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Management of medial malleolar fractures by tension band wiring: A prospective study

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Abstract

Medial malleolar fractures are most common injury seen in day today practice. Management of undisplaced fracture is plaster of Paris cast application. And for the fractures displaced more than 2 mm needs surgery. Here we are done a study to know the clinical and radiological outcome in the management of the medial malleolar fractures by tension band wiring technique. We studied 14 cases of transverse medial malleolar fractures admitted in our hospital from January 2010 to October 2014 managed by open reduction and internal fixation with tension band wiring technique. Postoperatively we evaluated the patients for the clinical and radiological outcome at 4, 8, 12 and 24 weeks. Medial malleolar fractures are most common type of ankle fracture. If the fracture is transverse in nature the choice of procedure is open reduction and internal fixation using tension band wiring.

Keywords: Tension band wiring, medial malleolus, abduction type, transverse fracture

1. Introduction

Medial malleolar fractures are most common injury seen in day today practice. Management of undisplaced fracture is plaster of Paris cast application. And for the fractures displaced more than 2 mm needs surgery. Various modalities of surgical fixation are available in literature. Closed reduction and internal fixation with two parallel k wires, closed reduction and internal fixation with two parallel cancellous screws, open reduction and internal fixation using cancellous screws, tension band wiring, modified tension band wiring. Each modality has got its own advantage and disadvantage. Here we are done a study to know the clinical and radiological outcome in the management of the medial malleolar fractures by tension band wiring technique.

2. Materials and methods

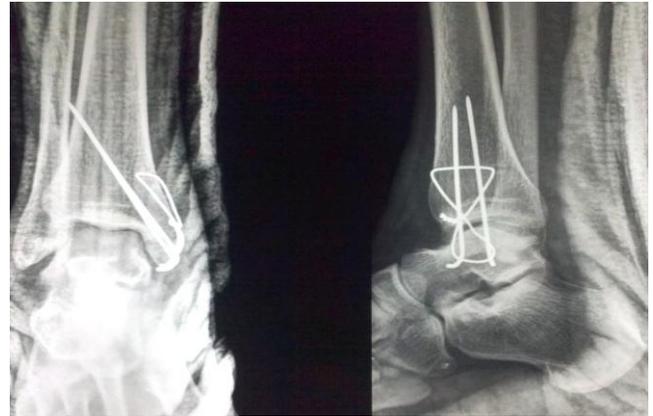
We studied 14 cases of transverse medial malleolar fractures (Fig 1) admitted in our hospital from January 2010 to October 2014 managed by open reduction and internal fixation with tension band wiring technique. Postoperatively we evaluated the patients for the clinical and radiological outcome at 4, 8, 12 and 24 weeks.

2.1 Surgical technique

All patients were operated under spinal anaesthesia, under tourniquet control. Medial approach was preferred. The fracture site was exposed. Debridement of the fracture site was done. Fracture reduction done and temporarily held with towel clip. Two 2mm parallel k-wires passed from the tip of malleolus obliquely until they engage opposite cortex (Lateral cortex of tibia) (Fig 2, 3). Around 3 to 4 cms proximal to the fracture site in anteroposterior direction drill hole is made, in that 18 gauge stainless steel wire was passed and then around the k-wires in the figure of eight pattern. Stainless steel wire was tightened until we achieve adequate compression at the fracture site. K-wires were bent and cut near the tip of malleolus and rotated inwards, the tail of stainless steel wire also cut and discarded. Wound was washed using normal saline. Wound was closed over layers using suitable suture materials. Postoperatively the check x-ray (Fig 4) was taken in all the patients to confirm the reduction and k-wires position. From day two ankle movements started, nonweight bearing walking

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started using axillary crutches. Suture removal done on 14th day. Follow up done at 4, 8, 12 and 24 weeks for clinical and radiological outcome.



3. Observations and results

In our study 6 were in 20 to 30 years, 4 in 30 to 40 years, 3 in 40 to 50 years and 1 in 50 to 60 years. 9 were males and remaining 5 were females. The mode of injury is road traffic accident in 11 and fall in remaining 3. Right sided was affected in 9 and left sided in 5. In x-ray examination, showing transverse fracture of the medial malleolus only selected. All were operated under spinal anaesthesia, under tourniquet control. After surgery follow up done at 4 weeks 11 patients were allowed for partial weight bearing as they were void of pain clinically. At 8 weeks all the patients were started with full weight bearing with full range of ankle movements. Radiological examinations reveal complete union of the fracture in all our cases. At twelve weeks all our patients were assessed for any residual pain and radiological union. No patients had pain and all were united radiologically.

4. Results

In our study, excellent results were achieved in 11 cases (78.57%), good in 3 cases (21.42%), according to the Baird and Jackson scoring system.

5. Discussion

The earliest description of ankle fractures was given by Pott and Dupuytren. Although many classification systems are proposed, two most widely used ones are the Weber and the Lauge-Hansen classification. The former is based on the relationship of the level of the distal fibular fracture with the syndesmosis, in an attempt to quantify stability. The latter is based on a cadaveric study involving two aspects the position of the foot at the time of injury and the direction of the applied deforming force. Medial malleolus fractures are most common type of ankle injury. Usually seen in high energy forces, leading to fracture in young active adult males. And in old age it is common in osteoporotic bones that too in females. The ankle fractures are classified according to Webers, based on in relation to the level of inferior tibiofibular joint. Based on lauge hansens classification adduction, abduction, supination external rotation, pronation external rotation and vertical compression fractures were described [1-4]. Medial malleolus fractures are most commonly in adduction and in abduction type of ankle fractures. In abduction type of injury due to tensile forces the fracture pattern will be transverse. In transverse depending on the size of the malleolus it is once again classified as small, medium and large. The diagnosis of the medial malleolus fractures is by history which says the mechanism of injury and symptoms of the injury like pain, swelling and unable to walk. Examination of the ankle joint for tenderness, swelling and abnormal mobility of the at the fracture site. The diagnosis confirmed by X-ray examination of the ankle joint by

anteroposterior and lateral views [5]. If the fracture is undisplaced managed conservatively by below knee cast application [6]. The treatment for the osteoporotic transverse fractures of the medial fractures is internal fixation by tension band wiring. In young adults if the size of the malleolus is small the choice once again is open reduction and internal fixation with tension band wiring, as cancellous screws will shatter the fragment. For moderate to large malleolar fragment both modalities of treatment are applicable like closed/ open reduction and internal fixation with two parallel cancellous screws [7] and tension band wiring [8]. The tension band wiring technique has got advantages over the screw fixation in the form of it resists the movement at the fracture site and it prevents non-union of the fracture as tension band wiring is four times stiffer than cancellous screws. In our series all the patients were operated by tension band wiring technique. And postoperatively follow up done at regular intervals and at the end of six months the outcome was assessed using braid and Jackson scoring system and we achieved excellent results were achieved in 11 cases (78.57%), good in 3 cases (21.42%). Our results are comparable to standard studies [9]. In our series we didn't notice any complications like infection, k-wire backout, delayed union or non-union.

6. Conclusion

Medial malleolar fractures are most common type of ankle fracture. If the fracture is transverse in nature the choice of procedure is open reduction and internal fixation using tension band wiring.

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