

Research Article

A study on surgical treatment of ankle fractures- A clinical study of 21 cases

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Abstract

Background: Ankle fractures are the most common significant lower extremity fractures. These fractures gain importance because the whole body weight is transmitted through the ankle, and locomotion depends on the stability of the ankle. Open reduction and internal fixation have become the main stay of treatment for most of the ankle fractures, As these operative methods restores the anatomy, biomechanics and contact loading characteristics of the ankle.

Materials & Methods: The results from a consecutive series of 21 patients followed for an average period of 6 months between November 2010- June 2012 that were classified according to Lauge-Hansens classification and treated according to the AO system are presented. Assessment of the outcome was done using the scoring system of Baird and Jackson which is based on subjective objective and radiological criteria.

Results: Out of 21 patients treated, overall good to excellent results were obtained in 17 patients. The results were fair in three and poor in one patient. There were no intra operative complications. The postoperative complications were skin infection in two patients.

Conclusions: Anatomical reduction is essential in all intra articular fractures, more so if a weight bearing joint like ankle is involved. Open reduction and internal fixation guarantee high standard of reduction besides eliminating chances of loss of reduction. The fibular length has to be maintained for lateral stability of the ankle. Chances of non union of the medial malleolus due to periosteal interposition are avoided. Poor clinical results are found to be associated with unsatisfactory surgical reduction.

Keywords: Ankle injuries; Ankle surgery; Bone screws

1. Introduction

Sir Robert Jones said "Ankle is the most injured joint of the body but the least well treated.¹ They are usually mixed injuries, ligamentous and bony and each injury is an end result of the sequence of ligamentous and bony failure due to deforming forces.² Malleolar fracture have varied presentations which have given rise to a wide variety of classification systems, of which two are Lauge - Hansens and Danis - Weber classification.

Malleolar fractures are one of the most common fractures in orthopaedictraumatology.^{3,4} When malleolar fractures are not reduced accurately they may lead to post traumatic painful restriction of motion or osteoarthritis or both.⁵

Many of the fractures which are stable are reduced by conservative treatment and have given good result. The other unstable displaced and open fractures require open reduction internal fixation. The superiority of ORIF over closed treatment have been thoroughly demonstrated in literature.^{6,7}

The purpose of this study is to assess the functional outcome and results of surgical treatment of malleolar fractures.

2. Materials and Methods

15 patients with ankle fractures between November 2010 to June 2012 were studied. Adult patients with ankle fractures age of 18 yrs and above were included in the study. Following patients were excluded:

- Age of 17 and below
- Associated with ipsilateral calcaneum, talus and tibia fractures
- Patients with spine injuries, head injuries and neurological disturbances which affect the gait
- Previously operated cases

2.1 Exposure and Fixation of Lateral Malleolus

The lateral malleolus was approached through a postero lateral incision. Reduction of the fracture was now done by reversing the force that caused the fracture.

2.2 Exposure and fixation of medial malleolus

A medial longitudinal incision of 8cm was put over the medial malleolus between its anterior and posterior borders with the lower end curving anteriorly at the tip of medial malleolus.

Post-operative immobilisation was done with below knee slab until suture removal and converting it into below knee cast for 4 weeks. On cast removal after 4 weeks, active & passive ranges of motion exercises of the ankle are started. Partial weight bearing was started after cast removal for the next two weeks and full weight bearing after 8 weeks. All the patients were evaluated and scores were given. Regular follow was done at 4 weeks, 12 weeks and 24 weeks.

2.3 Functional and Radiological Evaluation

Functional and radiological results were analyzed using the ankle scoring system of Baird and Jackson. The seven categories in the scoring system were given alphabetical grades each being assigned a point score.

3. Results

In our series of 21 cases of ankle fractures treated by surgical methods at Yenepoya Medical College, Mangalore, during the period from October 2010 to June 2012 were studied. The following were the observations made and the available data are analyzed as follows.

In our study, 6 cases were from 20-30 and 51-60 age group each, followed by 5 in 31-40 and 4 in 41-50. (Fig 1) In our study males were more commonly involved; Males- 13 cases and females- 8 case. (Chart 2) Housewives and labourers topped the list with 28.6% involvement each. (Fig 1) In the present series 12 patients had Supination external rotation type of injuries (57.1%), followed by Pronation abduction injuries 6 patients(28.6%), followed by Pronation external rotation and Supination adduction injuries

Based on the type of fracture, there was no statistically significant difference in their functional outcome. (Table 2) In our study, most of the cases were operated by 2 days (53%).

Fig1: Chart showing Age Distribution of cases

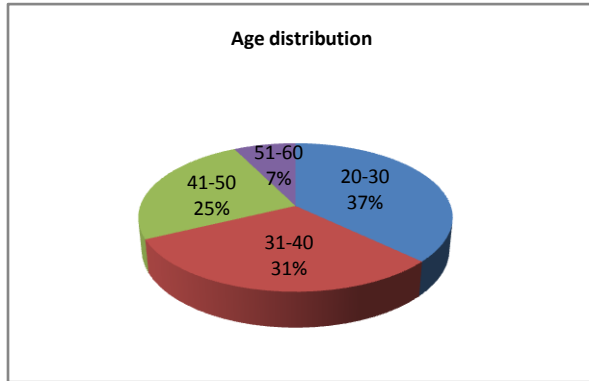


Fig 2: Chart showing Distribution of patients according to sex

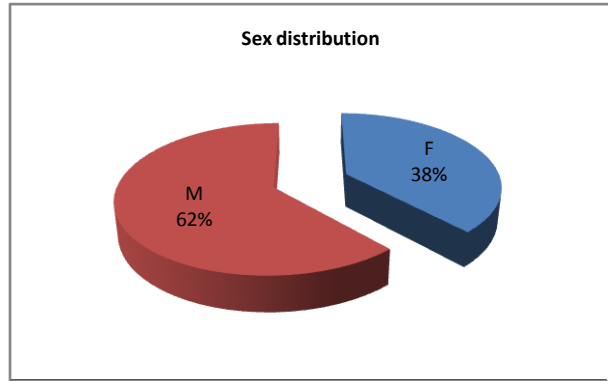


Table 1: Distribution of cases according to Occupation

Occupation	No. of Patients	Percentage
Businessman	5	23.8
Housewife	6	28.6
Labourer	6	28.6
Others	4	19.0
Total	21	100.0

Table 2- Showing comparison between the type of fracture and results

Results	Type				Total
	PA	SER	PER	SA	
Excellent	4	6	2	1	13
	30.8%	46.2%	15.4%	7.7%	100.0%
	66.7%	50.0%	100.0%	100.0%	61.9%
Fair	0	3	0	0	4
	0%	100.0%	0%	0%	100.0%
	0%	25.0%	0%	0%	14.3%
Good	2	2	0	0	4
	50.0%	50.0%	0%	0%	100.0%
	33.3%	19.7%	0%	0%	19.0%
Poor	0	1	0%	0	1
	0%	100.0%	0%	0%	100.0%
	0%	8.3%	0%	0%	4.8%
Total	6	12	2	1	21
	28.6%	57.1%	9.5%	4.8%	100.0%
	100.0%	100.0%	100.0%	100.0%	100.0%

Table 3: Scoring according to the subjective, objective and radiological criteria by Baird and Jackson

Category	Grade A	Grade B	Grade C	Grade D	Grade E	Total
Pain	14	7	-	-	-	21
Stability	21	-	-	-	-	21
Walking	19	2	-	-	-	21
Running	1	20	-	-	-	21
Work	13	8	-	-	-	21
Motion	16	5	-	-	-	21
Radiograph	20	1	-	-	-	21

Table 4: Composite score

Composite score	No. of patients	Percentage
Excellent(96-100)	13	62%
Good(91-95)	4	19%
Fair(81-90)	3	14.3%
Poor(0-80)	1	4.7%
Total	21	100

Following Implants were used

Medial malleolus

Cancellous screw- 10 cases

Malleolar screw- 5 cases

K-wire- 3 cases

Locking Compression Plate - 1

Tension Band Wiring- 1

Majority of the medial malleolar fractures were treated with cannulated cancellous screws i.e 10 cases; the others were treated with malleolar screws, LCP, Tension band wiring and K-wire

Lateral malleolus

Semitubular plate- 15 cases

Dynamic Compression Plate- 1 case

Out of the 16 cases of lateral malleoli fractures 15 were treated with Semitubular plate and 1 with DCP

Final scoring according to the subjective, objective and radiological criteria by Baird and Jackson was made. In the present study of 21 patients with ankle fractures treated by open reduction and internal fixation, excellent results were achieved in 13 patients, good in 4, fair in 3 and poor in 1 patient. (**Table 3**) If Complications are considered then, there was statistically significant difference in the outcome with the patients who had skin infection (in 2 patients) with fair results in one patient and poor result in the other patient. (**Table 4**)

4. Discussion

Fractures of the ankle being articular and in a weight bearing extremity needs accurate reduction if residual pain and disability are to be avoided and the incidence of arthritis is to be reduced.

Treatment of ankle fractures with accurate open reduction and internal fixation using AO principles was found to give good results. In our study 21 patients with ankle fractures treated surgically by open reduction and internal fixation were studied. The analysis has been made using the following subjective, objective and radiological criteria by Baird and Jackson for 25 patients: Pain, Stability, Walking, Running, Work, Motion and Radiograph.

In the present series, majority of the cases were from 20-30 and 51-60 age groups. Males were more commonly involved. According to Lauge Hansen classification 12 patients had Supination external rotation type of injury (57.1%), 6 patients (28.6%) had Pronation abduction injuries, followed by Pronation external rotation and Supination adduction injuries. Two patients had syndesmotic injury and were fixed with syndesmotic screw after confirming the diagnosis preoperatively and intraoperatively.

Out of 21 patients two patients has skin infection which were managed by regular dressing and antibiotic cover. In our study below knee slab was applied after the surgery and was converted into a below knee cast after suture removal. Patient was on Partial weight bearing for 6 weeks and Full weight bearing from 8 weeks. In the present study 80% of patients in this study achieved excellent to good results, 14% achieved fair results and one patient achieved poor result. The patients with poor result had mild pain with activities of daily living, diminution in the abilities to run/work, reduced ankle movements and decreased joint space.

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