

Interlocking Nailing Of Femoral Diaphyseal Fractures: Review of 47 Cases.

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ABSTRACT:

Background: Fracture femur shaft most commonly occurs as a result of high velocity trauma. In the past these fractures have been treated by various techniques like traction and conservative methods, operative methods like plating , intramedullary nailing. With the advent of interlocking intramedullary nails, these fractures have resulted in far better outcomes.

Aims: To evaluate the efficacy, union rates and complications of interlocking nailing of femoral shaft fracture.

Methods & Materials: Forty seven cases of femur fractures were treated with intramedullary nailing performed for diaphyseal fractures in Sebha Medical Centre, SEBHA, LIBYA. Operative outcome was evaluated with respect to radiological union , range of motion , muscle power and shortening and pain at fracture site.

Results & Conclusions: All achieved union and no evidence of implant failure was seen. Forty five patients returned to **prefracture** status. Intramedullary nailing has given good results in our study cohort.

Keywords: Femur, diaphyseal fracture, interlocking nailing, high velocity trauma.

I. INTRODUCTION

Femur fractures usually result from high velocity trauma. Before the advent of intramedullary nailing various treatment options were available to treat them. They included conservative traction for prolonged period , plating , and external fixation. When Sir Gerhard Kuntzner described his *cloverleaf nail*, it revolutionised the treatment protocol. He further refurbished it by using locking screws to abut the nail and, then was born the concept of *interlocking nailing*. Interlocking nailing has now been regarded as GOLD STANDARD against which other methods are compared. Abundant literature supports the good to very good results with this form of fracture fixation .We evaluated the results in forty seven patients treated with interlocking nail.

II. MATERIALS AND METHODS

2.1, A total of 47 cases were which were operated between Aug 2009 to Sept 2010 in Sebha Medical Centre, Sebha, LIBYA were followed up till radiological union. 38 patients were males and 9 were females. The majority of the patients were in the age group of 20-40 yrs. Commonest cause of injury was motor vehicle accident. In 3 patients the cause was fall from height, and one patient who was very old, had a trivial fall. Patients were reviewed, radiologically for the type of fracture and, for preoperative anaesthetic fitness. Winquist and Hansen classification was used during the study. Majority were middle third fractures [Table- 1]. 3 patients had grade 1 compound fracture. Four patients had head injury , cerebral contusion and did not require further neurosurgical care.

2.2, INCLUSION CRITERIA:

1. Femoral diaphyseal fractures including proximal and distal junctional fractures.
2. Skeletally mature patients.
3. Acute Traumatic fractures
4. Compound fractures grade-1,(Anderson and Gustilo).

EXCLUSION CRITERIA

1. Femoral supracondylar fractures and trochantric fractures.
2. Skeletally immature patients.
3. Compound fractures grade 2 and above.
4. Pathological fractures.

2.3, surgical technique:

All the patients underwent static intramedullary locking within seventy two hours of admission after anesthetic evaluation. All were done in lateral position in simple table with supracondylar pin for traction, under general anesthesia. The implant was aesculap, titanium nails with greater trochanter to lesser trochanter proximal locking system. Forty three patients underwent closed nailing and three required minimal opening to

facilitate the guide wire. One patient required formal open reduction and encirclage of butterfly fragment. Lateral position was given and the other leg was kept anteriorly and flexed so as not to interfere with the fluoroscopy. Rotation was judged by the distal femoral pin and greater trochanter. Before starting C arm images were obtained to confirm proper visualization. Proximal incision was taken above greater trochanter and piriformis fossa identified. A Steinmann pin loaded on to a Jacobs chuck served to breach the fossa. C arm images were taken in both AP & Lateral views to confirm intramedullary placement. Ball tipped guide wire was passed across the reduced fracture and till the upper pole of patella. Reaming was done to appropriate size. Plastic exchange tube was inserted over the ball tipped guide wire which was then removed. Smooth guide wire without ball tip was introduced in to the plastic tube, and the plastic exchange tube was extracted keeping the guide wire in situ. Appropriate sized nail was passed over the guide wire and static locking was done. One case had a butterfly fragment which was loose and required encirclage wiring after opening the fracture site [fig-2]. **Patients were mobilized** very next day with knee bending and crutch assisted ambulation with non weight bearing. Patients were discharged on day 2 after check dress and called back for suture removal and then monthly till fracture union. Radiological and clinical follow up was maintained until fracture union. Physiotherapy for knee range of motion and quadriceps strengthening was started as tolerated. Full weight bearing was allowed after confirming radiological union. Dynamization was not required in any of the cases.

III. RESULTS

Forty seven patients were followed up till fracture union. All the fractures showed radiological callus on follow-up with an average duration of twelve weeks [Fig- 1] and final union by 6-8 months. Range of motion was > 110 degree flexion in all of them except one case, who achieved up to 95 deg ROM after physiotherapy. There was mild wasting of quadriceps in about eight cases but the quadriceps muscle power of all the cases was grade 4. Two cases had <2 cm shortening. Four cases had malrotation < 10 deg. All of them were externally rotated. All of them were pain free at the fracture site after fracture union. Forty five patients had no disability and went back to join their pre-fracture jobs.

No non union was seen, there was no implant failure. Two cases had distal screw loosening after 6 weeks and were removed.[Fig-2,3] One case showed signs of infection, and was treated with removal of loosened distal screws, through debridement and antibiotics were given. Follow-up showed fracture union and the blood tests showed no evidence of infection. Though some of the cases had quadriceps wasting, the muscle power was grade 4.

IV. DISCUSSION

There is abundant literature with respect to nailing of femoral fractures. Kuntshner described his cloverleaf – simple nailing technique in 1962 ¹. Although it revolutionised the concept of femoral fracture treatment in that the trend shifted from the then existing concept of load bearing devices to the load sharing devices, however it did not confer the required rotational control for comminuted fractures. Kuntshner cloverleaf nail worked wonders for stable, transverse, isthmus fractures. It became the gold standard in the treatment of comminuted diaphyseal fractures of femur.

In the classic series of 520 femoral fractures in 500 patients treated with reamed intramedullary nailing, Winquist et al ² reported a union rate of 99.1%. Wolinsky et al ³ reported their results with 551 femoral shaft fractures treated with closed locked antegrade intramedullary nailing. The authors reported union in 98.9%, infection in 1%, and no malunions with greater than 10 degrees of angulation.

The increase in popularity was due to locked intermedullary nails which allowed for improved rotational control, better maintenance of femoral length, early mobilisation with weight bearing, and improved control of comminuted and segmental fractures. With closed techniques of nailing it also ensured the biological advantage of not opening the fracture site and hence help in greater rates of fracture union. The positive effects of reaming on fracture healing are thought to be from a combination of altered blood flow to the bone and the local muscles, and the deposition of marrow and cortical elements at the site of the fracture ^{4,5,6,7,8,9,10,11,12}.

Locking compression plates offer an alternative form of treatment. It has the advantage of avoidance of complications related to reaming, fat embolism. However plate fixation entails extensive surgical dissection with associated complications including blood loss, infections and soft tissue insult. Also because the plate is a load bearing implant, implant failure is expected if union does not occur. Although implant failure will ultimately occur with any orthopaedic device in the case of non union, a load sharing implant will have increased longevity compared with a plate ¹³.

Retrograde femoral nailing, first introduced by Kuntshner has few advantages, namely the ease of properly identifying the starting point, also distraction of the fracture site is decreased compared to the antegrade technique. Currently it is indicated in cases of shaft femur fracture with ipsilateral femoral neck or acetabular fractures¹³.

Our series was limited to 47 cases and though the sample size was not very big the results were gratifying and in accordance with previously published results. In **our** series of 47 cases of diaphyseal fractures of femur, the rate of union was 100% with acceptable percentage of complications.

We agree that majority of the surgeons would prefer fracture table and supine position, but we had no technical problem in any of the cases, save the need for one extra assistant. The surgeon should operate in the position in which he is comfortable and as long as the results are good, it does not matter.

V. CONCLUSIONS

Interlocking intramedullary nailing of femoral diaphyseal fractures has given good results in our study cohort.

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Fig-1 Preop, Postop, Union



Fig-2 Distal Screw Pullout



Fig- 3 Distal Screw Removal, Union Progressing

