RARE CASE OF DELTOID LIGAMENT AVULSION WITH MEDIAL MALLEOLUS FRACTURE OF ANKLE JOINT: CASE REPORT

Maruthi C.V[1], Roshan Pais[2]

HOW TO CITE THIS ARTICLE:
Maruthi CV, Roshan Pais. "Rare case of deltoid ligament avulsion with medial malleolus fracture of ankle joint: case report". Journal of Evolution of Medical and Dental Sciences 2013; Vol2, Issue 37, September 16; Page: 7047-7051.

ABSTRACT: INTRODUCTION: Abduction external rotation type of injury leading to deltoid ligament avulsion and medial malleolar fracture is reported once in 1989 by O'Leary and Ward. Here we are the second in the literature to notify a similar kind of injury. **CASE DETAILS:** 37 years male patient came with history of road traffic accident, he noticed sudden outward twisting of the ankle joint at the time of impact. Later while rescuing another injured person, he had an inward twisting of his ankle joint. X ray examination reveals transverse fracture of medial malleolus and external rotation of the malleolar fragment. Intraoperatively we noticed that there was near total avulsion of the deltoid ligament with only a few fibres of periosteum intact anteriorly. The deep ligament was anchored to the malleolus using ethibond through drill holes. Superficial ligament sutured in continuity with the periosteum and medial malleolus by tension band wiring technique. Follow up at three months showed no instability with fracture union and patient resumed his agricultural occupation. **CONCLUSION:** Deltoid ligament avulsion with medial malleolus fracture is very rare. It is caused by an abduction external rotation followed by a violent adduction injury. Ours is the second case to be reported in the literature. We treated it by repair of the ligament and fixation of the fracture by tension band wiring technique. Repair of the ligament and fracture fixation gives good functional outcome.

KEY WORDS: Abduction external rotation, Ankle fracture, Deltoid ligament, Medial malleolus.

INTRODUCTION: Ankle fractures are common fractures in adults and are caused by various mechanisms. Abduction external rotation type of injury leading to deltoid ligament avulsion and medial malleolar fracture is reported once in 1989 by O'Leary and Ward. Here we are the second in the literature to notify a similar kind of injury.

CASE DETAILS: 37 years male patient came with history of road traffic accident, he noticed sudden outward twisting of the ankle joint at the time of impact. Later while rescuing another injured person, he had an inward twisting of his ankle joint. Patient came to the emergency department with pain and swelling of the right ankle joint and inability to walk. Examination revealed tenderness and swelling over the tip of medial malleolus, ankle movements were reduced due to pain. X ray examination shows transverse fracture of medial malleolus and external rotation of the malleolar fragment (Pic 1). Intraoperatively we noticed that there was near total avulsion of the deltoid ligament with only a few fibres of periosteum intact anteriorly. The deep ligament was anchored to the medial malleolus using ethibond through drill holes. The superficial ligament was attached to the periosteum which was stripped off during exposure of the fracture and medial malleolus fixed by tension band wiring technique. All hardware closed under the periosteal sleeve (Fig- 2, 3, 4, 5). Postoperatively below knee slab was put, suture removal done on twelfth day and fracture healed by

six weeks (Fig- 6), and deltoid ligament by eight weeks. Patient gained full range of ankle movements without any signs of instability. At three months follow up patient is successfully rehabilitated in his occupation of agriculture.

DISCUSSION: Ankle injuries are usually caused by simple twisting injury to high energy injuries [1, 2, and 3]. The incidence is highest in elderly women. Two third of the ankle injuries are isolated medial malleolar fractures one fourth constitutes bimalleolar fractures and 7% is trimalleolar. Open fractures accounting for 2% [4]. Four major fracture types were described by Lauge-Hansen: supination-adduction, supination-external rotation (SER), pronation-abduction, and pronation-external rotation (PER) fractures. The most common injury mechanism is SER, which accounts for the majority of all patterns [5]. O'Leary and Ward described a high velocity injury caused by initial abduction external rotation followed by violent adduction leading to avulsion of the deltoid ligament and fracture of the medial malleolus respectively. Author quoted that they were the first to describe it in the literature in 1989. After them, we are the second to notify it in the literature [6]. Usual presentation is pain, swelling and inability to walk. Examination reveals tenderness, swelling and antalgic gait.

According to OARs ankle roentgenograms are done if there is pain near the malleoli, age above 55years or older, inability to bear weight, bone tenderness at the posterior edge or tip of either malleolus [7, 8]. In the acute trauma setting: mortice, anteroposterior and lateral nonweight bearing views to be done. If the patient is able to stand comfortably weight bearing views are done to check for alignment and stability [9, 10].

Plain x-rays show a discontinuity in condensed subchondral bone line around the talus that extends from the subchondral bone of the distal tibia to the medial aspect of the fibula. Disruption of this line indicates shortening, rotation, or displacement of the fibula. Other measures that help to determine non alignment after ankle injury include (a) measuring the talocrural angle, (b) determining the medial clear space, and (c) assessment of syndesmotic widening. The mortise view is probably the best for making all of these measurements. The medial malleolus fractures are treated by tension-band wire around two parallel K-wires. The proximal tension-band wire is placed through a drill hole or around a horizontally placed screw. This construct directly resists the bending forces that are partially responsible for the fracture and has been shown to have greater strength than two partially threaded screws [11, 12].

The deltoid ligament provides the medial ligamentous support of the ankle. It has been characterized as having a superficial component and a deep component. The superficial fibers arise from the anterior colliculus and the anterior aspect of the posterior colliculus, and they attach into the navicular, the neck of the talus, the medial border of the sustentaculum tali, and the posteromedial talar tubercle. The tibiocalcaneal ligament is the strongest component of the superficial layer of the deltoid ligament, and it is responsible for resisting eversion of the calcaneus. The deep layer of the deltoid ligament is the primary medial stabilizer of the ankle joint. It is a short, thick ligament that originates from a wide area between the anterior and posterior colliculi. The strongest fibers insert on the medial surface of the talus, under the tail of the comma-shaped articular surface. This ligament is virtually inaccessible from outside the joint, and it cannot be repaired unless the talus is displaced laterally or if the medial malleolus is inverted distally through

fracture or osteotomy. In our case as there was a fracture with eversion of the fragment, the ligament was visualized and repaired.

Ankle fractures with a deltoid disruption have a better prognosis than those with a medial malleolus fracture [2, 13]. The disruption of the deltoid ligament rarely needs to be surgically addressed. Interposition of the deltoid ligament is one potential cause of residual talar shift. We have not observed this problem, so it must be very unusual. The clinical outcome of these ankle fractures is not improved by suturing the deltoid ligament [14]. The surgeon should be aware that when the deltoid is disrupted and the ankle mortise is evaluated via x-ray in plantar flexion, a small increase in the medial clear space and valgus sag of the talus might be apparent. The talus is narrowest posteriorly leading to increased space in the mortise in plantar flexion. The absence of the deltoid allows the talus to further rotate externally, thus producing this radiographic appearance, which is eliminated with the ankle in dorsiflexion [15].

CONCLUSION: Deltoid ligament avulsion with medial malleolus fracture is very rare. It is caused by an abduction external rotation followed by a violent adduction injury. Ours is the second case to be reported in the literature. We treated it by repair of the ligament and fixation of the fracture by tension band wiring technique. Repair of the ligament and fracture fixation gives good functional outcome.

REFERENCES:

1. Bauer M, Bergstrom B, Hemborg A, et al. Malleolar fractures: nonoperative versus operative treatment. A controlled study. Clin Orthop Relat Res. 1985; 17-27.
2. Bauer M, Jonsson K, Nilsson B. Thirty-year follow-up of ankle fractures. Acta Orthop Scand. 1985; 56(2):103-6.
3. Kristensen KD, Hansen T. Closed treatment of ankle fractures. Stage II supination-eversion fractures followed for 20 years. Acta Orthop Scand. 1985; 56(2):107-9.
4. Court-Brown CM, McBirnie J, and Wilson G. Adult ankle fractures an increasing problem? Acta Orthop Scand. 1998; 69(1):43-7.
5. Lauge-Hansen N. Fractures of the ankle. Combined experimental-surgical and experimental roentgenologic investigations. Arch Surg. 1950; 60:957-85.
6. O'Leary C, Ward FJ.A unique closed abduction-external rotation ankle fracture**.** J Trauma. 1989 Jan; 29(1):119-21.
7. Stiell IG, McKnight RD, Greenberg GH, et al. Implementation of the Ottawa ankle rules. JAMA. 1994; 271(11):827-32.
8. Stiell I, Wells G, Laupacis A, et al. Multicentre trial to introduce the Ottawa ankle rules for use of radiography in acute ankle injuries. Multicentre Ankle Rule Study Group. Br Med J. 1995; 311(7005):594-7.
9. Brage ME, Rockett M, Vraney R, et al. Ankle fracture classification: a comparison of reliability of three X-ray views versus two. Foot Ankle Int. 1998; 19(8):555-62.
10. Cockshott WP, Jenkin JK, Pui M. Limiting the use of routine radiography for acute ankle injuries. Can Med Assoc J. 1983; 129(2):129-31.
11. Johnson BA, Fallat LM. Comparison of tension band wire and cancellous bone screw fixation for medial malleolar fractures. J Foot Ankle Surg. 1997; 36(4):284-9.

12. Ostrum RF, Litsky AS. Tension band fixation of medial malleolus fractures. J Orthop Trauma. 1992; 6(4):464-8.
13. Chissell HR, Jones J. The influence of a diastasis screw on the outcome of Weber type-C ankle fractures. J Bone Joint Surg Br. 1995;77(3):435-8
14. Stromsoe K, Hoqevold HE, Skjeldal S, et al. The repair of a ruptured deltoid ligament is not necessary in ankle fractures. J Bone Joint Surg Br. 1995; 77(6):920-1.
15. Vander Griend R, Michelson JD, Bone LB. Fractures of the ankle and the distal part of the tibia. Instr Course Lect. 1997; 46:311-21.

Fig-1

Fig-2

Fig-3

Fig-4

Fig-5

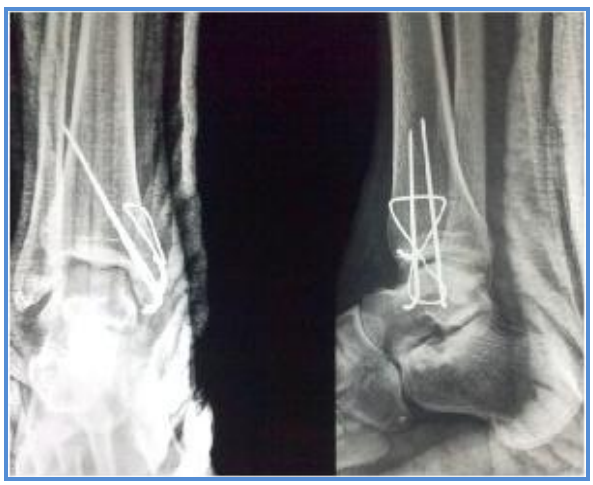

Fig-6

AUTHORS:

1. Maruthi C.V.
2. Roshan Pais

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Orthopaedics, M.V.J. Medical College and Research Hospital, Hoskote, Bangalore.
2. Assistant Professor, Department of Orthopaedics, M.V.J. Medical College and Research Hospital, Hoskote, Bangalore.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Maruthi C.V.,
6th Cross, Opp. APMC Yard,
Sir. M. V. Layout, M.G. Road,
Chikkaballapur - 562101.
Email- cvmaruthi@sify.com

Date of Submission: 17/08/2013.
Date of Peer Review: 18/08/2013.
Date of Acceptance: 24/08/2013.
Date of Publishing: 10/09/2013