

Outcome of Antegrade Interlocking Intramedullary Nailing in Fracture Shaft of the Femur in Community Based Medical College Hospital, Bangladesh

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Day by day road traffic accident in Bangladesh is increasing. Mymensingh- Dhaka highway passes beside the Community Based Medical College Hospital, Bangladesh. We often have to manage a greater number of traumatic patients. In road traffic accident the incidence of fracture shaft of femur is the most common. That's why my study was done to evaluate the result of management of fracture shaft of the femur with antegrade interlocking intramedullary nailing under the department of Orthopedic Surgery in CBMCH,B in the period between January 2009 to July 2013. Total 88 patients were selected for interlocking nailing initially in the study. Out of them 8 patients did not report in subsequent follow up. So the result of the study was based on 80 patients (48 males; 32 females) with the range of 20- 68 years of age. The average age of the patient was 36 years. Motor vehicle accidents was the most common cause of fracture shaft femur (65%) and the second most common cause was fall from height (20%) specially fall from tree. Among the patients; right sided femur involvement was 67.5% (54) and left sided femur involvement was 32.5% (26). The majority fracture of the shaft of the femur was lower third (70%). The patients were mostly in the day-laborers' groups (35%), and, the next group was students. The mean union time was 18 weeks with the range of 15-30 weeks. After operation, complications were found such as; infection 3.75% (3), non-union 1.25% (1). Excellent functional outcome was found in 82.5% (66), good in 12.5% (10), fair in 5% (4). This functional outcome study was evaluated by Klemm & Borner 1 criteria.

CBMJ 2015 January: Vol. 04 No. 01 P: 13-17

Key words: Fracture, shaft of femur, interlocking, intramedullary.

Introduction

Femur is the principal weight-bearing bone. In traumatology practice fracture of the shaft of femur is the most common. This fracture leads to prolong morbidity if treatment does not done in time and properly. This fracture must be treated with closed or open reduction and internal fixation because there is no role of conservative treatment unless patient is unfit for anaesthesia. Type, location of fracture, degree of comminution, age & socio-economic condition depends selection of implants. In earlier period fixation was done by conventional intramedullary nailing (Kuntscher's nail¹) specially middle third of the shaft because the medullary cavity of this bone is most narrowest here. But it is not suitable for proximal third, distal third, severe comminuted fracture. The best option of treatment of this fracture is interlocking

intramedullary or reconstructive nails which have to give transfixation screws in proximal

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and distal ends to maintain the length, rotational alignment and proper anatomical position. Although plate and screw fixation can be done in some cases but early weight-bearing or ambulation without brace is not possible.

Method

From January 2009 to July 2013 the total 88 patients were operated for the absolute indication of fracture shaft femur in Community Based Medical College Hospital, Bangladesh. All the patients spontaneously selected. 8 patients were dropped out in post-operative follow-up. The remaining 80 patients (48 males; 32 females) were evaluated. Average age was 36 and ranging from 20-68 years. All were closed fractures and according to Winquist-Hansen² classification the types were Type 0 – 35%, Type 1- 25%, Type 2 -15%, Type 3- 20%, Type 4- 5%. The majority of the patients' fracture were in lower-third(65%) and second number of patients were middle-third (25%) and proximal third were (10%). All the operations were done between the 7 days to 8 months. Antegrade static open nailing was done in all patients. In open nailing fracture side was open and fracture ends were cleaned and refashioned & anatomical reduction was done. Then the nail was introduced through the piriform fossa of the femur & locking screws were given in both ends. We had given autogenous cancellous bone graft in case of fracture >3 weeks old or non-union & in a few, severely comminuted fractures. In 3 cases dynamization was done by removing transfixation screws of proximal end of nail and finally union occurred.

Result

The patients were followed-up for the period of 4 months to 1 year with an average of 6 months. First postoperative X-ray were taken after 14 days(Fig no:1&8). Next follow-up were done in every month for 6 months(Fig no:3,4,9&10), then every 2 months for 6-12 months. Assessment of these patients was done by radiological findings and Klemm and Borner³ criteria.

Excellent	★ Full hip and knee motion ★ No muscle atrophy ★ Normal radiographic alignment
Good	★ Slight loss of hip or knee motion ★ < 2 cm of muscle atrophy ★ Angular deformity <5 degree
Fair	★ Moderate loss of hip or knee motion ★ >2cm muscle atrophy ★ Angular deformity 5-10 degree

According to the Klemm & Borner¹ criteria we found 66 patients were excellent, 10 were good and 4 in fair category. Four (4) patients developed complications. 3 were chronic osteomyelitis and 1 was non-union. The non-union patient we have treated by refixation & bone grafting. The patients of chronic osteomyelitis were treated by proper antibiotic after culture & sensitivity, continuous closed irrigation and early nail removal after union.

23 years old male patient Shariful Islam with fracture shaft of femur



Fig no-1: X-ray 14 days after operation



Fig no-2: X-ray after one month of operation



Fig no-3: X-ray after 3 months of operation



Fig no-4: X-ray after 6 months of operation.



Fig no-5: Photography 6 months after in standing position.



Fig no-6: Photography 6 months after in sitting position.

20 years old male patient Hasan Miah with fracture shaft of femur.



Fig no-7: Preoperative X-ray



Fig no-8: X-ray 14 days after operation



Fig no:9 X-ray 1 month after operation



Fig no:10 X-ray 6 months after operation



Fig no-11: Photography after 6 months in standing position



Fig no-12: Photography after 6 months in sitting position.

Surgical Technique

Despite two basic positions for femoral nailing, lateral decubitus and supine position we did all operation in lateral decubitus position as it provides easy access to the greater trochanter and piriform fossa. Fracture site was opened by lateral approach of the thigh and fracture ends were cleaned or refashioned. Then an another skin incision was given beginning about 2 cm distal to the greater trochanter and extended proximally in the line with gluteus maximus muscle fibres. After splitting of the muscle fibres piriform fossa was exposed and the awl was introduced through the piriform fossa and making a hole in the bone. Then antegrade reaming of proximal and distal fragments were done by increasing size of reamer gradually. After reduction of the fracture, interlocking nail of accurate size was introduced through the piriform fossa of the trochanter with the help of hammer. Then distal locking screws were introduced under the guidance of distal zig and finally proximal

locking screws were introduced by same way with the help of proximal zig. Then bone grafting was given in indicated cases. After keeping a drain in situ wound was closed in layer by layer.

Discussion

This study was noted as highly acceptable result. Though this modern technique was done in developed countries 2 decades back but it was first time in Community Based Medical College Hospital, Bangladesh. Age range of the patients was 20 to 68 years with an average age of patients 36 years. Apracioglu et al³ study showed the age ranged from 20 years to 69 years with mean age was 30.5 years and 30 were in the right, 7 were in the left and 3 were bilateral, the mean union time was 16.5 weeks (range 12s to 42 weeks) and excellent to good results in 88.6% cases. In our study motor vehicle accident was the most common cause of fracture found in 65% cases. Second most common cause of injury was fall from height (20%). Right sided involvement was more (67.5%). Majority of the patients (65%) had fracture in lower third of the femur and remaining 25% in middle and 10% in proximal third. According to Winkquist and Hansen² classification common fracture was type 0-30% and next common was type-3. Apracioglu et al⁴ study showed proximal 3rd fracture was 29.42%, middle third fracture was 51.47% and distal 3rd fracture was 19.17%. As in our country maximum stable proximal and middle 3rd fractures are managed by K-nail for our socio-economic condition, for this reasons stable upper and middle 3rd fractures were excluded from the study.

Among the patients day-laborer was the most common (35%) and the next was students'. The study which was done by Klemm and Borners³, 84% cases were close nailing but in our study all cases were open nailing due to lack of C – arm & others facilities. In their study 79.3 % were excellent & 17.7 % were good and 3% were fair with the rate of nonunion was 1.5% and infection rate was 2.6%. Sojbjerg et.al⁵ showed excellent results in 95% cases with 100% union rate and

infection rate was 0%. Wu et al⁶ compared closed and open nailing in the segmental fractures and closed nailing showed better technique.

In Wiss et al⁷ study showed nonunion rate in closed nailing was half of open nailing and rate of nonunion was 1.8% and infection rate was 0% in close nailing. Christie et al⁸ showed mean union time was 17 weeks, with a range of 10 to 28 weeks and the rate of nonunion was 1.6% and infection rate was 0%. Winquist and Hansen⁹ study showed 520 patients of femoral shaft fracture 87% united within 3 months with the rate of nonunion was 9%. Kempf et al¹⁰ study showed infection rate was 2.1% and the rate of nonunion was 7.6%. In our study, rate of nonunion was 1.25%, rate of infection was 3.75% and mean union time was 18 weeks. So, our study was compatible with the previous authors in respect of age groups, causes of fracture, time of union, rate of infection and rate of nonunion but dissimilar is only that majority of their cases were close nailing in respect of our open nailing. In our study excellent functional outcome found in 82.5%, good in 12.5%, fair in 5% of the patients and is compatible with previous study.

Conclusion

The study shows the antegrade interlocking intramedullary nailing is considered as gold standard in the treatment of the fracture shaft of the femur because the interlocking intramedullary nailing is revolutionary in the management of fracture shaft of femur, specially in fracture distal third, comminuted fracture & in other unstable fracture. It decreases the chance of infection providing early mobilization of the patient thus facilitating early union of the fracture with good compliance.

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