



CLINICORADIOLOGICAL OUTCOME OF INTERTROCHANTERIC FEMUR FRACTURE TREATED WITH INTRAMEDULLARY SHORT PROXIMAL FEMORAL NAILING

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ABSTRACT

INTRODUCTION: Proximal femoral nails (PFN) have been introduced relatively recent but have begun to compete the traditional Dynamic hip screw (DHS). The mechanical strength of the nail and less invasive procedure has made the procedure preferable and even using short PFN in unstable intertrochanteric fractures made surgical duration less than long PFN with near same functional results. In this study we have reviewed 12 cases operated in the time period of 1 year.

MATERIALS AND METHODS: 12 patients operated in last 1 year which have completed atleast 1 year follow up with us. All have been treated using a short proximal femoral nail for stable and unstable intertrochanteric fracture of femur. A radiological assessment was made with serial X-rays.

RESULTS: In a follow up of 12 patients, all fractures have eventually healed with no case of non union. Most of our patient have excellent outcome (58.3%), good outcome (41.1%), no patient with poor or fair outcome. The operative time was found to be short, less blood loss was seen during surgery and few early complications were noted. 1 case had a complication.

CONCLUSION: Short PFN is a suitable implant for intertrochanteric femoral fractures needing open reduction and internal fixation. It has low per operative and post operative morbidity.

KEYWORDS :

INTRODUCTION:

Intertrochanteric femur fractures are the most common fractures of hip. The incidence of intertrochanteric fracture is rising because of increase number of senior citizens with osteoporosis and also increased number of road traffic accidents.¹ conservative treatment for these type of fractures with prolonged bed rest and traction has been associated with general complications associated with prolonged immobilization. An intramedullary device has some advantages over extramedullary device as it is not dependant on screw fixation of a plate to lateral cortex.²

In the younger age group of people, in whom it is uncommon it occurs almost always due to high velocity trauma. The ideal internal fixation device should be such that the patient can be mobilized at the earliest without jeopardizing the reduction, stability, and union of the fracture.³ Various operative procedures with different implants have been described for the treatment of intertrochanteric fractures. Treatment options include dynamic hip screw (extramedullary fixation), gamma nail (intramedullary fixation), proximal femoral nail (intramedullary fixation).⁴

MATERIAL AND METHODS:

A total of 12 cases of intertrochanteric fractures which were treated with short proximal femoral nail were chosen for the study. Patients with fresh closed intertrochanteric fractures were included in the study while compound and pathological fractures were excluded. All patients were operated within 7 days of the occurrence of fracture.

Patients were examined and x-rays were taken of pelvis. Derotation boot and weight traction was applied to the affected limb in all cases. Fractures classified according to Orthopedic trauma association (AO/OTA) classification for intertrochanteric fracture of femur. Neck-shaft angle and medullary size were assessed. All patients were put on fracture table and closed reduction done. The reduction was achieved primarily by traction and internal rotation, and adduction or abduction as required. If this failed, reduction was achieved by inserting a Steinmann pin in anterior cortex of proximal femoral shaft towards neck and head of femur by which manipulation done to achieve reduction. Reduction was confirmed under an image intensifier. Thus, fracture reduction is the most important step prior to the fixation.

The PFN we used had a standard configuration with a length of 250 mm, mediolateral angulation of 6° and a neck-shaft angle of 135°. The nail had a proximal diameter of 14 mm and distal diameter of 9, 10, 11, and 12. We used a proximal de rotation screw of 6.4 mm and distal lag screw of 8 mm. Distal locking was done with self-tapping 4.9 mm cortical screws, one of which were applied in static mode and the other in dynamic mode allowing 5 mm dynamization.

Postoperatively, the limb was elevated with a pillow. Intravenous antibiotics were given for first 48 h followed by oral antibiotics for the next 3 days. Static quadriceps exercises were started on the 2nd postoperative day. Active quadriceps and hip flexion exercise were started on 6th and 3rd postoperative day. Dressing was done on 2nd, 4th and 7th postoperative days. Sutures were removed on 15th postoperative day. Patients were advised to walk non weight bearing with walker as soon as tolerable. Partial weight bearing was started at about 6 weeks postoperatively. Full weight bearing walking was allowed after assessing for the radiological and clinical union. The presence of callus radiologically and absence of tenderness was considered bony union. Patients were evaluated at 4 weeks, 12 weeks, and 24 weeks.

RESULTS:

This study involved 12 cases of intertrochanteric fractures of either sex above the age of 40. All cases were treated by intramedullary fixation with a PFN. The age distribution was from 42 to 84 years (average 57 years). The largest group of patients was from 51 to 65 years. There were 7 males (59%) and 5 females (41%) in the study.

9 patients (75%) sustained the fracture due to a fall and 3 patients (25%) due to road traffic accident. Most of the patients who sustained the fracture due to fall were older in age and had osteoporosis.

All the fractures were classified as per AO/OTA classification. Fracture pattern, 31A1 was considered stable and 31A2 and 31A3, unstable fractures. In our study, 4 patients (33.3%) suffered from fracture pattern 31A1, 5 patients (41.5%) suffered from 31A2 and 3 patients (25%) from 31A3. Average operating time was 65 min (45–120 min) after anesthesia. Closed reduction was achieved in all patients in study. The average hospital stay was 7 days. It was more in patients with comorbid conditions and complications with highest being 12 days. Four patients showed radiological union at 3 months while three patient had visible union at 6 months and five patients had visible callus formed at fracture at 12 months with an average of 7.8 months. All patients were evaluated by regular physiological and radiographical examinations.

Results based on harris hip score:

Table :1 Result

Results	No of patients	Percentage
Excellent	7	58.3%
Good	5	41.1%
Fair	0	00
Poor	0	00

Table 2: Fractures according to AO classification

Fracture pattern	Number of patients	Percentage
31A1	4	33.3%
31A2	5	41.5%
31A3	3	25%

Complications

We encountered complication only in one patient which had superficial infection which was treated with antibiotics. No any other complications were encountered in any of patients.

Preoperative x-rays

Immediate post op x-ray



Final follow up



Final follow up clinical Images

DISCUSSION:

The surgeon cannot control bone quality, patient compliance or any comorbidities but he should be able to minimize the morbidity associated with fracture by achieving an acceptable reduction with an ideal and economic implant. Proximal femoral nail is effective and ideal intramedullary load sharing device in intratrochanteric fracture femur in elderly patients¹. Closed reduction of the fracture, preserve the fracture hematoma and essential elements in consolidation process. Intramedullary fixation allows the surgeon to minimize soft tissue dissection thereby reducing surgical trauma, blood loss, infection and wound complications². Advantage over extramedullary implant is in line with femoral canal and biomechanics and has a less stress riser².

prakriti raj et al⁷ total two patients(4.7%) suture infection had occurred out of 48 patients, in our study only one patient (8.4%) has suture infection out of 12 patients. Prakriti raj et al⁷. had operated 48 patients with an average duration of surgery was 42.8 minutes. In our study average mean time for surgery is 45 minutes.

Table 3: Average union time

STUDY	NO. OF PATIENTS	TIME OF VISIBLE UNION IN months(mean)
V.A.pushkarana ⁸	80	5
Dr.Pankaj Inani ⁹	30	4
Our study	12	7.8

We have compared our study with two similar studies showing that mean time period for visible union is higher than compared studies as more number of patients for study in other studies. We have compared our study with few similar studies based on weight bearing and scoring system.

Table 4: Harris hip score

study criteria	Vishal Ashokraj Pushkarna et. Al ⁸	Pratik prajapati,vishal prajapati ¹⁰	Our study
Partial weight bearing (mean time in weeks)	6	4	5
Full weight bearing(mean duration in weeks)	10	7	6

Harris hip score	E	21	54%	43	57.33%	7	58.3%
	G	10	26%	19	25.33%	5	41.1%
	F	4	10%	03	4%	0	00
	P	5	10%	10	13.33%	0	00

(E=excellent, G=good, F= fair, P= poor)

The above comparison shows that intertrochanteric femur fracture operated using PFN has excellent to good outcomes in most of the patients in above studies suggest nailing with short PFN has better outcome as in long PFN11.

In comparison to gamma nail, PFN is biomechanical innovations stable greater implant length, it is valgus in the nail, the availability of small distal diameters and flexible distal end that reduces the concentration of stress to a minimum¹². Exclusion of need for diaphyseal reaming in order to introduce it and finally the possibility of placing an additional antirotational screw in the femoral neck in order to avoid breakdown of the fracture line and rotation of cervico-cephalic fragment.

CONCLUSION:

- The intramedullary short proximal femoral nail, is an optimum implant for the internal fixation of unstable intertrochanteric fractures with advantages of stable fixation, early load sharing fixation, shortened hospital stay and early weight bearing and ambulation, and union rate improvement.

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Conflicts of interest

There are no conflicts of interest.

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