Original Research Study

To Assess The Efficacy Of Proximal Femoral Nailing In Pertrochanteric And Subtrochanteric Fracture.: A Prospective Study

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ABSTRACT:
Introduction: The incidence of pertrochanteric femoral fracture has significantly increased in recent decades. Pertrochanteric femoral fracture in younger population occurs due to high velocity trauma whereas in advanced age individual occurs due to spontaneous fall. This study is intended to evaluate the efficacy of Proximal Femoral Nailing in Pertrochanteric and subtrochanteric fracture.
Material and Methods: patients admitted in orthopedic ward during emergency and visiting the orthopedic opd. total of 74 cases satisfying the inclusion criteria, having pertrochanteric and subtrochanteric fracture were included in the study. all patients were evaluated with respect to history,vital parameter, general condition and mode of injury. distal neurovascular deficit were checked and recorded. radiological, hematological and biochemical investigations were done. all surgical protocols were followed. regular follow up of every patient was carried out at 4 weeks interval initially and later at 6 weeks until union. clinical and radiological evaluation done. following points were noted. functional evaluation, radiological evaluation and implant used and any evidence of implant failure.
Results: Mean age in years=64.04. Youngest patient was 21 years while oldest is 81years. Total 74 patients, male 44 (59.4%) and female 30(40.5%). Domestic fall had the cases of 93.24% followed by road traffic accidents 6.7%. According to side of the injury right side 52.7% and left side 47.2%. The Intertrochanteric type fracture accounted for 81.08% where as Subtrochanteric accounted for 18.9%. according to Boyd and Grrifin type of fracture 48.3% were type 1. Average time lapse for surgery 4.56 days. Patients with blood hemoglobin values between 8 to 10 and less than 8, required blood transfusion perioperatively. Mean diameter of nail used was 9.4mm. Close reduction of the fracture done in 86.4% of patients. Average time for union was 17.6 weeks (4.42 month).
Conclusion: In conclusion PFN is a good implant for intertrochanteric and subtrochanteric fracture of the femur. The advantages includes smaller exposure, lesser blood loss, closed technique, shorter operative time, less morbidity, with mechanical advantages of rotational stability and possibility of dynamic or static distal locking. Fracture united in 98.3% cases and postoperative functional outcome was good.Surgical technique is complex and with stiff learning curve. The number of complications was acceptable and comparable with other fracture fixation system.

Key words: Pertrochanteric, Subtrochanteric, Proximal Femoral Nailing,

INTRODUCTION:

Pertrochanteric fractures are those occurring in the region extending from the extra capsular basilar neck region to the region along the lesser trochanter before the development of the medullary canal. Intertrochanteric and peritrochanteric are generic terms for pertrochanteric fractures. Subtrochanteric fractures typically occur in the proximal femur between the inferior aspect of the lesser trochanter and a distance of about 5 cm distally.[1] Pertrochanteric femoral fracture in younger population occurs due to high velocity trauma whereas in advanced age individual occurs due to spontaneous fall[2]. Most of pertorchanteric fractures are unstable and bear a high failure rate. This instability is multifactorial and includes loss of posteromedial calcar support and loss of posterolateral support or lateral wall insufficiency[3]. For a fracture to occur, four conditions must be met. First, the orientation of the faller should lead to an impact at or near the trochanter. Second, the protective responses of the patient, such as grabbing for a supportive object or extending the arms to reduce the energy of the fall, are inadequate. Third, local soft tissues around the hip are unable to dissipate energy adequately, and fourth, the bone strength is less than that necessary to withstand the residual energy imparted. . If balance is lost, she or he will tend to collapse to the side, which affects the hip directly. These fractures are more common in females as compared to males due to postmenopausal osteoporosis. Appreciation of this mechanism along with osteoporosis explains the risk of fracture with patient's age[4].

Conservative treatment for these types of fractures, with prolonged bed rest and traction, has been associated with various deformity with general complications.[5] Closed management of these injuries poses difficulty in obtaining and maintaining a reduction making operative management preferred treatment.Internal treatment of these fracture has gained wide spread acceptance but the problems i.e. Malunion, nonunion, implant failure, refracture and infection encountered after surgical correction and treatment of these fracture have prompted continued development of new devices and treatment programmes. Elderly patient with comorbid medical conditions such as diabetes, hypertension, renal, pulmonary, and cardiac problem are high risk factors with life-threatening complications such as sepsis, pneumonia, decubitus ulcer, and cardiorespiratory failure. All these circumstances mentioned above need to be prevented by an urgent surgical solution with the early rehabilitation and mobilization of the patient[6].

Operative treatment is now a treatment of choice for all trochanteric fractures due to advantages of early rehabilitation and mobilization. Dynamic hip screw has gained widespread acceptance during the last decade, but complications such as shortening, medialization of distal fragment, implant cut-out, uncontrolled lateralization of the proximal fragment, and varus collapse are common [8,9] . The AO/ASIF developed Proximal Femoral Nail (PFN) for treatment of such fracture. In addition to the all advantages of an intramedullary nail it has favorable characteristics i.e. it can be dynamically locked, allows early mobilization, has rotational stability and is done with minimal soft tissue damage. The aim of this study was to evaluate the efficacy of Proximal Femoral Nailing in Pertrochanteric and subtrochanteric fracture.

Material and Methods: Patients admitted in orthopedic ward during emergency and visiting the orthopedic OPD. Total of 74 cases satisfying the **inclusion criteria**, which were- 1.Displaced subtrochanteric and pertrochanteric fracture of femur,Close fractures. 2. Skeletally mature patients. 3. No medical contraindication for anesthesia.4.Those patients who are willing to give written informed consent for participation in study**.Exclusion Criteria** Were- 1. Skeletally immature patients, 2.A compound fracture 3. A pathological fracture. 4. Associated head injury (Glasgow coma scale <12). 5. Active infection at operative site, 6. Medical contraindication to surgery or anaesthesia. And 7. Ipsilateral fracture shaft femur, tibial fracture and injuries around the knee. Preoperative

Management included the Evaluation, Traction, Radiological investigation, Hematological and Biochemical investigations and Pre anesthetic check up

Type of implant: Diameter of nail was determined by taking conventional radiograph of normal femur and by measuring the inner diameter between two cortices at the level of isthmus of femur. We have also utilized ruler provision from PACS system of x ray functioning in our hospital.

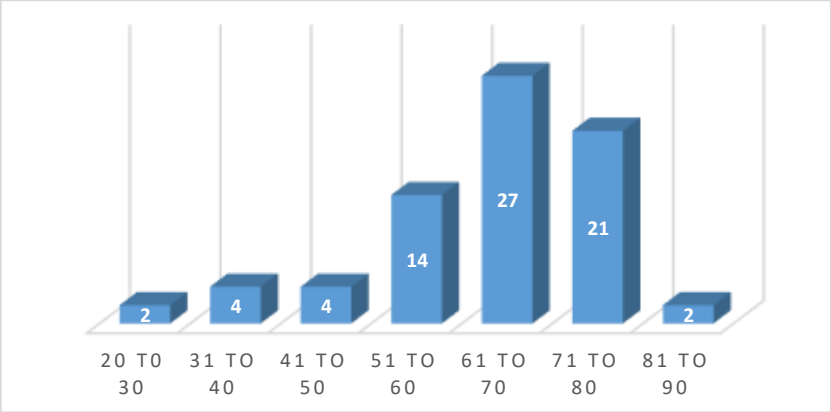
Operative procedure, Postoperative Management, Postoperative mobilization and weight bearing protocol were performed as per standard protocols. The Regular follow up of every patient was carried out at 4 weeks interval initially and later at 6 weeks until union. Clinical and radiological evaluation done for Deformity, Shortening. Range of hip motion. Following division of scores is practiced for different components:

Pain	44
Function	47
Range of motion	5
Absense of deformity	4
Total	100

Radiological Evaluation - Implant used and any evidence of implant failure: Implant failure was assessed under five categories as detailed below: No failure, loosening of screw, cut through of screw, Breakage of screw, Breakage of nail.

Results: 74 cases were treated. 44 (59.4%) were male and 30(40.5%) were female. Mean age in years=64.04 .Youngest patient was 21 years while oldest is 81years. (fig1)

Fig1- Distribution according to Age



The most common mode of injury was Domestic fall (93.24%) followed by Road traffic accident (6.7%). The right side involed predominalntly 52.7% than left side injury (47.2%). Intertrochanteric accounted for 81.08% and Subtrochanteric accounted for 18.9% fractures. (Table 1)

Table1- Distribution according to type of fracture

Type of fracture	**No. of patients**	**Percentage**
Intertrochanteric	60	81.08%
Subtrochanteric	14	18.9%
Total	74	100%

31 (51.8%) patients were Unstable Stability Pattern of intertrochanteric fractures while 29 (48.3 %) were Subtrochanteric were Stable Stability Pattern. According to Boyd and Grrifin type of fractures 30 (48.3%) were as type 1 and type 3 accounted for only 02 patients. (Table 2). According to type of

subtrochanteric fracture.(Seinsheimer classification) 10 (83.3%) were as type 1 zero cases and type 3, type 4 accounted for only 01 patients each. (Table 3). Average time lapse for surgery was 4.56 days. (Table 4). Close reduction of the fracture done in 86.4% of patients.(Table 5). Complications were chest infection (1.3%), Respiratory Distress (1.3%) UTI (1.3%) and local complications like superficial wound infection (1.3%), (Table 6). Average time for union was 17.6 weeks (4.42 month). Mean diameter of nail used was 9.4mm. Patients with blood hemoglobin values between 8 to 10 and less than 8 ,required blood transfusion perioperatively Mean Harris hip score were 77.6.Excellent to good results are seen in 56% of patients,66% patients shows fair to good results .

Table2- Case Distribution according to Boyd and Grrifin type of fractures

Type of fracture	**No. of patients.**	**Percentage.**
Type 1	30	48.3%
Type 2	18	29%
Type 3	02	3.22%
Type 4	12	19.35%
Total	62	100%

Table3- Case Distribution according to type of subtrochanteric fracture. (Seinsheimer classification)

Type of fracture	**No. of patients.**	**Percentage.**
Type 1	00	00
Type 2	10	83.3%
Type 3	01	8.3%
Type 4	01	8.3%
Type 5	00	00
Total	12	100%

Table4- Case Distribution according to time lapse for surgery

Time delay for surgery days	**No. of patients**	**Percentage**
0 -5	55	74.3%
6-10	19	25.6%
11-15	00	00
15-20	00	00
Total	74	100%

Table5- Case Distribution according to type of reduction.

	No. of patients	**Percentage**
Open	10	13.5%
Close	64	86.4%
Total	74	100%

Table6- Case Distribution according to Complications.

Complication	**No. of patients**	**Percentage**
Systemic complication		
Chest infection	01	1.3%
Pulmonary embolism	00	00
Respiratory distress	01	1.3%
Urinary tract infection	01	1.3%
Deep vein thrombosis	00	00
Local complication		

Superficial wound infection	01	1.3%
Deep wound infection	00	00
Death	05	6.7%

Discussion:

The discussion about the ideal implant for treatment of intertrochanteric and subtrochanteric fractures continues .Operative treatment in the form of internal fixation permits early rehabilitation and offers the best chance of functional recovery, and hence has become the treatment of choice for virtually all fractures in the trochanteric region. In this study an attempt was made to evaluate success in the management of Intertrochanteric fractures and subtrochanteric fractures using proximal femoral nail (PFN).

Most of patients from present study were males. There was a male preponderance in our study. Male: Female ratio was 1.3:1. which are in similar with studies done by Pavelka T, Kortus J.[9] J. Pajarinen,J. Lindahl.[10]. Most of patients in our study were in 6th to 8th decade of life. Mean age in years were 64.04. This signifies the fact that patients from these age groups are involved in low energy trauma like domestic fall (fall at home). Reported by Christian Boldin; Franz J. Seibert.[11]

In most of our patients (93.2%) domestic fall (fall at home) and trivial trauma was main reason behind fracture. 6.7% patient suffered road traffic accident , there were no case of assault. This may be attributed to the following factors as enumerated by Cummings and Nevitt; [12] Keneth J. Koval and Joseph D. Zuckerman observed that 90% of hip fractures in the elderly results from a simple fall. Hip fractures in young adults were observed to result most often with high energy trauma such as motor vehicular accidents or a fall from height.[13]

In our present study we have 60 (81.08%) intertrochanteric fractures with variable degree were in similar with study by Pavelka T, Kortus J[9]. In Indian population average diameter of medullary canal is found to between 9-10 mm.[14] In our study average diameter of nail used was 9.4mm. In our series 5(6.7%) patient died within 6 months of surgery and hence could not completed the follow up, with condition not related to surgery and mostly due to medical co-morbidities. Reported mortality rates for the first postoperative year is around 20 -25%[14] Functional outcome for elderly patient with unstable intertrochanteric fracture is difficult to assess and depends on many factors in addition to fracture care. Successful fracture care does not always correlate with a successful outcome [14,15]

Conclusion:

In conclusion PFN is a good implant for intertrochanteric and subtrochanteric fracture of the femur.The advantages includes smaller exposure, lesser blood loss, closed technique, shorter operative time, less morbidity, with mechanical advantages of rotational stability and possibility of dynamic or static distal locking. Fracture united in 98.3% cases and postoperative functional outcome was good.Surgical technique is complex and with stiff learning curve. The number of complications was acceptable and comparable with other fracture fixation system. Procedure is technically demanding with difficulty in early cases but gradually with learning and improvement in technique complications can be avoided. Operative management which allows early rehabilitation and offers to the patient the best chances for functional recovery is the treatment of choice for most of the peri-trochanteric fractures.

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