

RESULTS OF FRACTURE UNION IN CLOSED REAMED INTERLOCKING NAIL IN FRACTURES OF FEMUR

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ABSTRACT

Objective: To evaluate the results of fracture union in closed reamed interlocking nail in fractures of femur.

Methodology: A descriptive study conducted at Department of Orthopaedic surgery Ittefaq Hospital Lahore from March 2003 to July 2004. Fifty patients were recruited from Accident & Emergency and out patient department having close fracture of femoral shaft. All patients were operated under general or spinal anesthesia and closed reamed interlocking nailing was done. All patients were followed for nine month.

Results: Out of fifty patients, Forty seven patients underwent union in 90 to 150 days with a mean of 110.68 days. Ten patients had dynamization within six weeks because of obvious fracture gap in radiograph. There was one patient who had non-union, and two patients had delayed union which was treated with dynamization.

Conclusion: Close reamed interlocking intramedullary nail in femoral shaft fractures is the treatment of choice. Patient rehabilitation is early, hospitalization is short, and fracture healing response is good.

KEY WORDS: Close reamed interlocking nail, Femoral shaft fractures, Union, Dynamization.

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INTRODUCTION

Fractures of the shaft of femur are a major cause of morbidity and mortality in patients with lower extremity injuries. Most fractures are sustained in young adults during high velocity injuries.¹ Fractures of the shaft of femur can be life threatening due to an open wound, fat embolism, ARDS (Adult Respiratory Distress Syndrome) or resultant multiple organ failure. Even with survival after initial trauma, disability usually results from femoral shortening, fracture malalignment or prolonged immobilization of the extremity by traction or casting in an attempt to maintain fracture length and alignment during early phases of healing.² Shortening and malalignment of the leg can lead to a limp and post-traumatic arthritis.

There is considerable debate regarding the best method of treating femoral fractures.³ The unattainably perfect method of fracture treatment would safely fix the fracture so firmly that soft tissue and joints could be mobilized early and continuously during healing and offer sufficient strength to maintain fracture alignment⁴. A method closely approaching this perfection is intramedullary interlocking nails. Interlocking intramedullary nailing of femur greatly improves rotational stability and can be used for axially unstable diaphyseal fractures.⁵ This treatment modality has been the subject of controversy since its introduction because of concerns of damage to the medullary circulation possibilities of fat embolism^{6,7} and complications of misapplication of the technique because of a lack of understanding of the biomechanical principles of intramedullary nail fixation, radiation exposure⁸ and the equipment required.

Radiation exposure, cost of procedure and nonavailability of equipment (image intensifier, full range of nails, power reamers etc) are few of reasons why this treatment has not become popular in Pakistan. Our institute is one of few centers in Pakistan where we routinely perform closed reamed intramedullary interlocking femoral nail. To evaluate its use we decided to study the role of this mode of treatment in achieving the ultimate goal of fracture fixation i.e. union. We hope that this study will help in eliminating the controversy which exists regarding this technique especially in Pakistan.

METHODOLOGY

This descriptive study was carried out at Orthopaedic Department of ITTEFAQ Hospital Lahore. Forty patients were male and ten patients were females. All the patients were explained about treatment plan, cost of operation, hospital stay after surgery, complications of anaesthesia and their follow up after operation till the time of union. Examination of patients was done thoroughly at the time of admission to exclude other injuries.

Patient was laid supine on the fracture table with traction pin in condyles of fractured

femur. The fracture was reduced by traction and manipulation under image intensification. After preparing the femur in standard manner, an oblique skin incision was given on the proximal tip of greater trochanter upto 6-8cm proximally and posteriorly. The fascia of gluteus maximus incised in line with its fibers. Subfascial plane of the gluteus maximus identified and piriformis fossa palpated. Bone awl was used to locate exact entry point. Guide rod was introduced and advanced into the center of the distal fragment until the tip reached the epiphyseal scar. Reaming with power reamers was done, 2mm over the selected diameter of nail and then. Nail was introduced. Proximal locking was done with jig and distal locking with free hand technique. Wound was closed with suction drain in standard manner and antiseptic dressing was done. Drain was removed on 2nd post-operative day. Touch down weight bearing was started on 2nd post-operative day. Patient was discharged on 5th post-operative day and called for stitches removal on 14th post-operative day. These patients were assessed clinically and radiologically for union timing at nine months following surgery.

RESULTS

There were fifty patients in this study, ten were female and forty were male. The patients were divided in three groups according to their age for simplicity. Young age group included those patients whose age was less than forty years. In this group there were five females and twenty five males. Middle age group included patients, who were between the ages of 40-60 years. This group included five females and ten males. Old age group included patients older than sixty years. This group consisted of five males. Six male patients were diabetics and four of them were taking insulin. Five female patients were diabetics and were taking oral hypoglycemic.

The clinical results of our study were rated on the basis of the criteria of union, nonunion, delayed union or malunion. The patients were followed according to their clinical status. Forty

seven patients had union in 90 to 150 days with a mean of 110.68. Ten of our patients had diabetes. Union was achieved in eight patients in 95-109 days with a mean of 103.38.

We allowed our patients to start touch down walking with crutches on the 2nd day of operation as they feel comfortable. All patients except two started partial weight bearing on 6th week and full weight bearing on 12th week. These two patients had non weight bearing ambulation till the callus became visible on radiographs. They had comminution at fracture site (Winquest and Hensen type III).

All of our patients had full range of motion of there knees and hips. Three patients out of forty seven complained post operative knee pain, which was spontaneously resolved in two weeks. Our ten patients needed dynamization within six weeks because of obvious gap at the fracture site in subsequent radiographs. This was due to over distraction of fracture during operation. They were dynamized before starting partial weight bearing. The screw of less critical stability was determined (the screw which was away from the fracture) and it was removed in local anaesthesia. There were two i-e 4% delayed unions which were treated by dynamization. In our study only one of our patients (2%) was labeled as nonunion and was treated by exchange nailing.

DISCUSSION

Interlocking intramedullary nailing has been advocated as the treatment of choice for femoral shaft fractures by many international centers. Complications after dynamic or simple nailing of an unstable fracture pattern include shortening (average of 2cm) and malrotation that frequently requires reoperation. To confirm the clinical observations that statically locked fractures heal and to prevent the complications from not locking unstable fractures, Brumback et al.,⁹ prospectively treated one hundred femoral fractures with statically locked Russell –Taylor nails, regardless of comminution. All fractures united, and only two required dynamization for union. Lepore L, Lepore S, Maffulli N reported Five

Table-I: Percentage of cases who had union, malunion, delayed union, or nonunion (n= 50)

	Total Cases	%of Cases
Union	47	94
Non Union	1	2
Delayed Union	2	4
Malunion	0	0

out of 43 patients who underwent traditional nailing required dynamization to achieve union.

In our center we routinely perform the locking in static mode. In this study all the fractures were treated with statically locked intramedullary nail. Forty seven out of 50 patients were united with out any complication. Ten of our patient needed dynamization i-e removal of proximal or distal screw before starting partial weight bearing.

Two more patients showed no radiological signs of union at 4th month. They were dynamized and were encouraged to walk with bearing full weight. One of our patients had nonunion. He had comminution at fracture site i-e Winquest and Hensen type-II. He was treated with exchange nailing. In our study union rate is 94% which is very close to the reported series. Numerous studies have documented 97-100% union rate after reamed locked nailing of femoral shaft fractures. Kropfl et al¹⁰ reported a union rate of 100% in a study of 81 femoral shaft fractures with locked intramedullary nailing. Imran, et al,¹¹ reported a study of 37 cases in which union rate was 100% without any complication. Javaid, et al reported in their study (Closed intramedullary nailing versus dynamic compression plating for femoral shaft fractures in 85 adults) that reamed interlocking nailing is the treatment of choice in femoral shaft fractures and they had 100% union rate without any complication.¹² In our study union occurred in 90 to 150 days with a mean of 110.68 days which is very close to other studies.

Brumback et al,¹³ tested the safety and efficacy of immediate weight-bearing after locked intramedullary nailing of femoral

fractures and found that this was safe if the construct had relatively high fatigue strength using two locking screws distally instead of one.

In our study we did nailing after reaming the canal. This is a routine protocol in our center. There is reported literature which shows increased blood loss, increased operating time, increased risk of pulmonary embolism and adult respiratory distress syndrome after reamed interlocking nail. We have a reasonable policy to wait and stabilize the patient who has certain risk factors such as associated chest trauma and anaemia etc. When the patient is stable and fit for surgery we perform close reamed statically locked intramedullary nail.

The functional outcome of patients with femoral shaft fracture is probably the most important consideration when deciding on the best mode of treatment for a particular fracture pattern. Successful early fracture union in femoral shaft fracture is the most demanding outcome for good function in addition to other factors.

CONCLUSION

We have concluded that close reamed interlocking intramedullary nail in femoral shaft fractures is the treatment of choice, because patient rehabilitation is early, hospitalization is short, and fracture healing response is good. If proper equipments are available, pre-operative assessment and per-operative care is taken, it is safe method for treating femoral shaft fractures.

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