

Role of Interlocking Nailing in Fracture of shaft of Femur

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Abstract

Background: Fracture shaft of femur is one of the most common fractures encountered in orthopaedic practice. Fracture shaft of femur is major cause of morbidity and mortality in patients who sustain high energy trauma. This study looks at the epidemiology of patients presenting with femur fracture at a RIMS Ongole.

Methods: This prospective study was performed at RIMS Ongole.

All patients aged 18 years or above, who presented with fracture of shaft of femur were treated with interlocking nailing were included in the study. Various clinical and radiological parameters were collected during the course of treatment.

Results: 25 patients were included in the study; 72% males and 28% were female. 88% aged 50 years or less. Road traffic accident was the most common mode of injury and 56% of patients had fracture in the middle one-third femur. 76% of the patients presented within 24 hours of injury. Most of the patient's demonstrated clinical union of the fracture in 12 to 14 weeks and majority showed radiological union in 16 to 18 weeks. Partial weight bearing was started in patients in 10 weeks and full weight bearing in 16 weeks. Majority of the patients stayed in hospital for 10 to 14 days and the functional outcome as measured by Klemm and Borner criteria was excellent in 66% patients. Complications were seen only in 4 patients.

Conclusions: In our experience, interlocking nailing had very low complication rate and excellent functional outcome in fracture of the shaft of the femur.

Keywords: Femur, Fracture, Interlocking nailing, Management, Outcome

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I. Introduction:

Fracture shaft of femur is one of the most common fractures encountered in orthopedic practice. Injury is most common among persons younger than 50 years.

With the ever-increasing road traffic accidents, pedestrian accidents, sports injuries, fall from height, industrial accidents, shaft fractures of femur are becoming common. In high velocity injuries one must have a high index of suspicion for complications or other associated injuries where the bone is subjected to sudden and violent force resulting in severe and extensive comminution, jeopardizing the vascularity of bone and surrounding tissues.

Fractures are most often due to a bending load applied to the femur with comminution occurring via higher magnitude forces. Torsional loads, in contrast, form a spiral fracture pattern. Fracture shaft of femur is major cause of morbidity and mortality in patients who sustain high energy trauma. Morbidity arises from limb shortening, mal union, non-union and fracture disease. The muscle gets atrophied and fibrosed, the hip and knee joints lose their range of motion and chronic dependent edema develops. Mortality is infrequent, but can result from an open wound, fat emboli, adult respiratory distress syndrome (ARDS) or due to result of multiple organ failure especially in multiple injured patients, deep venous thrombosis (DVT), pneumonia, infection, hemorrhage nerve palsies and compartment syndrome.

currently, surgery is indicated for most femur fractures because of the high rate of union, low rate of complications, and the advantage of early fracture stabilization, which decreases the morbidity and mortality rates in patients (especially polytrauma patients) with these fractures.

Interlocking nailing of fractures with proximal and distal locking screws provides rotational stability and the nail functions as load-sharing, rather than bearing the load. Axial loading across fractures with stable pattern is encouraged thus promoting callus formation. If done by closed method i.e. without disrupting the fracture hematoma.

The fracture needs appropriate equipment and special expertise to carry out the procedure.

The aim of the study was to evaluate the operative procedure in management of fractures of the shaft of femur by inter-locking nailing. This study looks at the epidemiology of patients presenting with femur fracture RIMS Ongole. It includes detailed study on fractures of shaft of femur after internal fixation

with closed interlocking nailing and an attempt is made to manage these fractures with early ambulation and least disability

II. Methods:

This prospective study was conducted in RIMS Ongole, Andhra Pradesh where we included patients who are admitted in our hospital. Approximately 72% are males and 28% are females.

Study design

The study duration was from April- 3- 2017 till March -31- 2019. We included all patients, aged 18 years or above, who presented to our emergency ward with fracture of shaft of femur. Initial management in the form of fluid therapy, antibiotics and analgesics were given.

After initial stabilization, informed consent was obtained either from the patient or from patient's attendant. The patient was admitted and was followed throughout the course of surgery and post-operative period. Our inclusion criterion was fracture shaft femur in 18 to 60 years age group patients and those who were treated by interlocking nailing. We excluded patients who had associated abdominal and chest injuries, had epiphysis involvement, patients who were previously operated cases with non-union and mal-union fracture shaft femur, patients with associated pelvic injuries or patients with neurovascular deficit.

Data collection and analysis

We collected demographic information like age and gender of the patient and detailed history was taken. History taking included mode of injury, level of fracture, type of fracture, time of presentation after the fracture and time of surgery after admission. Additional

information for all patients was collected from their operative and post-operative notes. Mode of anesthesia administered, clinical union of fracture, radiological union of fracture, protected or partial weight bearing, full weight bearing, duration of hospital stay, any complications experienced and functional outcome of surgery was obtained as well.

III. Results:

25 patients fulfilled our inclusion and exclusion criteria during the study period, 72% of which were males and 28% were females. 88% of the study population was aged 50 years or less. Road traffic accident was the most common mode of injury, accounting for 56% patients (Majority of patients had fracture in the middle one-third femur. 76% of the patients presented within 24 hours of injury. no patient in our study population was taken for surgery within 24 hours of injury. 72% of patients were taken in for surgery within 1 to 3 days. Spinal anesthesia was the most common mode of anesthesia administered to patients. 52% of the patients demonstrated clinical union of the fracture in 12 to 14 weeks. Similarly, majority of the patients showed radiological union of the fracture in 16 to 18 weeks. Partial weight bearing was started in 36% patients in 10 weeks and full weight bearing in 42% patients in 16 weeks. Majority of the patients stayed in hospital for 10 to 14 days and the functional outcome as measured by Klemm and Borner criteria was excellent in 66% patients. Limb Length Discrepancy was seen in two patient's superficial infection in one patient and Deep vein thrombosis in one patient.

IV. Discussion:

In human body, femur is the longest, strongest, and heaviest tubular bone in the human body and one of the principal load bearing bones in the lower extremity. Fractures of the femoral shaft often result from high energy forces such as motor vehicle collisions. Femoral

shaft fractures can also result in major physical impairment due to potential fracture shortening, mal-alignment, or prolonged immobilization of the extremity with casting or traction.

PATIENT NAME	K.RAJA RAVINDHRA TEJA
AGE	22/Y MALE

PRE OP	POST OP
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CLINICAL UNION AFTER 16 WEEKS



Table 1:

Baseline characteristics of patients included in the study.

Variable n=25

Gender	Total	%
Male	18	72%
Female	7	28%
Age		
20-30 years	9	36%
31-40 years	8	32%
41-50 years	5	20%
51-60 years	3	12%
Mode of Accidents		
RTA	22	88%
Accident by incidents	3	12%
Leavel of Fractures		
Upper 1/3 rd	6	24%
Middle 1/3 rd	14	56%

Lower 1/3 rd	5	20%
Type of Fractures		
Type I	6	24%
Type II	7	28%
Type III	8	32%
Type IV	4	16%
Time of Presentation after Injury		
Within 24 hours	19	76%
1 to 7 days	4	16%
More than 1 week	2	8%
Time of Surgery After Admission		
Less than 24 Hours	0	
1-3 days	18	72%
4-7 days	5	20%
more than 7 days	2	8%

Essential initial management consists of evaluating the patient for major injuries and treating them as appropriate, placing an intravenous catheter and providing analgesia, and immobilizing the injured extremity. Patients with open fractures receive antibiotics and tetanus prophylaxis. Little clinical evidence exists to support the use of traction in the preoperative management of midshaft femur fractures. Nevertheless, many orthopedic surgeons advocate immobilizing well-aligned fractures, with or without neurovascular injury, initially with skin traction device.

Table 2:
Clinical Progress of Patient
n=25

Variable		
Clinical Union		
10-12 weeks	6	24%
12-14 weeks	13	52%
14-16 weeks	6	24%
Radiological Union		
14-16 weeks	3	12%
16-18 weeks	18	72%
18-20 weeks	4	16%
Protected /Partial Weight Bearing		
8 weeks	7	28%
10 weeks	10	40%
12 weeks	8	32%
Full Weight Bearing		
16 weeks	9	36%
18 weeks	7	28%
20 weeks	6	24%
22 weeks	3	12%
Hospital Stay		
6-9 days	5	20%
10-14 days	18	72%
15-20 days	2	8%

Functional out Come		
Excllent	16	64%
Good	6	24%
Fair	3	12%
poor	0	0%

Decisions about definitive treatment for femur fractures must take into consideration the patient's age, concomitant injuries, and underlying comorbidities, as well as resource availability and clinician experience. Standard treatment of a femoral shaft fracture is an antegrade reamed intramedullary nail. Antegrade intramedullary nailing is associated with a 98 to 99 percent union rate and low risk of infection (1 to 2%), even when used in open fractures. Although reamed nailing is accepted as the standard of care, undreamed intramedullary nailing is also associated with low rates of non-union (approximately 1.9%) and infection. The American College of Surgeons' Committee on Trauma recommends that femoral shaft fractures in polytrauma patients be repaired within 2 to 12 hours of injury, provided the patient is hemodynamically stable. Randomized and observational studies suggest that performing operative fracture repair within the first 24 hours decreases mortality, respiratory complications, multisystem organ failure, and length of hospitalization.

Table 3:
Complications among the patients included in the study.

Complication	n
Limb Length Discrepancy	2
Delayed Union and Non union	0
Re Fracture	0
Fat Embolism	0
Pulmonary Embolism	0
Deep Vein Thrombosis	1
infection	1

Kuntscher nailing which is a successful procedure for simple transverse fracture of the shaft of femur is not ideal for communitated fracture. Kuntscher nail doesn't offer rotational stability and adequate tight fit is not obtained due to the communitation of fragments. Hence implant failure, nonunion, retrograde migration of nail are all known complications. Plate osteosynthesis for communitated fractures is a bigger procedure, which needs a wide exposure and complications like infection, fibrosis of muscle and devitalization of the communitated fragments are common. Prolonged non-weight bearing is a mandatory requirement when femoral shaft fracture is fixed with a plate. For trauma patients with severe concomitant injuries, early definitive repair is associated with higher morbidity. Thus, delayed definitive repair of midshaft femur fractures may be the best approach in these patients. According to a large retrospective study, surgical repair delayed beyond twelve hours may reduce mortality by as much as 50 percent in severely injured patients. This strategy is part of the evolving concept of damage control surgery (or damage control resuscitation) in trauma, the details of which are beyond the scope of this review. Essentially, damage control surgery involves stabilizing trauma patients using the least invasive means available in order to minimize additional physiologic stress to a patient already in extremis. Overall, complication rates for femur fracture are low. The most common complications include infection, abnormal fracture healing, and pain. Less common complications include hemorrhage, neurovascular injury, compartment syndrome, repeat fracture, and hardware failure. Rare but life-threatening complications occur more often in multiple trauma patients and include death, multiorgan failure, and respiratory complications, usually due to acute respiratory distress syndrome and pulmonary or fat embolism.

V. Conclusion:

Midshaft femur fractures commonly occur in young adults as a result of high energy trauma and in older patients due to lower energy falls. In this research article, we presented the characteristics of patients who presented with femur fracture, their clinical course throughout their treatment done and the complications. Interlocking nailing had excellent functional outcomes in our patients.

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