

Study of Functional Outcome of Surgical Management of Bimalleolar Fractures of Ankle

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Abstracts: **Objective:** To assess the functional outcome of surgically managed bimalleolar fractures of ankle. **Methods:** This study was conducted on twenty-six patients at Shardaben hospital (Orthopaedic department). All the cases were treated by open reduction and internal fixation. The functional outcome was evaluated using the Baird and Jackson's ankle scoring system. **Results:** Twenty-six patients were included in the study: 18 men and 8 women. Excellent results were achieved in 15 cases (57.6%), good in 7 cases (26.9%), fair in 4 cases (15.3%) and poor results in 2 cases (7%). Fair to poor result, were seen in those with associated syndesmotic injury and in patients with delayed union of medial malleolus and those with superficial or deep infections. The average time taken for union was 10.4 weeks. Most of the cases (80%) showed union between 8-12 weeks. **Conclusion:** Functional outcome of surgery remained good to excellent. [Hardik V NJIRM 2017; 8(1): 25-27]

Keywords: ankle fracture, malleolus, syndesmosis, Lauge-Hansen.

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Introduction : Ankle fractures are one of the most common fractures encountered in the emergency and are among the most common injuries treated by orthopaedic surgeons.¹ Population-based studies suggest that the incidence of the ankle fractures has increased dramatically since the early 1960s.^{2,3}

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.^{3,4} Ankle is not a true hinge joint and is a highly congruent saddle shaped joint. Normally, the ankle joint has 15-20 degree of dorsiflexion and 35-40 degree of planter flexion. This motion is essential for normal function and anything that reduces this motion will limit function of the entire foot-ankle complex.^{5,6}

As a result of better understanding of the biomechanics of the ankle, and improvement in fixation technique, there has been a gradual evolution in the effective strategies for the treatment of ankle fractures. The goals of treatment continue to be both fracture union and an ankle that moves and functions normally without pain. Operative treatment is indicated when congruity of the joint cannot be restored with closed methods.⁶ So the purpose of this study was to assess functional outcome of surgery in ankle fractures.

Methods: Twenty-six patients of either sex above 21 years having closed or grade-I open malleolar fractures with less than two weeks old were identified and informed consent was taken about their inclusion in the study and the study was approved by ethical committee of institute. Patients with Infected,

pathological fractures and isolated malleolar and tri malleolar fractures were excluded from study. The demographic profile (i.e. age, sex) were noted. After careful history and examination, necessary radiographs of ankle were taken. In emergency department leg was elevated after correcting deformity and back slab was applied. All the patients were evaluated medically and base line investigations were carried out. Pre-operative antibiotics were given in all the cases at the time of induction. The patients were operated under anaesthesia by open reduction and internal fixation with AO technique. We reduce and internally fix lateral malleolar fracture before fixing medial malleolar fracture lateral malleolus is exposed using lateral longitudinal incision sometimes posterolateral incision used for posterior antigliding technique. Fracture is reduced with help of k wire or towel clip reduction is maintained using 3.5 one third tubular plate or multiple 3.5 mm screws or k wire tbw. Anatomical reduction and fibular length is maintained. Anteromedial incision is used for medial malleolus. Interposed periosteum between fracture sites is removed. With bone holding clamp or towel clip detached bone fragments are aligned. Reduction is temporarily maintained with k wire. Final fixation is done with 4 mm cc or tbw kwire. If syndesmotic injury is present, fixed with 3.5 mm screws. Patients follow up was done in outpatient department at 2 weeks, 6 weeks and 6 months. X-rays were made to see for the union. Baird and Jackson's scoring system was used for functional assessment. All the collected information was analysed and Qualitative & Quantitative variables were calculated.

1-Pre-Operative



2-Immediate Post op



3-nine months follow-up



Results: In our study, 26 cases of bi-malleolar fractures of ankle were treated by surgical methods at hospital. The mean age was 37.4 years.

Right ankle was more commonly affected, in accordance with Roberts RS¹², Beris et al¹¹. In our study, Lauge-Hansen classification system was used for operative evaluation. The most common type of injury was Supination-external rotation 10(38.4%), followed by Pronation-external rotation injury 8(30%), in accordance with by Roberts RS¹², Beris et al¹¹, Baird and Jackson⁷.

Table.1: Fracture type (Lauge-Hansen)

Lauge Hansen type	=n	%age
SE	10	38.4
SA	3	11.5
PA	5	19.2
PE	8	30.7

In our study, the average time taken for union was 10.4 weeks. Most of the cases (80%) showed union between malleolus. The infections (superficial and

deep) were managed with debridement and antibiotics. Delayed union of medial malleolus was treated with continued immobilization, which eventually united without surgical intervention.

In this study, excellent results were achieved in 15 cases (57.6%), good in 07 cases (26.9%), fair in 4 cases (15.3%) and poor results in 2 cases (7%). Excellent results were observed in most bimalleolar fractures. The patients with poor results had mild pain during their activities of daily living (Table.5).

Table.2: Functional results

Functional score	=n	%age
Excellent	15	57.6
Good	07	26.9
Fair	4	15.3

Discussion: Of all the intra-articular fractures, the most common joint involved is the ankle joint. Methods to restore function and to prevent arthritis are either closed treatment, which includes manipulative reduction and immobilization in plaster cast or open reduction with internal fixation. 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^{8,9,10,11}. In our study, we had 26 patients with bimalleolar ankle fractures, who were operated upon and were followed up with minimum period of 6 months.

In our study, fractures were commoner in the 31- 40 years age group, which is comparable to the studies made by, Beris et al¹¹, Roberts RS¹², Baird and Jackson⁷ and Lee et al¹³. Road traffic accidents constituted majority of cases, which was in accordance with study by Lee et al¹³.

Right ankle was more commonly affected, in accordance with Roberts RS¹², Beris et al¹¹. In our study, Lauge-Hansen classification system was used for operative evaluation. The most common type of injury was Supination-external rotation 15(37.5%), followed by Pronation-external rotation injury (30%), in accordance with by Roberts RS¹², Beris et al¹¹, Baird and Jackson⁷.

The results in current study were compared with that of Burnwell & Charnley⁸, Colton¹⁴, De souza et al⁹, Beris et al¹². In Colton¹⁴ series, 70% of the patients had a good to excellent results. Burnwell & Charnley⁸ in their series of 132 patients, 102(77.3%) had good results, 16% had fair results and 6% were found to poor score. In De souza⁹ series, 150 cases of ankle fractures treated by open reduction and internal fixation using AO technique, obtained 90% good results. In a study by Beris et al¹³, of 144 patients with ankle fractures, 105(74.3%) had good to excellent results. The functional results of the present study were comparable with that of the above cited studies, with 82.5% had good to excellent results, 12.5% had fair results and poor results in 5%. Although early mobilization was advocated by AO group, other studies⁸ have found no significant difference in the results produced after early mobilization. In our study, immobilization was done for 4 weeks. Partial weight bearing was advised for those with early radiological signs of union and full weight bearing when the signs of union were complete. In our series, there was 30 degrees or more plantar flexion in 23 patients (87.5%) and 20 degrees or more dorsiflexion in 22(82.5%) patients. Majority of the patients (82.5%) had good to excellent results in the current study; similar to what was observed in other series like Burnwell & Charnley⁸, Colton¹⁴, De souza et al⁹, Beris et al¹³. The treatment of bimalleolar fractures with open reduction and stable internal fixation using AO principles was found to give a high percentage of excellent and good results¹¹. This study supports these conclusions and was comparable with those in other studies

Conclusion: Surgical management of bimalleolar ankle fractures provides good functional outcome. Surgical treatment involves open reduction and internal fixation of the fractured parts using various fixation devices such as metal plates, screws, tension bands. These operative interventions provide anatomical restoration and immediate stability, which facilitates earlier mobilisation.

References:

1. SooHoo NF, Krenek L, Eagan MJ, Gurbani B, Ko CY, Zingmond DS. Complication rates following open reduction and internal fixation of ankle fractures. *J Bone Joint Surg Am* 2009; 91:1042-9.
2. Honkanen R, Tuppurainen M, Kröger H, Alhava E, Saarikoski S. Relationships between risk factors

- and fractures differ by type of fracture: a population based study of 12,192 perimenopausal women. *Osteoporos Int* 1998; 8:25-31.
3. Michelson JD. Ankle Fractures Resulting From Rotational Injuries. *J Am Acad Orthop Surg* 2003;11:403-12.
4. Khan MA, Shafiq M, Sahibzada AS. *J Postgrad Med Inst* 2005; 19:162-5.
5. Morris JM. Biomechanics of the foot and ankle. *Clin Orthop* 1977; 122:10–17.
6. Lindsjö, U. Operative treatment of ankle fractures. *Acta Orthop Scand* 1981; 52:1–131.
7. Baird AR and Jackson TS. Fractures of the distal part of the fibula with associated disruption of the deltoid ligament. *J Bone Joint Surg.* 1987; 69:1346-52.
8. Burwell HN, Charnley AD. The treatment of displaced fractures of ankle by rigid internal fixation and early joint movement. *J Bone Joint Surg.* 1965; 47:634-60.
9. De Souza LJ, Gustilo RB, Meyer TJ. Results of operative treatment of displaced external rotation-abduction fractures of ankle. *J Bone Joint Surg.* 1985;67: 1066-74.
10. Cimino W, Ichtetz D and Silabaugh P. Early mobilization of ankle fracture after open reduction and internal fixation. *Clin Orthop Relat Res.* 1991; 267:152-6.
11. Beris AE, Kabbani KT, Xenakis TA, Mitsionis G, Soucacos PK, Soucacos PN. Surgical treatment of malleolar fractures – a review of 144 patients. *Clin Orthop Relat Res.* 1997; 341: 90-8.
12. Roberts RS. Surgical treatment of displaced ankle fractures. *Clin Orthop Relat Res.* 1983; 172: 164-70.
13. Lee Yih-Shiunn, Huang, Chun-Chen NSP, Chen, Cheng-Nan, Lin Chien-Chung. Operative treatment of displaced lateral malleolar fractures: The Knowles pin technique. *J Orthop Trauma.* 2005; 19:192-7.
14. Colton CL .The treatment of Dupuytren's fracture dislocation of the ankle. *J Bone Joint Surg Br* 1971; 53:63-71.

Conflict of interest: None

Funding: None

Cite this Article as: Hardik V, Parag T, Piyush D, Priyesh M Study Of Functional Outcome Of Surgical Management Of Bimalleolar Fractures Of Ankle. *Natl J Integr Res Med* 2017; 8(1):25-27