

A CLINICAL COMPARATIVE STUDY BETWEEN KUNTSCHER NAILING AND INTERLOCKING NAILING OF FRACTURE SHAFT FEMUR

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ABSTRACT: AIMS AND OBJECTIVES: To study and evaluate the efficacy of k-nail and interlocking nail in relation to intra operative and post-operative complications, infection rate, fracture union and advantages of one over the other. **RESULTS:** In the present study 40 cases of femur shaft fractures treated by k-nail and interlocking nail in government general hospital Kurnool from January 2010 to august 2012 were included. These cases are divided in group A and group B. Group A includes 20 cases treated by k-nail and Group B includes 20 cases treated by interlocking nail. The commonest age group was 21-30 years with 50% in group A and 45% in group B. Intra operative complication in group A is seen in two cases (10%) while in group B in 5 cases (25%). Six cases in group A and 4 cases in group B has postoperative complications. Infection rate is similar in both groups. The average time for fracture union in group A is 19.35 weeks in group B it is 19.15 weeks. The functional outcome in group A is 80% excellent, 15% good and 5% fair. In group B 85% has excellent and 15% good. **CONCLUSION:** By the analysis of data collected interlocking nailing is the treatment of choice for fracture shaft femur. Post-operative complication, infection rates, time for union are equal in both modalities but functional outcome is excellent with interlocking nailing.

KEYWORDS: Interlocking nail, k-nail, femur shaft, fracture.

INTRODUCTION: Fractures of the femoral shaft are common encounters in trauma. These fractures are seen predominantly in active adults following road traffic accidents. Treatment focuses on near perfect alignment of fractures and early ambulation. Interlocking nailing and open k-nailing are the two widely used modalities of treatment for these fractures. In 1940 Kuntscher first described his cloverleaf nail and its use in fracture femur.¹ He initially described closed nailing first with the fluoroscopic control. But there were high complication like failure to reduce fracture, jamming of nail, splitting of distal fragments. Hence open reduction was developed. During the late 40's and early 50's open reduction and internal fixation of femoral shaft fractures with kuntschner nail become widely popular. Klemm and Schellman introduced the interlocking nail system in 1972.² Grosse and Kempf later modified the nail.

Of late interlocked nailing has dominated the treatment and has been accepted widely. It does not require periosteal stripping at the fracture site hence preserve the periosteal blood supply. When statically locked it gives rotational and vertical stability to the fracture. Hence it comes close to the goals of operative treatment.

Open k-nailing of the femur has the advantages of perfect reduction of the fracture under direct vision hence no mal alignment. But there are drawbacks of periosteal stripping and evacuation of fracture hematoma. K-nail is economical and a relatively simple procedure.

ORIGINAL ARTICLE

This study consists of 40 cases of fracture shaft femur, of which 20 cases were treated with k-nailing and remaining 20 with interlocking nailing and the results compared.

MATERIALS AND METHODS: During the period between January 2010 to August 2012, 40 patients who were admitted in department of orthopaedics, Government General Hospital, Kurnool with femur shaft fractures that fitted into the inclusion criteria and were treated surgically with interlocking nail and k-nail were included in the study.

Two groups are included in this study. Group A includes 20 cases treated with k-nail and group B includes 20 cases treated by interlocking nail. Inclusion criteria includes, all confirmed cases of middle third diaphyseal femoral fracture and patients over 18 years. The exclusion criteria includes, patients who cannot be operated due to various medical problems, group IV comminuted, open fractures and patients with previous failed procedures.

Radiograph of affected thigh AP and lateral views including knee and hip joints are taken. Fractures were classified based on AO and Winquist Hansen classification.³ All patients are splinted in Thomas splint with fixed skin traction. Associated injuries are treated. All routine investigations were done. After medical fitness, the shaft femur was fixed with open reduction and internal fixation with Kuntscher's cloverleaf nail in group A while internal fixation with statically locked nail in group B. Both groups received pre-operative antibiotics. The cases were studied for intra op and post op complications, union time, time for ambulation and functional outcome and the end results compared.

RESULTS: The following observations were made from the data collected during the study of 40 cases of femoral shaft fractures, of which 20 were treated with k-nail and 20 with interlocking in the Department of Orthopaedic Surgery, Kurnool Medical College and Govt. General Hospital, Kurnool from January 2010 to August 2012.

In the present study mode of injury in group A is RTA (100%), while in group B 80% due to RTA and 20% due to fall. Right side is predominant with 60% in group A and 70% in group B.

In the present study out of total 40 cases 36 were male and 4 were female with equal distribution in both groups. The Associated injuries in group A was 14% and in group B was 22%. Winquist and Hansen grade 0, 1, 2 fractures are predominant in group A while grade 1, 2, 3 predominant in group B. In group A middle third fractures are 55%, junction of proximal and middle third (25%), junction of middle third and lower third (20%) while in group B they are 70%, 20%, 10% respectively. Interval between injury and operation was 2.5 weeks in group A while in group B 2 weeks. All the fractures in group B were locked in static mode.

In the present study per operative complication of difficulty in reduction in group A was seen in two cases, while in group B difficulty in reduction in 2 cases, difficulty in distal locking in two cases, and difficulty in proximal locking in one case. Post-operative complication in group A includes superficial infection in two cases, angulation at fracture site in two cases, shortening of 1.5cm in one case and implant failure in one case. While in group B two cases of superficial infection and in two cases angulation at fracture site seen.

In the present study the average follow up time in group A was 13.5 months and in group B was 12.9 months. The fracture union is assessed by using criteria of Harper M.C. et al.⁴ In

ORIGINAL ARTICLE

group A time for union was 19.35 weeks, in group B was 19.15 weeks. In both the groups two case of superficial infection seen.

Functional outcome assessed using criteria of Klemm. K. W. et al.⁵ In group A 80% has excellent, 15% has good and 5% has fair results. In group B 85% has excellent and 15% has good results.

DISCUSSION: Fractures of shaft of femur are common due to ever increasing vehicular accidents. They occur most frequently in young men after high energy trauma and in elderly woman after a low energy fall. The bimodal distribution peaks at 25 and 65years of age with an overall incidence of 10 per 100000 population per year.

The isthmus of the femur is the region with the smallest intramedullary diameter, diameter of isthmus affects the size of the nail. Treatment of femoral fractures in earlier days was conservative. Surgery is the treatment of choice at present. Conservative management as definitive treatment for femoral shaft fractures is largely limited to adult patients with such medical morbidities that operative management is contraindicated.

This study was aimed to evaluate the efficacy of k-nailing and interlocking nailing in the treatment of femoral shaft fractures. Historically closed nailing was followed first and later closed the open nailing. Within short time open nailing was abandoned for closed nailing with sophistication of equipment and operative techniques. At present interlocking nailing is an accepted modality of treatment for femoral fractures. K-nailing was given up as high rates of infection and extensive surgery were noticed. But recently with the development of potent antibiotics, surgical asepsis and meticulous dissection, these fallacies can be overcome.

In our study over all post-operative complication in k-nailing occurred in 6 cases (30%) and shortening -5%, superficial wound infection-10%, proximal migration of nail-5%, malalignment in coronal plane-10% where as in interlocking group they occurred in 20% of cases which included superficial infection -10%, malalignment in coronal plane-10%. They were comparable with similar complication reported by Harper M.C. et al.⁴ They reported (closed and open nailing retrospectively) rotational malalignment-10% and 7%, superficial infection -5% and 4%. They had one case in closed nailing which developed deep infection.

Post-operative complication in other studies of interlocking reported are, Wiss et al superficial infection-0.9%, limb length discrepancy -11.5%, malalignment-12.5%.⁶ Thoresen et al reported malalignment-18%, superficial infection -0.8%.⁷ Our rates of union IS 19.35 weeks in group A compared to 19.15 weeks in B group. Our rates of union are a little higher than those reported by Harper M.C. et al.⁴ They reported average rates of union in open group at 14.3 weeks and closed group at 13.9 weeks. The rates of union reported in other series of interlocking nail are Wiss et al -26 weeks, Thoresen et al -16weeks, Brumback et al -19 weeks.^{6, 7, 8}

Partial weight bearing in our study started early in case of interlocking patients. This was probably because preserving fracture hematoma led to early appearance of callus which was delayed in case of open nailing by an average of 1.76 weeks. Harper M.C. et al reported no difference in full weight bearing in their cases of open and closed nailing at 8.8 weeks and 9.8 weeks respectively.⁴

ORIGINAL ARTICLE

Analyzing overall functional results, in open nailing group we had one fair result in a 25 year old male with grade 2 comminuted spiral fractures. Encirclage wire was put for the butterfly fragment, he had malalignment of 5° varus. Three other good results had limited knee flexion of up to 120°, there were no poor result.

One patient in closed nailing had type 3A fracture of opposite femur which was converted to closed nailing after wound healed. At 6th month follow up he had excellent resulting closed fracture and good result in open fracture of opposite side. Period of hospital stay was nearly the same in both groups and also time elapsed before surgery also did not differ much, similar results were observed in study of Harper M.C. et al.⁴

CONCLUSION: In this study conducted on 40 patients of fracture shaft femur treated with kuntscher nailing and interlocking nailing, intra operative complications and surgical time are high in interlocking nailing, which can be minimized by increased expertise. There is no difference in post-operative complications with open k-nailing and interlock nailing. There is no difference in time to fracture union with open k-nailing and interlocking nailing.



Fig. 1: Case 1 preoperative and postoperative radiographs



Fig. 2: Case 2 preoperative and postoperative radiographs

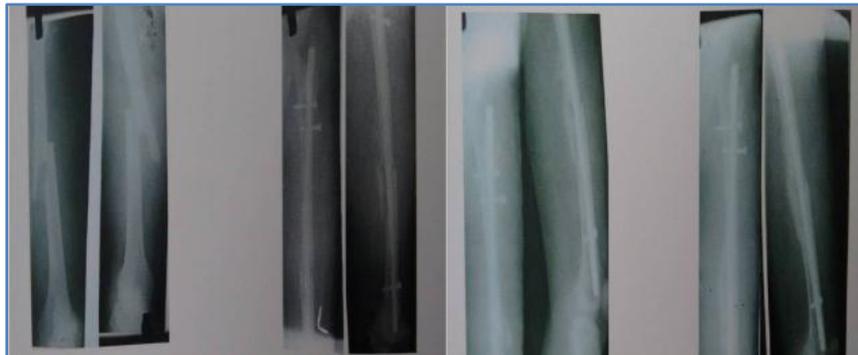


Fig. 3: Case 3 preoperative and postoperative radiographs

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ORIGINAL ARTICLE

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