

Research Article

Treatment of distal tibia fractures: plating versus intramedullary nailing

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ABSTRACT

Background: Distal tibia shaft fractures pose significant challenge to treating surgeons. Giving more importance to anatomical reduction and ignoring often injured soft tissues has led to poor outcomes and high complication rates. Although multiple options are described to treat these fractures, there is no consensus on the best method of treatment. We hereby want to study the results of distal tibia fractures treated by expert tibia nailing and distal tibia plating.

Methods: This study was undertaken in patients who were operated in between January 2012 to March 2015 at M S Ramaiah Teaching Hospital, which is a tertiary care hospital in Bangalore. Study included 52 patients with distal tibia fracture treated by surgery. All the fractures were closed distal diaphyseal fractures without articular involvement. Thirty two patients underwent expert tibia nailing whereas 20 patients were treated with open reduction and internal fixation with locking plates. Patients were followed up at 6 weeks, 3 months, 6 months and 1 year.

Results: Fifty two patients included in study and they were divided into two groups as nailing group and plating group. Plating group included 20 patients whereas nailing group included 32 patients. The mode of injury was road traffic injury in 32 cases, followed by self-fall in 17 cases and sports related injury in 3 cases. Distal tibia fracture was associated with in 29 patients (87%) of nailing group whereas in 17 patients (80) of plating group. Average distance of fracture from pilon was 6 cm in nailing group and 3cm in plating group. The average duration of surgery in nailing was group was 88 minutes (range, 65-130 minutes) whereas average duration of surgery in plating group was group was 92 minutes (range, 70-130 minutes). The average time for union was 16 weeks for nailing group and for plating group it was 18 weeks.

Conclusions: Both intramedullary nailing and plating are the optimal methods of treatment. Plating is preferred in cases where fracture is close to pilon whereas intramedullary nailing is preferred for fractures away from tibial pilon. There is no significant difference between union and complication rates.

Keywords: Distal, Tibia, Intramedullary, Nailing, Plating

INTRODUCTION

Distal tibia shaft fractures pose significant challenge to treating surgeons. The treatment of these fractures has evolved over past few decades with better understanding of the soft tissue biology. Giving more importance to anatomical reduction and ignoring often injured soft

tissues has led to poor outcomes and high complication rates.¹⁻⁴ Multiple methods of treatment are available for managing these fractures. Although multiple options are described to treat these fractures, there is no consensus on the best method of treatment. Though there are studies comparing these methods in our population in the past. We hereby want to study the results of distal tibia

fractures treated by expert tibia nailing and distal tibia plating.

METHODS

This study was undertaken in patients who were operated in between January 2012 to March 2015 at M S Ramaiah Teaching Hospital, which is a tertiary care hospital in Bangalore. Study included 52 patients with distal tibia fracture treated by surgery. All the fractures were closed distal diaphyseal fractures without articular involvement. Thirty two patients underwent expert tibia nailing whereas 20 patients were treated with open reduction and internal fixation with locking plates.

Patients were followed up at every 4 weeks till fracture union, at 6months and 1 year.

RESULTS

Fifty two patients included in study and they were divided into two groups as Nailing group and Plating group. Plating group included 20 patients whereas nailing group included 32 patients. The demographic features of both the group are given in Table 1.

Table 1: Demographic features of patients.

	Expert nailing	Plating
Total No cases	32	20
Age in yearsm(Mean)	46	44
Female	9	4
Male	23	16
Open fractures	6	4
Closed fractures	26	16
Mechanism of injury		
Associated fibula fracture	2	
Comorbidities		
Smoker	7	7
Diabetes	6	5
Average distance of fracture from tibial pilon	6 cm	3 cm

Average age for nailing group was 46 years (18-84 range) for nailing and for plating it was 48 years (range 34-62). Among the nailing group six cases were open injuries (Type 1:5, Type:1) whereas among plating group included two open cases (Type 1:2).

The mode of injury was road traffic injury in 32 cases, followed by self-fall in 17 cases and sports related injury in 3 cases. Distal tibia fracture was associated with in 29 patients (87%) of nailing group whereas in 17 patients (80) of plating group. Average distance of fracture from pilon was 6 cm in nailing group and 3 cm in plating group. The average duration of surgery in nailing was group was 88 minutes (range, 65-130 minutes) whereas average duration of surgery in plating group was group was 92 minutes (range, 70-130 minutes).

The average time for union was 16 weeks for nailing group and for plating group it was 18 weeks. The time taken for union of each case is shown in Table 2.

Table 2: Union time for all cases.

Plating case	Time of union in weeks	Nailing case	Time of union in weeks
P1	16	N1	16
P2	20	N2	16
P3	20	N3	16
P4	24	N4	24
P5	20	N5	16
P6	16	N6	16
P7	16	N7	20
P8	20	N8	16
P9	16	N9	20
P10	16	N10	16
P11	16	N11	24
P12	16	N12	20
P13	32	N13	16
P14	24	N14	24
P15	16	N15	24
P16	16	N16	20
P17	16	N17	20
P18	16	N18	28
P19	24	N19	16
P20	16	N20	16
		N21	28
		N22	20
		N23	16
		N24	16
		N25	24
		N26	20
		N27	16
		N28	16
		N29	16
		N30	20
		N31	16
		N32	24

DISCUSSION

Distal metaphyseal fractures are challenging fractures to treat given the number of complications arising out of various surgical modalities of treatment. These fractures are most often high energy fractures resulting from axial and rotational force on distal tibia.¹⁻⁴ There are multiple studies in the literature comparing various modalities of treatment for distal tibial fractures. The various treatment options include plating, Nailing, AO external fixation, Ilizarov fixation to conservative treatment. Although many studies are there already in the literature comparing the efficacy of each surgical methods the optimum treatment remains controversial.

Nonoperative treatment is also used in case of stable fractures with severe co morbidities but complications like delayed union, malunion and joints stiffness are very common.⁵⁻⁶

Locking plate fixation gives good rigid construct, anatomical reduction and biomechanically superior to intramedullary nailing, however it results in results in extensive soft tissue dissection resulting in wound complications and infections. Hardware complications are more with locking plates warranting implant removal more frequently. With use of minimally invasive techniques the complications have significantly reduced.⁸⁻¹⁰

Intramedullary nails are commonly used for treatment distal tibia fracture where the fracture is away from the plafond allowing two or more distal locking bolts. Though it is less invasive than plating, technically more challenging to achieve and maintain reduction because of anatomic characteristics of distal tibia.¹¹⁻¹⁶ The results have significantly improved with used of blocking screws and multiplanar locking bolts.²⁸

Our study principally compares the results of distal tibial fractures treated with intramedullary nailing and locking plate. This study has shown plating to have shorter healing time, lower rates of nonunion and malunion than in plating group. However, significant complication rates are higher with plating especially when used in the treatment of open tibial fractures.¹⁷⁻²⁷

In our study three (9%) patients from nailing group had malalignment whereas one case in plating group had malunion. The malunion was not clinically significant and hence no additional surgery was done. Malalignment of the tibia can cause degenerative changes in the knee and ankle joint. Patients undergoing nailing anterior knee pain was seen in there patients. Two patients from nailing group had gone into nonunion for which additional surgery was done to achieve union. For two nonunions in nailing group, bone grafting was done one case whereas dynamization was done the other. Two patients had infection in plating group post operatively. Both underwent implant removal, wound debridement and Ilizaorov fixation. Two patients had wound dehiscence post operatively which was managed with regular dressing and secondary suturing. The complications of our study tabulated in Table 3.

Table 3: Complications.

	Plating	Nailing
Malunion	1	3
Nonunion	1	2
Infection	3	0
Wound dehiscence	2	0
Anterior knee pain	0	3

CONCLUSION

Both intramedullary nailing and plating are the optimal methods of treatment. Plating is preferred in cases where fracture is close to pilon whereas intramedullary nailing is preferred for fractures away from tibial pilon. There is no significant difference between union and complication rates.

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