



DIAPHYSEAL TIBIAL FRACTURES; CLOSED INTRAMEDULLARY INTERLOCKING NAILING

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INTRODUCTION

Tibia is the commonest bone involved in road traffic accidents, and especially diaphysis is the common site involved. Infection and non-union are rather too common complications and lead to serious disability¹.

Modern implant to stabilize close diaphyseal tibial fractures is the intramedullary nailing, which is biomechanically stable and an ideal implant. Splinting provides only relative stability with no interfragmentary compression. In stable fractures

ABSTRACT... Objective: To determine the outcome and consequences of close intramedullary interlocking nailing in diaphyseal tibial fractures and to observe the hospital stay & complications in this method of treatment. **Place & Duration:** The study was conducted in department of orthopaedic unit-I at Liaquat University Hospital Jamshoro/Hyderabad during Jan 2011 to June 2012. **Patients & Method:** The present study constituted on 43 patients, 3 cases were dropped during follow up and the rest 40 cases completed 1 year post operative follow up. After having routine laboratory investigations and necessary x – rays, the stable patients were operated for intramedullary interlocking nailing on routine operating days. The patients were assessed according to the criteria mentioned in follow up proforma from date and time of arrival to final visit in review clinic and results were tabulated. **Results:** Among 40 patients, 38 (95%) were males and 02 (5%) females. The age ranges from 17 to 50 years with mean age of 32.23 years. There were 25 close fractures (62.5%) 15 open fractures (37.5%), among these 13 (32.5%) were Gustilo type I and 2 (5%) were of type II. The mode of injury in majority (75%) of cases was road traffic accident. Good union achieved in 39 cases (97.5%) in 17.53 weeks. But only 1 (2.5%) case unfortunately went in infected non union and was converted into Illizarove external Fixation. The main complication observed after surgery was loosening of screw in 3 (7.5%) cases. Deep infection was observed in the medullary cavity in 3(7.5%) cases (table-V). It has been observed in analyzing the functional outcome of these patients that majority (80%) of cases was able to sit on bed in 12-24 hours and was able to stand in 24-48 hours. In next 24 hours after surgery 75% of patients were pain free. The mean hospital stay in these cases was 8.53 days and by the 48th week all of cases were able to join their job except one case in which non union observed due to infection. **Conclusions:** The data from the current study reveals that intramedullary interlocking nailing of closed and open grade I and II fractures is a safe technique. It combines a high rate of union with a low complication rate, less hospitalization and early return to job.

Key words: Diaphyseal Tibial Fracture, Closed Intramedullary, Interlocking Nailing.

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however it permits early weight-bearing, which produces axial compression between the two main fracture fragments².

The intramedullary nail is a load-sharing device, which permits load-bearing across the fracture site. Active function after treatment is therefore possible in most of the cases. In early 1950's Kuntscher also introduced intramedullary reaming. This permitted the use of nails, which more accurately fit the diaphyseal portion of medullary canal and has led to improved fixation.

Kuntscher's concept of detensor (1969) was the predecessor of the current concepts of interlocking, which considerably extend the indications for prefer interlocking technique. Moreover reamed nailing is associated with a significantly lower time to union and a reduced requirement for a further operation³. Further experiences also showed that reaming allowed for longer and stronger nails, better stabilization with low non-union rate, no fatigue fracture or bending of nails, better rotational control and low infection rate⁴. Reaming has been shown to be advantageous in treatment of non-union and malunion⁵. It has been demonstrated that perfusion of callus and early strength of union are similar following intramedullary nailing with or without reaming⁶ & failure of either the nails or their screws may be more common without reaming⁷. Some studies suggest that there is no clear difference in the rate of major re-operations and complications between reamed and unreamed intramedullary nailing. Reamed intramedullary nailing has, however, a lower incidence of implant failure than unreamed nailing. 'Low' quality evidence suggests that reamed nailing may reduce the incidence of major re-operations related to non-union in closed fractures rather than in open fractures^{8,9}.

The intramedullary nailing is thought to be the method of choice for treatment of closed tibial shaft, there is ongoing debate on the optimal surgical approach in patients with open types of these fractures. In addition, choosing between the reamed and unreamed intramedullary nailing is still an issue for the orthopedic surgeons².

It has been observed by different researchers that treatment of diaphyseal fractures of tibia by other techniques has got prolonged immobilization, longer hospitalization, limited joint movements, malunion, non-union and delayed rehabilitation¹⁰.

In present study, we aimed to determine the outcome and consequences of close intramedullary interlocking nailing in diaphyseal tibial fractures and to observe the hospital stay & complications in this method of treatment.

MATERIAL & METHODS

The present study constituted on 43 patients between Jan 2011 to June 2012, in the department of orthopaedic unit-I at Liaquat University Hospital Jamshoro/Hyderabad. 3 cases dropped during follow up and the rest 40 cases completed 1 year post operative follow up. The inclusion criteria were closed diaphyseal fracture of tibia in adults irrespective of age and sex, Gustilo I, II and III-A open fractures & non-infective non-unions of diaphyseal tibial fractures. While the exclusion criteria includes Pathological fractures, malunited fractures, GustiloIII-B and III-C & Infected fractures.

After having routine laboratory investigations and necessary x – rays, the stable patients were operated for intramedullary interlocking nailing on routine operating days. The patients were assessed according to the criteria mentioned in follow up proforma from date and time of arrival to final visit in review clinic.

RESULTS

The present study was conducted on 40 patients including 38 (95%) males and 02 (5%) females. The age ranges from 17 to 50 years (table-I) with mean age of 32.23 years. There were 25 close fractures (62.5%) 15 open fractures (37.5%), among these 13 (32.5%) were Gustilo type I and 2 (5%) were of type II. The mode of injury in majority (75%) of cases was road traffic accident (table-II). Good union achieved in 39 cases (97.5%) in 17.53 weeks. But only 1 (2.5%) case unfortunately went in infected non union and was converted into Illizarove external Fixation (table -III). The main complication observed after surgery was loosening of screw in 3 (7.5%) cases (table-IV). Deep infection was observed in the medullary cavity in 3(7.5%) cases (table-V). It has been observed in analyzing the functional outcome (table-6) of these patients that majority (80%) of cases was able to sit on bed in 12-24 hours and was able to stand in 24-48 hours. In next 24 hours after surgery 75% of patients were pain free. The mean hospital stay in these cases was 8.53 days and by the 48th week all of cases were able to join their job except one case in which non union

observed due to infection

Age	No. Patients	%age
15-24	12	30%
25-34	12	30%
35-44	8	20%
45-54	8	20%
Total	40	100%

Table-I. Distribution of age of patients

Mechanism	No. Patients	%age
Fall	5	12.5%
R.T.A	30	75%
Assault	4	10%
Others (Fire arm injury)	1	2.5%

Table-II. Mechanism of Injury (N = 40)

Type	No. Cases	Mean union (weeks)
Total	40	17.53
Close	25	18.39
G-I	13	16
G-II	1	16.21
G-II	1	Non union (Infected)

Table-III. Union Time

Complications	Cases	%age
Angulations	-	-
Rotation	-	-
Malunion	-	-
Delay Union	1	2.5%
Non union	1	2.5%
L.L.D	-	-
Loosening of screw	3	7.5%
Migration of Nail	-	-
Breaking of screw	1	2.5%
Breaking of nails	-	-

Table-IV. Complications after Surgery (n=40)

Site of infection	Type of infection	
	Superficial	Deep
At fracture site	-	-
At screw site	-	-
Medullary cavity	-	03 (7.5%)

Table-V. Type and Site of Infection (n=40)

DISCUSSION

Fractures of long bones constitute the majority of emergency operating room procedures in most trauma centers. Among these, tibial fractures are the most common¹¹. In the last years intramedullary nailing has become the treatment of choice for most displaced diaphyseal tibia fractures. In contrast intramedullary nailing of distal tibia fractures is accompanied by problems like decreased biomechanical stability¹². Evidence favors the use of intramedullary nails to stabilize diaphyseal fractures of the tibia¹³. The extension of the indications goes along with a growing number of reported complications such as delayed healing, nonunion, coronal plane and rotational malalignment/malunion¹⁴. Various modifications and new developments of implants have been introduced to reduce the complications and make the benefits of intramedullary nailing applicable even in these distal tibia fractures¹⁵. However, the choice between reamed or unreamed intramedullary nailing of tibial fractures remains controversial¹⁶.

In present study it was observed that closed nailing of all displaced closed and grade - I, II Open tibial fractures can give good results 97.5% union with a relatively low complication rate. The reported union of tibial fractures, following reamed interlocking intramedullary nailing usually occurs between 15-21 weeks^{17,18}, our study confirms the results of these researchers as the union time in our research was 17.53 weeks..

The infection rate in our series was 7.5% (3 - cases), two out of these 3 cases were open fractures (Gustilo I and II) and one was closed and one each from open and close fractures

A. Mobilization	Mobilization	12/24: HOURS	24/24: HOURS	48/24: HOURS		
	Sitting on bed	32 (80%)	04(10%)	04 (10%)		
	Sitting on chair	04 (10%)	32(80%)	04 (10%)		
	Standing	04 (10%)	04 (10%)	32(80%)		
B. Pain Free	After Days	No of Cases	Percentage			
	1	30	75%			
	2	6	15%			
	10	2	5%			
	30	2	5%			
C. Weight Bearing	Weight	24 hours	2 Days	1st wk	2nd wk	3rd wk
	PWD	04(10%)	28(70%)	04(10%)	02(5%)	02(5%)
	FWD	00(0%)	04(10%)	04(10%)	04(10%)	27(67.5%)
D. Hospital stay (Days)	No of Cases	Minimum Stay	Maximum Stay	Mean		
	40	05	31	8.53		
F. Return to Job	No. of weeks	No of cases	%age			
	12	6	15%			
	24	12	30%			
	36	12	30%			
	48	9	22.5%			
	>48	1	2.5%			

Table-VI. Functional Outcome

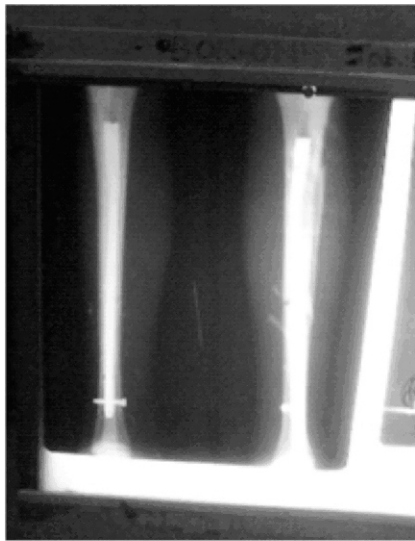


Fig-1. Post operative radiograph after one week.



Fig-2. Post operative radiograph after six weeks.

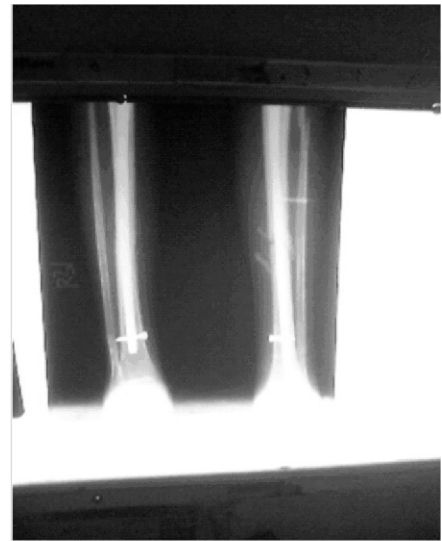


Fig-3. Post operative radiograph after one month

showed good union despite of infection, the reported infection rate is 1.8% to 7.3%¹⁹. The low infection rate mentioned in the literature is because that almost of the studies has been conducted in the developed countries, where

beside the good medical care environmental and physiological conditions play an important role, and majority of our patients were from rural areas.

Over 90% of our patients were weight bearing by

1st week of operation and the mean hospitalization time was 8.53 days. Hospitalization time for this technique is not found in literature but reported time for other options for tibial fracture following A.O plating are 12-30 days²⁰.

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