International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2019; 5(1): 413-416

www.orthopaper.com
Received: 09-11-2018
Accepted: 13-12-2018

Dr. Bandela Venugopal
Assistant Professor, Department of orthopaedics, Mamta Medical College, Khammam, Telangana, India

Dr. P Bala Krishna Kanth
Assistant Professor, Department of orthopaedics, Mamta Medical College, Khammam, Telangana, India

Dr. Mohammed Abdul Bari
Assistant Professor, Department of orthopaedics, Mamta Medical College, Khammam, Telangana, India

Correspondence
Dr. Bandela Venugopal
Assistant Professor, Department of orthopaedics, Mamta Medical College, Khammam, Telangana, India

Study of surgical management by internal fixation of bimalleolar fractures

Dr. Bandela Venugopal, Dr. P Bala Krishna Kanth and Dr. Mohammed Abdul Bari

DOI: https://doi.org/10.22271/ortho.2019.v5.i1h.74

Abstract
This study has been done to evaluate the effectiveness, functional results and complications following surgical internal fixation of Bimalleolar fractures of ankle joint, In this study 50 patients of fresh bi malleolar fractures of ankle joint treated surgically by internal fixation, studied between may 2017 to February 2018 in mamta general and super specialty hospital, khammam. Surgeries were performed within 5 days average. All cases treated by open reduction and internal fixation, In this study there was 19 cases of abduction, 7 cases of adduction, 16 cases with supination external rotation and 8 cases with pronation external rotation type of injuries with 80% of medial malleolar fracture are treated by malleolar screw and k- wire fixation, the other 20% by tension band wiring, most of the lateral malleolar fractures fixed with one third semi tubular plate amounting to 80% and rush nail have been used in few cases where the fracture is above the syndesmotic level. Anteriomedial approach for medial malleolus and anteriolateral approach for fibula was used in all 50 cases. All the fractures united with a union rate of 94%. Radiological union was possible in 12.2 weeks, weight bearing started from 12 weeks, early ankle stiffness noted in 4 % of cases which was overcome by good physiotherapy and full ankle motion observed in 90% patients. There were one case of non union, two cases of joint stiffness and about ten cases of superficial infections. Functional results according to criteria by Burwell *et al.* 82% of patients achieved good or excellent results, fair result obtained in 17.5% patient and 5% patient functional result was poor.

Keywords: closed fracture, bimalleolar fracture, ankle, internal fixation

Introduction
Injuries and accidents though present since ages, they have increased in modern era due to increase in mobility of man from one place to another place, increase in vehicular traffic and haphazard growth of cities.
Ankle injuries If not treated properly are the cause of disability for long time in the form of pain, instability and early degenerative arthritis of ankle joint. Surgical internal fixation following Bimalleolar fractures is accepted by most of surgeons, as the treatment of choice as Bimalleolar fractures are unstable fractures as it is associated with complications as mentioned above.
The stability of the ankle joint depends on the arrangement of the bones, ligaments, muscles, and on gravitational effects and positioning. Most ankle injuries are produced by abnormal motion of talus, in which a malleolus is either pushed or pulled by means of ligamentous attachments. In general, fractures produced by ligamentous avulsion are transverse; those produced by talar impact are oblique.
In nearly all published studies of treatment of ankle fracture it has been shown that the functional result is proportional to the quality of final reduction of the displacement. Even a displacement of the talus as small as 1mm can result in such incongruity of the joint surfaces as to produce point loading of the articular cartilage sufficient to result in early degenerative arthritis. So internal fixation assumes a greater role in treatment of malleolar fractures.

Objectives
This study has been undertaken to evaluate the effectiveness of internal fixation in malleolar

fractures and its results, complications following such treatment have been analysed.

Material and Methodology

This is the prospective study of effectiveness, results and complications of Bimalleolar fractures following surgical internal fixation, 50 patients with fresh closed billeolar fracture of ankle joint admitted from May 2017 to February 2018 in Mamta General And Super Speciality Hospital, Khammam were selected for the study, all the fractures in the series were post traumatic, and no pathological fractures included in the study. The method used for fracture fixation was open reduction and internal fixation, 80% of medial malleolar fracture are treated by malleolar screw and k- wire fixation, the other 20% by tension band wiring, most of the lateral malleolar fractures fixed with one third semi tubular plate amounting to 80% and rush nail have been used in few cases where the fracture is above the syndesmotic level Anteriomedial approach for medial malleolus and anteriolateral approach for fibula was used in all 50 cases. Bimalleolar fractures treated conservatively, compound Bimalleolar fractures according to Gustilo Anderson classification, comminuted fractures, and syndesmotic disruption are excluded in this study. The following protocol was observed for patients with Bimalleolar fractures on arrival.

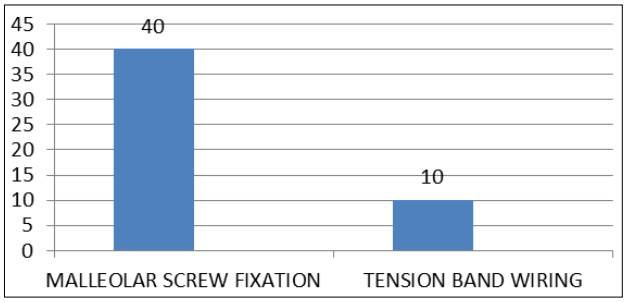
1. General and systemic examination as well as local examination of the patients
2. Thorough assessment of patient to rule out head/chest/abdominal/spinal or pelvic injuries
3. Preoperatively all patients were immobilized in below knee slab.

Observation and Results

A total of 50 patients with fresh billeolar fractures of ankle were studied from may 2017 to February 2018. All these patients were available for follow up at the time of study. Pre operatively following factors were observed and tabulated as follows:

Table 1: Method of internal fixation of medial malleolus

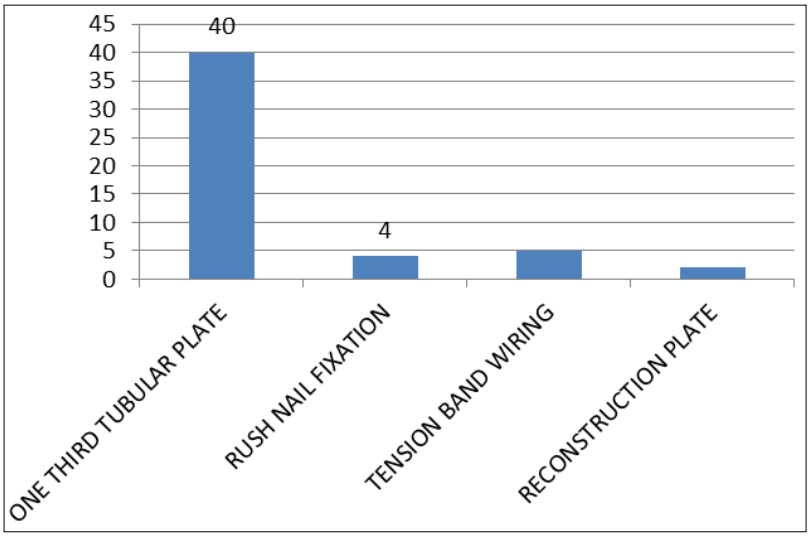
Method	Number Of Cases	Percentage
Malleolar Screw Fixation	40	80%
Tension Band Wiring	10	20%
Total	50	100%



Graphs 1: In present study medial malleolus fixed in 20% patients with tension band wiring and 80% with malleolar screw fixation.

Table 2: Method of fixation of lateral malleolus.

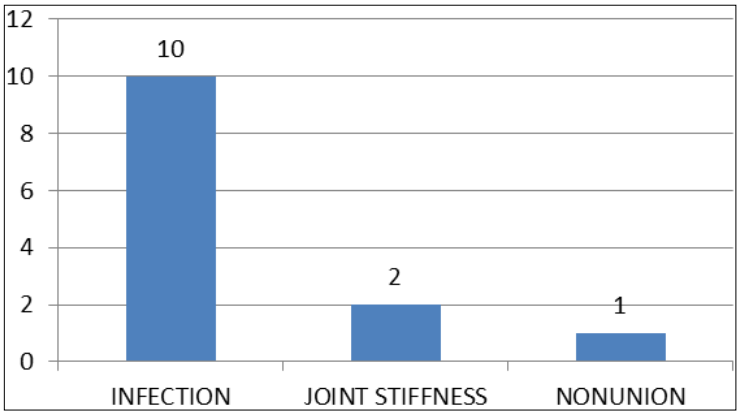
Method	Number of Cases	Percentage
One third tubular plate	40	80%
Rush nail fixation	4	8%
Tension band wiring	5	10%
Reconstruction plate	1	2%



Graphs 2: In present study lateral malleolus fixed in 80% patients with one third tubular plate, rush nail fixation in 8% of cases, tension band wiring in 5% of patients and 2% with reconstruction plate fixation.

Table 3: Postoperative complications.

Mode of complications	Number of patients	Percentage
infection (superficial wound infection)	10	20%
Joint stiffness	2	4%
Non union	1	2%



Graphs 3: Superficial wound infection was noted in 10 cases which is readily controlled with proper treatment. Non union reported in 2% of cases because of improper internal fixation.

Table 4: Functional results of internally fixed cases (50 cases)

Grade	Criteria	Number of Patients	Percentage
Good	Full Range Of Painless Ankle Movement Functional Recovery In 3 Months. No Complications	40	80%
Fair	Slight Pain Terminal Degrees Of Ankle Movement Restricted Functional Recovery In 4 Months Mild Complications Like Post Operative Stiffness, Wound Infection	8	16%
Poor	Painful Restricted Movements Of Ankle. Poor Functional Recovery With Complications Like Prolonged Infection And Improper Fixation $<50^0$	2	4%

Table 5: Comparison with Other Series

Burwell *et al.*	In Our Series
Good - 82%	Good - 80%
Fair – 17.5%	Fair - 16%
Poor - 5%	Poor - 4%

Discussion

The present study has been undertaken to assess the% role of internal fixation in Bimalleolar fractures. Total number of 50 cases has been followed during May 2017 to February 2018. Lauge Hanson classification has been followed to classify the fractures and their incidence. 38% of patients had abduction type of injury followed by supination external rotation injury i.e. 32%. The remaining 30% shared by other modes of injuries.

Regarding the fixation 80% of medial malleolar fractures are treated by malleolar screw and k-wire fixation the other 20% are treated by tension band wiring. Most of the lateral malleolar fractures have been fixed with one third tubular plate amounting to 80% and rush nail have been used in few cases where the fracture is above the syndesmotic level. Routine post operative plaster immobilization was applied for all patients up to suture removal and non weight bearing active exercises are advised in all the cases after suture removal with intermittent removal of the posterior plaster splint. Weight bearing started from 12 weeks onwards if the patient tolerates.

After evaluating the results at the end we had 80% of good results 16% of fair result and 4% of poor results.

Regarding the complications most of them are superficial skin infection only. One case of non union is recorded because of implant failure. We had noted early ankle stiffness in 4% of cases which was overcome by good physiotherapy. Comparing with other series made by Burwell *et al.* reported good results in 82% of cases and fair results in 17.5% of cases, Poor result of 5% of cases.

The swing towards the internal fixation has been favoured by these results and is compared with observations by Ramsay and Hamilton who has shown that even 1mm talar tilt can reduce tibio-talar contact area by 42% leading to point loading and degenerative arthritis.

In fact Burwell, Muller, Weber, Rudi and A.O. group in Switzerland have recommended open reduction and internal fixation in all Bimalleolar fractures.

This study shows that internal fixation of Bimalleolar fractures is an effective way of managing malleolar fractures.

Conclusions

Bi malleolar Fracture represent a complex problem and optimal management is essential if the patient is to regain significant pre injury level of function, this study comprised of 50 patients of fresh bi malleolar fracture treated with rigid internal fixation admitted between may 2017 to February 2018.

1. Abduction type of injury found commonest followed by supination external rotation injuries,
2. No incidence of post traumatic arthritis, malunion has been noticed.
3. The quality of clinical results was proportionate to the accuracy of fracture reduction.
4. Early mobilization after internal fixation prevents stiffness of the ankle joint.
5. It is concluded that rigid fixation following anatomical reduction is an effective way of managing malleolar fractures and avoid the complications seen with conservative treatment. Most complications following internal fixation of bi malleolar fractures are minor and can be easily treated.

References

1. Brodie IAOD, Denham RA. The treatment of unstable ankle fractures J Bone joint surgery. 1974; 56-B:252-262.
2. Burwell HN, Chanley AD. The treatment of displaced fractures of ankle by rigid internal fixation and early joint movement. J Bone joint surgery. 1965; 47-B:634.
3. Brodie IAOD, Denhan RA. Treatment of unstable ankle fractures J Bone joint surgery. 1974; 56-B:256.
4. Dehnars LE. Pathogenesis and treatment of bi malleolar fractures AAOS instr courser Lact. 1990; 39:85.

5. Lindsizo U. Operative treatment of ankle fracture dislocations a follow up study of 306/321 consecutive cases–clin-orthoop. 1985; 199:28-38.
6. Burwell HM, Cherenly AD. Treatment of displaced fractures of the ankle by rigid internal fixation and early joint mobilization J bone joint surgery. 1965; 47-B:634.
7. Beris AE, Kabbani KT, Xenakista *et al*. Surgical treatment of Malleolar fractures: A review of 144 patients clin orthopaedics. 1997; 341:90-98.
8. Brodie IAOD, Denhan RA. Treatment of unstable ankle fractures J Bone joint surgery. 1974; 56-B:256.
9. Burwell HM, Cherenly AD. Treatment of displaced fractures of the ankle by rigid internal fixation and early joint mobilization J bone joint surgery. 1965; 47-B:634.
10. Phillips WA, Spiegel PG. Evaluation of ankle fractures non operative verses operative, clinortho OP editorial. 1979; 138:17.
11. Lee HG, Horn TB. Internal fixation of the ankle. 1943; 76:593.
12. Muller Allgower M, sachnaider R, willungger H. Manual of internal fixation techniques recommended by AO group ED 2 Newyork, Springer-Verlog, 1979.
13. Ramsey PL, Hamilton W. Changes in tibio-talar area of contact caused by lateral talar shift J Bone Joint Surgery. 1976; 58-A:356-359.
14. Phillips WA, Schweartz HS, Keller CS *et al*. A prospective randomized study of management of severe ankle fractures J Bone & joint surgery. 1985; 67A:67.
15. Roberts RS. Surgical treatment of displace ankle fractures clin Ortho. 1983; 172:164.
16. Siegel D. Ankle fractures, internal fixation II. Displaced ankle fractures treated surgically and post operative management AAO & Inster course lect. 1979; 28:79.
17. Wilson FE Jr. Skilberd LA. Long term results in the management of displaced bimalleolar fractures J Bone Joint Surgery. 1966; 48A:1065.
18. Tunturi T, Kemppainen K, Patiala H *et al*. importance anatomical reduction for subject recovery of ankle fractures in acta ortho op Scad. 1983; 54(303):641-647.