

Open reduction in Pott's fracture-boon or bane

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Abstract

Introduction: Pott's fractures are common fractures occurring in all age groups. Appropriate management is necessary for optimal function and to prevent complications.

Objectives: To assess the role of ORIF of Pott's fractures in adults with fibular plating and Screw fixation of medial malleolus.

Materials and Methods: This was a Prospective study done at Kamareddy ortho and trauma care centre, Kalaburagi on 40 patients. Patients were evaluated with Olerud and Molander Score (OMAS) and radiologically.

Results: In our series of 40 patients, 20 patients (50%) had excellent results as per Olerud and Molander Scoring system, 12 (30%) had good results. 4 patients (10%) had fair results and a favourable outcome of 93%.

Conclusion: Our Study recommends ORIF of displaced Closed Pott's fractures, Cannulated Cancellous screw for medial malleolus and Lag Screw with posterior Neutralization plate for lateral Malleolar fractures.

Keywords: Pott's fracture, Malleolous, Canulated cancellous screw, Plate, Open reduction.

Introduction

The most common lower limb fractures are ankle fractures.¹ Sir Robert Jones said.

"The most injured joint of the body is Ankle joint but the least well treated".² They account for 9% of all fractures³ one fourth constitutes bimalleolar fractures.⁴ The most common causes of ankle fractures are twisting injuries and falls, followed by sports injuries. However, in the Indian scenario, RTA is the commonest mode of injury.⁵

Cast immobilization leads to a stiff, painful and swollen joint⁶. Hence, surgical fixation is the better choice. Failure to adequately identify and treat injuries to the syndesmosis may result in continued ankle instability and poor patient outcomes.

Aims and Objectives

1. To assess the role of open reduction and internal fixation of Pott's fractures fixed with fibular plating and Cannulated Cancellous Screw.

2. To evaluate functional outcome of surgically managed Pott's fractures.

Pre-operative radiographic assessment

Anatomical reduction includes maintaining the length, alignment and rotation of fibula and hence restores the syndesmosis.

Tibiofibular line (In Mortise view a line from distal fibular tubercle if drawn toward tibia should pass through tibial plafond)

Circle sign (on the mortise view there is complete circle formed between lateral recess of fibula and lateral process of the talus).⁷

There should be equal and parallel medial, superior and lateral clear space on the mortise View.

Circle sign and uniform clear space reflects restoration of fibular rotation and syndesmotic alignment.

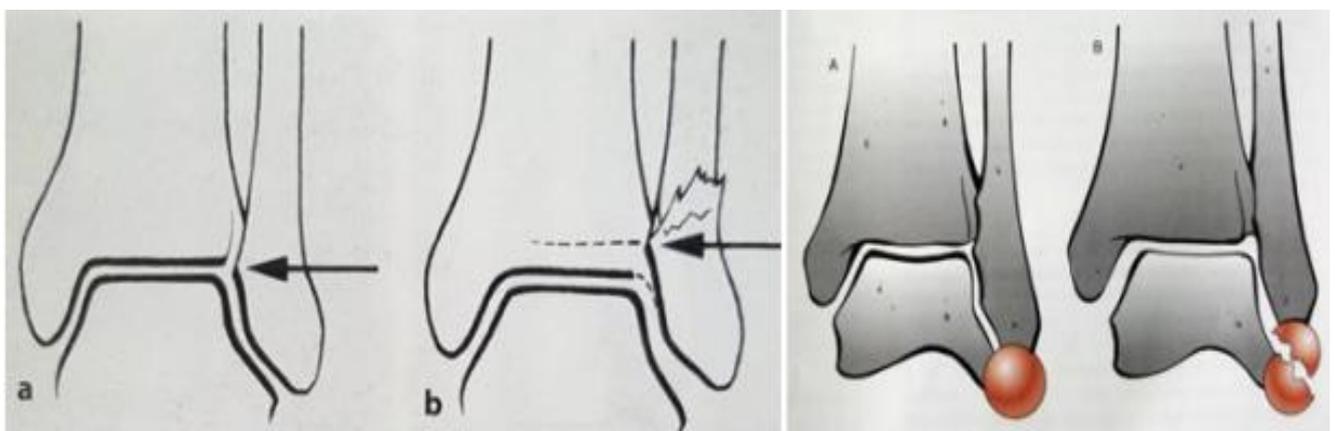


Fig. 1: Tibiofibular line circle sign

The two most universally accepted classification systems are the Danis-Weber and Lauge-Hansen systems.⁸⁻¹⁰

Danis-Weber AO Classification

1. Fibula fracture below syndesmosis (infrasyndesmotic)
2. Fibula fracture at the level of syndesmosis (trans-syndesmotic)
3. Fibula fracture above syndesmosis (suprasyndesmotic)

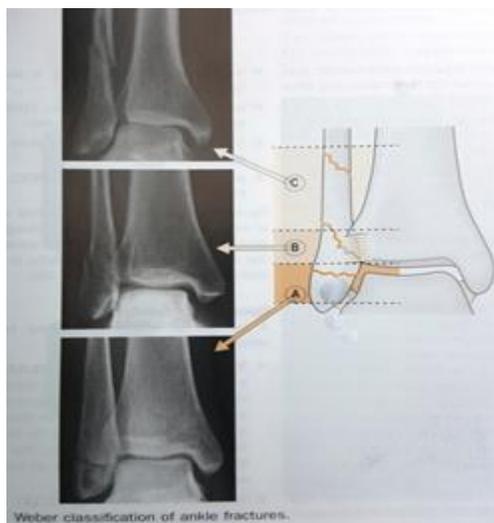


Fig. 2

Material and Methods

This is a prospective study carried out from May 2016 to June 2018 at kamareddy ortho and trauma care centre Kalaburagi, Karnataka, India, involving surgical intervention of ankle fractures and followed up for a period of 12 months. The study included 40 adult cases who were treated for Pott's fractures of ankle. X-Ray of antero-posterior, lateral and mortise view of ankle joints were taken.

Inclusion criteria

1. Patients with age above 18 years.
2. Patients having closed Pott's fractures
3. Patients who are fit for surgery and have given informed consent.

Exclusion criteria

1. Skeletally immature patients.
2. Patients with associated fractures around ankle joint.
3. Patients with undisplaced fractures which can be treated by closed methods.
4. Patients with late presentation, with nonunion, malunion and neurovascular injury.

Operative Procedure

Preoperatively the care of limb was given with Temporary Posterior Plaster Splint and kept elevated.

ORIF- Medial Malleolus by Cannulated Cancellous Screw 4 mm.

The Lateral malleolus was Fixed by 1/3rd Tubular Plate.

The surgeries were done in Spinal or Epidural Anaesthesia under tourniquet control. The Average Op Time was 1 hr.

For lateral malleolus

The fibula was Fixed first by lateral approach and fixed with 1/3rd Tubular plates.

For medial malleolus

ORIF by antero-medial incision was done, fracture site exposed, Soft tissue interposition were cleared and reduced & fixed with Cannulated Cancellous 4mm.

Post-operative

I/v antibiotics was administered for 5 days, the limb was kept elevated with a posterior splint. Active toe movements were advised on the Post op day -0. Knee range of movements were started from Post op day -1, Non- weight bearing Mobilization was done using Crutches around post op day-3. Sutures were removed on the 12th day & a Below knee plaster was applied. Patient was advised Non weight bearing and physiotherapy for atleast 6-8 weeks and partial weight bearing after 8 weeks. Follow-up X-rays were taken every month.

Results

Assessment criteria

All patients will be reviewed in OPD and X-ray were taken from 5th week onwards. Symptoms and functions were assessed by Olerud and Molander (1984) Scoring System.

Table 1: Functional outcome

Excellent	Good	Fair	Poor	Lost to follow up
20	12	4	4	0

In this prospective study, 40 cases of Pott's fractures of ankle were treated by surgery. The youngest patient was 24 years old and the eldest patient was 76 years old. The mean age was 45 years. In this series, men were more commonly involved, with M:F ratio of 6:1.

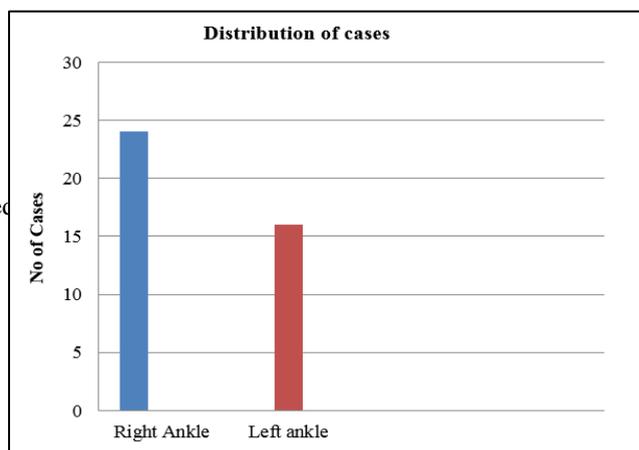


Fig. 3

Right ankle was most common involved in 24 (60%) cases and left ankle in 16 (40%) cases. RTA was most commonest cause involving 20 (50%) cases, followed by 16 (40%) cases by fall, and 4 (10%) cases of twisting injury.

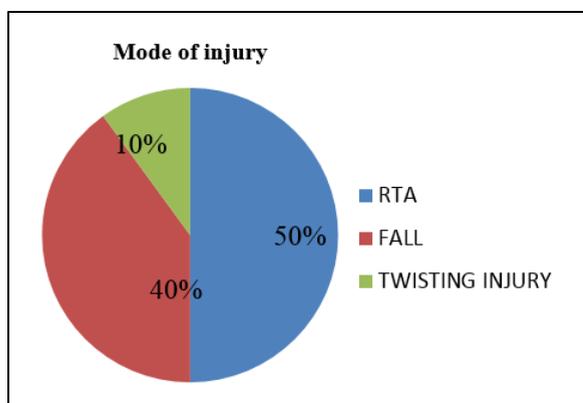


Fig. 4

Majority of the cases 20 (50%) showed supination–external rotation injury, followed by 10 (25%) cases of pronation–external rotation injury. In this study, most of the cases were operated between 2nd and 6th day of injury (77.5%). The mean time interval was 4 days. Five patients were operated late after 6 days of injury. Of them, 3 patients showed poor local condition (edema) and two patients came late after injury.

The average time for union was 10.4 weeks in our study. Predominant (80%) cases had union between 8 to 14 weeks. In our study, 2 Patient developed complications. 1 patient showed superficial infections. The superficial infections were managed with oral antibiotics. 1 Patient had delayed union of medial malleolus which was treated by immobilization, which eventually united.

Discussion

The most common joint involved for intraarticular fracture in weight bearing joint is the ankle joint.¹¹ Burwell and Charnley showed that anatomical reduction and rigid fixation led to early return to function.¹¹ The ankle is a mortise in which the talus is constrained by the fibula laterally and tibia both superiorly and medially, this configuration as also been referred to as the malleolar fork.¹²

Closed method often results inadequate restoration of the anatomy and biomechanics of ankle in unstable ankle fractures, however, 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.^{11,13,14}

The commonest age group ranges from 21–30 years age group, with mean age of 40 years and male:female ratio was 16:24, which were comparable with the studies done by Beris et al¹⁵ on 144 patients of ankle fractures with mean age of 30yrs the male: female ratio was 56:88 and male percentage was 38.8% and In a study by Robert et al¹⁶ on 25 patients of ankle fractures the mean age group having ankle fracture was around 40 years the male: female ratio was 11:14 and male percentage was found to be 44%.

In the current study, RTA constituted majority of cases, which was in accordance with study by Lee et al¹⁷ study

which was done on 168 ankle fracture patients and found that 98 patients had sustained injury due to Road Traffic Accident.

In this study, Right side was frequently involved, in accordance with Roberts¹⁶ and Beris et al¹⁷ ROBERT SR in the study of 25 patient's ankle fractures observed that 14 (56%) patients had Right sided ankle fracture and 11 (44%) patients had Left sided ankle fracture. Beris et al in their study of 144 patients of ankle fractures observed that 73 (50.6%) patients had Right sided ankle fracture and 71 (49.3%) patients had Left sided ankle fracture.

Lauge-Hansen classification system was used for operative evaluation. The most common type of injury was supination– external rotation (50%), followed by pronation– external rotation injury (25%), in accordance with Roberts,¹⁶ Beris et al.¹⁷

ROBERT SR in this study on 25 patients of ankle fractures, Supination External Rotation (34%) was the most common type of injury, while another study by Beris et al on 144 patients found supination external rotation (45%) as most common type of injury in ankle fracture patients.

Gregory Joy et al¹⁸ study recommended that anatomical reduction is the key towards a good clinical outcome, our study is also in contention with the same.

Hughes et al¹⁹ in their study recommended that lateral malleolus should be fixed first, then medial malleolus is inspected for stability and fixed if necessary.

This allows minimal postoperative immobilization and rapid recovery of function. The fractures of the medial malleolus are close to the plafond and require anatomic reduction to restore normal Tibio-Talar relationship but it does serve to emphasize that the lateral malleolus should no longer be ignored.

Displaced lateral malleolar fractures essentially require ORIF.²⁰ Lateral malleolus is important in displaced ankle fractures.²¹ However it does not decrease the necessity of anatomic reduction of medial malleolus.²² It has been advocated three alternative options for fixing lateral malleolar fractures which are 2 or 3 inter fragmentary screws, double oblique lag screw from the tip and semitubular plating. Plating has pitfalls of wound healing and cannot be done in osteoporotic bone.²³ Semitubular plate fixation is biomechanically sound effective but it needs 2nd operation for removal.²⁴

Results of our study highlighted almost 50% patients had excellent, 30% good, 10% fair and 10% poor as per Olerud and Molendar Scoring System.²⁵ 10% patients lost to follow up. Therefore, open reduction and internal fixation is an important therapeutic treatment option in case of ankle joint fracture, with very less chance of developing complications.

Our study reveals anatomic reduction of the fracture and restoration of the joint congruity of the ankle is possible at the earliest by surgical method. Most patients will have full range of motion by end of 12 weeks.

Conclusion

Anatomical reduction is essential in all intra articular fractures, especially in a weight bearing joint like ankle joint. Open reduction and fibular plating achieves restoring the length of fibula as well maintain the lateral stability of ankle and fixing the medial malleoli helps in achieving the stable ankle joint. Thus restores the two pillars of the ankle mortise and restores the syndesmotic integrity. We conclude that Good functional results are obtained by Surgery fixation of fracture. Early weight bearing and mobilization is achieved. Excellent results are obtained with stable fixation of fracture. Cancellous screws are far better in internal fixation of medial malleolus and lateral plating was the best for fibular fracture.

Source of funding

None

Conflict of interest

None.

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