

Comparison of Plaster Cast and Fixation with Plate and Screw for Management of Tibial Fractures: A Clinical Study

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ABSTRACT

Background: The tibial bone fracture is quite common and management requires careful analysis of case. The present study was carried out to compare plaster cast and fixation with plate and screw for management of tibial fractures.

Materials & Methods: This study was conducted in the Department of Orthopaedics, World College of Medical Sciences and Research, Gurawar, Jhajjar, Haryana (India) on 80 patients of both genders. Patients were divided into 2 groups of 40 patients each. Group I treated with plaster cast and Group II treated with fixation with plate and screws. Factors such as time to fracture healing, numbers of delayed union, nonunion and malunion, incidence of infection, and other complications were recorded in all groups.

Results: Group I was treated with plaster cast (40) with 20 males and 20 females. Group II treated with fixation with plate and screws with plaster cast (40) with 20 males and 20 females. The difference was non-significant ($P > 0.05$). Nonunion or delayed union was seen in group I was 14% and in group II was 12%. The difference was non-significant ($P = 0.2$). Malunion seen in group I was 20% and in group II was 14%. The difference was non-significant ($P = 0.1$). There was no superficial infection in group I. In group II, 8% of infection was seen. The difference was significant ($P < 0.05$). The need for reoperation in group I was 10% and in group II was 12%. The difference was non-significant ($P > 0.05$).

Reason for tibial fractures were road side accident (RSA) (60%), sports injury (20%) and fall from height (20%) in group I. In group II, the reason was road side accident (75%), sports injury (20%) and fall from height (5%). The difference was non-significant ($P > 0.05$).

Conclusion: Tibial fractures are becoming common due to road side accidents, fall from height and sports injury. Closed reduction and immobilization and open reduction with plates and screws are widely used.

Key words: Malunion, Nonunion, Tibial.

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INTRODUCTION

Tibial shaft fractures are classified according to the AO classification of long bones (Type 42) and are divided into simple, wedge and complex fractures (Type 42. A/B/C). Type A fractures are subdivided into spiral, oblique and transverse fractures, type B into spiral wedge, oblique wedge and transversal wedge fractures. Type C fractures are subdivided into spiral, segmental and irregular fractures. Closed soft tissue injuries can be classified by the classification of Tscherne/Oestern and open fractures by the classification given by Gustilo/Anderson.¹

The management of unstable distal tibia fractures remains Challenging. The proximity to the ankle makes the surgical treatment more complicated. Closed fractures of the tibial shaft are common. Tibia shaft fractures are the most common long

bone fractures. They usually occur in young and active patients and are often due to high-energy trauma like motor vehicle accidents, sports or falls from height. Advances in mechanization and the acceleration of travel have resulted in increase in road traffic accidents which is associated with increase in the number of Tibial fractures. Direct trauma like road traffic accidents often cause concomitant severe soft tissue damage with a high incidence of open fractures. The lack of soft tissue covering of the tibial shaft and difficult blood supply make these fractures vulnerable to infection and non-union. Tibial shaft fractures are severe injuries and may result in permanent disability.² Despite different treatment modalities, controversy still exists as to the best method of treatment. Stable, non-displaced fractures of

the tibial shaft can be treated conservatively by cast application. Conservative treatment in a thigh plaster is performed for approximately 4 weeks. Afterwards a functional brace can be used for 8 to 12 weeks. Intramedullary nailing is indicated for open and closed isolated tibia shaft fractures. Conventional plate osteosynthesis used to be the method of choice for tibial shaft fractures without soft tissue injury until recently being replaced by intramedullary nailing with locking screws.³ The present study was conducted to compare different treatment modalities for management of tibial fractures.

MATERIALS & METHODS

This study was conducted in the Department of Orthopaedics, World College of Medical Sciences and Research, Gurawar, Jhajjar, Haryana (India) on 80 patients of both genders. Patients were informed regarding the study and written consent was taken. Patient data such as name, age, gender etc was recorded. Patients were divided into 2 groups of 40 patients each. Group I treated with plaster cast and Group II treated with fixation with plate and screws.

Factors such as time to fracture healing, numbers of delayed union, nonunion and malunion, incidence of infection, and other complications were recorded in all groups. Results thus obtained

were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I shows that group I treated with plaster cast (40) with 20 males and 20 females. Group II treated with fixation with plate and screws with plaster cast (40) with 20 males and 20 females. The difference was non-significant ($P > 0.05$).

Table II shows that nonunion or delayed union seen in group I was 14% and in group II was 12%. The difference was non-significant ($P = 0.2$). Malunion seen in group I was 20% and in group II was 14%. The difference was non-significant ($P = 0.1$).

Graph I shows that there was no superficial infection in group I. In group II, 8% of infection was seen. The difference was significant ($P < 0.05$).

Group II shows that the need for reoperation in group I was 10% and in group II was 12%. The difference was non-significant ($P > 0.05$).

Table III shows that reason for tibial fractures were road side accident (RSA) (60%), sports injury (20%) and fall from height (20%) in group I. In group II, the reason was road side accident (75%), sports injury (20%) and fall from height (5%). The difference was non-significant ($P > 0.05$).

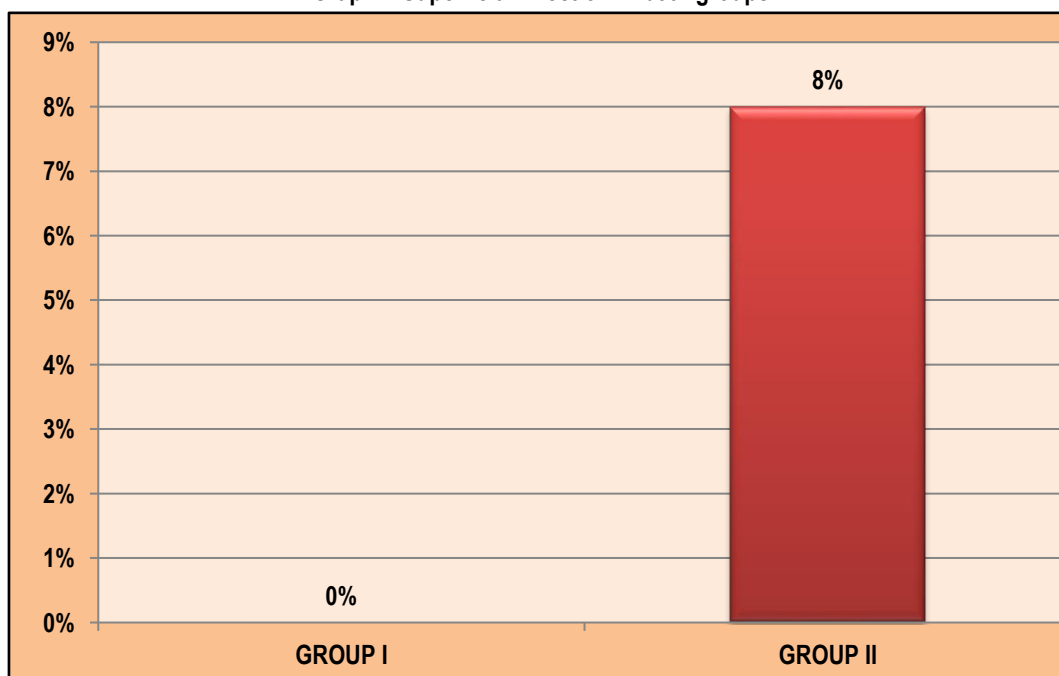
Table I: Distribution of patients in both groups

Group I [Plaster cast (40)]		Group II [Fixation with plate and screw (40)]	
Male	Female	Male	Female
20	20	20	20

Table II: Delayed union, nonunion and malunion in both groups

Groups	Group I	Group II	P value
Delayed union, non-union	14%	12%	0.2
Malunion	20%	14%	0.1

Graph I: Superficial infection in both groups



Graph II: Need for reoperation in both groups

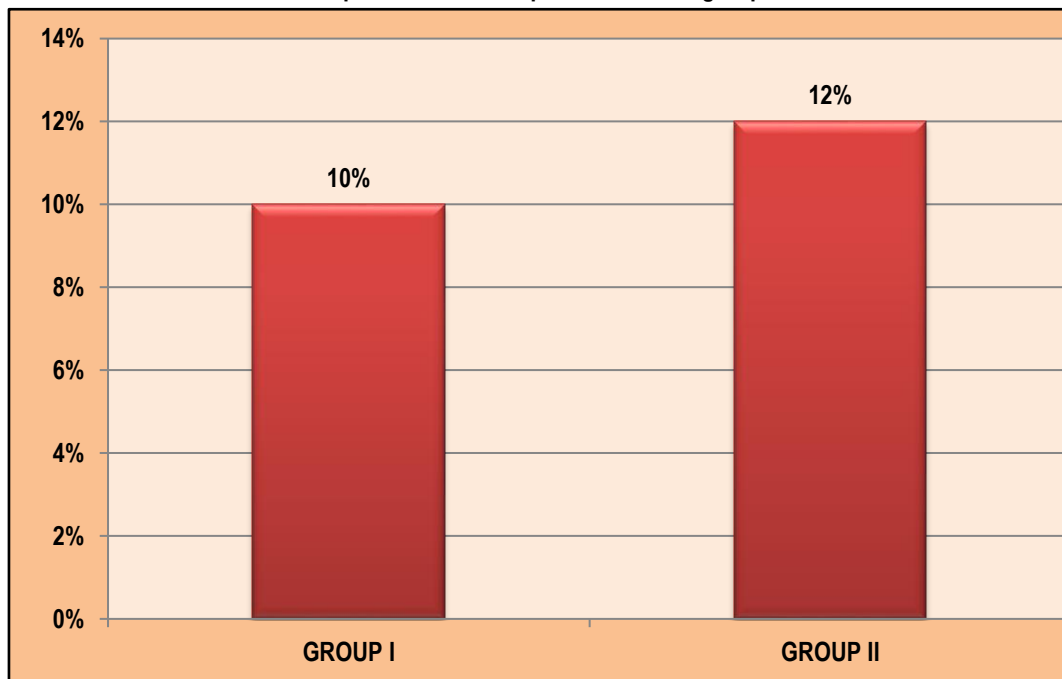


Table III: Mode of injury in both groups

Mode	Group I	Group II	P value
RSA	60%	70%	0.1
Sports Injury	20%	20%	
Fall from height	20%	5%	

DISCUSSION

The direction, magnitude and location of the force, as well as the position of the knee at impact, determine the fracture pattern, location, and degree of displacement. Most studies have shown, that the most injuries affect the lateral plateau, isolated injuries of the medial plateau occur in (10% to 23%) of cases, whereas involvement of both plateaus is found in (10% to 30%) of reported series. Fractures of tibia occur as a result of strong valgus or varus forces combined with axial loading.⁴ The present study was carried out to compare different treatment modalities for management of tibial fractures.

In present study, patients were divided into 2 groups of 40 patients each. Group I treated with plaster cast and Group II treated with fixation with plate and screws. We found that nonunion or delayed union seen in group I was 14 % and in group II was 12%. Malunion was seen in group I was 20% and in group II was 14%. Similar results were seen with the study of Chui et al.⁵

Tibial fractures are difficult to treat because of their intra-articular nature, cancellous bone involvement, and proximity to a major weight bearing joint. Despite of many advances in the care of intra-articular fractures, management of these fractures remains challenging for orthopaedic surgeons even in the present day.⁶

We found that, in group II, 8% of infection was seen. Blachut et al⁷ found high prevalence of infection with plates and screws in their study. The need for reoperation in group I was 10% and in group II was 12%. Similar results were seen in study of Court et al.⁸

Open reduction and stable internal fixation is required for depressed or displaced and unstable fractures to regain the early and complete range of motion. Proper physiotherapy and

compliance of patient are equally important to achieve good results. Full weight bearing fast, solid bony union, avoidance of pseudarthrosis, regain full range of motion of the knee and ankle joint, avoiding infections and further soft tissue damage are the aims of the tibial shaft fractures therapy.⁹

In distal tibial fractures, Bedi et al¹⁰ summarised the literature regarding both intramedullary nailing and plating. They quoted five papers dealing with intramedullary nailing of distal fractures. Altogether the papers dealt with 266 fractures treated by intramedullary nailing. Ten patients were lost to follow up but of the remaining fractures 84.4% united without secondary surgery with the remaining 15.6% requiring a reconstructive procedure. In the six papers dealing with percutaneous plate fixation of distal tibial fracture there were 116 fractures of which six (5.2%) required secondary surgery to facilitate union.

CONCLUSION

Closed reduction and immobilization and open reduction with plates and screws are widely used. Complications are common with both techniques. Therefore selection of specific treatment modality is essential in preventing complications.

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