

Functional Outcome of Proximal Femoral Nailing in Intertrochanteric Fracture

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ABSTRACT

Background: Intertrochanteric fracture of femur is one of the commonest fracture seen in elderly, osteoporotic female. The main stay of treatment is fixation with dynamic hip screw or intramedullary device like Proximal Femoral Nail. Intramedullary devices are found to be more biomechanically advantageous. The functional outcome of these fractures depends on the type of fixation, age and stability of fracture. The objective of this study is to assess the functional outcome of Proximal Femoral Nail in intertrochanteric fracture.

Methods: An observational study was conducted in Kathmandu Medical College, Sinamangal from January 2018 to May 2019. 32 patients with intertrochanteric fracture were treated with proximal femoral nail during this period. The functional outcome was measured at 6 weeks, 12 weeks and 6 months using Harris hip score.

Results: There were 46.9% males and 53.1% females with mean age of 71.09 ± 12.35 years. Most of the patients sustained injury after falling from standing height (53.1%). The functional outcome measured at final follow up (6 months) with Harris hip score was good in 62.5% and excellent in 28.1% patients likewise follow up in 12 weeks was good in 15.6%.

Conclusions: Proximal Femoral Nail in trochanteric fractures seem to provide a good functional outcome at 6 months follow up. This technique, therefore appears to be a viable option in the management of intertrochanteric fracture of femur.

Keywords: Harris hip score; Intertrochanteric fracture; proximal femoral nail.

INTRODUCTION

Intertrochanteric fractures of femur are fractures that extend from greater trochanter to lesser trochanter. They are commonly seen in elderly, osteoporotic people mostly post-menopausal women.¹ Operative treatment is considered to be more beneficial than conservative as it permits early mobilization of the patient.² Intramedullary device like gamma nail or PFN (Proximal Femoral Nail) has the advantage of more medial load transfer from the femoral head with short lever arm which makes it useful in reverse oblique and unstable fracture patterns.^{3,4} PFN is more popularly used for fixation of stable as well as unstable intertrochanteric fractures. In fractures fixed with PFN there is less sliding of lag screw and less limb shortening.⁵ The goal of the treatment of intertrochanteric fracture is stable fixation, which allows early mobilization of the patients.⁵ The aim of this study is to assess the functional outcome of PFN in intertrochanteric fracture.

METHODS

We conducted a prospective observational study from January 2018 to May 2019 in department of orthopedic surgery, Kathmandu Medical College Teaching Hospital (KMCTH), Kathmandu, Nepal. We use a census sampling method in this study. Total cases presenting in emergency and OPD in a year was 32. So, we take a total sample size as 32. Ethical clearance was taken from Institutional Review Committee (Ref No. 020120181) of KMCTH. All patients who had intertrochanteric fractures, age > 40 yrs and gave informed consent to participate in the study were included in the study. Participants with pathological fractures, polytrauma and open hip fractures were excluded from the study. Patients were evaluated clinically and radiologically. Under spinal anesthesia, patient underwent closed reduction internal fixation with PFN. Data about the clinical outcome was collected in a standard proforma and functional outcome was assessed at the end of 6 weeks, 12 weeks

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and 6 months by Harris hip score (HHS).² The patients were evaluated using plain radiographs at 6 weeks, 12 weeks and 6 months and observed for signs of union, lag-screw cut out and refracture. The statistical analysis were done using Statistical Package for Social Sciences (SPSS) version 16 for windows.

RESULTS

There were 32 patients, among which 17 (53.1%) were female and 15 (46.9 %) were male. The mean age of patients was 71.09 ±12.35 ranging from 48-90 years. Intertrochanteric fractures were more common in females of 66 to 75 years age whereas it is more common in males of age 45 to 65 years. Out of total participants, 20 (62.5%) had fracture of their right femur and 12 (37.5%) had fracture of left femur. More than 50% had intertrochanteric fractures resulted from fall from standing height, followed by falling from some height (steps, chairs) and road traffic accident (RTA) (Table 1).

Table 1. Mechanism of injury.

Mechanism of injury	Frequency (N)	Percentage (%)
Fall from standing height	17	53.1
Fall from some height (steps, chairs)	8	25
RTA	7	21.9
Total	32	100.0

Out of 32 patients, almost 50% had Boyd Griffin type II fracture (Figure 1).

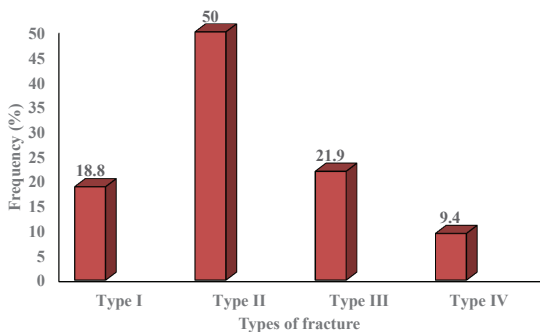


Figure 1. Type of fracture among patients.

The mean Harris hip score for the injured patient at 6 weeks follow up was found to be 43.43 ±3.01 which

increased to 75.25±6.37 at 12 weeks and was 84.34±6.11 at 6 months of follow up examination. The functional outcome assessed using Harris hip score at 12 weeks follow up showed that 25 (78.1%) patients had fair outcome and five (15.6%) patients had good outcome. At 6 months follow up, Twenty (62.5%) patients had good outcome, nine (28.1%) patients had excellent outcome according to Harris hip score (Figure 2).

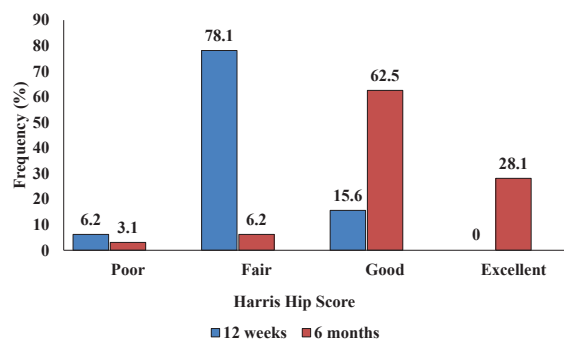


Figure 2. Comparing Harris hip score at 12 weeks and 6 months follow up.

While comparing mean Harris Hip Score in both sex, it was found that male had better score at the end of 6 months than female. (Table 2).

Table 2. Comparing mean HHS in both sex.

Sex	HHS (Mean ± SD)
Female	84.76 ± 6.08
Male	88.13 ± 5.8

In this study, the mean HHS score in the age group (45-55) was 94. As the age of the patient increases the HHS decreases and it was also statistically significant (p <0.001) (Table 3).

Table 3. Mean HHS in different age group.

Age groups	HHS (Mean ± SD)	p-value*
45-55 years	94 ± 1.50	<0.001
56-65 years	86 ± 3.03	
66-75 years	86 ± 4.11	
76-85 years	82 ± 2.26	
86-95 years	79 ± 9.74	

*chi-square test

In this study, the functional outcome at the end of the study did not depend upon the type of fracture (p=0.963) (Table 4).

Table 4. HHS in different types of fracture.

Type of fracture	HHS (Mean \pm SD)	p-value*
Type I	87.00 \pm 5.47	0.963
Type II	86.31 \pm 7.06	
Type III	85.45 \pm 3.82	
Type IV	87.33 \pm 9.01	

*chi-square test

Five cases had complications out of which two patients developed superficial wound infection. One patient required blood transfusion (Hb < 7 gm/dl) and one patient each developed acute renal failure and hyperkalemia. (Table 5) None of them develops non-union, refracture, lag screw cutout and deep wound infection.

Table 5. Incidence of different complications.

Complication	No. of patients (N)	Percent (%)
No complication	27	84.37
Superficial	2	6.25
Low Haemoglobin	1	3.12
Hyperkalemia	1	3.12
Acute renal failure	1	3.12

DISCUSSION

Intertrochanteric fracture is recognized as a major challenge in terms of demanding fixation technique, poor post-operative rehabilitation and complications. The aim of treatment has shifted towards early mobilization with return to early pre-injury condition, leading functionally and psychologically independent life as far as possible.⁶ The mean age for sustaining intertrochanteric fracture is lower in this study in comparison to western literature.^{5,7,8} This could be due to lower socioeconomic status which contributes to low bone density leading to osteoporosis.

Although total number of cases of female is more in this study, it is not statistically significant ($p=0.055$). Most studies have shown that intertrochanteric fractures are more common in elderly female population.^{9,10} The reason for this findings may be due to females have wider pelvis than males with a tendency to having coxavara and they are usually less active and more prone to senile osteoporosis.⁹ When mechanism of injury is compared with age it is found that in older age group most fractures are from trivial trauma i.e. fall from standing height and in younger age group mostly from road traffic accident. According to Weinlein John C low-energy falls from a standing height account for about 90% of community hip fractures in patients more than 50 years of age.¹⁰ High energy hip fractures are relatively rare; they are more

common in men less than 40 years of age.¹⁰ Kumar R and Singh R found that most common mechanism of injury was domestic fall.¹¹ Hwang et al had reviewed 66 cases of intertrochanteric fractures and found more outdoor high energy trauma as the cause of injury.¹² This might be because he has included patient who were less than 40 years of age.

This study revealed that most common was type II fracture (50%), followed by type III (21.9%), type I (9.4%) and type IV (9.4%) respectively. James et al conducted study in 22 patients, with mean age of 62.09 years in which he found that the most common fracture was type III followed by type II, IV and I respectively.¹³ The finding of this study showed that Harris hip scores at 6 weeks follow up was 43.43 \pm 3.01, at 12 weeks follow up it was 75.25 \pm 6.37 and at 6 months follow up it turned out be 86.34 \pm 6.11. This shows the increasing trend of HHS as the time progresses. This could be because of decreasing pain and union at the fracture site. This study showed that mean HHS of Type II fracture was 86.3, which was similar to study conducted by Aithala J and Rao S.¹⁴ While the study conducted by Akan et al, Sahin et al, Okcu et al showed lower HHS as compared to our study.¹⁵⁻¹⁷ The probable reason for this could be that the study conducted by Akan et al, Sahin et al, Okcu et al had included open fractures. Kumar et al included only stable fractures in their study and showed better functional outcome (mean HHS of 93) as compared to this study.¹¹ This study has included unstable fractures also which explains the poor outcome as compared to Kumar et al.

This study showed that five patients had one or the other complications. Hohendorff et al studied 133 patients and found 44 (31.7%) complications in 31(23.3%) patients.⁷ Bhakat et al found one implant failure in PFN and 4 complications in DHS (2 implant failure and 2 superficial wound infections).¹⁸

CONCLUSIONS

The mean Harris hip score for the injured patient at 6 weeks follow up was found to be 43.43 which increased to 75.25 at 12 weeks and was 84.34 at 6 months of follow up examination. According to this study, HHS gradually increasing and at the end of 6 months it tends to be good to excellent.

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