

## ORIGINAL RESEARCH

# Assessment of outcome of sub-trochanteric femur fractures managed with long proximal femoral nail

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### ABSTRACT

**Background:** Femoral fractures involving the lesser trochanter that extend distally up to 5 cm are known as sub-trochanteric fractures. The present study was conducted to assess outcome of sub-trochanteric femur fractures managed with long proximal femoral nail. **Materials & Methods:** 70 patients with sub-trochanteric fractures of femur of both genders were managed with long proximal femoral nail. All patients were assessed functionally by Harris Hip Score. **Results:** Out of 70 patients, 38 were males and 32 were females. Intra operative complications were failure to achieve closed reduction in 1 case, fracture of lateral cortex in 2 patients, failure to put anti-rotation screw in 1 case, guide wire breakage in 3 cases. Delayed complications were knee joint stiffness in 2 cases, delayed union in 1 case, implant failure in 2 cases, hip joint stiffness in 3 cases, superficial infection in 1, varus angulation in 1 patient. The difference was significant ( $P < 0.05$ ). **Conclusion:** For subtrochanteric femur fractures, the long PFN is a dependable implant with a high rate of bone union and little soft tissue injury. Although intramedullary fixation offers advantages in terms of biology and biomechanics, the procedure is technically complex.

**Keywords:** Femoral fractures, superficial infection, varus angulation

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### INTRODUCTION

Femoral fractures involving the lesser trochanter that extend distally up to 5 cm are known as sub-trochanteric fractures. Between 10% and 34% of all hip fractures are these kinds of fractures. During daily activities, the sub-trochanteric area is typically subjected to significant levels of stress. A large moment arm is produced by axial loading forces across the hip joint, along with notable medial compressive pressures and lateral tensile stresses. Significant rotational shear forces are produced by hip muscle forces in addition to bending forces and torsional effects. Healing problems are caused by a greater thickness of cortical bone and decreased vascularity in the sub-trochanteric region. Femoral fractures involving the lesser trochanter that extend distally up to 5 cm are known as sub-trochanteric fractures<sup>1</sup>. These breaks include between 10% and 34% of all hip fractures.

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across the hip joint, along with notable medial compressive pressures and lateral tensile stresses. Significant rotational shear forces are produced by hip muscle forces in addition to bending forces and torsional effects. Healing problems are caused by a greater thickness of cortical bone and decreased vascularity in the sub-trochanteric region.

Sub-trochanteric fractures have been treated with extramedullary implants, such as condylar blade plates and proximal femoral locking plates, but these procedures have been linked to problems such as a high rate of reduction loss, fixation failure, and the necessity for reoperation. Intramedullary implants offer several biomechanical advantages over extramedullary implants. These advantages include the ability to bear weight immediately following fixation, less soft tissue dissection, dynamic locking, ease of insertion, potential reduction in blood loss, and restoration of the mechanical axis. The present study was conducted to assess outcome of sub-trochanteric femur fractures managed with long proximal femoral nail.

**MATERIALS & METHODS**

The present study was conducted on 70 patients with sub-trochanteric fractures of femur of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. A thorough clinical examination was done. All were

subjected to X- ray lateral and AP view. All patients were managed with long proximal femoral nail. All patients were assessed functionally by Harris Hip Score. Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

**RESULTS**

**Table I Distribution of patients**

Total- 70		
Gender	Males	Females
Number	38	32

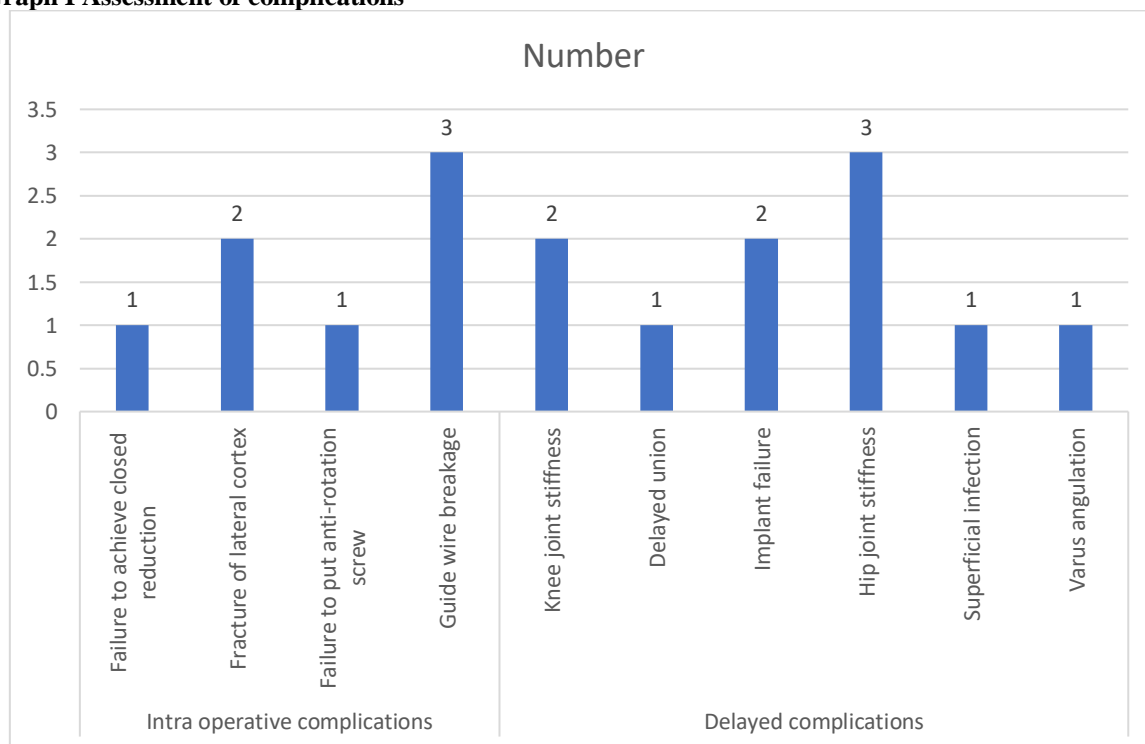
Table I shows that out of 70 patients, 38 were males and 32 were females.

**Table II Assessment of complications**

Parameters	Variables	Number	P value
Intra operative complications	Failure to achieve closed reduction	1	0.91
	Fracture of lateral cortex	2	
	Failure to put anti-rotation screw	1	
	Guide wire breakage	3	
Delayed complications	Knee joint stiffness	2	0.84
	Delayed union	1	
	Implant failure	2	
	Hip joint stiffness	3	
	Superficial infection	1	
	Varus angulation	1	

Table II, graph I shows that intra operative complications were failure to achieve closed reduction in 1 case, fracture of lateral cortex in 2 patients, failure to put anti-rotation screw in 1 case, guide wire breakage in 3 cases. Delayed complications were knee joint stiffness in 2 cases, delayed union in 1 case, implant failure in 2 cases, hip joint stiffness in 3 cases, superficial infection in 1, varus angulation in 1 patient. The difference was significant (P < 0.05).

**Graph I Assessment of complications**



## DISCUSSION

High-energy trauma is typically the cause of subtrochanteric fractures, which are frequently severely displaced and difficult to repair with traction. Since delayed union, malunion, and nonunion of fractures are so common, conservative treatment has been eliminated in contemporary trauma care. Prolonged surgical exposure, significant soft tissue damage, and blood loss are possible drawbacks of extra medullary fixation with plating, which might result in issues with fracture union and implant failure. Additionally, because of the mechanical load-sharing effect, the eccentric plate is vulnerable to fatigue breaking. In addition to its mechanical advantages over plate fixation, intramedullary nailing is intimately associated with "biological internal fixation" in a minimally invasive manner. By minimizing soft tissue dissection, intramedullary fixation helps the surgeon reduce surgical trauma and blood loss. The present study was conducted to assess outcome of subtrochanteric femur fractures managed with long proximal femoral nail.

We found that out of 70 patients, 38 were males and 32 were females. Kumar et al<sup>12</sup> analysed the management and complications of subtrochanteric fractures using long proximal femoral nail (PFN). Average duration of union was 17.08 weeks (range 13 to 32 weeks), union was achieved in 92% cases. Closed reduction was achieved in 68% cases and open reduction was required in 32% cases. Various intraoperative complications were seen in 12% and delayed complications in 26% of cases. Good anatomical results were achieved in 86% of cases and 14% were fair. As per Harris Hip score, excellent results were noted in 28% cases, good in 56% cases and fair in 16% cases.

We found that intra operative complications were failure to achieve closed reduction in 1 case, fracture of lateral cortex in 2 patients, failure to put anti-rotation screw in 1 case, guide wire breakage in 3 cases. Delayed complications were knee joint stiffness in 2 cases, delayed union in 1 case, implant failure in 2 cases, hip joint stiffness in 3 cases, superficial infection in 1, varus angulation in 1 patient. Jiang et al<sup>13</sup> evaluated the clinical outcome of traumatic subtrochanteric fractures fixed with long proximal femoral nail (PFN) or long gamma nail with particular emphasis on our experience of surgical techniques. They reviewed the results of 49 consecutive patients who had undergone intramedullary fixation specifically with a long PFN or a long gamma nail for traumatic subtrochanteric fractures. All the 49 traumatic subtrochanteric fractures healed uneventfully except 1 case of delayed union. Walking and squatting ability was completely restored in every case at follow-up examination 6 months postoperatively. Among them, 32 fractures were successfully reduced with traction on a fracture table under fluoroscopy, but cerclage wiring or cable bandage through a small incision was needed in the

other 17 cases. The average operative time was 46 minutes (range, 21 to 98). Eighteen Seinsheimer type II fractures were left unlocked distally, and static distal interlocking with 1 bolt was carried out in the other 31 cases. No complications such as cutout or breakage of the implants were encountered.

The shortcoming of the study is small sample size.

## CONCLUSION

For subtrochanteric femur fractures, the long PFN is a dependable implant with a high rate of bone union and little soft tissue injury. Although intramedullary fixation offers advantages in terms of biology and biomechanics, the procedure is technically complex.

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