ORIGINAL RESEARCH PAPER



STUDY OF THE FUNCTIONAL OUTCOME OF FEMUR SHAFT FRACTURE TREATED WITH INTRAMEDULLARY INTERLOCKING NAIL

KEY WORDS: femur shaft, intramedullary nailing, minimal invasive

Orthopaedics

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| Khanpara Introduction: The femur is the strongest, largest and heaviest long bone in the body. Femoral shaft fractures are the model common injuries which the orthopaedic surgeons come across, which are the result of severe trauma in young age Patients who have low mineral density got their shaft fractured even by low impact trauma. 1-6 the treatment of femore shaft fractures still remains a problem, and a subject of controversy among orthopaedics surgeons. Knowing the advantages and disadvantages of different methods or technique we can reduce the morbidity, disability and period stay in the hospital.2,3 intramedullary fix ation has gained wide acceptance, in the treatment of femoral shaft fractures. Objectives: To study of the functional outcome of fracture shaft of femur which have been treated with intramedullar interlocking nail. Materials and methods: 30 patients of right or left femur shaft fracture with or without any associated comorbidition and were treated with intramedullary interlocking nail. Results: All the patients showed clinical healing by the avg. Period of 18 weeks, and partial weight bearing started after 3 month. The fracture union rate was 100%. Shortening remain a major complication. Average shortening of the femur was 1 cm. Conclusion: This method of fixation of fracture femur shaft is 1) Minimally invasive process. 2) Easy learning curve. | |

- 3) Least post operatively morbidity.
- 4) It can be done in morbidly obese or uncontrolled diabetes patients.
- 5) Superior in fixation of long oblique spiral fractures.

INTRODUCTION

The femur is the strongest, largest and heaviest long bone in the body. Femoral shaft fractures are the most common injuries which the orthopaedic surgeons come across, which are the result of severe trauma in young age. Patients who have low mineral density got their shaft fractured even by low impact trauma.1-6 the treatment of femoral shaft fractures still remains a problem, and a subject of controversy among orthopaedics surgeons. Knowing the advantages and disadvantages of different methods or technique we can reduce the morbidity, disability and period of stay in the hospital.2,3 intramedullary fi xation has gained wide acceptance, in the treatment of femoral shaft fractures.

AIMS AND OBJECTIVES:

To study the functional outcomes of femur shaft fracture treated by intramedullary interlocking nail.

MATERIALS AND METHODS:

In this study, we included 30 patients of right or left femur shaft fracture with or without any associated comorbidities.

Intramedullary interlocking nail with its pre requisite instruments were prepared for the surgery.

OPERATIVE PROCEDURE:

- Under anesthesia the patient is given supine position on fracture table by the foot holder. Before preparation and drapping the operative part traction is applied and reduction is confirmed in antero-posterior and lateral view under IITV
- Entire thigh is prepared and drapped in routine manner. A longitudinal skin incision is made on lateral aspect of thigh.
- The incision started at the tip of trochanter and extended proximally for approximately 4 cm paralleling the shaft.

The gluteus maximus fascia is identified and splitted in the line of skin incision.

- The underlying muscle fibers of gluteus medius are bluntly separated using the fingers. Once the bone is reached the tip of trochanter is palpated and piriformis fossa is reached. The curved awl is inserted at the piriformis fossa, usually with the straight portion parallel to the floor and in line with the femoral shaft. The entry point is identified in the piriformis fossa slightly posteriorly on the trochanter, and bone cortex is perforated with the bone awl and verified on the anteroposterior and lateral views.
- After making entry with the awl, reduction is done with manual manipulation and guide wire is passed across fracture site. The position of guide wire is confirmed under IITV in both views. An ideal position for guide wire is central in the canal of the femur in anteroposterior and lateral views.
- The femoral canal of the proximal and distal fragment and is reamed with increasing size of reamers up to 1 mm more than the measured canal diameter preoperatively or till tightness over reamer is felt and no more reaming is possible. Reaming should be avoided in the comminuted fracture and open fracture.
- The proper nail length is determined by guide wire method at this point. With the distal end of guide wire at the proximal pole of the patella, a second guide wire of same size is kept at femoral entry point.
- The remaining length of 2nd guide wire from tip of 1st rod is taken as length of the nail. The nail of measured size is assembled over the jig. Sleeves for locking are assembled and matching of sleeve is checked by passing a drill bit.
- A nail of pre-measured size with jig is passed over the guide wire, its cylindrical handle pointed away from the patient and keeping convex part of nail anteriorly to match anterior curvature of the femur.

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- The nail is passed over guide wire across fracture site manually and if required with light hammering. During entire procedure fracture is held in reduced position. The guide wire is removed after confirming the central position of nail in distal part of femur. The nail tips should lie at upper end of patella and the proximal end to lie flush with the tip of the greater trochanter.
- The distal locking is carried out with "Free Hand Technique".(5,8) Image intensifier is placed and distal area is scanned.
- A true lateral image is taken, till distal screw holes appear circular (full moon).
- Then stab incisions are put on lateral aspect centering over both holes. Then drill bit or Steinmann pin is passed in center of the most distal hole and made bicortical which is confirmed in APView.
- The drill bit is removed and locking bolt is passed in same track and made bicortical. Bolt size and position is confirmed under IITV and clinically with blockade of guide wire in the nail. Then proximal hole of distal lock is also dealt in the similar way and confirmed.

FOLLOW UP ASSESSMENT:

- Follow up has been carried out at 6,10,14 weeks. During follow up, patients were examined regarding pain, implant impingement, deformity, tenderness, range of movement at hip and knee joint, ability to bear weight, sitting cross legged and any other complications.
- Radiographs were taken and progress of union and position of implants are noted. Depending upon clinical and radiological progress of the fracture healing increasing weight bearing on the injured limb was allowed.
- Unassisted full weight bearing was allowed once complete healing took place. Fracture union was considered when there was no pain on weight bearing and bridging callus was seen on two radiographs made in anteroposterior and lateral views.
- Dynamization was considered after 12 weeks when radiologically gap was seen between the fracture fragments. All cases are studied and followed up as per the proforma attached.

ASSESMENT CRITERIA

| PARAMETERS | ASSESSMENT | SCORE |
|----------------------|---------------------------------------|-------|
| Pain | None | 15 |
| | Slight pain over upper end of nail | 10 |
| | Sever pain over upper end of nail | 5 |
| Deformity | 0-10° | 10 |
| (Angulation) | 10°-15° | 6 |
| | >15° | 3 |
| (shortening) | 0 c.m. | 10 |
| | 0-1.5c.m. | 6 |
| | >1.5 c.m. | 3 |
| Sitting cross legged | Possible | 10 |
| and squatting | Difficult | 6 |
| | Unable | 3 |
| Weight bearing | Full | 10 |
| | With support | 6 |
| | Unable | 3 |
| Infection | Nil | 10 |
| | Superficial and cured | 6 |
| | Deep with pus discharging sinus | 3 |
| Range of movement | Full | 10 |
| (at hip) | Reasonable | 6 |
| | Grossly limited | 3 |
| (at knee) | >120° | 10 |
| | 80°-120° | 6 |
| | <80° | 3 |
| Patient's | Satisfied | 15 |
| satisfaction | Partially satisfied | 10 |
| | Notsatisfied | 5 |

Maximum Score : 100 Excellent :>85 Good : 70-84 Fair : 66-70 Poor :<65

RESULTS:

- Sex distribution- M-24 and F-06
- **Age group(year)-** 18-35:20,36-50:03, >50:07
- Mode of injury- Road traffic accident:22 and fall:08
- Open fracture :07, closed fracture :23
- Gstilloanderson classification:

type 1:02 type 2:04 type 3:01

- Fracture site-right-16 left-14
 - Anatomical level: upper/3:09

middle/3:10

lower/3:11

- Associated fractures- 4- head injury, 2-tibia fracture, 2patella fracture, 2- abdominal injury
- **Comorbidities** hypertension and diabetes mellitus with ischaemic heart disease and a few with liver and renal dysfunction

• Day till surgery-

- 08-within 24 hrs
- 11- within 1-3 days
- 11->3 days

Fracture pattern:

- 19-transverse
- 02-oblique
- 02-spiral
- 06-comminuted
- 01-segmented
- Implants- femur interlocking nail and 4.5 mm bolt
- Surgical time-40-45 mins from the incision to closure
- **Mobilization**-partial weight bearing after 45 days and full weight bearing after 90 days
- Limb length discrepancy-13% patients(0.5-1 cm)
- Clinical healing average-6-8 weeks
- Avg.time for union: 18 weeks (14-28)
- Union ratio: 100%
- Complication:
- 1. 13%shortening
- 2. 03% infection

SUMMARY:

- The present study was a prospective study of closed locked intramedullary nailing in 30 femoral shaft fractures in 30 patients performed under IITV quidance.
- The patients were in the age group of 16 to 68 years.
- Mean age of patients was 34 years.
- Majority of patients (80%) were male.
- More number of patients had fracture of the right femur (54%), while one patients had bilateral fracture.Most of the patients (73%) sustained fracture due to vehicular accidents.
- Incidence of associated injuries was 47%.
- Most of the femora were operated within three days of trauma.
- All nailing were carried out in supine position.
- Reaming was performed in 87% of the cases.
- Average time of fracture healing was 18 weeks.
- Average shortening at final follow up was 1 cm.
- Uneventful union occurred in 97 % of the cases.
- 90% of patients were satisfied with their final outcome.
- Excellent to good results were obtained in 96% of patients.

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CONCLUSION:

- Though the numbers of patients in the present series are comparatively less, however it appears that:
- Possibility of the associated injuries must be kept in mind. Every attempt should be made to diagnose such injuries to minimize morbidity and mortality. A detailed clinical examination is of utmost important.
- Life and limb threatening injuries should be addressed on priority basis. A complete radiological examination and preoperative planning will reduce intra and post operative problems.
- Proper entry for nail insertion and careful reaming will reduce complications like fracture neck femur and intra operative shattering of the fragment.
- Final checking of nail position, length and position of screws and a fracture alignment must be screened under IITV in both the planes.
- Fixation should be carried out as early as possible. Early fixation does not increase the risk of complications.
- Interlocking nailing appears to be safe technique for open fractures (Grade I, II). Early mobilization and range of motion exercise is possible after stable internal fixation with interlocking nail if associated injuries do not preclude it.
- Early adequate debridement and judicious use of antibiotics are important to minimize post operative infection.
- We agree with the literature that the intramedullary interlock nailing for femoral shaft fracture is safe, sound and giving good end results.
- It is of special value for comminuted, oblique and segmental fractures.

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