

**To Analyse the Clinical and Radiological Outcomes of Subtrochanteric Fractures of Femur Managed with Long Proximal Femoral Nailing****Sharma Saurabh<sup>1</sup>, Gupta Mansi<sup>2</sup>, Sahu Manoj<sup>3</sup>, Gupta Anshul<sup>4</sup>, Meena Rajesh<sup>5</sup>, Shriwastava Ashish<sup>6</sup>**<sup>1</sup>Assistant Professor, Department of Orthopaedics, Govt. Gandhi Medical College, Bhopal (M.P.)<sup>2</sup>Demonstrator, Department of Microbiology, Govt. Bundelkhand Medical College, Sagar (M.P.)<sup>3</sup>Assistant Professor, Department of Anaesthesia, Govt. Bundelkhand Medical College, Sagar (M.P.)<sup>4</sup>Associate Professor, Department of Orthopaedics, Govt. Bundelkhand Medical College, Sagar (M.P.)<sup>5</sup>P.G. Resident, Department of Orthopaedics, Govt. Bundelkhand Medical College, Sagar (M.P.)<sup>6</sup>P.G. Resident, Department of Orthopaedics, Govt. Bundelkhand Medical College, Sagar (M.P.)

Received: 15-07-2023 / Revised: 28-08-2023 / Accepted: 30-09-2023

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Conflict of interest: Nil

**Abstract:**

**Background & Method:** The aim of the study is to analyse the clinical and radiological outcomes of subtrochanteric fracture of femur managed with long proximal femoral nailing. A semi-structured questionnaire was designed to collect the socio-demographic details and the clinical history from all the patients with subtrochanteric fractures. For all patients the operative procedure was done under spinal/epidural anaesthesia. After placing the patient on the fracture table, using discussion about reduction techniques before the fracture is reduced and the affected limb is slightly adducted in such a way it helps in facilitating the proximal femoral nail insertion through greater trochanter.

**Result:** Mean values of outcomes of study subjects- Mean duration of surgery was  $1.52 \pm 0.38$  hr. whereas Radiological union time (weeks), Blood Loss (ml), Neck shaft angle ( $^{\circ}$ ) and Full weight bearing time (weeks) were  $21.66 \pm 1.91$  weeks,  $205.70 \pm 100.05$  ml,  $124.24 \pm 7.79$  degrees and  $13.340 \pm 3.75$  weeks respectively.

**Conclusion:** Majority of the patient in our study were between 41-50 years with a mean age of  $42.12 \pm 13.19$  years. The complication encountered like broken implant or varus collapse was less. We could achieve excellent range of motion.

**Keywords:** Subtrochanteric, Femur, Femoral Nailing, PFN.

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**Introduction**

Subtrochanteric fractures are one of the common fractures encountered in today's orthopaedic practice. Sub-trochanteric fractures have evolved as one of the most important causes of morbidity and mortality in elderly patients.[1] These fractures account for 10% to 34% of all hip fractures.[2] Overall, the incidence of these fractures has been estimated to be approximately 15–20 per 100,000 individuals.[3]

The age distribution for these fractures has a bimodal distribution: individuals younger than 40 years old account for approximately 20% of Subtrochanteric fractures, while individuals older than 50 years account for over 66% of Subtrochanteric fractures.[4]

At younger ages, the incidence of these fractures appears to be nearly equal between male and female; however, with increasing age, the incidence among females increases disproportionately to males.[4] Additional Subtrochanteric fracture risk factors

include patients undergoing treatment of osteoporosis with bisphosphonates, low total bone mineral density, and chronic diseases such as diabetes mellitus.[5]

Subtrochanteric region is area below the inferior border of lesser trochanter extending distally 5 cm to the junction of proximal and middle third of femur. These fractures have a bimodal distribution and are seen in two main populations, older osteopenic patients following low energy falls and younger patients with high energy trauma.[6,7]

Early surgical intervention is needed in majority of the patients to avoid the major complications that can occur due to long term immobilization which include deep vein thrombosis, thrombophlebitis, urinary and lung infections and ulcers. Although these fractures are the most difficult to manage in femur, our improved understanding of the complex biology and biomechanics of the trochanteric region as well as the rapid development of orthopaedic

principles and implants has led to consensus on the treatment of subtrochanteric fractures.[8,9] However, the appropriate implant for the internal fixation of sub trochanteric fractures remains debatable; and a multitude of different intra and extra medullary devices for their surgical fixation have been advocated.

### Material & Method

Present study was conducted in the Department of Orthopaedics, Bundelkhand Medical College Sagar, (M.P.) from October 2021 to September 2022 for a period of 12 months. Patients were recruited as per inclusion and exclusion criteria and informed consent was taken. History was also taken and physical examination was performed. A semi-structured questionnaire was designed to collect the socio-demographic details and the clinical history from all the patients with subtrochanteric fractures. For all patients the operative procedure was done under spinal/epidural anaesthesia.

After placing the patient on the fracture table, using discussion about reduction techniques before the fracture is reduced and the affected limb is slightly adducted in such a way it helps in facilitating the proximal femoral nail insertion through greater trochanter.

### Inclusion criteria

- Age above 18 years
- Date of injury within two weeks
- All types of subtrochanteric fractures up to (5cm) below lesser trochanter

### Exclusion criteria

- Age below 18 years
- Age above 80 years
- Open fractures
- Pre-operative surgical site infection present
- Pathological fractures

### Results

**Table 1: Age Wise Distribution of Subjects under Study**

Age group	No.	Percentage	
<30 Years	10	20.0	
31-40 Years	15	30.0	Min.: 21 years
41-50 Years	18	36.0	Max.: 70 years
51-60 Years	1	2.0	Mean: 42.12±13.19
>60 Years	6	12.0	
Total	50	100.0%	

The above table showing age wise distribution of subjects under study. Most of the patients were from age group 41-50 Years (36%), followed by 31-40 Years (30%), <30 Years (20%), >60 Years (30%), and 51-60 years (2%). The mean age of patient was 42.12±13.19 year.

**Table 2: Mode of Injury wise distribution of Subjects**

Mode of Injury	No.	Percentage
Accidental slip and fall	23	46.0%
Road traffic accidents	27	54.0%
Total	50	100.0%

Majority of number of cases were due to road traffic accident (54 %) (High velocity trauma), and few 46% were due to accidental slip and fall by self (low velocity).

**Table 3: Distribution of Comorbidities among Subjects Studied**

Comorbidities	No.	Percentage
Hypertension	2	4.0
Diabetes	7	14.0
None	41	82.0
Total	50	100.0

This table shows Comorbidities wise distribution of study subjects. Diabetes (14%) was in majority whereas hypertension was observed in only 4% of patients.

**Table 4: Side of Injury wise distribution of Subjects Studied**

Side of Injury	No.	Percentage
Left	15	30.0
Right	35	70.0
Total	50	100.0

Majority of number of cases were injured in their right side (70%) whereas 30% were at left side.

**Table 5: Mean values of outcomes among subjects studied**

Outcomes	Mean	SD
Surgery Duration (hr.)	1.52	0.38
Radiological union time (weeks)	21.66	1.91
Blood Loss (ml)	205.70	100.05
Neck shaft angle (°)	124.24	7.79
Full weight bearing time(weeks)	13.340	3.75

This table and figure shows mean values of outcomes of study subjects. Mean duration was  $1.52 \pm 0.38$  hr. whereas Radiological union time (weeks), Blood Loss (ml), Neck shaft angle (°) and Full weight bearing time(weeks) were  $21.66 \pm 1.91$ ,  $205.70 \pm 100.05$ ,  $124.24 \pm 7.79$  and  $13.340 \pm 3.75$  respectively.

**Table 6: Distribution of Subjects Studied according to Seinsheimer Classification**

Seinsheimer Classification	No.	Percentage
4	4	8.0
5	5	10.0
2A	6	12.0
2B	6	12.0
2C	10	20.0
3A	17	34.0
3B	2	4.0
Total	50	100.0

This table shows Seinsheimer Classification wise distribution of study subjects, where 3A constituted (34%) in majority, followed by 4, 5, 2A, 2B, 2C and 3B as 8.0%, 10.0%, 12.0%, 12.0%, 20.0%, and 4.0 %, respectively.

### Discussion

All the fractures that occurred in patients younger than 50 years were either due to fall from height or road traffic accident. This supports the view that bone stock played an important role in causation of fracture in elderly, which occurred after trivial trauma. The subtrochanteric region is the most common site of senile osteoporosis. Hip joint being a major joint in the mechanism of weight bearing, already weakened part cannot withstand any sudden abnormal stress. The space between bony trabeculae is enlarged and loaded with fat, whilst ensheathing compact tissue is thinned out and calcar is atrophied [10].

Most common mode of injury in our study was fall by Accidental slip and fall 46% that is low velocity trauma seen in elderly patients and high velocity trauma 54% road traffic accident in adults. In Endigeri et al. study, the most common mode of injury was low energy trauma due to fall in elderly (62%).[11] In the young age group, fracture was due to high energy trauma. The mode of injury in various study was low velocity trauma mostly fall at home relating to the osteoporotic changes.[11] A study in 2016 by Jonnes et al. they observed that subtrochanteric fractures due to trivial trauma (77%) was more common mode of injury followed by road traffic accidents (23%).[12]

In our study the incidence of diabetes (14%) was found to be more than hypertension (4%). The same group had more incidence of infection as compared

to others. In majority of the cases patients were operated within 14 days. The delay was attributed to co-morbid problems of diabetes and hypertension and getting pre- anesthetic check-up. In Tank et al series they found that hypertension was more commoner than diabetes in their study.[14]

In our study the average time for radiological union was found to be  $21.66 \pm 1.91$  weeks evident on disappearance of fracture lines. There was some controversy regarding criteria for time of fracture union in different studies. Some used radiological while some use radiological and clinical union. We had used criteria for union as presence of bridging callus at fracture site. Clinically, absence of pain at fracture site and SLRT positive. Salphale et al. found the average union time to be 11.5 weeks.

In Nagaraj et al[10] series the average time seen for radiological union was 12 weeks. In 2015 James et al. the average time seen for radiological union was 12 weeks.[13] In our study the union was seen around the same time as compared to other studies.

### Conclusion

We conclude that proximal femoral nail is a very good implant in treating unstable subtrochanteric fracture as it is a closed procedure. The blood loss was less. The time duration was less. The incision was small. It is a load sharing implant. The complication encountered like broken implant or varus collapse was less. We could achieve excellent range of motion. Early weight bearing was possible. Most of the patients scored excellent results according to the Harris hip score and they returned early to their functional activities. Therefore, we analyzed that fixation of subtrochanteric fracture with proximal femoral nail is a good option.

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