

ORIGINAL RESEARCH

Assessment of cases of distal tibial fractures managed with spanning fixator around ankle joint

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ABSTRACT

Background: Distal tibial fractures are among the most challenging orthopaedic problems. The present study was conducted to assess the cases of distal tibial fractures with spanning fixator around ankle joint. **Materials & Methods:** 50 fractures of distal tibia of both genders was enrolled. All cases were managed with spanning fixator. AOFAS (American orthopaedics foot and ankle society) score was used to evaluate the outcome. **Results:** Out of 50 patients, males were 27 and females were 23. The mode of injury was fall in 12, Pedestrian in 10, four wheelers in 18 and two wheelers in 10. Side involved was right in 23, left in 21 and both in 6. Associated injuries were right calcaneal fracture in 5 and forearm fracture in 3. Interval between injury & surgery was 1-3 hours in 32 and 4-6 hours in 18. Complications were non-union in 4 and malunion in 2. Outcome was excellent in 34, good in 11 and fair in 5 cases. The difference was significant ($P < 0.05$). **Conclusion:** The use of spanning fixator for injuries around the ankle joint is a relatively simple and cost-effective method for treating these fractures, achieving union and also maintaining ankle function.

Key words: Distal tibial fractures, spanning fixator, Pedestrian

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INTRODUCTION

Distal tibial fractures are among the most challenging orthopaedic problems.¹ Fractures of distal tibia have been treated by a variety of methods, including plaster immobilization, traction, lag screw fixation, open reduction and internal fixation with plates, and external fixation with or without limited internal fixation.²

Several factors must be considered when formulating a treatment plan. Span scan and plan technique is used for making a plan.³ The mechanism of injury, whether high energy or low energy, usually correlates with the extent of skeletal and soft-tissue damage. The fracture type should be determined according to the amount and location of displacement and comminution and impact.⁴

Joint Spanning transfixation of ankle joint aims at mostly temporary retention of reduction i.e. restoring length and axial adjustment and stabilization of ankle mortise in highly unstable fracture around ankle and under critical soft tissue condition.⁵ In selected cases, external fixation serves as an additional stabilization also following completed internal fixation or the

fracture can be treated in the external fixation. The goal of surgery is to allow quick soft tissue recovery, prevention of redislocation and stabilization of ankle and adjacent structures.⁶ The present study was conducted to assess the cases of distal tibial fractures with spanning fixator around ankle joint.

MATERIALS & METHODS

The present study comprised of 50 fractures of distal tibia of both genders. All were enrolled after taking their written consent. Ethical clearance was also obtained.

Data such as name, age, gender etc. was recorded. All cases were managed with spanning fixator. The patients were reviewed with post op x-rays immediately after surgery and at the end of 3, 6, 12 and 24 weeks. AOFAS (American orthopaedics foot and ankle society) score was used to evaluate the outcome. Excellent having score of 95-100, good with 75-94, fair with 51-74 and poor with 0-50. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I: Distribution of patients

Total- 50		
Gender	Males	Females
Number	27	23

Table I shows that out of 50 patients, males were 27 and females were 23.

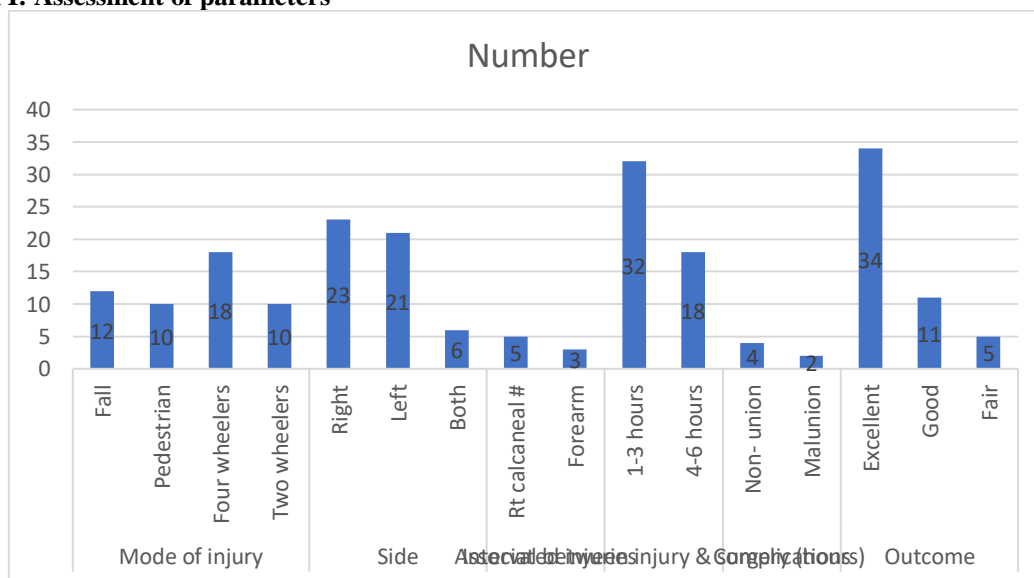
Table II Assessment of parameters

Parameters	Variables	Number	P value
Mode of injury	Fall	12	0.17
	Pedestrian	10	
	Four wheelers	18	
	Two wheelers	10	
Side	Right	23	0.05
	Left	21	
	Both	6	
Associated injuries	Rt calcaneal #	5	0.04
	Forearm	3	
Interval between injury & surgery (hours)	1-3 hours	32	0.02
	4-6 hours	18	
Complications	Non- union	4	0.05
	Malunion	2	
Outcome	Excellent	34	0.02
	Good	11	
	Fair	5	

Table II, graph I shows that mode of injury was fall in 12, Pedestrian in 10, four wheelers in 18 and two wheelers in 10. Side involved was right in 23, left in 21 and both in 6. Associated injuries was right calcaneal fracture in 5 and forearm fracture in 3.

Interval between injury & surgery was 1-3 hours in 32 and 4-6 hours in 18. Complications was non- union in 4 and malunion in 2. Outcome was excellent in 34, good in 11 and fair in 5 cases. The difference was significant (P< 0.05).

Graph I: Assessment of parameters



DISCUSSION

Distal tibial extra-articular fractures are often a result of complex high energy trauma, which commonly involves associated fibular fractures and soft tissue injury. High-energy distal tibial injuries involve concomitant fibular fractures in 80% of cases.⁷ The presence of ipsilateral fibular fractures in distal tibial

fractures has been correlated with a higher severity of injury than those without fibular fractures.⁸ Infection rates at fracture sites of 16% and delayed unions of 14% are common sequelae encountered in severe open tibial fractures. Pin tract infections are the most common complication of external fixation, reported at between 0.9% and 60%.⁹ The present study was

conducted to assess the cases of distal tibial fractures with spanning fixator around ankle joint.

We found that out of 50 patients, males were 27 and females were 23. Antocy et al¹⁰ compared the mechanical stability of external fixation with and without spanning of the ankle joint with a foot plate in an in vitro model of extra-articular distal tibia fractures. Ten fresh-frozen lower extremities (5 pairs) with a simulated OTA 43-A3.3 fracture were stabilized with an Ilizarov hybrid fixator with and without a foot plate. There was significantly more vertical translation (2.57 +/- 0.97 mm vs. -0.83 +/- 0.64 mm) and angular displacement (4.49 +/- 0.45 degrees vs. -1.15 +/- 0.61 degrees) of the distal fragment in the arrangement without a foot plate compared with the construct with a foot plate. The anterior translation of the distal fragment was similar with (1.12 +/- 0.98 mm) and without a foot plate (1.19 +/- 1.23 mm). This study supports the mechanical importance of spanning of the ankle with a foot plate in most cases of external fixation for unstable extra-articular and periarticular distal tibia fractures.

We found that mode of injury was fall in 12, Pedestrian in 10, four wheelers in 18 and two wheelers in 10. Side involved was right in 23, left in 21 and both in 6. Associated injuries was right calcaneal fracture in 5 and forearm fracture in 3. Interval between injury & surgery was 1-3 hours in 32 and 4-6 hours in 18. Complications was non-union in 4 and malunion in 2. Outcome was excellent in 34, good in 11 and fair in 5 cases. Okcu and Aktuglu¹¹ compared 24 tibial plafond fractures treated with Ilizarov fixation with 20 fractures treated with a monolateral external fixator. Both groups had limited open reduction and fixation as necessary. There were no significant differences between the groups except for better ankle and subtalar movement in the Ilizarov group. All fractures united, and there was 16 no osteomyelitis in either group. Malunion was defined as more than 5 degrees angular or rotational deformity or more than 2 mm articular step-off. Using these criteria, five fractures (20%) treated with the Ilizarov fixator and five (25%) treated with the monolateral fixator had malunions. No patient required arthrodesis. The authors concluded that both methods were satisfactory.

Marsh, Weigel, and Dirschl¹² examined 35 pilon fractures followed for 5 to 12 years after treatment with monolateral spanning external fixation. Arthrodesis had been performed in 13% of ankles with known outcome. Reduction was rated as good in 14, fair in 15, and poor in six. Osteoarthritis was grade 0 in three, grade 1 in six, grade 2 in 20, and grade 3 in six. Arthritis was correlated with severity of injury and quality of reduction, but did not correlate with clinical result. Fifteen patients rated

their outcome as excellent, 10 as good, seven as fair, and one as poor. Most patients (27 of 31) were unable to run.

The limitation the study is small sample size.

CONCLUSION

Authors found that the use of spanning fixator for injuries around the ankle joint is relatively simple and cost-effective method for treating these fractures, achieving union and also maintaining ankle function.

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