

Open Kuntscher nailing for fracture shaft of femur

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Abstract: Interlocking intramedullary nails is now the standard in the treatment of femoral shaft fractures however cost, use of traction table and image intensifier precludes its common use in developing countries, making open Kuntscher nailing a common procedure. This study was done to evaluate the outcome of Kuntscher nailing with regard to union, infection, limb length and range of motion. We retrospectively reviewed 30 patients with Fracture shaft of femur treated with open Kuntscher nailing. All fractures were simple transverse, oblique. Patients were discharged from the hospital after 14 days of surgery. All fractures healed within 16-24 weeks and the union rate was 100%. 2 patients developed superficial wound infection. 2 had limb shortening of 1-2 centimetres and range of motion at the knee from 100 to 135 degrees at minimum 12 months follow up. There were no rotational deformities. 2 patients had limited knee flexion (less than 30). 1 patient had bent nail because of early mobilisation. It was concluded that open Kuntscher nailing for fracture shaft femur is still a relevant surgery in the developing worlds with good functional and clinical results in the following situations: in hospitals with no traction table and image intensifier, in irreducible fractures and in female patients with pregnancy.

Keywords: Kuntscher nail, intramedullary nail, femoral shaft fracture

I. Introduction

Open Kuntscher nailing is no longer the common method of fixation of the femoral shaft now a days as interlocking nail offers good control of limb length and rotational alignments. However the cost of instrumentation and the nail has been a major factor against the wide spread use especially in developing countries. We have done a retrospective study on 30 patients treated by open Kuntscher nailing at RAJENDRA INSTITUTE OF MEDICAL SCIENCES, RANCHI. This prospective study was done to evaluate the use of open Kuntscher nail with regard to time to union, infection, limb length and range of motion at the knee

II. Patients and methods

We studied 30 patients with femoral shaft fracture treated with open Kuntscher nailing at Rajendra Institute Of Medical Sciences, Ranchi, between "July 2011–Feb 2013". All the patients presented with closed fractures of femoral shaft involving the proximal and middle third of the bone who had open retrograde intramedullary nailing with Kuntscher nails were included in this study. This also included those with fresh and old fractures however those with open fractures and severe comminution were excluded. Those with fresh fractures had initial clinical assessment, resuscitation, and investigation done in the emergency department of the hospital. There were 24 males and 06 females, one of whom was pregnant. The average age was 31 years (range 15 to 70 years). 5 patients had polytrauma. The degree of comminution of the fracture was graded using Winquist et al grading. Patients were positioned in the lateral decubitus position on a standard operating table. Fracture fragments were exposed and cleaned with minimum periosteal stripping through lateral approach. The canal was reamed. The nail length was measured with help of reamer passed through the canal of both fragments and an appropriate sized Kuntscher nail was inserted retrograde through the proximal fragment. The fracture was then anatomically reduced under direct vision and the nail inserted into the distal fragment by punching. Rotation was corrected using the linea aspera as a marker. The nail was left protruding 2 cm proximal to the greater trochanter to facilitate its later removal. The wound was closed routinely over a suction drain. The knee was passively manipulated through a full range of movements. The average operating time was 50 minutes (range from 40 to 60 minutes). Antibiotics were given for 14 days (6 days injectable and 8 days oral) and patients were mobilised non weight bearing on day 7. The average postoperative hospital stay was 14 days.

III. Results

All the wounds healed within 12 days, except one in which cellulitis persisted for two weeks. There was no deep wound infection. All fractures healed in 16 to 24 weeks (fig: 1 & 2).



(Figs:1 Radiographs of 30 yr old patient with fracture shaft of femur(AP & Lat. View)



Fig:2 Same pt as in FIG 1 Radiographs 4 months after operation showing sound union of the fracture in good position.



(Fig:3 Radiographs of the femur of 19 year old patient show bend nail in situ).

There was no rotatory deformity. No fat embolism occurred and no nails fractured. One patient had bend nail(fig:3).2 (6.66%) of the patients had shortening ranging of 2 cm. Patients with shortening had type III fracture comminution. The duration of follow up was 12-18 months with average of 15 months. The range of motion at the knee was 100 -135degrees at follow up. Fracture configuration was transverse in 21 (70%)patients, and comminuted in 9 (30%)patients. The degree of comminution using Winquist et al classification are:16 patients had type I,12 had type II and 2 had type III.21 (70%) of the fractures was on the right and 8(26.66%)involved the left limb one involved bilateral. There was involvement of the upper third femur in 12(40%)patients and middle third femur in 16(53.33%) patients and lower third femur in 2(6.66%). The anti-rotation bar was applied in 2 patients with unstable fractures. Two patients had superficial wound infections which resolved completely with dressing and appropriate antibiotics. 5 (16.66%) of the patients had associated injuries. Full weight bearing was commenced on the average of 18.3 weeks.

IV. Discussion

When Gerhard Kuntscher introduced the nail in 1940, it was considered revolutionary in the management of femoral shaft fracture. Open Kuntscher nailing for Fracture shaft of femur is no longer common in practice where closed interlocking nailing is considered the treatment of choice. Infection and non-union in the literature is reported to occur in between 1.5%- 10% of cases. In our series, the infection rate was 6.66%. This was superficial and caused delayed wound healing. It had possibly spread from the ipsilateral wound over leg. All the

fractures united. There was no rotatory deformity as patients were not permitted to weight bear before fracture healing.

Interdigitation of the fragments, the clove leaf shaped configuration of the nail, and secure fixation in the cancellous distal femur, prevent further rotation.

This procedure was found especially useful in the following patients:

1. In hospitals with no traction table and image intensifier.
2. In irreducible fractures with displaced fragments and soft tissue entrapments, such as the quadriceps muscle, which usually require open reduction.
3. In female patients with pregnancy, no screening is required, operative procedure is short, there is minimal anaesthetic toxicity to the foetus,
4. In polytrauma patients because the procedure is short and permits early rehabilitation.

Although the surgical technique is no different from that described in the literature, special attention must be paid to blunt dissection. Complications such as infection and non-union can be controlled by minimal stripping of the periosteum. Reaming of the distal 5 cm of the femur should not be performed, as this may lead to loosening of the nail and allow rotational instability. The length of the distal fragment should be measured over the thigh, up to the proximal pole of the patella to avoid penetration of the nail into the knee joint.

V. Conclusion

We believe that open Kuntscher nailing is still indicated in hospitals where a traction table or image intensifier is not available. Special indications are the pregnant female, in whom exposure of foetus to radiation can be avoided and irreducible fractures. However, this procedure is not recommended for very comminuted fractures or when the fracture is in the distal third of the femur. Special attention to surgical technique minimises excessive blood loss and rotational problems. While closed interlocking nails remain the gold standard in the treatment of femoral shaft fractures, open Kuntscher nailing still has its relevance in the developing countries where these facilities may not be available. In this study all the patients treated with open Kuntscher nailing had their fractures united on the average of 20 weeks with a range of 16 to 24 weeks. This was comparable to the findings by Davlin¹⁰ et al at 20 weeks but longer than those reported by Devnani¹² et al that had union in their group of patients at 14 weeks. We established from this study the extended use of Kuntscher nails to fractures of Winquist type I and II also achieved union at average of 20 weeks.

The advantages of interlocking nails was the prevention of shortening and mal-alignments but despite the locking this has not been completely prevented with reports of 1-2 cm and 10-15 degree of mal-rotation regarded as excellent to good results. In this study only 2 (6.66%) patients had 1-2 cm shortening. This did not affect their gait significantly as none of them had any need for shoe raise. Though rotation mal-alignment was not looked for in this study, prevention of this complication of Kuntscher nailing was effected firstly through good cortical apposition of the fracture ends in type I and II comminution. The type III comminution in addition to cortical apposition had three point purchase of straight nail on the endosteal surface of the medullary canal. Secondly, all the patients with comminuted fractures had application of de-rotation bar.

The fear of infection has always been there in open surgery hence recent trend towards closed surgery. In this study 2 (6.66%) patients developed superficial wound infection that resolved with dressing and appropriate antibiotics. This was higher than those reported by Blumback et al⁹ who reported 3-5 % in 89 fractures and Williams¹¹ reported 2.4% in 42 fractures. However, their reports included only deep infections. The range of motion at knee ranged from 100 to 135 degrees at minimum six month of follow up. It was concluded that open Kuntscher nailing is safe, effective and still relevant in the centre where facilities for closed interlocking nails may not be available. It gives good functional and clinical results in transverse, short oblique fractures and those with lesser degrees of comminution.

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