

OPTIMAL FIXATION FOR DIAGONALLY FRACTURES MEDIAL MALLEOLUS AND TALUS OF ANKLE

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Abstract

Background: Fixation of alternative for diagonal fractures of medial malleolus was invariably a debate as most of the days the fragment is too little to attain placement of two screw heads. In comminuted and osteoporotic fragments, absolute stability of the medial malleolus fragment with one screw presents challenges. **Material & Methods:** This is often a prospective study conducted in our centre from the Gregorian calendar January month 2021 to December 2023 in 60 cases. **Results:** Out of sixteen cases of primary fixation with a single screw, there were two cases of fixation with a single screw failure, which corresponds to 9 (15%) of cases of failure with main single screw fixation. **Conclusion:** we tend to advise mending two screws of 4.0mm cannulated cancellated screws crossing the fracture website if the fragment is giant enough to support screw heads. If the fragments area unit little we tend to choose to do a tension band wiring with two K-wires and a diagonal screw that we tend to have exhausted 34 (56.66%) of cases as a primary procedure. All two failure cases in our series achieved union with tension band wiring.

INTRODUCTION

Fractures of the medial malleolus (MMs) are most commonly seen in orthopaedic and trauma surgery [1]. There are several accepted fixation methods for treating these types of fractures, including screws, tension band wiring with cerclage or suture materials, absorbable implants, and plate fixation [2]. The distal medial extension of the tibia is called the medial malleolus (MMs). It is divided into the colliculus anterior and posterior. An articular aspect on the lateral surface meets the parallel comma-shaped aspect on the medial side of the talus. The inter-collicular groove on the lateral side separates the anterior and posterior colliculus as a unit. The superficial deltoid ligament is attached to the anterior colliculus, while the deep deltoid ligament is attached to the posterior colliculus and inter-collicular groove, facilitating the creation of the ligamentous structure. [3, 4]. Once the MMs are fractured, their pattern relies on the mechanism of injury. In rotary motion motility injuries, the MMs fracture is superiorly oriented. It should be obliquely directed upward or become vertical. It's the result of

the inversion of the mortise joint so that the talus impacts the MMs leading to a push-off sort of fracture [5]. In supination-external rotation, pronation-abduction, and pronation-external rotation fractures, the MMs fracture tends to be diagonally in configuration. It's a pull-off type fracture [6-7]. Herscovici et al have delineated the various medial malleolar fracture patterns [8]. Supported by AO principles, the MMs fracture is conventionally addressed when reduction and stabilization of the fibular fracture. Open reduction and interior fixation of diagonal fracture of MMs fragment to tibia bone may be finished with numerous devices as operation is imperative [9-11]. The hardware devices embody cellular screws, K-wires, tension bands, bio-absorbable screws, or a combination of all the above [12]. The failure of a fixation device can be due to the improper support of broken bone, support at one purpose of fixation, shortening and rotation of malleoli and comminution [13]. When MMs fragments are small or osteoporotic, tension band wiring is advised by AO-ASIF for those MMs fragments since screw fixation is not an effective solution. [13,14].

The study aims to evaluate the explanations for the failure of fracture fixation of medial malleoli and to evaluate the selection of fixation for the difficult little osteoporotic MMs fragments.

MATERIALS AND METHODS

We were attuned to study a consecutive series of patients who conferred within forty-eight hours of injury who presented to the Department of Orthopaedics, Government General Hospital, Nizamabad. All diagonal fractures of MMs enclosed within the study, i.e., (simple diagonal fracture, bimalleolar, and trimalleolar fractures). There have been 26 (43.33%) men and 18 (30%) female, with a mean age of 26.8 years (18 to 48); twenty-one rights and fourteen left diagonally fractures were concerned. This study was done after approval from the Ethical Committee of our hospital. During the study period from January 2021 to December 2023.

3. Operative procedure:

Under image steerage, the procedure is carried out while the patient is in a supine posture with compression bandage management. An anteromedial incision that is slightly wavy is used to approach the MMs. Carefully dissecting the skin and body covering tissue prevents venous blood vessels and nerves. Because of the sharp distribution of dissection to the bone, the periosteum that is in between is raised by about one millimetre on each fracture facet. The tibialis connective tissue occasionally obstructs reduction; consequently, the connective tissue must be removed to aid in reduction. The joint is irrigated through the fracture site to eliminate debris and fracture haemorrhage. A pointed reduction clamp is used to command the reduction, which is then momentarily stuck with a small-diameter K-wire and secured with either.

(a). Two 4.0 millimetre partly rib cancellated screws if the fragment is small; just 4.0 millimetre partly rib cancellated screw is employed. The screws are started close to the tip of the malleoli and directed perpendicular to the fracture site while not participating opposite cortex however the thread has to cross the fracture site.

(b). Tension band wire around two parallel K-wires; the proximal finish of stainless steel wires is placed through a drill-hole around a horizontally placed screw with or while not washer.

Statistics

To obtain valid results with the small number of cases in each group the permutation test and the Karlsson and Peterson scoring.

RESULTS

Of the sixty patients, fifteen (twenty-five per cent) had two calculated screws used for fixation; seventeen instances had primary tension band wire; nine patients had one four-millimetre cancellated screw used for fixation. Two of the three instances

of unsuccessful fixation involved the use of a single screw (Figure 1), especially after a trial to maintain a smaller incision had been made or in the presence of a combination. Tension band wiring was used in all three cases, negating the need for additional bone grafting. Nine cases (15%) of medial malleolar fixation with a single screw have failed. Of the 4 cases, one was a failing try for percutaneous screw fixation within the hope for soft-tissue preservation and therefore the second was a comminuted MMs fragment whereas the third failure was thanks to trimalleolar fracture. Altogether the two cases, the fracture united once ever-changing the one screw implant to tension band wiring.



Figure 1: Failed MMs fixation in trimalleolar fracture in an attempt to have minimal skin incision



Figure-2a



Figure-2b



Figure-2c



Figure-2d

Figure 2 a & b: Postoperative X-ray showing good reduction with tension band wiring; Figure 2c & d: Postoperative X-ray showing good reduction with tension band wiring

DISCUSSION

In comparison to traditional partially threaded cancellous screws, tension band wiring of MMs around two K-wires and a horizontally positioned screw has demonstrated greater energy and resistance to fracture-causing bending pressures [14, 15]. The drawback of tension band wiring is that, despite the opinions of most writers, it necessitates proximal dissection, horizontal screw fixation, and the potential for soft tissue infection of the tibialis posterior and implant prominence. This results in a comparatively longer fixation time [16]. Tension band wiring is recommended by researchers in all cases. The majority of writers disregard it as a little and/or osteoporotic particle [17–19]. The researchers recommend saving the use of tension bands for tiny or osteoporotic fragments.

CONCLUSION

The authors opine not to attempt percutaneous screw fixation within the wish of recognize soft tissue as the possibilities of slipping of reduction and interposition of the periosteum are excessive in 9 (15%) of cases and to repair the small and osteoporotic fragment of MMs with anxiety band wiring (Figure 2a to 2d). Tension band wiring has a problem of distinguished hardware and irritation of smooth tissues, so we propose to apply cannulated partially threaded cancellous screws with threads crossing the fracture site each time the fragment is huge enough to help the screw heads and to revise failed fixation with tension band wiring. In our collection, 34 (56%) cases had small fragments with trouble guiding two screw heads, so we needed to do tension band wiring in them as a number one technique.

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