



FRACTURE OF SHAFT OF FEMUR; COMPARISON OF SOLID VERSUS CANNULATED INTERLOCKING NAIL.

Sajjad Rasool¹, Basharat Manzoor², Muhammad Omer Aslam³

1. MBBS, FCPS
Assistant Professor
Department of Orthopedics
Nawaz Sharif Medical College,
Gujrat.
2. MBBS, MS (Ortho)
Assistant Professor
Department of Orthopedics
Allied Hospital Faisalabad.
3. MBBS
Medical Officer
Basic Health Unit, Faisalabad.

Correspondence Address:
Dr. Basharat Manzoor
Department of Orthopedics
Allied Hospital Faisalabad.
drbasharat5050@gmail.com

Article received on:
21/11/2017

Accepted for publication:
10/02/2018

Received after proof reading:
05/04/2018

ABSTRACT... Introduction: Fracture of the shaft of the femur is among the most common fractures encountered in orthopedics practice.¹ **Objectives:** The aim of the study was also compare the outcome of solid versus cannulated inter locking nails as a method of internal fixation in closed fractures of the shaft of femur in adults. **Design:** Quasi Experiment design. **Setting:** Orthopedic Department Allied Hospital P.M.C Faisalabad. **Results:** We had total of 60 cases, 30 in groups of solid I/M nailing and 30 in group B of Cannulated in I/M nailing we have reported the follow up study up to 9 months. (1) There were 27 (90%) males and 3 (10%) females in group A. (2) If in group B 26 (86.666%) were males 4 (13.333%). (3) The mean age was 37.4 + 1.61 years. **Union:** Group A, In 26 (86.666%) patients the fracture uniting within 3 months. 3 (10%) patients went into phase of delayed union which ultimately united. 1 (3333%) patient into non-union for which bone grafts has to be done after nine months. **Group B:** In 26 (86.666%) patients the fracture united within 3 months. Patient in group B went into nonunion due to deep infection, second due to nail breakage an in third no apparent causes was found. Total no of cases of non-union in group B were 3. **Infection:** In group A one patient in group B 2 patient had superficial infection which were treated with appropriate antibiotics. In group B one patient had deep infection and went into non-union due to infection. **Implant Failure:** In group B one case with nail breakage.. 2 Cases with distal Inter Locking screws breakage & 1 case with proximal interlocking screw breakage were noted. **Conclusion:** (1) There is no statistical difference in union and infection in both groups (P-Value > 0.05). (2) There is significant difference in implant failure in both groups no patients in group A went with implant failure but four patients in group B developed implant failure (P-value < 0..05) so Solid inter locking nail is stronger than cannulated interlocking nail.

Key words: Femoral shaft fractures, Intra medullary nailing

Article Citation: Rasool S, Manzoor B, Aslam MO. Fracture of shaft of femur; Comparison of solid versus cannulated interlocking nail. Professional Med J 2018; 25(4):627-632. DOI:10.29309/TPMJ/18.4529

INTRODUCTION

Fracture of the shaft of femur are among the most common fractures encountered in orthopedic practice.¹

The majority of these injuries occurs in young, active working community and is result of high energy mechanisms, such as motor vehicle accidents, fall from height, or industrial accidents.^{2,3}

This poses a great challenge for the person, family, society, and the country in terms of economy, health care delivery system and development. All over the world trauma is the leading cause of mortality and morbidity. So many recourses have to be spent in the rehabilitation of these

individuals.

Several treatment options are available for treatment of formal shaft fracture.¹³⁻²⁰

The decision regarding treatment option depends on many factors such as, age of the patient type of fracture, comminution and site of fractures, availability to expertise and many others to mention a few. Management of fracture with Intra medullary nail inserted into the femur is the standard of care for surgical fixation for most femoral shaft fractures.^{1,2,9,10,11}

Intra medullary nailing has much theoretic and practical advantages over the other forms of external and internal fixation in terms of stable

and reliable fixation with early weight bearing.^{12,13}

The wide spread use of inter locking nailing of femoral fractures is the most important simple advance in the operation treatments of acute fracture in the present decade.

Various designs of inter locking intra medullary nailing system allowing closed nailing techniques have been used in the treatment of femoral shaft fractures since detensor" nail was described by kuntscher in 1968.¹⁴

These systems control shortening, angulations and rotations in complex fractures via screw / bolts that may be inserted transversely and or obliquely through the nail both proximal & distal to the fracture site.¹⁵ The nail systems serve as load bearing device. Intra medullary nail may be classified by some of their physical properties (Biomechanics).

They are rigid nails which may be solid or cannulated (un slaughtered or slaughtered).

Those nails differ in their physical properties of stiffness, axial load, bending and torsion.

Fracture healing after intra medullary inter looking nailing is effective, with union rates between 95% to 99%.¹² The bony healing can be demonstrated both clinically and radiologically. Complication of femoral shaft fractures as result of trauma may be due to open fracture associated neuro vascular damage, intra-abdominal or intra thoracic injuries and femoral shaft fractures associated with ipsilateral femoral neck fractures.

Complication occurring as result of fixation of the fractures of the shaft of the femur are that subject of concern and worry for the orthopedic surgeon. The complications are in the form of limb shortening, rotational deformities in valgus or varus, infection (superficial or deep), delayed union, nonunion, knee stiffness and implant failure.

Fractures were considered to be united clinically in the absence of movement and pain on stress at

the fracture site. Radio graphic union was achieved in the form of uniform and continuous ossification of callus, with consolidation and development of trabeculae across the fracture site.¹⁰ Union time of more than 26 weeks in closed fractures and 39 weeks in open fracture was considered to be delayed union.^{17,18,19}

The diagnosis of non-union was made in presence of abnormal movement at the fracture site at last 9 months after the injury and with no progressive signs of healing for at last 3 months, despite continuing treatment.^{44,17}

The purpose of study was to compare the results of solid and cannulated interlocking nails in treatments of femoral shaft fractures, on the basis of union, failure union, implant failure and infection.

Review of literature

Femoral shaft fractures are usually the result of high energy forces 56, 54, 55 such as motor vehicle accidents, auto pedestrian accidents, motorcycle accidents, fall from heights and gunshots.

Orthopedic assessment of the entire limb should be systematic and complete. The pelvic ring and hip are inspected for tenderness. Hip cannot be moved voluntarily by the, patient palpation of the groin and buttock is important.

Although neurovascular injuries are rarely associated with closed fractures, a complete preoperative examination of distal nerves and vessels is mandatory.

Few patients with isolated fracture of the femoral shaft are in hypovolaemic shock, major blood loss into the thigh is present in most cases (west ETT Al 1989).

In a retrospective study of patients with isolated shaft fractures (lievrencia at al 1992) reported that 21 of 53 required transfusion and estimated the average blood loss in all 53 patients to be more than 1200 ml.

Therefore, careful preoperative assessment of the homodynamic stability of the patients is necessary.

Non displaced fractures of the femoral neck are frequently missed because of the overlying shadow of the splint or poor quality pre-operative radio graphs.

Intramedullary devices have been used in various forms to stabilize long bone fracture for many years. It is recorded that the Aztecs used wooden intramedullary nails 500 years ago (haeger 1988).

The intra medullary techniques that are common in use today derive mainly from the work of Gerhard Kuntcher in Germany or Rush family in United States of America.

“Kuntcher’s intramedullary nailing is the method of the fracture”. These remarks are especially significant because Bohler was known internationally as the representative of conservative fracture treatment.

Rascher et al (1972) used Kuntcher’s method of closed intra medullary nailing in femur in forty two patients and described its advantages, disadvantages, indications contra indications and special emphasis on apparatus & technique. Hansen and Waiquest (1979) reported results of 300 femoral shaft fracture treated by closed nailing.²²

Rothwell reported in 1982, of 32 more severely comminuted fracture shaft by closed Kuntcher nail, 12 patients had shortening up to 2 CM & 2 delayed union.

OBJECTIVES

The aim of the study was to compare the outcome of solid versus interlocking nails as a method of internal fixation in closed fracture of the shaft of femur in adults

METHODS & MATERIAL

Study Design

Quasi Experimental design

Setting

Orthopedic Department Allied Hospital (PMC) Faisalabad.

Duration of Study

One Year

60 cases were included in this study. In group A (30 patients) internal fixation of femoral shaft fractures was done with solid interlocking nail while in group B (30 patients) internal fixation of femoral shaft fracture was done with cannulated interlocking nail.

Inclusive Criteria

All patients between the age of 18 to 60 year, presenting in accident and emergency department of Allied hospital, Faisalabad with closed non comminuted femoral shaft of fractures.

Exclusion Criteria

Poly trauma Pt
Open femoral shaft fractures
Unfit for Anesthesia
Pathological Fracture
Fracture more than weeks old
Non Union fractures

All Patients with closed fractures of shaft of femur were managed initially in the accident and emergency department. Patients were assessed thoroughly for any evidence of other injuries X-ray was done to confirm the fractures of shaft of femur and to exclude other injuries like pneumothorax and other fractures. Patients were investigated for complete blood count, random blood Sugar, blood urea, serum creatinine.

In group A patients open reduction and internal fixation of femoral shaft fractures was done with solid interlocking nail.

On the other hand, in group B patients open reduction and internal fixation was done with cannulated internal locking nails. Patients were discharged on third postoperative day and broad Spectrum antibiotics were given for seven days post operatively Further follow up was done at 10th day, later at 6, 10, 16, 20 weeks up to 9

months to see the union, presence of infection & implant failure.

RESULTS

We had total 60 cases, 30 in group A of solid I/M nailing and 30 in group B of cannulated I/M nailing.

There were 27 (90%) males and 3 (10%) female in group A. In group B 26 (86.666%) were males and 4 (13.333%) were female. The youngest patient was 25 years old and oldest was 60 years. Mean age was 37.4 ± 1.61 years.

The most common cause of fractures of shaft of femur in our study was road traffic accidents. The most common site of femoral shaft fracture was middle third 32 cases (55%) followed by the upper third 16(25%) and distal third 12 (20%)

Union

Group A in 26 (86.666%) patients the fractures united within 3 months. One patients went into delayed union.

3 (10%) patients went into a phase of delayed union which ultimately united.

1 (3.333%) patient went into nonunion for which bone grafting has to be done after nine months.

Group B in 26 (86.666%) patient. The fracture united within 3 month.

Pt went into delayed union.

3 Patient in group B went into nonunion, due to deep infection, second due to nail breakage and in third no apparent cause was found. So total no of cases of nonunion in group B were 3.

Infection

In group A 1 Patient had superficial infection
In group B 2 Patient had superficial infection

Implant Failure

No patient in group A went to implant failure in group B one case with nail breakage 2 cases with distal inter locking screws breakage and 1 case

with proximal interlocking screws breakage were noted.

DISCUSSION

Orthopedic surgeons often encounter distaphyseal femur fractures.^{1,2,3} Because these fractures most often result from high energy trauma, one must have a high index of suspicion for complications or others injuries. While main stay of treatment has been reamed interlocking intramedullary nailing, a variety of treatment options exist for solitary fractures or fractures with associated injury. Surgical options in adults include the intra medullary nailing, with antegrade or retrograde. Plate fixation and external fixation are used less frequently, However, one must consider the patients immature bones, open physes, parental care available, and growth potential when forming a treatment plan in children.^{4,5,6}

In one study we had 53 (88.33%) males and 7 (11.660%) females and the age range was 25 to 60 years.

Borel et al studied results of closed locking nailing of complex femoral fracture in adults. A total of 60 cases were studied. There were 52 men (76.47%) and 16(23.52) women and the age was between 16 to 83 years.

Umer M et al studied the results of femoral shaft fractures with reamed intra medullary interlocking nails. They studies 89 cases, most of these were young patients involved in high velocity road traffic accidents.

Fracture comminution was graded according to Win quest and Hansen. The type of comminution in addition to the location of the fracture has an important bearing on the type of locking used. We used static locking in type II and III comminution. As noted by Jonsen etal (1984) it is important that starting portal position of the periformis fossa should be correct small mal position of the early portal may create enough pressure during insertion of the nail to propagate fracture lines which may displace days or even weeks post operatively.

We treated all of our patients of superficial infection on OPD basis (4 Patient). But one readmitted for proper treatment. Similarly all the patients with nonunion had also to be admitted for proper management.

Lohowe has reported an infection rate of 5% Brum back et al at 8%. Buxeli et al had no infection rate. Umer et al had 4% infection rate while Ligh reported an infection rate 0.938%.

In our study no patient in group A developed implant failure, neither in the form of nail breakage nor inter locking screws breakage. But in group B we had 4 cases of implant failure (13.333%) 1 with nail breakage (3.333%) two with distal inter locking screws breakage (6.667%) and one (3.333%) with proximal interlocking screw breakage. This much difference in the rate of implant failure between the two groups might be due to multiple factors.

Firstly as studied by Schanded Maries P et al. The Relative stiffness on unslotted (solid) nail is more (6-1.8 Nm/Degree) as compared to slotted (cannulated) nail (0.2 nm/degree) secondly the quality of metal used may matter. We used solid nails donated by American NGO SIGN. But cannulated used were manufactured locally so quality of material may matter.

CONCLUSION

The most Common cause of femoral shaft fracture is road traffic accident and affects the adult male population. There is no difference in union and superficial infection in both groups but one patient with cannulated inter locking nail developed deep infection and went into nonunion due to deep infection. No patient with solid inter locking nail developed deep infection. There significant difference in implant failure both groups. No patient in group A went into implant failure but four patients in group B developed implant failure. So solid inter locking is stronger than cannulated inter locking nail.

Copyright© 15 Feb, 2018.

REFERENCE

- Whittle AP, wood GW 11. **Fractures of the lower extremely. In: canale ST, editor.** Campbell's Operative Orthopedics Vol.3..10th Ed. New York: Mosby; 2003.P:275-872.
- Blistrode CJK, Kinnin month A. **Lower limb trauma In: russell RCG, william NS, Bulstode CJK, editors.** Bailey & Love's Short practice of surgery 24th ed. London: Arnold; 2004. P:397-405.
- Bain GL, Zacr AC, Paterson DC, midleton J, PDHI AP. **Abduction Stre following inter medullary nailing of the femur.** J ortho P Trauma 1997; 11:93-7.
- Hennrikus WL, Kasser JR, Rand F, Millis MB, Richards KM. **The Function of the patient who are loss than seventeen years old.** J Bone joint surg Am 1993; 75:508-13.
- Ostrum RF, Diccioj, Lakator, R, Poka A. **Retrograde intra medullary nailing of femoral dia physeal fractures.** J orthop trauma 1998; 12; 464-8.
- Ostrum RF, Agarwal A, Lakatos R, PokaA. **Prospective comparison of retrograde and antegrade femoral inea medullary nailing J orthop trauma 2004, 14:496-501.**
- Leggon RE, Feld mann DD, **Retgrograde femoral nailing; a focus on the knee** AM J knee SmG 2001; 14; 109-18.
- Kapp W, lindsy RW, Noble PC, Ru dersdosf T, Henry P. **Long-Term residual musculo sketal deficits after femoral shaft fracture treated with intra medullary nailin.** J Trauma 2000; 49; 446-9.
- Tay BKB, Colmn WW, Berven S, Fonter Rjr, Gunthers, Homme w, et al orthopdeics. **In: way LW, editor. Currant surgical diagnosis and treatment 11th ed.** Boston: Megraw- It ill; 2003.P:166-229.
- Kenfl, Grosse A, Back G. **Closed Locked intra medullary nailing; its application to cmminuted fracture of the femur** J Bone joint surg Am 1985; 67: 709-20.
- FortertE, Healy WL. **Operative management of distal femoral fracture.** Orthop Rev 1991; 20:962-9.
- Chirtie J, Court Brown, kinninmonth AWG, howk R. **Intra meduallary locking nails in the management of femoral shaft fracture.** J Bone Joint surg Pro.1988; 70:206-10.
- Christic J, Court- Brown C- **Femoral Neck Fracture during closed medullar nailing, brief report.** J Pooe joint surg Por 1988; 70:670.
- Russell TA, Taylor Je, Lavelle DG, Beals NB, Brum field DL, Durhom AG **Mechanical characterization of femoral intra locking intra medullary nailing systems.**

Jorthop trauma 1991; 5:332-40.

15. Russel TA. **Bio Mechanical concept of femoral intra medullary nailing.** Interm J orthop trauma 1991; 1:36-51.

16. Wo JCIK K, Gazdizk Ts, Barans Kat, Nolewajka M. **Locking Intra medullary nailing in failure of bone union orthop traumatol rehabile** 2000, 30:49-53.

17. Mirad T. **Operative Treatment of femoral shaft fracture in childrens; a nine year experience in saudia Arasian population.** Injury 2000; 31:769-71.

18. KIM NH, Hahn SB, Park HW, Yang I+I. **The ortho fix external fixator for fracture of long bones.** Int orthop 1994; 18:42-6.

19. Kulkarni SS, moran Ca. **Results of dynamic condylar screws for sub trochanteric fractures.** Injury 2003; 34:117-28.

20. Kuentscher G. **Intra medullary surgical technique and its place orthopdecis surgery.** My Present concept. J Bone joint surg Am 1965; 47:809-18.

21. Rashar JE, Nahigian SH, macys JR, Brown JE. **Closed nailing of femoral shaft fractures** J Bone Joint surg 1972; 64-A: 533-44.

22. Hansen ST, **Closed Intra Medullary nailing of the femur.** Dlin orthop 1973; 138: 56-61.


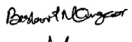
“

*Not all storms come to disrupt your life.
Some come to clear your path.*

– Unknown –

”

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Sajjad Rasool	Data collection	
2	Basharat Manzoor	Data analysis	
3	M. Omer Aslam	Final Review	