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MANAGEMENT OF FRACTURES AROUND ANKLE JOINT

Orthopaedics

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ABSTRACT

Aim: To study the functional outcome and results of surgical treatment of Bimalleolar fractures of the ankle.
Introduction: Malleolar fractures are one of the most common fractures in orthopaedic traumatology. Malleolar fractures necessitate accurate reduction and stable internal fixation.
Materials And Methods: 30 patients with fresh Bimalleolar fractures were studied. The fractures were classified based on Lauge–Hansen's classification in adults. Surgical techniques used were open reduction and internal fixation of lateral malleolus with semi-tubular plate or Tension band wiring and then the medial malleolus with malleolar screws or Tension band wiring.
Results: At the end of the study, excellent to good results were seen in 23(76.7%) cases, 6(20%) cases had fair results, and 1(3.3%) had unfortunate results.
Conclusion:
1. Good anatomical reduction is essential for good clinical outcomes, irrespective of the type of fracture.
2.The results are satisfactory in 90% of patients treated by open reduction and internal fixation.

KEYWORDS

Bimalleolar, Kirshnerwire, Pronation, dorsiflexion, Supination, adduction, Tension band wiring.

INTRODUCTION

Ankle injury is the most common weight-bearing orthopaedic musculoskeletal trauma encountered in emergency medicine and practice. In the clinical setting, the determination of ankle stability is critical when planning fracture management. Stable fractures can be treated conservatively with good results, although outcomes in the management of unstable ankle fractures are often better with surgical treatment. The purpose of the study on malleolar fractures of the ankle is to evaluate the functional outcomes after surgical management by various methods.

OBJECTIVES

To study the functional outcome and results of surgical treatment of Bimalleolar fractures.

METHODS

Study Type

A prospective observational study was carried in the Department of Orthopaedics, Santhiram medical college.

Study Population

The study population included in the current study were 30.

Sampling Criteria:

A) Inclusion Criteria:

- Patients with clinical evidence of Bimalleolar fracture.
- Patients who are willing to give informed and written consent.

B) Exclusion Criteria:

- History of previous surgeries to the musculoskeletal structures in either limb of the lower extremities.
- History of fracture in either limb of lower extremity requiring realignment.
- Acute injuries to musculoskeletal structures of other joints of the lower extremity in the previous 3 months, which impacted joint integrity and function resulting in at least one interrupted day of desired physical activity.

Open Reduction And Internal Fixation

Open treatment is indicated when there is a failure to maintain an adequate position with closed reduction or when significant portions of the articular surfaces are displaced.

Approach To Lateral Malleolus:

A direct lateral approach over the fibula is standard for reducing and internally fixing distal fibula fractures. The dissection plane is between the peroneus Tertius anteriorly and the peroneus longus and brevis posteriorly. when more proximal dissection is required superficial peroneal nerve should be identified and protected.

Approach To Medial Malleolus34:

The medial malleolus is approached directly through a longitudinal incision over the malleolus. In the anterior part of the incision, care must be taken to avoid the saphenous vein and the accompanying nerve.

METHODOLOGY

Thirty patients with fresh Bimalleolar fractures who attended Santhiram Medical College & General Hospital between January 2020 to June 2021 were studied. As soon as the patients were brought to the casualty, a complete survey was carried out to rule out significant injuries. Then the patient's radiographs were taken, both anteroposterior and lateral views of the ankle joints.

On admission to the ward, detailed history was made and then were put through a thorough clinical examination. Analgesics were given and were put on a below-knee posterior pop slab to alleviate pain. The fractures were classified based on Lauge–Hansen's classification in adults. Routine investigations were done for all patients. Patients were operated on as early as possible once the general condition is stable and fit for surgery.

Implants Used For Surgery

Medial Malleolus

· Malleolar screw	23 cases
· Tension band wiring	07 cases

Lateral Malleolus

· Semi-tubular plates	27 cases
· Tension band wiring	03 cases

RESULTS

Final Score According To Subjective, Objective, And Radiological Criteria

Baird And Jackson Scoring System[48]

	Points
Pain	
A. No pain	15
B. Mild pain with strenuous activity	12
C. Mild pain with activities of daily living	8
D. Pain with weight-bearing	4
E. Pain at rest	0
Stability to ankle	
A. No clinical instability	15
B. Instability with sports activities	5
C. Instability with activities of daily living	0
Ability to walk	
A. Able to walk a desired distance without limp or pain	15
B. Able to walk the desired distance with mild limp or pain	12
C. Moderately restricted inability to walk	8
D. Able to walk short distance only	4
E. Unable to walk	0
Ability to run	
A. Able to run desired distance without pain	10
B. Able to run desired distance with slight pain	8
C. A Moderate restriction inability to run with mild pain	6
D. Able to run short distances only	3
E. Unable to run	0
Ability to work	
A. Able to perform usual occupation without restrictions	10
B. Able to perform usual occupation with restriction in some strenuous activities	8
C. Able to perform usual occupation with substantial restriction	6
D. Partially disabled; selected jobs only	3
E. Unable to work	0
The motion of the ankle	
A. Within 10° of uninjured ankle	10
B. Within 15° of uninjured ankle	7
C. Within 20° of uninjured ankle	4
D. <50% of the uninjured ankle, or dorsiflexion<5°	0
Radiographic result	
A. Anatomical with intact mortise (normal medial clear space, normal superior joint space, no talar tilt	25
B. Same as A with mild reactive changes at the joint margins	15
C. Measurable narrowing of the superior joint space, with superior joint space >2mm, or talar tilt >2mm	10
D. Moderate narrowing of the superior joint space, with superior joint space between 2 and 1mm.	05
E. Severe narrowing of the superior joint space, with superior joint space<1mm, widening of the clear medial space, severe reactive changes (sclerotic subchondral bone and osteophyte formation)	00
Maximum possible score	100

Excellent =96-100 points; Good=91-95 points; Fair=81-90 points; Poor=0-80points

Table 1: Final Score According To Subjective, Objective, And Radiological Criteria

category	Grade A	Grade B	Grade C	Grade D	Grade E	Total
Pain	13	14	3	-	-	30
Stability	30	-	-	-	-	30
Walking	25	5	-	-	-	30
Running	18	10	2	-	-	30
Work	25	5	-	-	-	30
Motion	20	8	2	-	-	30
Radiography	27	2	1	-	-	30

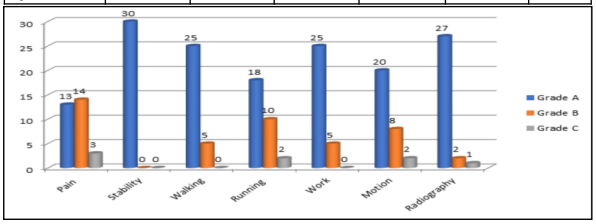

Figure-1 Final Score According To Subjective, Objective, And Radiological Criteria

Ankle Pain

In this series, 13 (43.3%) had no pain, and 14 (46.7%) patients had grade B, i.e., pain with strenuous activities, and the remaining 3 (10%) had pain with activities of daily living.

Stability Of Ankle

All the patients had no clinical instability.

Ability To Walk

The majority, i.e., 25 (83.3%) of patients, could walk a desired distance without limp or pain, and 5 (16.7%) patients were able to walk the desired distance with slight pain.

Ability To Run

Eighteen (60%) patients were able to run the desired distance without pain, 10 (33.3%) patients were able to run the desired distance with slight pain, and 2 (6.7%) patients had moderate restriction inability to run with mild pain.

Ability To Work

In our series, 25 (83%) patients were able to perform usual occupation without restriction, and the rest 5 (16%) patients were able to perform usual occupation with restriction in some strenuous activities.

Motion Of Ankle

In this series, 21 (70%) patients had a range of motion of the ankle within 10° of the uninjured ankle, and 7(23%) patients had motion within 15° of the uninjured ankle. The rest 2 (6%) patients had motion within 20° of the uninjured ankle.

Table 2: Composite Score

Composite score	No. of patients	Percentage
Excellent (96-100 points)	13	43
Good (91-95 points)	10	33
Fair (81-90 points)	6	21
Poor (0-80 points)	1	3
Total	30	100

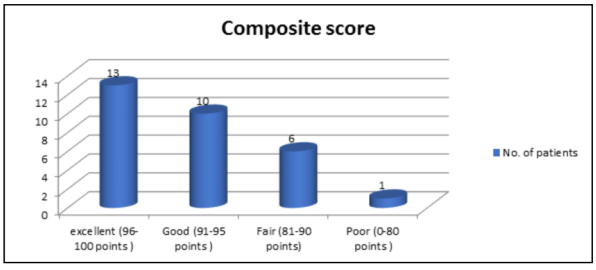

Figure 2: Composite Score

In the present study of 30 patients, Excellent results were achieved in 13 (43%), good in 10 (33%), fair in 6(20%), and poor in 1 (3%) of patients.

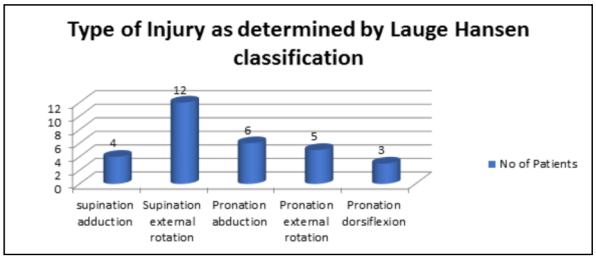

Figure 3

In the present series, 12(40%) patients had supination external rotation injuries, which are the majority followed by 6 (20%) patients having pronation abduction and 4 (13.3%) patients had Supination adduction, 5 (16.7%) had pronation external rotation. The remaining 3 (10%) patients had pronation dorsiflexion in injury.

DISCUSSION

Fracture of the ankle being articular and in a weight-bearing extremity needs accurate reduction if residual pain disability is to be avoided, and the incidence of arthritis is to be reduced. Treatment of malleolar fractures with accurate open reduction and internal fixation using AO principles was found to give results. This study supports these

conclusions.

The scoring system of Baird and Jackson is a composite score with slight variations from normal. About 76% of patients in this series achieved excellent to good results, 20% achieved fair results, and 3% achieved poor results. All had an anatomical reduction of the malleolus radiologically.

The result in the study was compared with Song KJ et al., [55]Erhan Yilmaz et al., Beriset al.[71,] and Frank Wilson and ArneSkilbred. [52]

In Soni KJ Series, good to excellent results were obtained about 89% (32) of cases. In ErhanYilmas et al. series, .good results were obtained in 58%, moderate results in 26%, and poor results in 16% of patients.

In the study conducted by Frank Wilson et al. on 55 patients. Forty –two (77%) had excellent to good results, and only one had poor results.

In the study conducted by Beris et al. of the patients with ankle fractures, there were good to excellent results in 74.3% of patients, fair results in 14.6%, and poor results in 11.1%.

CONCLUSION

In this review of 30 patients with Bimalleolar Ankle fracture treated surgically by open reduction and internal fixation per AO principles

1. The majority of them were supination external rotation injuries
2. Understanding the mechanism of injury is essential for good reduction and internal fixation.
3. The bend of the lateral malleolar should be reproduced during lateral plating for the fibula.
4. Fibular length should be maintained for good ankle stability
5. Good anatomical reduction is essential for good clinical outcomes, irrespective of the type of fracture.
6. The results are satisfactory in 90% of patients
7. Chances of non-union of medial malleolus due to periosteal interpositions avoided.
8. Tension band wiring is the method preferred for small fragments and osteoporotic bone.
9. Cast immobilization for four weeks did not affect movements at the ankle because the duration was very short.

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