



“STUDY OF FUNCTIONAL OUTCOME IN DISPLACED BIMALLEOLAR FRACTURE TREATED WITH FIBULAR PLATING FOR LATERAL MALLEOLUS AND PINNING OR SCREW FOR MEDIAL MALLEOLUS ”

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ABSTRACT

Fractures of the ankle joint are among the commonest fractures in adults, with an incidence of up to 174 cases per 100 000 persons per year¹. A study was conducted to learn the functional outcome of displaced bimalleolar fracture treated with fibular plating for lateral malleolus and pinning or screw for medial malleolus. For a good long-term functional outcome to be achieved, reliable early evaluation is crucial so that it can be determined whether the problem is a distortion (sprain), ligament rupture, bony ligament avulsion, or fracture of the talocrural joint. The proper treatment is chosen on the basis of the mechanism of the accident and the correct classification of the injury and accompanying soft-tissue damage. The goal of treatment is to enable the patient to put his or her full weight on the joint once again without pain and to prevent permanent damage². In this study, a total of 25 patients were included. Detailed history and clinical findings are confirmed and noted. After surgery patients followed on at 1 month, 3 months & 6 months, and thereafter yearly for their radiological and functional outcome.

KEYWORDS : Bimalleolar fracture, functional outcome, ankle, fibular plating, medial malleolus screw or pin.

INTRODUCTION

Ankle fractures are most commonly managed by orthopaedic surgeons in the emergency department. Increase in the prevalence of ankle fractures over the last two decades in the young and old age patients has been observed^[6,7]. Ankle fractures are complicated injuries that are difficult to manage. These patients are prone for long-term disability and complications^[8]. The goal of treatment includes achieving complete union of fracture and painless ankle joint. Surgical management restores the normal anatomy of joint. Additional benefits include easier early rehabilitation, early mobilization of joint and earlier weight bearing^[8]. The purpose of this study is to assess the functional outcome and results obtained after surgical management of bimalleolar fractures by various methods of internal fixation.

AIM & OBJECTIVE:

To evaluate the functional outcome of surgically managed closed bimalleolar fractures treated with fibular plating for lateral malleolus and pinning or screw for medial malleolus of the ankle.

MATERIAL AND METHODS:

This prospective study was carried out among 25 patients with displaced bimalleolar fractures who were admitted to the orthopaedic department at the tertiary care centre. The study was carried out for a period of 18 months. Patients aged between 18-60 years with displaced bimalleolar fractures were included in the study. Patients with open fractures were excluded from the study. Following parameters were observed in the patients: age, mode of injury, side of injury, type of injury according to Lauge Hansen classification, Baird and Jackson's ankle scoring system to know the functional outcome & complications of surgery. A careful history was taken from the patient and patient attenders to know the mechanism and severity of the injury. The patients were then assessed for general condition and to rule out vital injuries. Written

informed consent of the patient had been taken and institutional ethical clearance was obtained. On examination of the patient ankle, swelling of the ankle joint, deformity around the joint, soft tissue injuries, and distal neurovascular status were observed. Lower ends of tibia and fibula were palpated and looked for bony tenderness, displacement if any fracture, bony crepitus and stability of joint. Dorsalis pedis artery and posterior tibial artery pulsations were checked and noted. Syndesmotoc instability was confirmed with the squeeze test and stress test. Preoperatively all routine blood investigations were done. Radiological evaluation with plain radiographs in antero-posterior, lateral and mortise views was done. The fractures were classified according to Lauge-Hansen classification^[3] and anatomical types^[4]. Computed tomography of the ankle was done for preoperative planning with 3 dimensional reconstructional video. Figure 1 (a) shows pre operative anteroposterior & lateral views of ankle while figure 1 (b) shows post operative anteroposterior & lateral views of ankle fixed with fibula plating with syndesmotoc screw & medial malleolus fixed with malleolar screw.



Figure 1. a) Preoperative Xrays



b) Postoperative Xrays

Operative Technique:

Under spinal anaesthesia, the patient was placed in supine position with a bolster under the ipsilateral hip. The lateral approach was used for lateral malleolus fracture. In this technique after appropriate reduction, the fracture was fixed with one-third tubular fibula plate. Medial approach was used for medial malleolus fracture for open reduction internal fixation. After proper surgical dissection followed by reduction of medial malleolus held with towel clip, it was fixed with malleolar screw or tension band wiring or k wire.

Postoperative protocol:

Intravenous antibiotic was given in the post-op period. Below knee slab was applied and physiotherapy was started from day 1. Dressing was checked on the 2nd, 5th & 8th post operative day. Suture removal was done on 12th post operative day. Non-weight bearing walking was advised from first postoperative day. Partial weight bearing toe touch was started once radiological sings of union were seen, which was approximately at 6-8 weeks & then gradually increased to full weight bearing. Ankle weight bearing was delayed in cases with syndesmotomic screw fixation which was removed after 6 weeks post operatively. Patients was followed on 1st, 2nd, 3rd, and 6th months and there after yearly. Baird and Jackson's ankle scoring system^[5] of subjective, objective and radiographic criteria was used for the present study. In this scoring system patients were questioned and assessed with pain, stability of ankle, able to walk, run & work, motion of the ankle, radiographic result.

Statistical analyses:

Data analysis was done with the help of the appropriate software version. Quantitative data was presented with the help of mean, standard deviation, median and comparison among the study groups was done with the help of an unpaired T-test. Qualitative data were represented with frequency and percentage tables, the association among study parameters was assessed with the help of a chi-square test. P-value less than 0.05 is taken as a significant level.

CONCLUSION:

Present study concludes that as bimalleolar fracture is very common injury among adults. This should be diagnosed and treated at earliest. Open reduction internal fixation with fibula plating & medial malleolar screw or pin gives good post-operative results. The functional outcome is good in surgically treated patients and complications noted were also very less. So, surgically managed displaced bimalleolar fracture with fibular plating for lateral malleolus & pinning or screw for medial malleolus can be considered as good option for restoration of ankle mortise.

RESULTS

In this study, the mean age of the study participants was observed to be 43.68 ± 15.06. (Table 1) Among the study participants, 84% were male while 16 % were female.(Table 2) The results in our study showed that right-sided ankle fracture was more prevalent which accounted for 56% while left side

accounted for 44 %.(Table 3) The most common mode of injury was found to be road traffic accident in 68% of participants while 16% of participants had an injury because of self fall while 8% of participants each had injury due to fall from height and fall of heavy object respectively. (Table 4) Supination External rotation type was the most common type of fracture as per Lauge & Hansen classification (48%) followed by Pronation External rotation type (44%) (Table 5). There were 7 patients (28 %) with associated injury, of which one case had head injury, three had associated posterior malleolus fracture, one each had pubic rami fracture, sacral ala fracture & talus fracture. (Table 6) Applying multiple regression to Baird and Jackson score r2 value is 0.9 and p value was zero. 20% of cases showed excellent functional outcome, 76% showed good and 4% showed fair outcomes.(Table 7) Complications were seen among 15% of cases.

Table 1: Age distribution among the study participants

	N	Mean	Std. Deviation
Age	25	43.68	15.06

Table 2: Gender distribution among the participants

	Frequency	Percent
Male	21	84
Female	4	16
Total	25	100

Table 3: Side of the Injury in the study participants

Side of Injury	Frequency	Percent
Right Side	14	56
Left Side	11	44
Total	25	100

Table 4: Mode of Injury in the study participants

Mode of Injury	Frequency	Percent
Road Traffic Accident	17	68
Self fall	4	16
Fall from height	2	8
Fall of Heavy Object	2	8
Total	25	100

Table 5: Types of fracture observed in the study

Type of Fracture	Frequency	Percent
Supination External rotation type	12	48
Pronation External rotation type	11	44
Supination Adduction type	1	4
Pronation abduction type	1	4

Table 6: Injury associated with the fracture

Injury	Frequency	Percent
Head Injury	1	4
Left superior pubic rami fracture	1	4
posterior malleolus fracture	3	12
N	1	4
talus fracture	1	4
None	18	72
Total	25	100

Table 7: Functional outcome of the Injury in the study participants

Baird & Jackson Score	Number of participants	Percentage	Functional outcome
90-100	5	20	Excellent
91-95	19	76	Good
0-80	1	4	Fair
Total	25	100	

DISCUSSION

In our study, the mean age of the study participants were observed to be 43.68 ± 15.06. Our findings are compared and similar results as shown by Beris et al^[10], Roberts RS^[11] and Baird and Jackson^[5] Among the study participants, 84% were

male population and which were comparable to the study by Baird & Jackson^[5]. The mode of injury was found to be road traffic accidents in 88% of individuals, which was compared with study result by Lee et al.^[12] while 16% had an injury because of self fall while 8% participants had an injury due to fall from height and fall of heavy object respectively. Supination External rotation type was the most common fracture with 48% of participants being affected, and are compared with studies by Roberts et al^[11], Beris et al.^[10], Baird and Jackson et al.^[5]. Yablon^[13] study shows that, anatomical reduction and fixation of the lower fibula is the best thing to do in the treatment of ankle fractures with syndesmotic instability. Functional outcome according to Baird and Jackson's ankle scoring system we found that, most of the patients had good(76%) to excellent(20%) results are similar results as shown by Burnwell & Charnley et al.^[14], De souza et al.^[15], Beris et al^[16]. Excellent and good functional results are achieved with anatomical reduction and rigid internal fixation^[16]. Fair to poor results in the current series were seen because of postoperative wound infection, associated syndesmotic instability, and associated posterior malleolar fracture.

CONCLUSION

The present study concludes that good functional outcome can be achieved through anatomical reduction and rigid fixation of malleolar fractures. Early mobilization of joint can be achieved through surgical fixation of fracture. Surgical management of fracture was found to give a high percentage of good functional results.

Conflicts of interest:

There are no conflicts of interest.

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