

Closed Intra-Medullary Interlocking Nail Improves Surgical And Functional Outcome Of Diaphyseal Fracture Of Tibia – Our Experience

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ABSTRACT

BACKGROUND:

The management of tibial fracture in adult is a challenge to orthopedic surgeons due to poor soft tissue coverage and blood supply. Although there are several treatment methods for tibial shaft fractures, no single method is appropriate for all types of tibial shaft fractures. Plate fixation and intramedullary nailing were two well-accepted and effective methods in the management of fracture tibia. In this study we have evaluated the surgical and functional outcome of intramedullary nailing for the treatment of closed diaphyseal fractures of the distal tibia.

METHODS: This prospective study was done in 30 patients who had diaphyseal fractures of tibia were treated with closed interlocking nailing during the period of October 2010 to 2012 at a tertiary care hospital, Nellore over a period of 24 months.

RESULTS: out of 30 patients 27 patients had united within 5 months of injury and 2 cases developed delayed union which united in 7 months and 1 case went into non-union. Whereas all the patients operated in this technique in which 21(70%) patients were with excellent, 6(20%) patients with good, 2 (7%) patients with better and one (3%) patient with poor functional outcome was evident.

CONCLUSION: Closed interlocking intramedullary nailing showed a safe and quite effective for treatment of tibial diaphyseal fracture which allowed earlier return to work.

KEYWORDS: Tibial fracture, Diaphyseal fracture, closed interlocking intramedullary nailing,

INTRODUCTION:

The tibia by its location is exposed to frequent injuries as one third of its surface is subcutaneous. The management of tibial fracture in adult is a challenge to orthopedic surgeons due to poor soft tissue coverage and blood supply. Extra-articular fractures of the distal tibia are common. Such fractures are often difficult to treat, since they are close to the ankle joint and usually associated with severe comminution and soft tissue injury. (1) Tibial shaft fractures are primarily caused by high-energy trauma, such as motor vehicle accidents, sports injuries, and falls from a height; they are the most common diaphyseal fractures in adults. Although there are several treatment methods for tibial shaft fractures, no one method is appropriate for all types of tibial shaft fractures (2). They should be treated either internal fixation because conservative treatment or external fixation. External fixation are likely to cause loss of reduction and malunion, or pin tract infection with external fixation. (3) Plate fixation and intramedullary nailing were two well-accepted and effective methods in the management of fracture tibia. However, Plate fixation for distal tibial fractures can achieve anatomical reduction, but may result in delayed union non-union or soft-tissue complications. (4)

In this study we have evaluated the surgical and functional outcome of intramedullary nailing for the treatment of closed diaphyseal fractures of the distal tibia.

METHODS:

The present study was undertaken at the department of orthopedics, Narayana medical

college and hospital, Nellore. 30 patients who had diaphyseal fractures of tibia were treated with closed interlocking nailing during the period of October 2010 to 2012. This prospective study was done over a period of 24 months with regular follow up.

Sample size: 30; random sampling. All the cases presenting the OPD /Emergency department

Inclusion criteria: all the cases of closed tibial diaphyseal fractures; open diaphyseal fractures of tibia Type I and type II as classified by Gustillo-Anderson grading (5). Diaphyseal fractures in the age group of more than 18 years.

Exclusion criteria: open diaphyseal fractures of tibia type III, tibial fractures with intraarticular extensions., medically ill who are unfit for surgery, Diaphyseal fractures in age group of less than 18 and those who were unable to give consent to undergo this study.

After fitting in the inclusion criteria of the admitted patient thorough history was elucidated, complete physical examination performed and investigations carried out.

Informed consent was taken from all the Patients. Preoperatively the length of the nail is calculated by measuring from just above the tibial tuberosity to the medial malleolus. Medullary canal is measured at the isthmus on X-ray for nail diameter. Accordingly a stock of interlocking nails 2 cm above and below the measured length and 1 mm above and below the required diameter were kept.

Perioperative Inj.ceftriaxon (2gm) was given on induction and interlocking intramedullary nails (8-11 mm of diameter and 30 to 38 cm. long) were used. Antibiotics were continued for 02 weeks.

Patients were mobilized on first postoperative day. Knee and ankle exercises were started. Patients were allowed for touch weight bearing on first post operative day, half weight bearing after six weeks when callus was seen on X-Rays and full weight bearing after fracture heals. Stitches were

removed on fourteenth post operative day. Patients were followed up for fortnight for first visit and then every four weeks for subsequent visits for total time period of about 30 weeks. In each visit the progress of healing of fracture site was examined clinically and radiologically.

RESULTS:

Clinical Parameters	No. Of Cases	Percentage
Age (Years)		
18-40	17	56
41-60	09	32
>60	04	12
Gender		
Male	21	70
Female	09	30
Laterality		
Right	16	53
Left	14	47
Type Of Fracture		
Simple	23	78
Compound - I	05	16
Compound - II	02	06
Total	30	100
Mode Of Injury		
RTA	26	86
Fall	04	14
Level Of Fracture		
Upper	03	10
Middle	16	54
Lower	11	36
Associated Injuries		
Ipsilateral Fibula Fracture	20	67
Head Injury	02	06

Ipsilateral Shaft Femur Fracture	01	03
Contralateral Tibial Fracture	01	03
Fracture Clavicle	01	03
Type Of Anesthesia		
Spinal	27	90
General	03	10
Commencement Of PWB (Partial Weight Bearing-Days)		
0-10	21	70
11-20	05	16
21-30	01	04
>30	03	10
Commencement Of FWB (Full Weight Bearing-Weeks)		
7-10	21	70
11-14	06	20
15-18	02	07
>18	01	03
Complications		
Anterior Knee Pain	07	24
Superficial Infection	03	10
Deep Infection	01	03
Delayed Union	02	06
Mal-Union	03	10
Non-Union	01	03
Functional Outcome (Klemman & Borner)		
Excellent	21	70
Good	06	20
Fair	02	07
Poor	01	03
Patient Satisfaction		
Pleased	21	70
Satisfied	08	27
Unhappy	01	03

DISCUSSION

Larsen et al (6) studied 45 patients with reamed interlock nail in whom average time to fracture healing was 16.7 weeks and had two malunion while in our study healing time was 18 weeks with no malunion.

Bonnevialle et al (7) studied intramedullary nailing with reaming (Grosse-kempf nail) in 32 patients in whom only one case (3.12%) developed deep infection while in our study there was no infection. He concluded that nailing with moderate reaming remains the preferred method of treatment of tibial diaphyseal fracture.

Bonnevialle et al (8) in another study pointed out that there was normal range of active movement in knee and ankle while 19 out of 38 (50%) patient complained of pain at the site of the nail insertion while in our study knee pain was observed in 22 (75.90%) cases.

Steinberg et al (9) and his colleagues studied 54 cases with diaphyseal fracture. They pointed out 11 (20.4%) complications related to the nailing. 3 (5.55%) deep infection, 2 (3.7%) superficial infection, 2 bone shortening of 1 centimeter secondary to nail protrusion in the knee, 1 compartment syndrome, 1 fracture propagation, 1 distal malalignment and 1 delayed union.

Vidyadharn et al (10) studied the clinicoradiological outcome of interlock nail in tibia in which he found that the average time of fracture healing was 20.1 weeks while in our study it was 18 weeks. He also pointed out that meticulous intramedullary nailing for tibial diaphyseal fracture has excellent clinico-radiological outcome and is relatively safe. It is evident from above facts that closed interlocking

intramedullary nailing is a safe and quite effective for treatment of tibial diaphyseal fracture.

In current study 30 patients with fresh tibial diaphyseal fractures were treated with reamed intramedullary interlocking nail. Among them all fractures were reduced by closed reduction with no intraoperative complications and results are excellent and good in terms of rate of union and functional outcome, with fewer complications. Hence we conclude that the intramedullary interlocking nail is ideal for tibial diaphyseal fractures and may be recommended for wider use.

Conflict of interest: None

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