOID LIGAMENT RUPTURE. V.S.Pai

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ABSTRACT

The author reports a case of a fractured medial malleolus with a completely disrupted deltoid ligament following a pronation injury. To the author's knowledge, concurrent failure of both structures over the medial side of the ankle has not been well documented.

INTRODUCTION

Lauge Hansen (3) suggested that on pronation-abduction or pronation-external rotational injury, either the medial malleolus or the deltoid ligament was first to fail (stage I). In his analysis of 228 cases of ankle fractures, there were only 5 cases of stage I pronation injuries. However, there was no description of concurrent failure of both medial structures in a pronation injury although this is possible in supination injury with fracture of the anterior colliculus and rupture of the deep deltoid ligament (2,4). In this report a rare case of concurrent complete rupture of the deltoid ligament and fracture of medial malleolus is described following a pronation injury.

CASE REPORT

A 22 year-old driver was involved in a collision when the front of his vehicle hit a tree. His left foot was forcibly dorsiflexed and abducted by the car's brake pedal. There was gross swelling over the medial aspect of the left ankle. There was no tenderness over the lateral malleolus or over the anterior tibio-fibular syndesmosis. Plain radiographs (Fig 1) revealed a fracture of the

medial malleolus of the left ankle. The medial malleolus was rotated by 90° and the distance between the medial malleolus and talus was more than 10 mm.

At operation, utilizing an anteromedial approach, the medial malleolus was found to be lying free, devoid of any ligamentous attachment. The fracture fragment appeared to be bigger than that seen on the radiograph and contained a portion of both the anterior and posterior colliculi. Both the superficial and deep fibres of the deltoid ligament were completely detached from its proximal attachment and were lying close to the medial surface of the talus. There was no apparent damage to the body of the talus. The fracture was reduced and fixed with a cancellous screw and wire. The deep deltoid ligament was repaired by inserting sutures (1 Vicryl) into the substance of the ligament and then tied under the washer of the screw. The superficial deltoid ligament was stitched with a bone stitch to the anterior colliculus.

A below knee cast was applied for six weeks after the operation. At review, 12 months after the initial injury, the patient had no discomfort in his foot. Clinical examination revealed a normal range of left ankle and subtalar movement. X rays confirmed that the internal fixation was secure and that the fracture had healed soundly (Fig2).

DISCUSSION

An isolated lateral injury is more common than medial injuries because supination injury is more frequent and because of the specific construction of the three subtalar joints (1). Lauge-Hansen (3) studied on concomitant ligamentous injuries based on the experimental production of fractures in cadavers. He (2,3) classified ankle fractures into five categories, using a dual designation where the first word of the designation referred to the position of the foot at the moment of injury and the second word detailed the specific direction of talar motion. With only three exceptions, it was possible to classify the 228 cases within four groups in his series. 87 % of ankle injuries belonged to supination injury and 12% to pronation injury. Winston Mitchel (7) used the Lauge-Hansen's genetic classification in 1250 cases of ankle fracture and the

distribution was as follows: 50% supination-external rotation, 12% supination-adduction, 20% pronation- abduction and 18% pronation-external rotation injuries. A failure of the deltoid ligament alone is rare and accounts for only 2% of ligamentous injuries of the ankle. (1,2,6).

Supination of the foot tightens the lateral structures, which are injured first (5). By contrast, pronation tightens the medial structures, which then will be injured first. The injury pattern then moves sequentially around the ankle in the same direction as the deforming force.

The reported case appears to be of the pronation type as the failure is only in the medial side with an intact tibiofibular syndesmosis and lateral structures. With the foot in pronation, when the talus is rotated externally, tension develops initially within the deltoid ligament, resulting in either ligament rupture or an avulsion fracture of the medial malleolus. This stage I pronation-external injury is identical to that encountered with stage I of pronation-abduction. For this reason, the true incidence of pronation-external rotation as well as pronation-abduction injuries cannot be ascertained with assurance.

The patient in this case report appears unique in that his deltoid ligament failed first and the direct impact of the talus due to the medially directed force then caused a fracture of the medial malleolus. This association of medial malleolar fracture with deltoid ligament rupture is extremely uncommon in a pronation injury and to my knowledge this has not been reported earlier.

In author's opinion, it would not be possible to achieve a closed reduction in the reported case and conservative treatment may result in nonunion of fractures and may result in valgus deformity.

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Illustrations

Fig 1

Fracture of the medial malleolus with

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Fig 2:

Open reduction and fixation of the medial malleolus

