

Original Article

Evaluation of the results of fixation of femoral shaft non-union with Implant failure by Sign Inter Locking Intra Medullary Nail

Mumun Rashid Bhuiya¹, Md. Mizanur Rahman², Molla Mizanur Rahman³, Sharmin Hossain⁴, Md. Humayun kabir⁵, Md. Ferdous Talukdar⁶, Liton Chandra Dey⁷.

¹Senior Consultant, 300 Bedded Hospital Narayanganj. ²Associate Professor, Department Orthopedics, Dhaka National Medical College & Hospital. ³Assistant Professor, Department Orthopedics, Dhaka National Medical College & Hospital. ⁴Assistant Professor, Department Community Medicine, Dhaka National Medical College & Hospital. ⁵Senior Consultant, 250 Bedded Hospital, Gopalgong. ⁶Professor and Head, Department Orthopedics, Dhaka National Medical College & Hospital. ⁷Assistant Professor, Department Orthopedics, Dhaka National Medical College & Hospital.

Abstract:

This prospective study of "Evaluation of the result of fixation of femoral shaft nonunion with implant failure by SIGN interlocking intra medullary nail" was carried out during the period of July 2007 to June 2009 at National Institute of Traumatology and Orthopedic Rehabilitation (NITOR), Dhaka, Bangladesh. Mean age of the patients was 38 years. Majority of the patients were male. Among 10 cases 8 were found injury was high energy trauma due to motor vehicle accident and there was a preponderance of fracture on the right side. Removal of the previous implant, re-shinning of the fracture ends, open reduction and fixation either antegrade or retrograde SIGN interlocking intramedullary nail depend on the site of involvement. The mean union time was 16 weeks. Reaming materials was used as internal bone graft and one patient developed deep infection with poor union status. Functional outcome was analyzed by Thoresen classification system. Excellent functional outcome was found in 5 (50%) cases, good in 3 (30%) cases, fair in 1 (10%) case and poor in 1 (10%) case. The final outcome satisfactory result was found in 8 (80%) cases and unsatisfactory result in 2 (20%) cases.

Key Words: Femoral shaft, Non Union, Sign Inter locking Intra Medullary Nail.

Introduction

The femur is the largest bone in the body. It function transmit load, maintain the length of the limb, and anchor muscles for weight bearing and locomotion. Despite advances in surgical technique, fracture fixation alternatives and adjuncts to healing, femoral nonunion continue to be significant clinical problem. femoral fractures may fail to unite because of the injury, damage to the surrounding soft tissue inadequate initial fixation, and demographic characteristic of the patients. The management of femoral fractures was revolutionized by the introduction of intramedullary nail by Kuntscher in 1939 (Kuntscher, 1968) the excellent clinical result resulted in wide dissemination of the technique.

Hypothesis

Fixation of femoral shaft non union with implant failure by SIGN intra medullary inter locking nail is a better method.

Objectives of study

General Objective: To find out the effectiveness of stable SIGN nail fixation for implant failure and nonunion of femur fracture with implant failure.

Specific Objective

1. To determine the union status, time of union of SIGN nail fixation with implant failure and nonunion of femoral shaft.
2. To find out difficulties and complications during operation.
3. To find out complications after operation.
4. To find out functional outcome including range of motion of both Hip and knee joint.

Method & material

Type of the study

This prospective study was under taken to evaluate the result of fixation of femoral shaft non union with implant failure by SIGN interlocking I. M. Nail.

Place and period of study

The study was carried at the National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Dhaka from July 2007 to June 2009.

Sampling method

Purposive sampling method was followed as per inclusion

and exclusion criteria. Selection was done on the basis of history, clinical examination and radiological evaluation at the out patient department (OPD) of NITOR

Inclusion criteria

- a) Age- adult (>18 years)
- b) Implant failure.
- c) Non-union of femoral shaft.

Exclusion criteria

- a) Recent fractures
- b) Infected non union
- c) Open fracture
- d) Non union of Femoral neck and Trochanteric fracture
- e) Non union of T-Y intercondylar fracture
- f) Pathologic fracture
- g) Children s Fractures.

Clinical Procedure

1. Clinical Assessment:

A complete history of the selected cases was taken with particular emphasis to the time and mechanism of injury, past treatment, and was assessed to rule out any co-existing diseases (Diabetes mellitus, Hypertension, collagen tissue disorder). This was followed by a through general and physical examination to exclude any associated injuries.

A detailed local examination was the carried out with particular attention to:

- Attitude of the limb and deformity
- Limb length discrepancies
- Mobility of the fracture fragments
- Signs of active infection
- Discharging sinus
- Join status to hip and knee
- Neuro Vascular status
- Any associated injuries

2. Radiological Assessment

A good quality antero-posterior and lateral view of the involved femur including hip and knee joint was taken fracture configuration, status of the previous implant, status of union was assessed.

3. Laboratory Investigations:

- The following investigations were conducted:
- Complete blood count
- Blood grouping
- Urine for R/E and M/E
- Random blood sugar
- Blood Urea
- CRP
- X-Ray chest P/A view

- ECG

4. Preoperative Preparation:

- Pre- anesthetic checkup
- 6 hours NPO before operation
- Selection of appropriate size of implant

Nail size mensurement

Preoperatively lateral X-ray view of patient's fumer was done to estimate the length and diameter of the required intramedullary nail. The diameter of the nail was estimated by measuring the diameter of the intramedullary canal of the diaphysis at the narrowest point. Magnification should not exceed 10 percent. In general, the exact nail length and diameter are determined during surgery.

Choice procedure

Ante grade Nailing- for proximal and middle third fracture. Retrograde Nailing- for distal third fracture

Prophylactic Antibiotic

In all cases 3rd generation cephalosporins were started 1 hour before syrgery.

Surgical technique Anaesthesia

All the 10 patients were operated under spinal anaesthesia.

Patient positioning

At operation patient were placed in the lateral position with the affected side uppermost for antegrade nailing and patients were placed in the supine position with flexion of the knee 60 to 90 degree for retrograde nailing.

Assesmbily of the JIG/T - Handle/Nail construct

1. Attachment of the T-handle to the Nail: Locking bolt was interested through the hollow stem tube of the T-handle until the threads were visible at the bottom of the stem tube (fig.20a). Using the provided hex wrench, the bolt was threaded through the nail. The notches in the nail were carefully aligned to the corresponding protrusions in the stem tube of the T-handel and hand-tightened.
2. Attachment of assembled T-handle and nail to the proximal Target Arm: The shoulder bolt was used to attach the T-handel to the Jig. Proper alignment of the targeting holes ant the holes or slots in the nail was done by using the alignment pin.
3. Determination of the placement of the distal target arm: This was done by placing the alignment pin through one of the distal targeting holes and lining it up with the corresponding holes in the nail.

Result-

Table- 1: Number of the patient s (n-10)

Number of patients	10
Number of Male patients	7
Number of Female patients	3
Mean age of patient s	38 years

Table-2: Incidence of complications

Type	Patients
Restricted knee motion and shortening of limb	2
Superficial wound infection	2
Deep wound infection and Delayed union	1

Table-3: Classification system for the result of treatment (According to B.O thoresen et, 1985)

Criteria	Result			
	Excellent	Good	Fair	Poor
Malalignment of femur (degrees)/varus/valgus	5	5	10	>10
Recurvatum	5	10	15	>15
Internal rotation	5	10	15	> 15
External rotation	10	15	20	>20
Shortening of femur(cm)	1	2	3	> 3
Range of motion of knee(degree) Flexion	>120	>120	90	< 90
Extension deficit	5	10	15	>15
Pain or Swelling	None	Minor	Significant	Severe

Table-4: Results of the patient Series (n-10).

Grading	Number of patient	Percentage
Excellent	5	50%
Good	3	30%
Fair	1	10%
Poor	1	10%
Satisfactory Result (Excellent plus Good)	8	80%
Unsatisfactory Result (Fair plus poor)	2	20%
Total	10	100%

References

1. Anastopoulos G, Aimakopoulos A, Exarchou E., pantazopoulos. T.1993, closed interlocked nail in comminuted and segmental femoral shaft fractures j.trauma, vol 35, pp 772-775.
2. Barbarosa v, Brank R.2001, Treatment of modified osteomyelitis and infected nonunion of the femor

by modified ilizarov technique ; follow- up study Croatian Medical Journal vol 42, pp. 643-41.

3. Basset Ca, Mitchell SN, schink MM:1982, Treatment of therapeutically resistant non unions with bone graphs and pulsing electromagnetic fields journal of Bone joint surg, vol 64A, pp.1214-1220.
4. Beredjiklianpk, naranja rj, HeppenstallRb. 1999 Result of treatment of 111 patients with non union of femoral shaft fractures. Uniiv. Pennsylvania Orthop J , vol-12, pp. 52-56.
5. Brav EA, 1968, the use of intera medullary nailing for non union of the femur. Clin orthop Vol 60, pp 69-75.
6. Christiej. Court-BrownC, kinniworth A.W, Howies C. 1988. Intramedullary locking nails in the management of femoral shaft fractures. J Bone joint surg vol.70=b, pp 206-210.
7. Giannoudis et al. 1999, journal of bone 7joint surgery, vol, 81. pp 356-61.
8. Kuntscher G1968. The interamedullary nail of fractures. Clin orthop, vol 60, pp 5-12.
9. Laing p1953 .the blood supply of the femoral shaft. J bone jone joint surg vol.35 b, pp462-6