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A Prospective Study on Fibular Fixation in Patients of Distal Tibial Fractures

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ABSTRACT

Background: Distal tibia fractures with associated fibular fractures can result from high-energy trauma. The present study was conducted to assess fibular fixation in patients with distal tibial fractures. **Methods:** This study was conducted on 82 patients of distal tibia and fibula fractures of both genders. Patients were treated with minimally invasive percutaneous plate osteosynthesis (MIPPO). The outcome of the surgery was assessed. Clinical results graded as excellent, good and fair as per Tenny Wess criteria. **Results:** Out of 82 patients, males were 50 and females were 32. The mode of trauma was RTA in 46, fall in 21 and violence in 5. Left side was injured in 30 and right side in 52 cases. Time taken for full weight bearing was 20. 1 weeks and for partial was 6.4 weeks, time for radiological union was 20.4 wks and range of dorsiflexion motion at ankle was 16 degrees and plantar flexion was 31 degree. The difference was significant (P< 0.05). Clinical results were excellent (58), good (24) and fair (0) as per Tenny Wess criteria. The difference was significant (P< 0.05). **Conclusion:** Authors found that minimally invasive percutaneous plate osteosynthesis for distal tibia fractures with fibula fixation is more feasible and excellent results are obtained.

Keywords: Fibula, plate osteosynthesis, Tibia.

INTRODUCTION

Distal tibia fractures with associated fibular fractures can result from high-energy trauma such as motor vehicle accidents or low-energy torsional injuries.[1] Treatment of distal tibia fractures is challenging because of the limited soft tissue envelope, subcutaneous location of the bone, poor vascularity, and limited opportunities for surgical incisions.[2]

The incidence of tibial shaft fractures especially those of the distal end are on the rise due to increased rate of road traffic accident by two wheeler users, partly due to the traffic scenario in the Indian Subcontinent. High speed vehicles, poor infrastructure and rapid industrialization has further compounded the problem.[3] Managing distal tibial fractures is a dreadful experience both for treating orthopaedic surgeons and patients. A major reason is the relative poor vascularity of the distal segment which delays the fracture healing. It is dificult to obtain a satisfactory reduction and rigid fixation due to the short distal segment resulting in instability at the fracture site. Conservative management of these fractures were highly unacceptable as it caused severe shortening, non-union, mal-union and ankle stiffness.[4]

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The MIPPO technique, using cortical as well as locking screws for the anatomical precontoured locking plates, are hence used in these cases. Since this is a rigid / semirigid fixation without much compression at the fracture site, the postoperative protocol is almost like that of intramedullary nailing. The weight bearing is allowed as the fracture healing progresses.[5] The present study was conducted to assess fibular fixation in patients with distal tibial fractures.

MATERIALS AND METHODS

This study was conducted in the department of Orthopaedics. It comprised of 82 patients of distal tibia and fibula fractures of both genders. Patients were informed regarding the study and their consent was obtained. Ethical clearance was obtained before starting the study.

Demographic profile such as name, age, gender etc. was recorded. Patients were subjected to CT scan to assess the fracture. Patients were treated with minimally invasive percutaneous plate osteosynthesis (MIPPO). The outcome of the surgery was assessed and the patients were followed up clinically and radiographically during the post-operative period. Clinical results graded as excellent, good and fair as per Tenny Wess criteria. Results were subjected to statistics. P value < 0.05 was regarded significant.

RESULTS

Table 1: Distribution of patients

Total- 82		
Gender	**Males**	**Females**
Number	50	32

[Table 1] shows that out of 82 patients, males were 50 and females were 32.

Table 2: Characteristics of patients

	Variables	Number	P-value
Mode of trauma	RTA	46	0.02
	Fall	21	
	Violence	5	
Side injured	Left	30	0.05
	Right	52	
Time taken for weight bearing (wks)	Partial	6.4	0.02
	Full	20.1	
Time for radiological union (wks)		20.4	
Range of motion at ankle (degrees)	Dorsiflexion	16	0.04
	Plantar flexion	31	

[Table 2] shows that mode of trauma was RTA in 46, fall in 21 and violence in 5. Left side was injured in 30 and right side in 52 cases. Time taken for full weight bearing was 20. 1 weeks and for partial was 6.4 weeks, time for radiological union was 20.4 wks and range of dorsiflexion motion at ankle was 16 degrees and plantar flexion was 31 degree. The difference was significant (P< 0.05).

Table 3: Outcome of treatment

Grading	Number	P value
Excellent	58	0.01
Good	24	
Fair	0	

[Table 3 &Figure 1] shows that clinical results were excellent (58), good (24) and fair (0) as per Tenny Wess criteria. The difference was significant (P< 0.05).

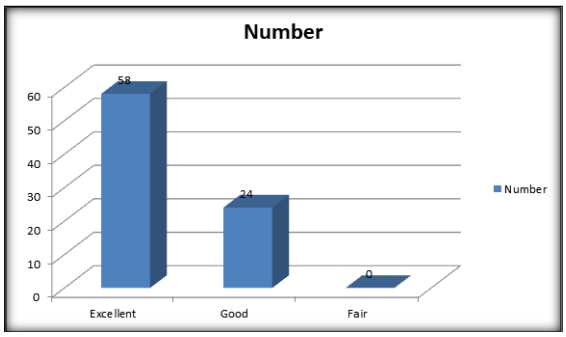

Figure 1: Outcome of treatment

DISCUSSION

Tibial fractures are seen in less than 7% fractures and less than 10% of all lower limb fractures and again 15% of all distal tibia fractures are extra-articular. These fractures are common, following road traffic accidents. Since the muscles and soft tissues covering are less in the lower leg hence the fracture will tend to be an open fracture.[6] Thus, the complications of infection (16%), soft tissue damage, delayed union (14%) are more common in distal tibia fractures. The surgical management of distal tibia fractures has significantly evolved over the past several decades.[7] In 1969, precedent for fixation of the fibula associated with distal tibia intraarticular fractures (ie, pilon fractures) was established by Ruedi and Allgower,[8] citing the following operative principles such as restitution of correct length of fibula, reconstruction of articular surface of tibia, cancellous bone autograft and medial support by buttress plate. The present study was conducted to assess fibular fixation in patients with distal tibial fractures.

In this study there were 82 patients, of which males were 50 and females were 32. The mode of trauma was RTA in 46, fall in 21 and violence in 5. Left side was injured in 30 and right side in 52 cases. Time taken for full weight bearing was 20. 1 weeks and for partial was 6.4 weeks, time for radiological union was 20.4 wks and range of dorsiflexion motion at ankle was 16 degrees and plantar flexion was 31 degree.

Vasanad et al,[9] assessed the results of distal tibial fractures treated with minimally invasive plate osteosynthesis utilizing precontoured dital medial tibial locking plates without fibular fracture fixation in 30 patients (22 men and 8 women). 14 fractures were type A1, 6 type A2, and 4 type A3. Open Grade II fracture were 4 and Open Grade IIIA fracture was 2. The mean follow-up duration was 2 years. The mean time to bone union was 20 weeks. No patient had shortening, hardware breakdown, or deep-seated infection. Out of 30 patients, 24 had excellent results, 6 had good results. Four patients had palpable screws, two patient had blisters which subsidized with conservative treatment. This minimally invasive technique for treatment of distal tibial fractures proved to be a feasible and worthwhile method of stabilization.

We observed that clinical results were graded as excellent (58), good (24) and fair (0) as per Tenny Wess criteria. Bhairi et al,[10] studied 20 patients that suffered a distal tibial fracture. They were managed by intramedullary nailing with or without fixation of the fibula. Results were based on radiological and functional outcomes categorized by excellent, good, fair and poor. 65% of the patients had an excellent outcome, 25% had good, 5 had fair and 5 had a poor outcome. 6 patients suffered complication. The average time to union was 15 weeks. Results concluded the excellent outcomes that could achieved by intramedullary nail with the distal locking screw.

The interosseous membrane between the tibia and fibula has been shown to function as a conduit for stress transmission, creating a load sharing function of the fibula.[11] In a holographic investigation of cadaveric limbs, complete sectioning of the interosseous membrane revealed that there was an reduction in fibular load transference by 30%. Salton et al,[12] reported 52 tibial intraarticular fractures treated with ORIF 40% of the patients suffered some complication, with deep infection or osteomyelitis occurring in 43% of fractures, and a wound break down requiring soft tissue coverage in 62% of fractures.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that minimally invasive percutaneous plate osteosynthesis for distal tibia fractures with fibula fixation is more feasible and excellent results are obtained.

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