



Prospective Randomised Comparative Study of Screw and Helical blade Proximal Femoral Nail for the Treatment of unstable Intertrochanteric Fractures

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Abstract

Background- Proximal femoral fractures in elderly are usually resulting from minimal to moderate physical trauma to areas of bone significantly weakened by osteoporosis.

Methods- This was a Prospective Randomised Comparative Study of Screw and Helical blade Proximal Femoral Nails for the Treatment of unstable Intertrochanteric Fractures in adults and elderly patients of both genders admitted in orthopedic wards of SMS Medical College Jaipur Rajasthan (During the study period between April 2016 to December 2017).

Results- Mean \pm Sd of duration of surgery in 2 groups of subject. The mean duration of surgery in group I and group II was 66.60 ± 8.22 min and 87.92 ± 13.83 min respectively. The mean duration of surgery of group II was found to be higher as compare to group I subjects. Mean 209.60 ml blood loss was present in 25 patients of group II. Mean \pm sd was 171.80 ± 39 & 209.60 ± 44.02 in group I & group II respectively.

Conclusion- We can conclude that use of helical blade PFN is certainly better in these type of fracture than screw PFN.

Keywords- Fracture, Screw, PFN.

Introduction

Trochanteric fractures are among the most common injuries necessitating hospital admission (Zuckerman JD. Hip fracture. N Engl J Med 1996;334:1519–25). Regardless the type of fracture, proximal femoral fractures can lead to substantial morbidity and mortality, especially in elderly patients. They are three to four times more common in women ¹.

Proximal femoral fractures in elderly are usually resulting from minimal to moderate physical trauma to areas of bone significantly weakened by osteoporosis. In younger patients, proximal femoral fractures are usually the result of high energy physical trauma. However pathologic fractures are common cause of trochanteric fracture.

Surgery has been the mainstay of the treatment for these fractures to allow early mobilization of the patient, with partial weight bearing restrictions, depending on the stability of the reduction and fixation achieved. A variety of internal fixation devices has been used for treatment of these fractures, like DHS, PFN, TFN, PFNA, DCS, Proximal Femoral Locking Plates, Blade Plate etc.

The greatest problems for the orthopedic surgeon to treating the unstable trochanteric fracture and the complications (implant failure, varus collapse, non union) occur from fixation that result of instability. Stability refers to the capacity of internally fixed fracture to resist muscle and gravitational force around hip that tend to force the fracture into various position. Intrinsic factors like osteoporosis and comminution of the fracture and extrinsic factors like choice of implant and technique of insertion, contribute to failure of internal fixation.

Among the surgical treatment, dynamic hip screw (DHS) as extramedullary power transmission system and proximal femoral nail (PFN) as the means of intramedullary stabilization are the established and standard in the treatment of trochanteric femoral fractures, particularly in elderly patients with osteoporotic bone. The DHS implant system is technically simple and cost effective thus widely used for the treatment of petrochanteric fractures of the femur particularly in stable type A1 and A2. Arbeitsgemeinschaft fur Osteosynthesefragen (AO/ASIF) in 1996 designed a new intramedullary device, the proximal femoral nail (PFN). Unstable intertrochantric fracture are difficult to treat. Intramedullary devices such as PFN are biomechanically stronger and more rigid compared to extramedullary devices such as DHS².

Material And Methods

This was a Prospective Randomised Comparative Study of Screw and Helical blade Proximal Femoral Nails for the Treatment of unstable Intertrochanteric Fractures in adults and elderly patients of both genders admitted in orthopedic wards of SMS Medical College Jaipur Rajasthan (During the study period between April 2016 to December 2017).

The patients were divided into two groups:

- **Group I**-Patients treated with Helical PFN (n=25) as group I

- **Group II**-Patients treated with Screw PFN (n=25) as group II

Inclusion Criteria

- Close unilateral unstable fracture intertrochanteric femur.
- AO/OTA fractures 31A2.2 through 31A3.3.
- Elderly (50 -70 years of age or more) patients.
- Patient`s who are willing to give consent .
- No associated injuries.

Exclusion Criteria

- Open and pathological intertrochanteric fracture.
- Patients with vascular injury.
- Medically or anaesthetically unfit patients.
- Patient refusing consent for surgery.

Observations And Results

Table No.1

Distribution according to type of AO classification of fracture in two groups

	Group I (N=25)	Group II (N=25)
31A2.2	12	10
31A2.3	13	15
Total	25	25

Table no 2.

Distribution of surgical time between two groups of subjects

	Mean	Sd	P value	Difference
Group I (N=25)	66.60	8.22	0.0004	Significant
Group II (N=25)	87.92	13.83		

Table no. 3

Mean ± Sd of blood loss between two groups of subject

	Mean	Sd	P value	Difference
Group I (N=25)	171.80	39.29	0.0024	Highly Significant
Group II (N=25)	209.60	44.02		

Table No.4 Singh's index

	Mean	Sd	P value	Difference
Group I (N=25)	2.24	0.778	0.035	Significant
Group II (N=25)	2.72	0.79		

Table No. 5 Bone union duration (In month)

	Mean	Sd	P value	Difference
Group I (N=25)	3.75	0.49	0.290	Non Significant
Group II (N=25)	3.86	0.17		

Table No. 6 Complications

	Group I (N=25)	Group II (N=25)
Screw cut out	1	-
Z Effect	-	2
Non union	1	-
Implant failure	1	2
Wound infection (superficial)	-	1
Total	3	5

Discussion

Fractures of intertrochanteric femur have been recognized as a major challenge by the Orthopaedic community, not solely for achieving fractures union, but for restoration of optimal function in the shortest possible time that to with minimal complications. The aim of management accordingly has drifted to achieving early mobilization, rapid rehabilitation and quick return of individuals to premorbid home and work environment as a functionally and psychologically independent unit.

Operative treatment in the form of internal fixation permits early rehabilitation and offers the best chance of functional recovery, and hence has become the treatment of choice for virtually all fractures in the trochanteric region. Amongst the various types of implants available i.e. fixed nail plate devices, sliding nail/screw plate and intramedullary devices, the compression hip screw is most commonly used (still remains the GOLD STANDARD) but recently techniques of closed intramedullary nailing have gained popularity.

In this study an attempt was made to survey, evaluate, document and quantify and compare the results of , patients treated by using Helical proximal femoral nail(PFNA2) and Screw proximal femoral nail(PFN) implants . The study was conducted on fifty patients (25cases by PFNA2 and 25cases by PFN) of unstable intertrochanteric femoral fractures attending outpatient / casualty department of Orthopaedics, SMS Medical College Jaipur Rajasthan (During the study period between April 2016 to December 2017).

In present study, the cases of unstable intertrochanteric femur fracture were taken. 50(100%) cases had AO type 31A2.2 & 31A2.3.The most of the patients of trival injury had 31A2.3 type of fracture in both the groups . In our study not include A1 and A3.

Jung Ho Park et al 2010³ In term of AO classifications in the screw proximal femoral nail group,5, 10, and 2 patients were classified A1, A2 and A3 respectively, and in helical proximal femoral nail group,7, 13, and 3 patients were classified A1, A2, and A3, respectively. Fracture subtype classifications showed no statistical difference.

According to **Madsen JE et al** the Inter trochantric fractures are considered as stable or unstable depending upon integrity of posteromedial cortex. Fractures with intact posteromedial cortex are considered as stable fractures while fractures with loss of posteromedial cortex are considered as unstable fractures. Posteromedial cortex constitutes mainly the lesser trochanter.⁴

In present study observation shows that bone union duration in Mean \pm Sd in group I & group II was 3.75 ± 0.49 & 3.86 ± 0.17 in month respectively. That was not significant.

Jung ho park et al; 2010³ observed similar time of bone union in the screw proximal femoral nail groups was (3.82 months) and helical proximal nail group (3.43 months), and this was not significantly different.

Mean Singh's indexes of the helical proximal femoral nail groups and screw proximal femoral nail groups were 2.24 and 2.72, respectively, which were significantly different ($p = 0.035$). It's denote helical proximal femoral nail group had more osteoporotic bones.

Jung ho park et al 2010³ Mean Singh's indexes of the helical proximal femoral nail groups and screw proximal femoral nail groups were 2.46 and 2.67, respectively which were not significantly different ($p = 0.59$).

Conclusion

We can conclude that use of helical blade PFN is certainly better in these type of fracture than screw PFN.

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