



## A STUDY OF SURGICAL MANAGEMENT OF INTERTROCHANTERIC FRACTURE USING PROXIMAL FEMORAL NAILING

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### ABSTRACT

#### AIM AND OBJECTIVE:

Intertrochanteric femoral fractures are among the most often encountered fractures by Orthopaedic surgeon . Many operative implants are available for the management but none has been satisfactory. The Dynamic Hip Screw has been considered the implant of choice because the fracture union predictably occurs . A problem with Dynamic hip screw is loss of hip offset and shortening. So the PFN was designed by AO -AS IF group in 1997 for treatment of proximal femoral fracture . PFN being an intramedullary nail is positioned closer to the mechanical axis of femur and therefore is subjected to smaller bending moment than laterally placed plate and screw devices . The short lever arm also decreases tensile strain on the implant there by reducing risk of implant failure. Additional anti rotational screw increases the rotational stability of the head - neck fragment . This prospective study is to analyse the outcome of treatment of Intertrochanteric fractures with Proximal Femoral Nail.

**MATERIALS AND METHODS:** This prospective study comprises of 40 cases of Intertrochanteric fractures that fitted into the inclusion criteria were operated in our institution

Our institution is situated in semi urban area with a rural background . Patients often come to the institution after trying other modalities of native treatment . The study was basically conducted to find out the age incidence, sex distribution, side incidence, mode of injury, fracture anatomy, the operative technique itself and the results obtained and complications if any . Following inclusion and exclusion criteria were used.

**RESULTS:** This prospective study was conducted in our institution, 56 cases of trochanteric fractures were in the study out of which 11 patients were operated with DHS, 3 patients went against medical advice refusing operative treatment, 2 patients were considered unfit for surgery due to high co - morbidities . So 40 cases of intertrochanteric fractures were operated during the above period, which comprises this study

**CONCLUSION:** In our experience use of PFN in the treatment of Intertrochanteric fractures produces better results. Although surgery is technically demanding with need of C - arm & fracture table the outcome was good. It is more biological, aesthetic friendly & can be done in elderly patients with Intertrochanteric fractures with co - morbidity. Good anatomical reduction with posteromedial cortical contact & placement of screws as discussed will prevent complications like varus collapse, Z - effect & shortening. Also the size of incision, time of surgery & blood loss is much less. Recovery is faster with return to functional ability at the earliest.

**KEYWORDS :** Intertrochanteric fracture; Proximal femoral nail; Harris hip scoring (modified); AO classification

**INTRODUCTION:** Trochanteric fractures are devastating injuries that commonly affect the elderly and have a tremendous impact on the health care system and society in general. Elderly persons are prone for Intertrochanteric fractures even due to trivial injuries like a stumble and fall because of osteoporosis and consequent weakening of the bone . Intertrochanteric fractures are also becoming common in younger age group, as a result of high velocity injury due to road traffic accidents. Speedy vehicles on the smooth highways encourage the drivers to drive fast resulting in inadvertent road traffic accidents with severe high velocity injuries and with severe fracture comminution

#### INCLUSION CRITERIA:

- 1 . Patient who has been diagnosed as having Intertrochanteric fractures.
- 2 . Patients more than 20 years of age.
- 3 . Patient who are fit for surgery.

#### EXCLUSION CRITERIA:

- 1 . Less than 20 years .
- 2 . Patients with compound fractures .
- 3 . Patients unfit for the surgery .
- 4 . Patients with pathological fractures .
- 5 . Previous wound or bone infections, operatively treated fractures, or retained hardware in the same extremity .
- 6 . Patients who discontinued follow up / expired later post operatively .

#### Evaluation of patients:

Upon arrival the patients were assessed clinically and were stabilized haemodynamically . Patients were examined and

investigated with X - ray pelvis with both hips AP and Lateral view (whenever possible) . Following radiographs patients were admitted to orthopaedic wards and were maintained on skin traction over a Bohler - Braun frame was applied to all cases till surgery .

Routine investigations carried out for all patients .

#### 1 . Blood investigations

- Haemoglobin
- Total count
- Differential count
- ESR
- Blood urea
- Serum Creatinine
- Blood sugar Level
- Blood grouping and Rh type
- Bleeding time and Clotting time
- HIV
- HbsAg

#### 2 . Urine routine – Albumin, Sugar, microscopy .

#### 3 . Electro cardiogram

4 . Chest X – ray were routinely done for all cases that were subjected to surgery . Specific investigations of all associated medical illness were carried out .

Pre op anaesthetic & physician fitness done . Adequate blood reserved in blood bank . Shaving of affected extremity, written informed consent of patient & relatives for internal fixation taken. All the patients were kept fasting overnight . All the patients were operated using a Proximal femoral nail on a fracture table in supine

position or lateral position under image intensifier control using standard techniques. Patients were discharged on the tenth post-operative day following sutures removal, of their post operative period was uneventful.

Patients were assessed clinically and radiologically on the 2<sup>nd</sup> post-operative day, at 6 weeks, 3 months and then between 6 months to 1 year depending upon the fracture union. These findings are documented according to a detailed proforma which was exclusively prepared for the study. Healing was judged by both clinical (pain & motion at fracture site) and radiological (bridging callus filling the fracture site or trabeculations across the fracture site) criteria and functional outcome was reviewed according to the Harris Hip score (modified).

**RESULTS AND DISCUSSION**

**SIDE OF INJURY**

**TABLE: 1**

AFFECTED SIDE	NUMBER OF CASES	PERCENTAGE
RIGHT	23	57.5%
LEFT	17	42.5%

In the present study, the highest incidence being 57.5% with intertrochanteric fractures on the right side indicating right sided preponderance.

**INCIDENCE OF INTERTROCHANTERIC FRACTURES BASED ON AO CLASSIFICATION**

**TABLE: 2**

AO CLASSIFICATION	NUMBER OF PATIENTS	PERCENTAGE
31 . A1 – STABLE	13	32.5%
31 . A2 – UNSTABLE	20	50%
31 . A3 – UNSTABLE (REVERSE OBLIQUE)	7	17.5%

In the present study, the highest incidence being 50% with trochanteric fractures in Type 31 . A2.

Lowest incidence is 17.5% with Type 31 . A3 fracture.

**FRACTURE UNION**

**TABLE: 3**

AVERAGE TIME OF UNION	MONTHS
	3

**COMPLICATIONS**

**TABLE: 4**

COMPLICATION	PERCENTAGE
INFECTION	NIL
CUT OUT OF SCREW	2.5%
REVERSE – Z EFFECT	NIL
Z EFFECT	2.5%
DIAPHYSEAL FRACTURE	NIL

In the present series, 2.5% (1) of cases had Cut out of the anti-rotational screw was noted. z effect was noted in 2.5% (1) of patients. No patients had infection, Reverse z- effect and diaphyseal fractures.

**LIMP TABLE: 5**

LIMP	NUMBER OF PATIENTS	PERCENTAGE
NONE	30	75%
SLIGHT	9	22.5%
MODERATE	-	-
SEVERE	1	2.5%

In the current study majority of patients had no or slight limp that did not affect their activities. 2.5% (1) had severe limp which was mainly due to pain and screw cut out.

**WALKING ABILITY**

**TABLE: 6**

WALKING ABILITY	NUMBER OF PATIENTS	PERCENTAGE
NONE	31	77%
CANE FOR LONG WALKS	5	12.5%
CANE – MOST OF THE TIME	2	5%
CRUTCH	1	2.5%
2 CANE	-	-
2 CRUTCHES	1	2.5%
NOT ABLE TO WALK	-	-

In our study 77% (31) patients did not require any support for walking and 12.5% (5) of patients cane for long walks. 5% (2) patients used cane most of the time. 2.5% (1) of patient was mobilizing with the help of crutch. 2.5% (1) of patient was mobilizing with the help of 2 crutches. The requirement of the cane or crutches is primarily because of old age of the patients and associated osteoarthritis of knee.

**FUNCTIONAL OUTCOME**

**Flexion**



Pre op – AP view

Immediate post-op



3 months post-op AP and lateral



Standing



Squatting



Flexion



Sitting in Crossed Legs



## DISCUSSION

Intertrochanteric fractures particularly occur in elderly patients having osteoporotic bones due to low energy injuries. As these patients usually have additional systemic diseases, Long hospital stay may cause complications such as DVT, Pulmonary embolism, pneumonia, uremia, UTI and pressure sores which have a negative effect on prognosis and increases death rate

The best treatment for intertrochanteric femoral fractures remains controversial. Most of the complications occurs from treating the unstable fracture types. PFN was designed by AO/ASIF in 1997 for the treatment of peritrochanteric fractures. It combines the intrinsic advantages of the intramedullary nail and those of sliding screw is a valid and an important option in the treatment of intertrochanteric fractures. It is a relatively easy procedure, a bio mechanically stable construct and a minimally invasive device; especially ideal in compromised elderly patients who are the majority population suffering from these type of fractures. With incorporation of single helical blade in place of two proximal screws in PFN, AO/ASIF has further enhanced the treatment modalities by devising PFNA (Proximal Femoral Nail Antirotation).

The success of proximal femoral nail depended on good surgical technique, proper instrumentation and good C - arm visualization. All the patients were operated on fracture table. We found following advantages

- Reduction with traction is easier
- Less assistance is required
- Manipulation of the patient is reduced to minimum
- Trauma to patient is decreased
- Better use of C - arm with better visibility.

Placement of the patient on the fracture table is important, for better access to the greater trochanter the upper body is abducted away 10 - 15°. Position of the C - arm should be such that proximal femur is seen properly in AP and lateral view. sliding screw is a valid and an important option in the treatment of intertrochanteric fractures. It is a relatively easy procedure, a bio mechanically stable construct and a minimally invasive device; especially ideal in compromised elderly patients who are the majority population suffering from these type of fractures. With incorporation of single helical blade in place of two proximal screws in PFN, AO/ASIF has further enhanced the treatment modalities by devising PFNA (Proximal Femoral Nail Antirotation).

In our study one of the important factor was the cost of the implant as Proximal femoral nail is costly than the dynamic hip screw, but at

the end it didn't cause much of the difference as:

- Less operative time thus reducing the cost
- No or less need of transfusion of blood
- Post - operative antibiotics were used less reducing the cost of the drugs
- Less hospital stay
- Early return to daily activities.

Dynamic hip screw introduced by Clawson in 1964 remains the implant of choice due to its favorable results and low rate of complications. It provide s control compression at the fracture site. Its use has been supported by its biomechanical properties which have been assumed to improve the healing of the fracture 5 7. But Dynamic hip screw requires a relatively larger exposure, more tissue trauma and an anatomical reduction. All these increase the morbidity, probability of infection and significant blood loss. It also causes varus collapse leading to shortening and inability of the implant to survive until the fracture union.

## CONCLUSION

Literature suggests that Dynamic hip screw is the Gold standard for treatment of stable type of intertrochanteric fractures as well as unstable types.

According to our study and use of Proximal femoral nail in Intertrochanteric fractures we can say that: **Proximal femoral nail can be considered the most Judicious and Rational method of Treating Intertrochanteric Fractures**, especially the unstable and reverse oblique type.

## The reasons to support this are:

- It can be a effective device in management of complex proximal femoral fractures.
- It is a closed procedure, minimal soft tissue damage thus preserves the fracture hematoma and yields early healing and early union.
- It can be used with equally good results in all grades of osteoporosis.
- Nail entry is on the tip of the greater trochanter or lateral to it as medial entry will cause the distraction.
- It gives good results even with non - anatomical reduction

Hip screw and cervical screw placement is important. They have to be parallel in AP and overlapping in lateral. And cervical screw 10mm shorter than hip screw to avoid the "Z - effect", But Proximal femoral nailing requires a higher surgical skill, good fracture table, good instrumentation and good C - arm control. Thus we can conclude that the PROXIMAL FEMORAL NAIL is after proper training and technique, a safe and easy implant option for treatment of complex intertrochanteric fractures.

## SUMMARY

1. 40 patients with Intertrochanteric fractures were studied with follow up of 6 months.
2. The average age of the patient was 55.6 years with almost equal male female ratio of 1:0.9.
3. 57.5% had right sided and 42.5% had left sided injury.
4. 62% were due to domestic fall and 37.5% due to road traffic accidents.
5. 32.5% had stable fracture type - 31. A1, 50% had unstable fracture type 31. A2, and 17.5% had unstable reverse oblique type 31. A3.
6. 22.5% had grade - III Osteoporosis and 12.5% had grade -II Osteoporosis.
7. Result of reduction was 72.5% good, 22.5% fair and 5% poor.8. The average operating time was 55 minutes.
8. 5% of the patients required limited open reduction. 10. Average time of fracture union was 3 months.
9. Total complications were 5% with 2.5% z - effect and 2.5% screw cut - out.
10. The average hospital stay was 11.2 days.

11 .We had 47 .5% excellent, 27.5% good, 17 .5% fair and 7.5% (n=3) poor results according to Harris Hip Score (modified) . 2 of these 3 patients had poor reduction post operatively .  
12 .Mean Harris Hip Score was 85 .6% .

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