



## COMPARATIVE STUDY OF MANAGEMENT AND CLINICAL OUTCOME OF INTRAMEDULLARY VERSUS EXTRAMEDULLARY FIXATION FOR UNSTABLE INTERTROCHANTERIC FRACTURES

### Orthopaedics

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### ABSTRACT

**Introduction:** Surgery is the common therapy for intertrochanteric fractures as this fracture takes a long time to heal on its own. Open reduction and internal fixation (ORIF) is one of the surgical treatments for this fracture (4). Based on the location and type of the fracture different kinds of fixation devices are used. However, the best repairing method for intertrochanteric fractures is still controversial. **Aim And Objective:** To Evaluate functional outcome and Compare the result of treatment with intramedullary (PFN) versus extramedullary (DHS and PFLCP) fixation for unstable intertrochanteric fracture. **Methodology:** In this prospective study from March 2018 to October 2019, 40 consecutive patients with unstable intertrochanteric femoral fractures having an unstable pattern, of either sex were randomized by computer generated tables to undergo fixation with either Intramedullary and extramedullary fixation. A detailed history and clinical examination was done in a systemic manner and noted on a specially designed proforma. Plain radiographs were obtained on admission and all fractures categorized according to AO/ASIF. **Result:** In intramedullary group the mean blood loss was 142.5 ml whereas in DHS group it was 330 ml and PFLCP group it was 415 ml. In intramedullary group 5% subjects had wound infection, In DHS group 10% subjects each had malunion, wound infection and screw cutout, whereas in PFLCP group 2(20%) subjects each had wound infection and screw cutout. **Conclusion:** in unstable intertrochanteric fractures, the intramedullary fixation has significantly better outcome in terms of early restoration of walking ability, shorter operative time, a smaller incision and less blood loss during surgery as compare to extramedullary fixation of unstable intertrochanteric fractures.

### KEYWORDS

Intertrochanteric fracture, intramedullary, extramedullary. K wire

### INTRODUCTION

Intertrochanteric fracture is most common type of hip fractures (45%). 30 to 35 % are unstable with displacement of posteromedial cortex. Gullberg et al. predicted that the incidence of hip fracture worldwide would double to 2.6 million by 2025 and 4.5 million by 2050. Hagino et al reported a lifetime risk of hip fracture at 50 years of age to be 5.6% for man and 20 % for woman. Incidence of intertrochanteric fracture is more in females than males due to osteoporosis(1).

Surgery is the common therapy for intertrochanteric fractures as this fracture takes a long time to heal on its own. Open reduction and internal fixation (ORIF) is one of the surgical treatments for this fracture(2). Based on the location and type of the fracture different kinds of fixation devices are used. However, the best repairing method for intertrochanteric fractures is still controversial. EM fixation of unstable intertrochanteric fractures involves the application of a plate and screws to the lateral side of the proximal femur. In external fixators, the stabilizing component is held outside the thigh by pins or screws driven into the bone(3). IM fixation is used in segmental and compound fractures, unstable fractures, or with poor skin condition or osteopenic bones. It consists of a rod that is placed in the femur bone channel and hinged in the upper part through a screw.(4)

For many years, the sliding hip screw and plate had been the gold standard in treating pertrochanteric fractures. Nowadays, there is an increasing interest in intramedullary nailing. Intramedullary devices, although technically difficult seems to have a biomechanical advantage over laterally fixed side plates(5). Literature is full of articles categorizing DHS in stable Trochanteric fractures, (31-A1.1, A1.2, A1.3 and 31-A2.1) and use of intramedullary devices PFN as implant of choice in unstable trochanteric, subtrochanteric fractures and particularly in reverse oblique.

However, even with increasing number of clinical trials comparing IF with EF for treating unstable intertrochanteric fracture, the reported results still have not reached the consistency. Although there were several systematic reviews and meta-analysis comparing the differences between two kinds internal fixation devices, the findings are still in need of more evidence.

In the same time, novel devices and surgeon's experience with device also updates with time. Thus, in this study, we conducted a meta-analysis to achieve a detailed comparison and evaluation of IF and EF for unstable intertrochanteric fractures(6).

### Aim Of The Study

To Evaluate functional outcome and Compare the result of treatment with intramedullary (PFN) versus extramedullary (DHS and PFLCP) fixation for unstable intertrochanteric fracture

### MATERIAL AND METHODS

In this prospective study from March 2018 to October 2019, 40 consecutive patients with unstable intertrochanteric femoral fractures having an unstable pattern, of either sex were randomized by computer generated tables to undergo fixation with either Intramedullary and extramedullary fixation. A detailed history and clinical examination was done in a systemic manner and noted on a specially designed proforma. Plain radiographs were obtained on admission and all fractures categorized according to AO/ASIF classification. The patients with unstable intertrochanteric fracture recruited from the orthopaedics department of Rajendra Institute Of Medical Science, Ranchi, Jharkhand. Patient of age group 18-75 year with Unstable intertrochanteric fracture of femur were included in our study.

### Exclusion Criteria

- Open fractures /injuries.
- Associated head injury/pelvic injury/abdominal injury.
- Pathological fractures other than those due to senile osteoporosis.
- Sustained peri-prosthesis fracture.

### Functional Assessment

The functional outcome was assessed based on postoperative pain, walking ability and range of hip joint movement and limb length shortening.

### Excellent:

- no postoperative pain,
- hip range of motion more than 80% of normal,
- shortening less than 0.5 cm,
- ability to walk without support.

### Good :

- mild postoperative pain not affecting ambulation,
- hip range of motion upto 60 to 80% of normal,
- shortening of 0.5 to 1.5cm,
- ability to walk with a cane or minimal support.

### Fair :

- moderate postoperative pain affecting ambulation requiring

- regular analgesics,
- hip range of motion upto 40 to 60% of normal,
- shortening of 1.5 to 2.5cm,
- ability to walk with 2 canes/ crutches/other living support

**Poor:**

- severe postoperative pain even at rest requiring stronger analgesics
- hip range of motion less than 40% of normal
- shortening of > 2.5cm
- confined to bed or wheelchair

**Statistical Analysis**

The result of the study were indicated as mean+ SD. Data were analyzed using SPSS version 18.0 and P. Value of <0.05 was considered as the cut off level for significance. Independent t-test was used to compare between the groups. In addition chi-square test was used to find out the relationship between Intramedullary versus extramedullary fixation for unstable intertrochanteric fracture in the study subjects.

**RESULTS****Table 1: Distribution Of Study Subjects As Per Age**

AGE	Intramedullary PFN	Extramedullary	
		DHS	PFLCP
21-40	7(35)	1(10)	2(20)
41-60	7(35)	6(60)	6(60)
61-80	6(30)	2(20)	2(20)
81-100	0(0)	1(10)	0(0)
TOTAL	20(100)	10(100)	10(100)

Table 1 shows Distribution of study subjects as per age. In intramedullary group Majority of study subjects 35% respectively in the age group 21-40 yrs and 41-60 yrs respectively and 30% were in 61-80 yrs, In extramedullary group Majority of the study subjects 6(60%) subjects were in the group DHS and PFLCP group respectively.

**Table 2: Distribution Of Study Subjects As Per Sex**

SEX	Intramedullary PFN	Extramedullary	
		DHS	PFLCP
FEMALE	6(30)	4(40)	3(30)
MALE	14(70)	6(60)	7(70)
	20(100)	10(100)	10(100)

Table 2 shows distribution of study subjects as per sex. In the intramedullary PFN group majority of study subjects 70% were male, whereas in extramedullary group 6(60%) were in DHS grp and in PFLCP GRP 7(70%) subjects were male.

**Table 3: Distribution Of Study Subjects As Per Etiology**

Etiology	INTRAMEDULLARY	DHS	PFLCP
Fall from height	2(10)	0(0)	0(0)
RTA	8(40)	4(40)	5(50)
TRIVIAL FALL	10(50)	6(60)	5(50)
	20(100)	10(100)	10(100)

Table 3 shows Distribution of study subjects as per etiology. In intramedullary grp majority of study subjects(50%) had trivial fall, whereas in DHS group 6(60%) subjects had trivial fall whereas 5(50%) subjects from PFLCP had trivial fall.

**Table 4: Distribution Of Study Subjects As Per Blood Loss**

Method	No	Mean	SD
Intramedullary	20	142.5	33.54
Extramedullary DHS	10	330	34.95
PFLCP	10	415	47.45

Table 4 shows Distribution of study subjects as per blood loss. In intramedullary group the mean blood loss was 142.5 ml whereas in DHS group it was 330 ml and PFLCP group it was 415 ml.

**Table 5: Distribution Of Study Subjects As Per Post Operative Complication**

	Intramedullary	DHS	PFLCP
Malunion	0(0)	1(10)	1(10)
Wound Infection	1(5)	1(10)	2(20)
Screw cutout	0(0)	1(10)	2(20)

pain	Intramedullary N(%)	DHS N(%)	PFLCP N(%)
NO PAIN	8(40)	3(30)	1(10)
Mild pain	11(55)	4(40)	4(40)
Moderate pain	1(5)	1(10)	2(20)
Severe pain	0(0)	2(20)	3(30)

Tab 5 shows Distribution of study subjects as per Post operative complication. In intramedullary group 5% subjects had wound infection, In DHS group 10% subjects each had malunion, wound infection and screw cutout, whereas in PFLCP group 2(20%) subjects each had wound infection and screw cutout.

Distribution of study subjects as per Post operative pain. In Intramedullary grp 55% study subjects had mild pain, 40% subjects do not had pain. In DHS grp 40% subjects had mild pain, 20% subjects had severe pain whereas in PFLCP grp 40% subjects had mild pain, 30% subjects had severe pain.

**Postoperative Range Of Movement**

The average range of hip joint motion was below 90 degree in DHS and PFLCP group and more than 90 degree in PFN group in the 6 month of follow up study. In our study the patient in PFN group regained a significant range of motion than DHS group. (p=0.002) This is comparable to results obtained by Saudan et al.<sup>(6)</sup>

**DISCUSSION**

The best management of intertrochanteric fractures remains controversial. PHN nail and DHS have been the most commonly used devices to fix these fractures over the past decade. For unstable intertrochanteric fractures, an intramedullary fixation is better in biomechanics, and many clinical benefits have been suggested for this method.

In our study, In intramedullary group Majority of study subjects 35% respectively in the age group 21-40 yrs and 41-60 yrs respectively and 30% were in 61-80 yrs, In extramedullary group Majority of the study subjects 6(60%) subjects were in the group DHS and PFLCP group respectively. In study by Dhakad RKS et al(5) age of patients ranged from 24 - 90 years with fracture more common in 6th decade of life. Study by Ali Andalib et al(4) shows mean age of 62.74±16.4, these findings are in accordance with our study.

In our present study In the intramedullary PFN group majority of study subjects 70% were male, whereas in extramedullary group 6(60%) were in DHS grp and in PFLCP GRP 7(70%) subjects were male. Study by Dhakad RKS et al(5) shows 42 (70%) patients were male and 18 (30%) were female, male preponderance was similar to our study. Study by Ali Andalib et al(4) shows out of 93 patients 43 were males and 50 females, female preponderance was found in this study which is contrary to our study.

In our present study In intramedullary grp majority of study subjects(50%) had trivial fall, whereas in DHS group 6(60%) subjects had trivial fall whereas 5(50%) subjects from PFLCP had trivial fall. In intramedullary group the mean blood loss was 142.5 ml whereas in DHS group it was 330 ml and PFLCP group it was 415 ml. Dhakad RKS et al(5) The average blood loss in PFN was 88.3ml, standard deviation (SD) = ± 12.88 and average blood loss in DHS was 318.33ml, standard deviation (SD) = ± 24.50, Student t-Test T=45.22 p value = <0.05 (Highly significant).

In the study of Saudan et al(7) social function and mobility of patients were compared in two groups that were treated with cephalomedullary nail and DHS, 3, 6 and 12 months after surgery. According to the results of their study, there were no significant differences in 12 months follow-up of patients in terms of return to preoperative level of ability and independence between these two groups (8). Another study compared functional recovery in 12 months after IM or EM fixation of intertrochanteric fractures; final assessments revealed that there were no differences between the two groups in recovery score(9).

**CONCLUSION**

We want to conclude that in unstable intertrochanteric fractures, the intramedullary fixation has significantly better outcome in terms of early restoration of walking ability, shorter operative time, a smaller incision and less blood loss during surgery as compare to extramedullary fixation of unstable intertrochanteric fractures. Hence in our opinion, intramedullary fixation (PFN) may be the better fixation device for most of the unstable intertrochanteric fractures of femur.

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