



A FUNCTIONAL AND RADIOLOGICAL OUTCOME OF SURGICAL MANAGEMENT OF BIMALLEOLAR AND TRIMALLEOLAR ANKLE FRACTURES

Orthopaedics

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ABSTRACT

BACKGROUND: Ankle joint is one of the unstable joints in the body due to its anatomic position and is more prone to injury during daily activities. Malleolar fractures are one of the most common fractures in orthopedic traumatology.

OBJECTIVES : The aim of this study was to evaluate the clinical and functional results of patients with ankle fractures treated with Open reduction and internal fixation with different modalities.

Method and Materials: A prospective study was conducted from April 2016 to April 2018 over a period of 2 years. Total 50 patients were treated by various techniques of open reduction and internal fixation.

Result : According to Baird and Jackson scoring system, 23 (51 %) patients had excellent outcome, 14 (31%) had good outcome, 6 (13 %) had fair outcome and 2 (4 %) had poor outcome. Supination External Rotation injury is the commonest mechanism of injury.

CONCLUSION : We concluded that early treatment, anatomical reduction and fracture fixation, stringent postoperative mobilization and rehabilitation should help improve Functional outcome in ankle fractures.

KEYWORDS

TBW –tension band wiring, Baird and Jackson scoring system, Lauge – Hansen Classification.

INTRODUCTION

The ankle is a complex joint consisting of functional articulations between the tibia and fibula, tibia and talus, and the fibula and talus, each supported by a group of ligaments^{1,2}. Ankle fractures are one of the most common skeletal injuries seen in clinical practice³. The prevalence of such fractures has increased over the last two decades in both young, active patients and the elderly people^{4,5}.

Ankle injury gained importance because body weight is transmitted through it and locomotion depends upon stability of the joint. It must be realized that ankle injuries are mixed ones i.e. ligamentous and bony so the primary goal of treatment should be full restoration of anatomy and function of the ankle joint. Though malleolar fractures are discussed extensively, the opinions in the treatment of these fractures varies widely because of differences in the classification, reduction techniques and subjective symptoms at follow up studies. Many of these fractures were managed by manipulative reduction and conservative treatment and have yielded satisfactory results.

Anatomic restoration of the joint is the goal of management in fractures about the ankle as has been shown experimentally by Paul L. Ramsey, about one mm lateral shift in Talus, produces about 42 per cent of decrease in tibio-talar contact area⁶.

Stable and undisplaced fractures mostly managed by conservative management. Inadequate and improper treatment may result in long-term orthopedic complications and disability^{7,8}. When malleolar fractures are not reduced accurately they may lead to posttraumatic painful restriction of motion or osteoarthritis or both⁹.

So Open reduction and internal fixation is the standard of care for ankle fractures. The operative method restores the anatomy and contact-loading characteristic of the ankle. Additional advantages include easier rehabilitation without a cast, early mobilization and earlier weight bearing^{10,11}.

The aim of this study was to evaluate the clinical and functional results of patients with bimalleolar, trimalleolar fractures treated with semitubular/Reconstruction plating or intra medullary nailing in fibula along with cc screw and tbw in medial malleolus and their outcomes in various subtypes.

METHOD AND MATERIALS

A prospective study was conducted from April 2016 to April 2018 at Dr RN COOPER HOSPITAL, Mumbai over a period of 2 years. Total 50 patients were treated by various techniques of open reduction and internal fixation.

Inclusion Criteria :

1. Patient with Unimalleolar, bimalleolar and trimalleolar fracture of ankle
2. Closed fracture
3. Age between 18 – 65 yrs
4. Patient willing to give informed written consent

Exclusion Criteria :

1. Open fracture
2. Age < 18 yrs and > 65 yrs
3. Associated with ipsilateral limb trauma
4. Medically unfit cases.

Preoperative Evaluation :

All patients reporting to hospital with ankle trauma were evaluated clinically for swelling, soft tissue damage and neurovascular status. After immobilization Xray of ankle Anteroposterior view, Mortise view and lateral view were taken. Ankle fractures were classified according to Lauge-Hansen system.

Displaced, malleolar fractures often involve significant subluxation or dislocation of the tibiotalar joint. Prompt closed reduction of the ankle mortise decreases the articular damage and in turn decreases soft tissue swelling. Operative treatment was usually delayed for a few days till the initial swelling had subsided. If soft tissue injury like abrasions and lacerations or blisters were present, surgery was delayed until the skin had healed.

Operative Technique :

All patients were operated under Spinal anaesthesia and in supine position for bimalleolar fractures and in Prone position for Trimalleolar fractures.

Different type of implants like tension band wiring, 3.5 mm DCP, Semitubular plates, reconstruction plates and cc screw were used

according to fracture pattern and quality of bone .

Postoperative protocol :

- Patient mobilised nil weight bearing on next day after surgery on walker.
- IV antibiotic were given for 5 days
- Oral antibiotic were given for 10 days
- Suture removal done on 15th day.
- Below knee slab given for 6 week.
- Nil weight bearing for 6 week.

Follow up :

All patients were follow up at 2 weeks ,6 weeks ,3 month and 6 months. Post-Operative evaluation of function and radiological outcome was done using the Baird and Jackson scoring system.

RESULT

Out of 45 cases, 27 (60 %) cases were male and 18 (40 %) cases were females. The mean age of patient in study was 38.66 yrs with maximum age of 63 yrs and minimum age of 18 yrs. In our study, left side ankle was more involved than right side. Road traffic accident was the most common mode of injury. The mean delay for surgery after trauma was 7.8 days mostly because of soft tissue swelling and fitness issues.

As per Laugh and Hansen Classification, Supination External rotation (SER) was most common type of fracture and pronation external was the rarest type of injury. Three patients were having posterior malleolus fracture which were fixed with 4 mm CC screw. Plating was done in 41 cases to fix lateral malleolus and 4 cases were fixed with k-wire. CC screw fixation was done in 35 cases to fix medial malleolus and 10 cases were fixed with tension band wiring and k-wire. 12 patients had syndesmotic injury for which syndesmotic screw was used which were removed at 8 weeks .

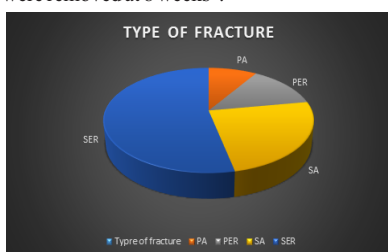


FIG 1. Type of Fracture

According to Baird and Jackson scoring system, 23 (51 %) patients had excellent outcome, 14 (31%) had good outcome, 6 (13 %) had fair outcome and 2 (4 %) had poor outcome. The average time taken for union was 12 weeks.

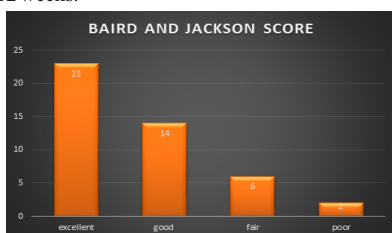


Fig 2 : Baird and Jackson score

5 patients developed superficial infection, which recovered with daily dressing and antibiotics. No patient developed deep infection or skin complications. 3 patient developed ankle stiffness. And 2 patient had delayed union.



Fig 3: Clinical picture showing semitubular plate for lateral malleolus fixation



Fig 4 : Clinical picture showing Tension band wiring For medial malleolus fixation.

CASE :



Figure 5 : Pre op Xray showing Trimalleolar fracture



Figure 6 : Immediate post op Xray

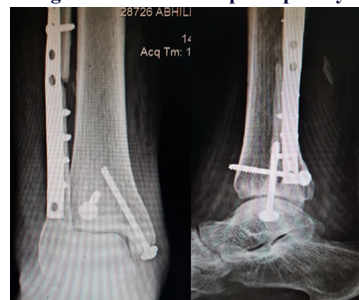


Figure 7 : 6 month post op xray showing union



Figure 8 : Clinical pictures showing good range of motion

DISCUSSION

Ankle joint is one of the unstable joints in the body due to its anatomic position and is more prone to injury during daily activities. Malleolar fractures are one of the most common fractures in orthopedic traumatology. Treatment of these fractures is complicated and challenging as the outcome influences the locomotion.

Closed method of treatment is often inadequate in restoring the anatomy and biomechanics of ankle joint. Conversely, open reduction with internal fixation is an excellent method for restoration of normal

anatomy of joint. Several studies indicated that, internal fixation of displaced malleolar fractures of ankle provides better results^{9,12,13,14}.

In our study, we studied the surgical management of malleolar fractures of ankle in adults and we evaluated our results and compared them with those obtained by various other studies.

In our study, there is male preponderance (60%) possibly due to the fact of male dominance over the female in travelling, occupational injuries in India which is comparable to various other studies^{9,15}.

Road traffic accident was most common mode of injury in our study which is comparable to other studies like Lee et al¹⁶.

In our study, right ankle is more commonly involved than left side which is comparable to other studies like Roberts and beris et al^{8,17}.

Lauge–Hansen classification system considers the position of the foot and the deforming force that resulted in injury for assessment¹⁸.

We followed this system to classify the ankle trauma. The most common type of injury was SER (46.6%), followed by pronation-abduction injury (33.3%) and our observation is in accordance with previous reports^{17,19}.

Although early mobilization was advocated by AO group, other studies have found no significant difference in the results produced after early mobilization. In our study, immobilization was done for 4 weeks and gradual mobilization was started and full weight bearing was started once union were complete or syndesmotic screw removed. In our study 5 (11.11 %) patients had superficial skin infection. Out of these 5 patients, 4 patients had uncontrolled diabetes which suggest that patients having diabetes has more chances of infection as compared to non-diabetic patient.

We had 3 (6.66%) patients with ankle stiffness. This was probably due to the noncompliance of the patient to the advised physiotherapy regimen, as there was no means to monitor the physiotherapy of the ankle joint after discharge of the patient.

We had 2 patients with delayed union which was probably due to inadequate reduction and infection which healed over a period but with poor functional outcome.

CONCLUSION

Mechanism of injury is essential in deciding the method of treatment and for accurate anatomical reduction and fixation. Unstable bimalleolar ankle fractures are common owing to road traffic accidents. Open Reduction and Internal Fixation in ankle fractures yield good results in terms of anatomical reduction, stability and Post Op functional return. Supination External Rotation injury is the commonest mechanism of injury in our study. Age was a significant predictor of the final outcome, with younger patients having a better outcome. No significant wound complications were noted. So we concluded that Early treatment, anatomical reduction and fracture fixation, stringent postoperative mobilization and rehabilitation should help improve Functional outcome in ankle fractures.

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