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A Clinical Study on Surgical Management of Diaphyseal Fracture of Femur With Closed Intra medullary Interlocking Nail

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ABSTRACT

Intramedullary interlocking is presently considered to be the treatment of choice for femoral shaft fractures. It has high rates of fracture union. This modality with advantage of early stabilization decreases the morbidity and mortality rate in patients, allows early mobilization, decreases the incidence of infection, malunoin, non-union or implant failure. We studied a total of 30 patients of fracture shaft of femur admitted in the Orthopaedic Department treated with closed intramedullary interlocking nailing. 23 patients were male and 7 were females and age group ranged from 18-49 years with mean age 30 Yrs. right side fractures encountered in 18 cases and 12 left side. 24 fractures were closed and 6 fractures were open type. 5 fractures were in proximal third, 19 fractures were in the middle third and 6 in distal third of femur. Duration of study was 18 months. Duration between injury and surgery was <24 Hours in 6.67%, 24-72 hours in 50% and 4-7 Days in 43.3%. Duration of hospital stay was average 11.43 days ranging from 06-22days. Mean time for union was 21.3 weeks ranging from 16-32weeks.There were two cases of superficial infection and no deep infection. Excellent to Good result in 90% cases. We conclude that closed intramedullary interlocking nailing after is an excellent technique for the treatment of femoral shaft fracture. It is an excellent mode for treatment of complex, comminuted and unstable femoral fracture. It reduces the incidence of malunoin and maintains length of the bone. Minimal soft tissue injury during surgery, early rehabilitation ensures complete restoration of motion. It is a safe method in management of Type I and II compound fractures.

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Key Words

Fracture, shaft, femur, closed, interlocking, intramedullary, nail, diaphyseal

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INTRODUCTION

Fractures of femoral shaft are among the most common fractures that orthopedic surgeons encounter. Because the femur is the largest bone of the body and one of the principal load bearing in the lower extremity, fracture can cause prolonged morbidity and extensive disability unless treatment is appropriate. Possible treatment methods for fractures of the femur shaft include closed reduction and spica cast, skeletal traction, femoral cast bracing, external fixation, intramedullary nailing, plate fixation[1]. Closed nailing is an exacting technique. Full set of nails, reamers, extractors and related equipment and an image intensifier must be available. Preoperative radiographs of the uninjured femur can be used to estimate proper nail diameter, expected amount of reaming and final nail length for severely comminuted fractures[1]. Locked intramedullary nailing is currently considered to be the treatment of choice for most femoral shaft fractures. Regardless of the treatment method chosen, the following three principles are agreed on[2].

- Restoration of alignment, rotation and length
- Preservation of blood supply to aid union and prevent infection
- Rehabilitation of the extremity and the patient[1]

The art of femoral fracture management is often challenging. Malrotation, Hemorrhagic shock, fat embolism, MODS (Multiple Organ Dysfunction syndrome). There can be increased morbidity due to physical impairment caused due to shortening, malalignment, prolonged immobilization and traction. Management has tremendously improved over the years from external splints used in the Hippocratic age to the patient specific tailored instrumentation with improved biomechanics. The aim of the surgical management of diaphyseal fracture of the femur is to achieve anatomical reduction with restoration of the function to the best of the normal status with early immobilsation[3]. Different factors like the like and location of the fracture, degree of compunction, age, socioeconomic status and nutritional status influence the method of the treatment. The aim of the surgical management of diaphyseal fracture of the femur is to achieve anatomical reduction with restoration of the function to the best of the normal status with early immobilsation. The present study is carried out to understand functional outcome of fractures of the shaft of the femur treated with closed intramedullary interlocking nailing, the intra-operative difficulties and complications, time of fracture union and post-op complications. Hence it was help to understand better about the proper management of the femur fracture and contribute to affirmation of management of femur shaft with intramedullary interlocking nailing[4].

MATERIALS AND METHODS

Data was collected by history taking, clinical examination and investigations was done. Operative procedure shall be attended. Follow up was be done at 6 weeks, 3 months and 6 months.

Study Design: Prospective interventional study.

Study Setting: Male and female wards, department of Orthopaedics.

Sample Size: Thirty cases.

Sampling Procedure: Simple Random sampling.

Study Duration: Eighteen months.

Inclusion Criteria:

- All cases are selected on the basis of
- Radiological findings confirming femur diaphyseal fracture
- Patients who are medically fit and wasing for surgery
- Age group of above 18 years of either sexes

Exclusion Criteria:

- Patients below 18 years
- Patients who are unfit for surgery due to associated medical problems
- Grade-IIIB and C, Gustillo Anderson fracture

All patients were admitted, the history was elicited from patient and attendants to know the mechanism of the injury and the severity. The patient was then examined for airway, breathing and circulation. Then vitals was recorded and the examined for general condition, head injury, spine injury blunt trauma, or for injury anywhere in the body. After a detailed primary survey, examination was done focusing the injured limb. The involved limb was examined for swelling, abnormal mobility, crepitus, deformity, shortening, discoloration, skin integrity and neuro vascular status. Medical consultation was sought expeditiously for geriatric patients. General surgeon consultation was sought to evaluate all high energy accident victims to rule out polytrauma. Radiographic evaluation included anteroposterior and lateral radiographs of the entire femur, including the hip joint and the knee joint. Application of manual traction of the limb during radiographs was often clarify fracture morphology. The limb was then immobilized in a Thomas splint with skin traction. The patient was then taken up for surgery after investigations and as soon as the patient was medically fit for surgery.

Table 1: Nail Diameter

Nail Diameter (mm)	Number of Case	Percentage	Sex	Number of Case	Perfect Age (%)
9	8		Male	6	
			Female	2	
10	16		Male	15	
			Female	4	
11	6		Male	3	
			Female	0	

Table 2: Nail Length

Nail Size-Length (mm)	Number of Case	Percentage	Sex	Number of Case	Percentage
360	6		Male	2	
			Female	4	
380	9		Male	8	
			Female	1	
400	9		Male	8	
			Female	1	
420	4		Male	4	
			Female	0	
440	2		Male	2	
			Female	0	

Table 3: Weight Bearing

	Partial Weight Bearing	Full Weight Bearing
6-12 weeks	22	0
13-16 weeks	8	22
17-20 weeks	0	08

Table 4: Radiological Fracture Union

Weeks	Number of Cases	Percentage
12-16	10	
17-20	11	
21-24	7	
>24	2	

Table 5: Complications

Complication	No. of Patients	Percentage
Fat Embolism	1	
Breakage of screws/nail	00	
Superficial infections	1	
Deep infections	0	
Delayed union	1	
Non union	0	
Implant Failure	0	
Restriction of movement at Knee joint (in degrees)		
91-120	2	
<90	0	
Shortening 1cm	2	6.67
>1-2cm	1	3.3

Table 6: Shortening

Shortening	Number of Cases	Percentage
0	27	90
1	2	6.67
>1	1	3.33

Table 7: Number of Days of Hospitalization

Number of Days	Number of Cases	Percentage
1-09	14	
10-15	13	
16-20	3	
21-30	0	

Table 8: Duration from Injury to Surgery

Duration	Number of Cases	Percentage
<24 Hours	8	
24-72 hours	16	
4-7 Days	6	

Table 9: Functional Outcome

Functional Outcome	Number of cases	Percentage
Excellent	23	76.67
Good	4	13.33
Fair	3	10
Poor	0	0

Table 10: Comparison of Time from Injury to Surgery

Study	Injury to Surgery
Present Study	2.83 Days
Lhowe Hansen[5]	7 hours
Blumberg[6]	3.5 days
Hanks[7]	7.5 days

Table 11: Comparison of Time Duration of Hospital Stay

Study	Average time of Hospital Stay
Present Study	11.43
Wiss *et al*.[8] (IMIL)	12
Winquist Hansen[5]	44
Gross Kempf[9]	21

Table 12: Comparison of Average Time for Union

	Union Weeks
Present Study	21.3 (16-24)
Gross Kempf *et al*.[9]	18
Thoresen *et al*.[10]	16
Wiss *et al*.[9]	26

Table 13: Comparison of Complications

Study	Deep Infection Percentage
Wiss *et al*.[8]	8
Lhowe *et al*.[5]	5
Present study	0

Table 14: Comparison of Functional Outcome

	Number of cases	Duration of Hospital Stay	Shortening>1cm %	Union weeks	Deep Infection%
Present study	30	11.43	10	21.3	0
Thoresen *et al*.	48	-	7.5	16	0
Gross Kempf *et al*.	49	21	7.5	18	2.1
Winquist and Hansen	245	26	7.3	14	0.4

RESULTS AND DISCUSSIONS

Interval between injury and surgery in our series was between 3 to 10 days. Average 6.20 days. The compound fracture (Grade II) were thoroughly debrided and open interlocking was done in the same setting. Head injury patients were operated after fitness was given by Neurosurgeons. The average time of hospital stay in our study was an average of 11.43 days, compared to Wiss *et al*. 12 days. The average time for union in our series was 21.3 weeks ranging from 16-24 weeks. Gross Kempf *et al*. reported union at 18 weeks, Thoresen *et al*. at 16 weeks, Wiss *et al*. obtained at 26 weeks. The incidence of infection following open nailing was reported by Wiss et al. as 8.3% and by John *et al*. as 13%. The incidence of infection was drastically low in closed interlocking. 2 cases of Fat Embolism was encountered one preoperative and another immediate post operatively. Both patients recovered within 48-72 hours with supplementary oxygen, fluid management, steroid therapy, none required invasive ventilation. In our series there were 2 cases with superficial infection and no case of deep infection. The case was managed with antibiotics did not need any surgical intervention. The functional outcome in our present study was 90% for excellent and good results.

CONCLUSION

Closed intramedullary interlocking nailing is a very effective, successful and time tested method of treatment for diaphyseal fractures of femoral shaft. It is advantageous over other methods of treatment because Fracture hematoma not disturbed. Fracture site vascularity not further hampered. Stable fixation. Faster rate of fracture union. Lower rate of complications like infection and non-union. Allows early mobilization and return to routine activities.

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