

Original article:

Study of Management of Subtrochanteric fractures of the femur in Adults using Proximal Femoral Nails

¹Dr. Prasad M. Gowda* , ²Dr. Jayakrishna B. S. Reddy , ³Dr. Nabeel Shams

Sri Siddhartha Medical College, Tumkur- 572 107, Karnataka, India

*Corresponding author: Email: drprasadmg@gmail.com

Abstract:

Background: Numerous variations of Intramedullary nails have been devised to achieve a stable fixation and early mobilization of subtrochanteric fracture, among which is the proximal femoral nail (PFN). We reported here the results of a prospective study carried out at our institute on fifty consecutive patients who had suffered subtrochanteric fracture between June 2007 and June 2009 and were subsequently treated with a PFN.

Materials & Methods: The inclusion criteria being acute and/or pathological subtrochanteric femur fractures aged above 18 years. The patients were maintained on traction preoperatively in cases whose surgical intervention was delayed for more than two days. All operations were performed under spinal/ epidural anaesthesia. Postoperative mobilization was started once the patient's conditions were favourable. Weight bearing was determined by the fracture pattern.

Results: We came across 36 male patients and 14 female patients. Majority of the cases (n=38) were due to high energy trauma of road traffic accidents involving relatively younger patients. At the end of five months, all except four patients could mobilize independently without any aid. We did not come across complications like fracture of femur and failure of fixation and no reoperations were required.

Conclusions: Proximal femoral nails are a good implant for subtrochanteric fracture of the femur. The advantages include minimal exposure (closed technique), better stability and early mobilization. Fractures united in all cases and postoperative functional outcome was satisfactory. PFN could be preferred implant of choice in treating subtrochanteric fractures especially in elderly since it allows early and stable mobilization.

Key-words: subtrochanteric fracture , proximal femoral nail, femur fracture

Introduction:

Subtrochanteric femoral fractures have been variously defined, but most of the authors limit the term to fractures between the lesser trochanter and the isthmus of the diaphysis.(1) Only recently has a better understanding of fracture biology, reduction techniques, and biomechanically improved implants has allowed subtrochanteric fractures to be addressed with some success.(2) In 1996, the Arbeitsgemein-schaft für Osteosynthesefragen AO/ASIF developed the proximal femoral nail (PFN) as an intramedullary device which has several favourable characteristics. It can be dynamically locked, allows early mobilization, has high rotational stability and is done with minimal soft tissue damage.(3) This study was aimed to evaluate the outcome of subtrochanteric femur fractures treated with

proximal femoral nails and list their various complications.

Materials and Methods:

50 patients with subtrochanteric hip fracture admitted in the period of June 2007 to June 2009 who met the following inclusion criteria were taken up. The inclusion criteria included acute subtrochanteric femur fractures, patients aged ≥ 18 and pathological subtrochanteric femur fractures.

Patients with open fractures, cases infected in preoperative period and fractures in patients below the age of 18 were excluded from the study. The patients were maintained on traction preoperatively in cases whose surgical intervention was delayed for more than two days. All operations were performed under spinal/ epidural anaesthesia. High risk patients had thrombosis

prophylaxis with low molecular weight subcutaneously during the hospitalization.

For surgery, the patient was positioned supine on the fracture table under spinal or general anesthesia as the condition of the patient permitted. The fracture was reduced by longitudinal traction and the limb was placed in neutral or slight adduction to facilitate nail insertion through the greater trochanter. A straight lateral incision was made from the tip of the greater trochanter extending 4-6cm proximally; the gluteus maximum muscle was dissected in line with its fibers. Open reduction was used by extending the incision wherever necessary. The entry portal was at the tip of the greater trochanter, half way between its anterior and posterior extent. A Kirschner wire was inserted at the tip of the greater trochanter under C-arm control. In cases where standard PFN was used we had to ream the distal femur also with increasing diameters of reamers up to 11mm.

After mounting the appropriate sized nail on the insertion device the nail was introduced manually into the femoral shaft. Via the aiming arm, which was attached to the insertion device, first the guide wire for the neck screw was introduced into the femoral neck in such a way that the 8mm screw was placed in lower half of the neck on the antero-posterior view and centrally on the lateral view. The hip pin was introduced first with the tip just about 25mm medial to the fracture line, and then the neck screw of appropriate size was inserted. Afterwards depending on the type of fracture, distal interlocking either statically or dynamically was achieved via the same aiming arm in standard PFN and

with free hand in long PFN. The stability of the construct was assessed and wounds were closed in layers over negative suction drain and antiseptic dressings done.

Results:

Highest number of patients were in the age group of 50-70, followed by 18-30, 30-50 and >70 age groups with number of patients being 18, 16, 14 and 2 respectively. The right side was found to have slightly more risk of injury (52%) compared to left side. Males represented 36 cases out of the study whereas females were 14 in number. 76% of the cases were associated with road traffic accidents and other 24% associated with history of fall. 12 cases were present in each Type 2C and Type 3B classes of Seinsheimer classification. **(Table 1)** 28 cases had no co-morbid conditions. **(Table 2)** All except two patients underwent the surgery within six days of admission. One patient with pre-existing cardiac disease was treated by the medical team prior to the surgical procedure. Only four patients needed size 10 PFNs. The rest had medullary canals appropriate for the size 9 nail. Mean operation time in our study was 60-120 minutes on an average. **(Table 3).**

The average time to radiological union was 4.6 months. At the end of five months, all except four patients could mobilize independently. Two patients with a contralateral intertrochanteric fracture was using a Zimmer frame to mobilize. Two patients were using crutch to mobilize upto six months postoperatively. **(Table 4)** The only complications were surface wound infection in two cases and anaesthetic complications in two cases. **(Table 5)**

Indian Journal of Basic and Applied Medical Research

Is now OFFICIALLY listed in

CABI , UK & Research Bib

Table 1: Case Distribution according to Seinsheimer Classification

Type 1	0
Type 2A	6
Type 2B	10
Type 2C	12
Type 3A	8
Type 3B	12
Type 4	2
Type 5	0
Total Cases	50

Table 2: General Helath of the Patient

Co-Morbid Conditions	Number of patients
Nil	28
Diabetes Mellitus	2
Hyepertension	16
Cardiac Disease	4
Anaemia	16

Table 3 : Operating time in Minutes

Operation time (minutes)	Number of cases
0-60	2
60-120	40
>120	8

Table 4: Postoperative Independence of Ambulation

Final Outcome	8weeks	12weeks	20weeks
Walk Independently	6	32	46
Crutch	30	12	2
Zimmer Frame	14	6	2

Table 5 : Complications during operative procedure

Complication	Number of cases
Infection	2
Implant related	None
Medical/Anaesthetic	2
Limb length discrepancy	None

Discussion:

The discussion about the ideal implant for treatment of proximal femoral fractures continues. Closed reduction of the fracture preserves the fracture haematoma, an essential element in the consolidation process. Intramedullary fixation allows the surgeon to minimize soft tissue dissection thereby reducing surgical trauma, blood loss, infection, and wound complications.(4) In the study by Christian et al, proximal femoral fractures healed in all 55 patients. The longest consolidation time

was 5 months which was one month less than the longest time seen in our series.(4) From the mechanical point of view, a combined intramedullary device inserted by means of a minimally invasive procedure by means of a minimally invasive procedure seems to be better in elderly patients. All elderly patients did well functionally in our series. Walking 15 metres were comparable to the study by Ekstrom et al.(5)

Duration of hospital stay was comparable. The type of fracture, according to Seinsheimer classification,

did not affect functional outcome. We did not come across any implant related complications compared to other studies.(6) The average duration of stay in our series was 17 days.

Conclusions:

Proximal femoral nails are a good implant for subtrochanteric fracture of the femur. The advantages include minimal exposure (closed technique), better stability and early mobilization. Fractures united in all cases and postoperative functional outcome was

satisfactory. PFN could be preferred implant of choice in treating subtrochanteric fractures especially in elderly since it allows early and stable mobilization.

Acknowledgement:

We extend a whole hearted gratitude to the Department of Orthopaedics, Sri Siddhartha Medical College, Tumkur for providing me a platform for conducting my studies, my colleagues, staff and my post graduates students for lending me a helpful hand in whatever way possible.

References:

1. LaVelle DG. Fractures and dislocations of Hip. In: Canale S, editor. Campbell's Oper. Orthop. 11th ed. Elsevier Mosby; 2008. p. 3262–90.
2. A, Bedi, Toan Le T. Subtrochanteric femur fractures. Orthop. Clin. North Am. 2004;35(4):473–83.
3. Pavelka KT, Linhart J. Osteosynthesis of proximal femoral fractures using short femoral nails. Acta Chir. Orthop. Traumatol. Cech. 2003;70(1):31–8.
4. Boldin CS, Fankhauser F, Peicha F, Grechenig G, Rudolf. The proximal femoral nail (PFN)-a minimal invasive treatment of unstable proximal femoral fractures:a prospective study of 55 patients with a follow-up of 15months. Acta Orthop. Scand. 2003;74(1):53–8.
5. Menezes DF, Gamulin A, Noesberger B. Is the Proximal Femoral Nail a Suitable Implant for Treatment of All Trochanteric fractures? Trauma. 2004;221–7.
6. Ekstrom W, Karlsson-Thur C. Functional outcome in treatment of unstable trochanteric and subtrochanteric fractures with the Proximal Femoral nail and the Medoff Sliding Plate. J. Orthop. Trauma. 2007;21(1):18–25.

Date of submission: 11 December 2013

Date of Provisional acceptance: 08 January 2014

Date of Final acceptance: 12 February 2014

Date of Publication: 04 March 2014

Source of support: Nil; Conflict of Interest: Nil

