

Original Research

Expert tibial nailing with distal tibial plating in patients with distal 1/3rd extraarticular tibial fractures- A comparative study

¹Abhinav Sharma, ²Arvind Karoria

¹Senior Resident, ²MBBS MS, Dept of Orthopedic, GMC Shivpuri, Madhya Pradesh, India

ABSTRACT:

Background: Fractures of the distal tibia are distressing because these occur mainly because of high-energy mechanisms and vehicles. The present study compared expert tibial nailing with distal tibial plating in patients with distal 1/3rd extraarticular tibial fractures. **Materials & Methods:** 54 patients with extraarticular distal 1/3rd tibia fractures of both genders were divided into 2 groups of 27 each. Group I were treated with expert tibial nailing and group II with distal tibial plating. **Results:** There were 17 males and 10 females in group I and 12 males and 15 females in group II. Operative time (minutes) was 82.4 in group I and 102.6 in group II, intraoperative blood loss (ml) was 51.4 in group I and 85.2 in group II and fracture union time (weeks) was 18.2 in group I and 25.3 in group II. The difference was significant ($P < 0.05$). Johner - Wruss scoring system in group I and group II was excellent in 20 and 17, good in 3 and 5, fair in 2 and 2 and poor in 2 and 3 respectively. The difference was significant ($P < 0.05$). **Conclusion:** The management of patients with distal 1/3rd extraarticular tibial fractures with expert tibial nailing resulted superior treatment outcome than distal tibial plating.

Key words: tibial fractures, tibial nailing, union time

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Corresponding author: Abhinav Sharma, Senior Resident, Dept of Orthopedic, GMC Shivpuri, Madhya Pradesh, India

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INTRODUCTION

Fractures of the distal tibia are distressing because these occur mainly because of high-energy mechanisms and vehicles. Because of the complex nature, fractures of distal tibia and pilon are difficult to manage. In combination with crucial bone injury, the adjacent soft tissue components often become severely traumatized.¹

Closed fractures of the tibial shaft traditionally have been treated with closed reduction and a cast.² Since the late 1950s, open reduction and internal fixation (ORIF) was reserved for situations in which an adequate reduction could not be obtained or maintained by conservative means.³ ORIF often necessitates extensive dissection and tissue devitalisation, creating an environment less favourable for fracture union and more prone to bone infection. As a result, other, less invasive methods were developed to treat diaphyseal fractures of the tibia. The most successful, closed intramedullary (IM) nailing, has been associated with shorter time to union and a shorter period of disability.⁴

Recently, minimally invasive percutaneous medial locked plating has been described in the literature

with promising results.⁵ Intramedullary fixation is desirable as it is less invasive, load sharing spares extraosseous blood supply, and fracture hematoma. Expert Tibial Nail currently represents an effective approach to the treatment of complex extraarticular distal tibial fractures.⁶ The present study compared expert tibial nailing with distal tibial plating in patients with distal 1/3rd extraarticular tibial fractures.

MATERIALS & METHODS

The present study comprised of 54 patients with extraarticular distal 1/3rd tibia fractures of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 27 each. Group I were treated with expert tibial nailing and group II with distal tibial plating. A complete clinical examination of the patient was done. Symptoms of pain, swelling, abnormal mobility, deformity, loss of function were recorded. Parameters such as mode and nature of injury, conscious level, any treatment history, signs of shock and any emergency treatment taken were recorded. Swelling and abnormal mobility

and deformity was noted. Data thus obtained were considered significant. subjected to statistical analysis. P value < 0.05 was

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Method	Expert tibial nailing	Distal tibial plating
M:F	17:10	12:15

Table I shows that there were 17 males and 10 females in group I and 12 males and 15 females in group II.

Table II Comparison of parameters

Parameters	Group I	Group II	P value
Operative time (minutes)	82.4	102.6	0.04
Intraoperative blood loss (ml)	51.4	85.2	0.01
Fracture union time (weeks)	18.2	25.3	0.03

Table II, graph I shows that operative time (minutes) was 82.4 in group I and 102.6 in group II, intraoperative blood loss (ml) was 51.4 in group I and 85.2 in group II and fracture union time (weeks) was 18.2 in group I and 25.3 in group II. The difference was significant (P< 0.05).

Graph I Comparison of parameters

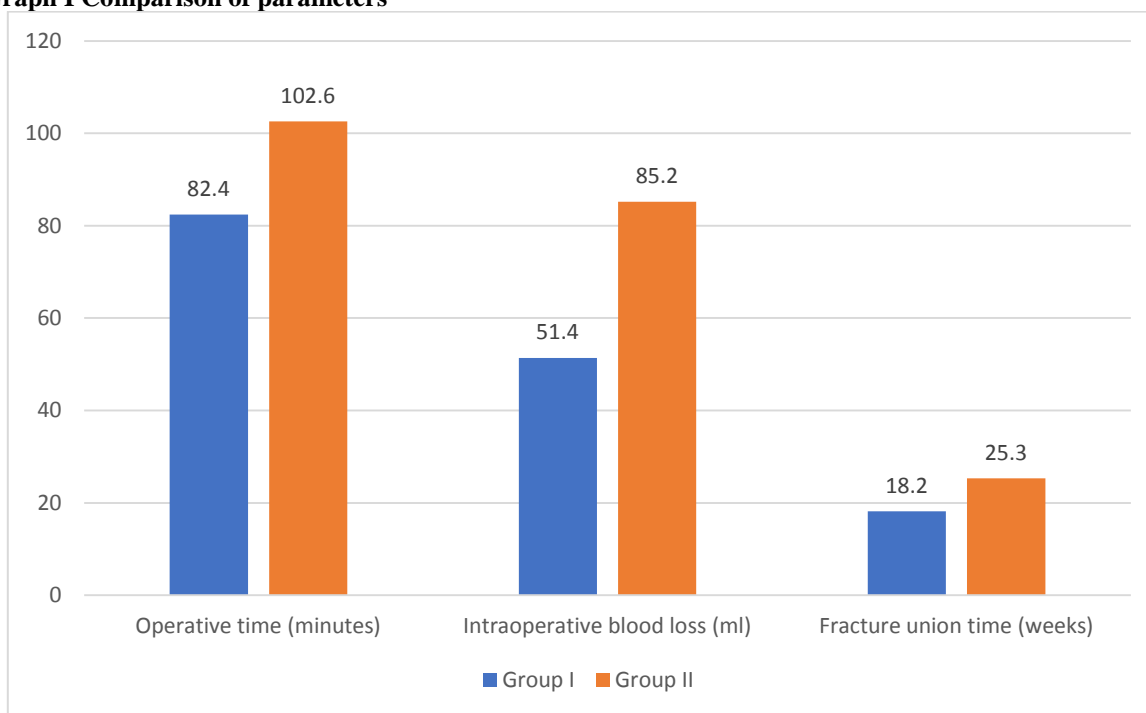
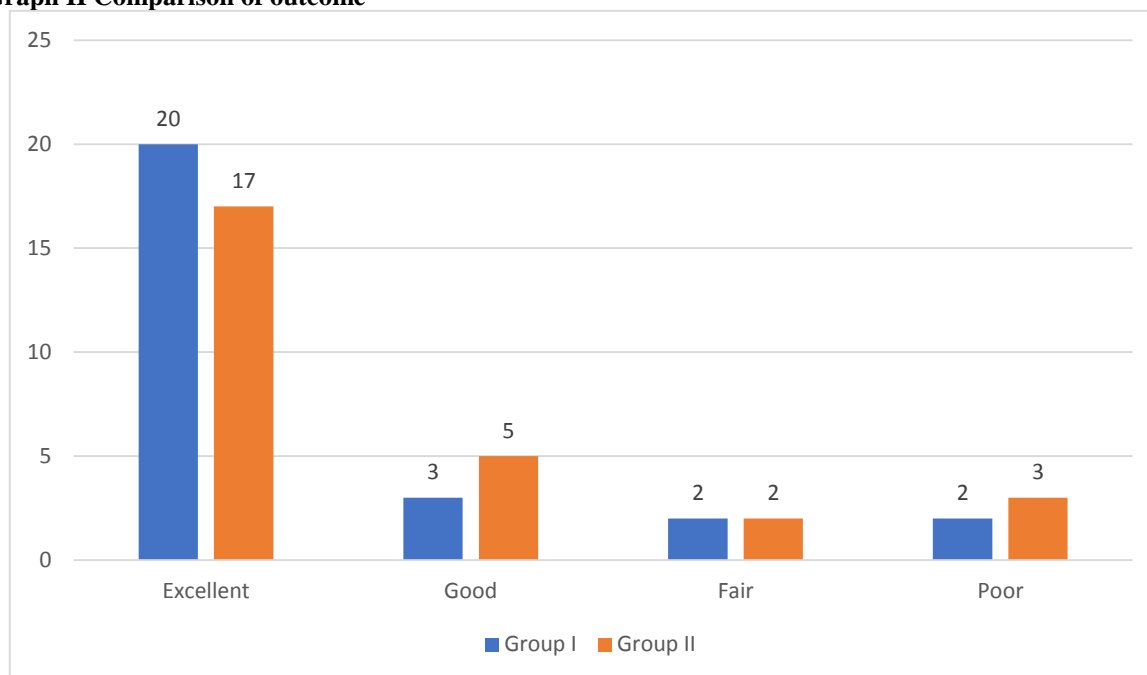


Table III Comparison of outcome

Johner -Wruss scoring System	Group I	Group II	P value
Excellent	20	17	0.04
Good	3	5	
Fair	2	2	
Poor	2	3	

Table III, graph II shows that Johner -Wruss scoring system in group I and group II was excellent in 20 and 17, good in 3 and 5, fair in 2 and 2 and poor in 2 and 3 respectively. The difference was significant (P< 0.05).

Graph II Comparison of outcome

DISCUSSION

In traumatic bone fractures, tibia is the most commonly involved long bone with multiple fracture types. Among them, two segmental tibial fracture, i.e. type 42-C2 fracture (AO classification) is a high energy injury and frequently combined with open soft tissue injuries.⁷ Its treatment is very challenging because of the unstable fracture region, hard reduction fixation and severely disturbed blood supply.⁸ As a result, surgery is usually required. During surgery, protection of the blood supply is a priority.⁹ And then effective internal fixation can be conducted to stabilize the fracture region. Early functional exercises and walking activities are important. External fixators, plate internal fixation, intramedullary nailing, etc are several common choices for surgical treatment.¹⁰ External fixators have a relatively poor intensity and long union time, therefore they accompany a high risk of nail path infection and loosening. Plate and screw fixation needs a long plate, which adds the content of the affected leg and directly increases the risk of osteofascial compartment syndrome and infection.¹¹ The present study compared expert tibial nailing with distal tibial plating in patients with distal 1/3rd extraarticular tibial fractures.

In present study, there were 17 males and 10 females in group I and 12 males and 15 females in group II. Singla et al¹² compared the results of expert tibial nailing with results of distal tibial plating in patients with distal 1/3rd extraarticular tibial fractures. The study was conducted on 40 patients with extraarticular distal 1/3rd tibia fractures. All the patients were divided into two study groups randomly with 20 patients in each group as follows: Expert Tibial Nailing group, & Distal Tibial Plating group. All the patients underwent procedures according to their

respective study groups. During the postoperative phase, static quadriceps exercises & toe movements, as tolerated were started from 1st postoperative day. Full weight-bearing was allowed after 10 to 12 weeks, depending on the radiographic signs of fracture healing. Patients were followed up for 6 months after operation and evaluated as per Johner and Wruss Criteria. The mean age of the patients of the expert tibial nailing group and distal tibial plating group was 48.12 years and 49.71 years respectively. Mean operative time among the patients of the expert tibial nailing group was 83.15 minutes and was significantly lower in comparison to the patients of the distal tibial plating group (101.2 minutes). Mean intraoperative blood loss was compared between expert tibial nailing and distal tibial plating. Tourniquet was used in all the cases. Mean intraoperative blood loss among the patients of the expert tibial nailing group was 51.6 ml and was significantly lower in comparison to the patients of the distal tibial plating group (89.1 ml). Mean postoperative weight-bearing time among the patients of expert tibial nailing was 8.95 weeks and was significantly lower in comparison to the patients of the distal tibial plating (14.35 weeks). Mean fracture union time among the patients of the expert tibial nailing group was 18.6 weeks and was significantly lower in comparison to the patients of the distal tibial plating group (25.84 weeks). Excellent results were obtained in 80 percent of the patients of the expert tibial nailing group and 55 percent of the patients of the distal tibial plating group respectively. We found that operative time (minutes) was 82.4 in group I and 102.6 in group II, intraoperative blood loss (ml) was 51.4 in group I and 85.2 in group II and fracture union time (weeks) was 18.2 in group I and 25.3 in group II. Janssen et al¹³ in their study 24

patients who sustained an extraarticular fracture of the distal third of the tibial shaft was performed to determine the effect of the type of treatment, open reduction and internal fixation (ORIF) or closed reduction and intramedullary (IM) nailing, on the occurrence of malalignment. All patients were treated in our clinic between 1993 and 2001 for a fracture in the distal third of the tibia. Twelve patients treated with ORIF were matched to 12 patients treated with IM nailing, with regard to gender, age decade, and the AO classification of the fracture. The group treated with IM nailing was assessed after a mean 6.0 years versus ORIF after a mean of 4.5 years. Two patients treated with ORIF versus six patients treated with IM nailing had a malalignment of the tibia. Furthermore, we found no difference with regard to time to union, non-union, hardware failure or deep infections between ORIF and IM nailing. Results suggest that control of alignment is difficult with IM nailing of distal tibial fractures. For optimal alignment we advise considering the use of ORIF for closed and type I open extra-articular fractures in the distal third of the tibia

We found that Johner -Wruss scoring system in group I and group II was excellent in 20 and 17, good in 3 and 5, fair in 2 and 2 and poor in 2 and 3 respectively. In the study conducted by Zhu et al (2015)¹⁴, good to excellent results were seen in 90.32 percent of the patients of the nailing group and 77.27 percent of the patients of the plating group. In another study conducted by Soni et al, (2018)¹⁵ good to excellent results were seen in 86.66 percent of the patients of the nailing group and 80 percent of the patients of the plating group.

CONCLUSION

Authors found that the management of patients with distal 1/3rd extraarticular tibial fractures with expert tibial nailing resulted superior treatment outcome than distal tibial plating.

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