



A LONG TERM RANDOMIZED STUDY OF FUNCTIONAL OUT COME OF DISTAL CLOSED BIMALLEOLAR FRACTURE MANAGED BY DIFFERENT METHODS OF INTERNAL FIXATION IN YOUNG ADULTS: THREE YEARS FOLLOWUP STUDY

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ABSTRACT

Introduction: Among the many cases handled by an orthopaedic surgeon in emergencies, the ankle joint trauma is very common and account for near about 10% of the cases dealt on day to day basis. The number of ankle joint trauma cases have been increasing drastically over the past 15-20 years in active adult age group especially due to auto mobilization causing RSA. The injury around the ankle joint are usually complex which makes the task challenging for a surgeon and are usually very hard to treat in one sitting. Ankle joint plays a very crucial role in a person's day to day life thus making accurate reduction of the joint an important role surgically. Aim and Objectives: To compare the various methods of surgical fixation by using PTE system in open/closed malleolar fractures of ankle in adults and their outcomes with a full follow-up of 3 years. **Materials and Methods:** This prospective study conducted in Rama Medical College, Mandhna, Kanpur from March 2017 to March 2019. We analysed a total of 74 cases of bimalleolar ankle fracture. Classifications used are Lauge-Hansen Classification. Road traffic accident, Twisting injury and fall from height are major mode of injury. Cannulated cancellous screw, Malleolar Screw and TBW used for medial malleolus and semi tubular plate, cannulated cancellous screw and malleolar screw, tension bend wiring and buttress plate used for k wires are used as common mode of fixation. **Results.** Final Score According to Subjective, Objective, and Radiological Criteria: Scoring System of Baird and Jackson Functional Results in this study, 74 patients with bimalleolar fractures were treated surgically. Excellent results were achieved in 43 cases (58.10%), good in 19 cases (25.67%), fair in 9 cases (12.18%) and poor in 3 cases (4.05%). Of the 3 patients with poor results, 2 patients showed superficial infection and the other showed delayed union. **Discussion and Conclusion:** Unstable bimalleolar ankle fractures are common owing to road traffic accidents. Ankle injuries are common in middle aged and elderly women. In this study, it was observed that Bimalleolar fracture treated with ORIF gain Excellent to Good Ankle function after 6 months by using Baird and Jackson scoring system. Supination-external rotation type of injury was common. The Frequency of Pronation-external rotation and Pronation abduction type of injury was less. The Anatomical reduction and stable internal fixation restore the articular congruity of ankle joint results in excellent to good functional outcome and help in early mobilization after surgery.

KEYWORDS : Bimalleolar ankle fracture, lauge-hansen classification, road traffic accidents and twisting injury.

INTRODUCTION

Both the malleolus are highly susceptible to injuries as they are mobile and subcutaneous and bear lot of the stresses during weight bearing. The distal articular surface of tibia supports more weight per unit area [1]. The most congruous joint in the lower extremity. The Ankle joint which bears up to five times the body weight [2]. Sir Robert Jones said-Ankle is the most injured joint of the body but the least well treated [3]. Ankle injuries are very much important as almost full weight is transmitted through it and mobility of patient depends upon it. Most of the ankle injuries have both bony and ligamentous injury. Magnetic resonance imaging (MRI) now a days is useful for diagnosing ligamentous injury. The French had written extensively on ankle injuries beginning with Baron, Dupuytren and then Maisonneuve, but it was not until 1922 that a proper understanding of Classification and The Mechanism of the ankle fractures was published in a paper by Ashurst and Bromer [4]. In 1948-1954, Lauge-Hansen recognized four patterns based on pure injury sequences and taken into account at the time of Ankle injury, deforming force direction and position of the foot. To avoid complications as in all intra-articular fractures it is necessary to achieve anatomical reduction by open method and internal fixation of Bimalleolar ankle fracture. The results of fixation of bimalleolar fractures are better on anatomical reduction of fracture, stable internal fixation, regaining full fibular length and early active pain free mobilization, since the advent of A.O principles of fixation.

OBJECTIVES

To compare the various methods of surgical Fixations of closed Bimalleolar fracture in young adults at the end of 12

months in terms of

- Time required for union with respect to clinical and Radiological outcomes.
- Range of movements.
- Functional scoring system (Baird and Jackson) on five following criteria.

Pain

Stability of ankle

Able to walk

Able to run

Motion of the ankle

Radiographic evaluation

METHODOLOGY

This study was done to evaluate the functional outcome of ankle joint after internal fixation of bimalleolar fracture, those who are operated with different modalities. This is a prospective study conducted in 74 patients treated at RAMA MEDICAL COLLEGE, Mandhna, Kanpur from March 2017 to March 2019. We included the patients presenting themselves in casualty and OPD of Department of orthopaedics and newly diagnosed as bimalleolar fractures. Maximum Follow up period was 12 months after operative management.

When the patients were seen for the first time after injury, a through history was taken concerning about the time of injury, mechanism of injury, any significant past or personal history. Patients were examined giving special importance to whether the fracture was open or closed, presence of gross swelling, fracture blisters and presence of other associated injuries. Routine investigations were done as were necessary. The diagnoses was confirmed by antero-posterior, lateral and

mortise radiographs. Stabilization was done with a below knee slab, and ORIF was done once the skin condition was good and swelling had subsided.

Inclusion criteria: Age group between 18 years and 45 years both the genders, patients having bimalleolar fracture of either ankle joint, patients who are fit for surgery, and patients willing to participate in the study.

Exclusion criteria: Age below 18 years and above 45 years, post-menopausal and post hysterectomy osteoporotic females, Unwillingness to participate in the study, patients unfit for surgery and/or anaesthesia, patients with history of previous bimalleolar fracture of either ankle, Pilon fracture, trimalleolar fracture. The basic idea was to achieve near anatomical reduction. ORIF was used in all 74 patients. It was done as a planned and elective procedure. Before patients were taken up for surgery, they were put on foot elevation and anti-inflammatory drugs for few days to reduce ankle swelling.

Post-operatively limbs were immobilized in plaster splint, patients were put on antibiotics and analgesics and limbs were elevated. Dressings were done regularly and sutures were removed on average on 14th day (decided according to the wound inspection). The below knee splint was continued or cast was done till 6 weeks of postoperative and was then removed. Patients were assessed for fracture union radiologically. Once the fracture showed signs of union, partial weight bearing was advised, which was approximately at 6-8 weeks and it was then gradually increased to full weight bearing. Physiotherapy exercises for ankle movements were started on removal of slab or cast. Follow up: Weight bearing is restricted for 6 weeks. At 6 weeks, the plaster was removed. Clinical examination was done regarding movement of ankle. At 6 weeks x-ray of the ankle was taken in Antero-posterior and lateral views and looked for signs of fracture union and then were advised partial weight bearing once the fracture showed signs of union. Patients were advised to keep the limb at elevation to night times and perform active movements of ankle joints. It was then gradually increased to full weight bearing. Regular follow up was done at 6 weeks, 3 months and thereafter at monthly intervals till 6 months after operation till the fracture.

Assessment of results: Baird and Jackson scoring 5 system was used to evaluate the patients at the end of 6th month. Finally, correlation between results of the score and clinical data were used to evaluate functional outcome of ankle joint after internal fixation of Bimalleolar fracture. Baird and Jackson Scoring System

- 1) Pain Score: No Pain 15, Mild pain with strenuous activity 12, Mild pain with activities of daily living 8, Pain with weight bearing 4 and Pain at rest 0
- 2) Stability of ankle: No clinical Instability 15, Instability with sports activities 5, and Instability with activities of daily living ability to Walk 0
- 3) Able to walk: Able to walk desired distances without limp or pain 15, Able to walk desired distances with mild limp or pain 12, Moderately restricted in ability to walk 8, Able to walk short distances only 4 and Unable to walk 0
- 4) Able to run: Able to run desired distances without Pain 10, Able to run desired distances with slight pain 8, Moderate restriction in ability to run with mild pain 6, Able to run short distances only 3 and Unable to run 0
- 5) Ability to work: Able to perform usual occupation without restrictions 10, Able to perform usual occupation with restrictions in some strenuous activities 8, Able to perform usual occupation with substantial restriction 6, Partially disabled; selected jobs only 3 and Unable to work 0
- 6) Motion of the ankle: Within 10 of uninjured ankle 10, Within 15 of uninjured ankle 7, Within 20 of uninjured ankle 4, <50 of uninjured ankle, or dorsiflexion <50
- 7) Radiographic result: Anatomical with intact mortise

(normal medial clear space, Normal 2mm superior joint space, no talar tilt) 25, Same as above with mild reactive changes at the joint margins 15, Measurable narrowing of the superior joint space, superior joint space 2mm, or talar tilt >2mm 10, Moderate narrowing of the superior joint space, with superior space between 2 and 1mm. 5 Severe narrowing of the superior joint space, with superior joint space <1mm widening of the medial clear space, severe reactive changes 0 (Sclerotic subchondral bone and osteophyte formation).

Score According to the Baird and Jackson

Excellent: 96-100

Good: 91-95

Fair: 81-90

Poor: 0-80

Maximum Possible Score- 100

Method of Statistical Analysis: The Excel and Graphpad Instat (Graphpad softwares inc, USA) software packages were used for data entry and analysis.

RESULTS & DISCUSSION

In this prospective study, 74 cases of bimalleolar fractures of ankle were treated by surgical methods. The youngest patient was 18.6 years old and eldest was 45 years old. In this series, men were commonly involved, with M: F ratio of 9:2.

Right ankle was involved in 46(62.17%) cases and left ankle in 28(37.83%) cases, hence right ankle being more commonly involved than the left side. Road traffic accident was the most common mode of injury involving 33(44.5%) cases, followed by 28(37.83%) cases of fall, and 13(17.56%) cases of twisting injury. Majority of the cases 30(40.54%) showed supination-external rotation injury, followed by 20(27.02%) cases of pronation-external rotation injury. The AO type B was the most common, involving 37(50%) patients, followed by type C in 28(37.83%) and least in type A. In this study most of the cases were operated between 2 and 5 days (77.02%). The mean time interval was 3.5 days. 9 patients were operated late after 6 days of injury. Of them, 6 patients showed poor local condition (edema) and 3 patients came late after injury. Majority 54 (72.97%) cases of the medial malleolus fractures were fixed with TBW, in the rest of the cases, cancellous screw and K-wire were used. Below syndesmotomic medial malleolus fracture were successfully treated using TBW. Large fracture fragments were fixed by cancellous screw and small un displaced fractures by K-wire. Most 37 (50%) cases of the lateral malleolar fracture were fixed with K-wire. In the rest of the cases, one-third tubular plate and Rush pin were used. Above syndesmotomic uncommunited fractures of lateral malleolus were fixed by plating. While the communited above syndesmotomic fractures were fixed by Rush pin, the small below syndesmotomic fractures were fixed by K-wire. In our study, the average time taken for union was 10.4 weeks. Most of the cases (80%) showed union between 8 and 14 weeks. In our study, 17.5% patients developed complications. 4 patients showed superficial infections, 1 patient deep infection, and 2 patients delayed union medial malleolus. The superficial infections were managed with oral antibiotics and deep infections debridement and antibiotics. Delayed union medial malleolus was treated with continued immobilization, which eventually united without surgical intervention. Final Score According to Subjective, Objective, and Radiological Criteria: Scoring System of Baird and Jackson Functional Results in this study, 74 patients with bimalleolar fractures were treated surgically. Excellent results were achieved in 43 cases (58.10%), good in 19 cases (25.67%), fair in 9 cases (12.18%) and poor in 3 cases (4.05%). Of the 3 patients with poor results, 2 patients showed superficial infection and the other showed delayed union. The patients with poor results complained mild pain during their activities of daily living, diminution in their abilities to run and do work, and reduced motion of the ankle and narrowing of joint space. The excellent and good

functional scores were observed in 61 patients; of them, 54 patients were operated for TBW medial malleolus.

CONCLUSION

Unstable bimalleolar ankle fractures are common owing to road traffic accidents. Ankle injuries are common in middle aged and elderly women. In this study, it was observed that Bimalleolar fracture treated with ORIF gain Excellent to Good Ankle function after 6 months by using Baird and Jackson scoring system. Supination-external rotation type of injury was common. The Frequency of Pronation-external rotation and Pronation abduction type of injury was less. The Anatomical reduction and stable internal fixation restore the articular congruity of ankle joint results in excellent to good functional outcome and help in early mobilization after surgery.

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