

## Original Research

### Comparative evaluation of efficacy of proximal femoral nail and dynamic hip screw in treating patients with inter trochanteric fractures of femur: A clinical study

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#### ABSTRACT

**Background:** Unstable inter trochanteric fractures are notorious for their complications and high failure rates following treatment with conventional dynamic hip screw (DHS). Proximal femoral nail (PFN) and Gamma nail are 2 commonly used devices in the intramedullary fixation. Hence; the present study was undertaken for assessing and comparing the efficacy of proximal femoral nail and dynamic hip screw in treating patients with inter trochanteric fractures of femur. **Materials & methods:** A total of 28 patients who reported to the department with inter trochanteric fractures of femur were enrolled in the present study. All the patients were broadly divided into two study groups with 14 patients in each group as follows: Group A: Patients who were treated with DHS, Group B: Patients who were treated with PFN. All the patients were treated according to their respective groups. All the surgeries were carried out under the hands of skilled and experienced orthopaedic surgeons. Clinico-radiological assessment of the patient was done and comparison was done. All the results were analysed by SPSS software. **Results:** No significant difference was obtained while comparing the complete union cases in between PFN group and DHS group (P- value > 0.05). Mean HHS among the patients of DHS group and the PFN group were found to be 84.81 and 85.15 respectively. No- Significant results were obtained while comparing the mean HHS in between the DHS group and the PFN group. **Conclusion:** Both PFN and DHS can be used with equal efficacy for treating patients with inter-trochanteric fractures of femur.

**Key words:** Dynamic hip screw, Inter-trochanteric fractures, Proximal femoral nail

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#### INTRODUCTION

Hip fracture contributes to both morbidity and mortality in the elderly. The demographics of world populations are set to change, with more elderly living in developing countries. Inter trochanteric fractures of femur occur in the area between the greater and lesser trochanter and may involve these two structures.<sup>1-3</sup> In elderly patients are often pathologic, usually resulting from minimal to moderate physical trauma to areas of bone significantly affected by osteoporosis. Unstable inter trochanteric fractures are notorious for their complications and high failure rates following treatment with conventional dynamic hip screw (DHS). Proximal femoral nail (PFN) and Gamma nail are 2 commonly used devices in the intramedullary fixation. PFN has become prevalent in

treatment of intertrochanteric fractures in recent years because it was improved by addition of an antirotation hip screw proximal to the main lag screw.<sup>4,5</sup> Hence; under the light of above mentioned data, the present study was undertaken for assessing and comparing the efficacy of proximal femoral nail and dynamic hip screw in treating patients with inter trochanteric fractures of femur.

#### MATERIALS & METHODS

The present study was undertaken in the Department of Orthopaedics, Hind Institute of Medical Sciences, Safedabad, Barabanki, U.P. with the aim of comparing the efficacy of proximal femoral nail and dynamic hip screw in treating patients with inter trochanteric fractures of femur. A total of 28 patients who reported to the

department with inter trochanteric fractures of femur were enrolled in the present study. All the patients were broadly divided into two study groups with 14 patients in each group as follows:

Group A: Patients who were treated with DHS,

Group B: Patients who were treated with PFN.

Ethical clearance was obtained from institutional ethical committee and written consent was obtained after explaining in detail the entire research protocol.

**Inclusion Criteria:**

1. Closed inter-trochanteric fracture.
2. Patients of more than 18 years of age
3. Patients with absence of compound fractures

General and radiographic examination of all the patients was carried out. Pre-operative antibiotics were given to the patients. Pre-operative planning was done to decide the type and length of implant to be used. All the patients were treated according to their respective groups. All the surgeries were carried out under the hands of skilled and experienced orthopaedic surgeons. Clinico-radiological assessment of the patient was done and comparison was done. Overall clinical outcome using Modified Hip Score was noted for each patient.<sup>7</sup>All the results were analysed by SPSS software. Chi- square test, Mann- Whitney U test and student t test were used for assessment of level of significance. P- Value of less than 0.05 was taken as significant.

**RESULTS**

In the present study, a total of 28 subjects were included in the present study, out of which, 14 underwent DHS treatment while the remaining 14 underwent PFN treatment. Mean age of the patients of the DHS group and PFN group was 79.4 years and 80.4 years respectively. 64.3 percent of the patients of DHS group and 71.4 percent of the patients of the PFN group were males. Among the patients of the DHS group, fall and road side accident (RSA) were the mode of trauma among 9 (64.3%) and 5 (35.7%) patients respectively. In the patients of the PFN group, fall and RSA were responsible for trauma in 8 (57.1%) and 6 (42.9%) patients respectively.

In the present study, among the subjects of the DHS group, in 9 patients (64.3%), complete union occurred in 10 to 14 weeks' time, while in 5 patients (35.7%), complete union occurred in 14 to 18 weeks' time. Among the subjects of the PFN group, in 10 patients (71.4%), and 4 patients (29.6%), complete union occurred in 10 to 14 weeks and 14 weeks to 18 weeks' time respectively. No significant difference was obtained while comparing the complete union cases in between PFN group and DHS group (P- value > 0.05). Mean HHS among the patients of DHS group and the PFN group were found to be 84.81 and 85.15 respectively. No- Significant results were obtained while comparing the mean HHS in between the DHS group and the PFN group (P- value > 0.05).

**Table 1:** Distribution of subjects according to age

Age group	DHS group		PFN group	
	Number of patients	Percentage	Number of patients	Percentage
21- 40	1	7.2	2	14.3
41- 60	3	21.4	2	14.3
61- 80	5	35.7	4	28.6
81 and above	5	35.7	6	42.8
Total	14	100	14	100

**Table 2:** Distribution of subjects according to gender

Gender	DHS group		PFN group	
	Number of patients	Percentage	Number of patients	Percentage
Males	9	64.3	10	71.4
Females	5	35.7	4	29.6
Total	14	100	14	100

**Table 3:** Distribution of subjects of DHS and PFN group according to mode of trauma

Evans classification	DHS		PFN	
	No of patients	Percentage	No of patients	Percentage
Fall	9	64.3	8	57.1
Road side accident	5	35.7	6	42.9
Total	14	100	14	100

**Table 4:** Distribution of subjects with complete radiological union according to different time

Radiological Union	DHS		PFN		p- value
	Number	Percentage	Radiological Union	Percentage	
10-14 WEEKS	9	64.3	10	71.4	0.18
14-18 WEEKS	5	35.7	4	29.6	
Total	14	100	19	100	

**Table 5:** Comparison of mean HHS among DHS and PFN group patients

Group	Mean HHS	SD	P- value
DHS	84.81	12.45	0.71
PFN	85.15	13.71	

## DISCUSSION

The structural anatomy of the proximal femur is peculiar and is designed to support a large amount of weight in single stance. Various types of implants are available for intertrochanteric fractures. Implants may be either extramedullary or intramedullary in nature. The most commonly used extramedullary implant is the dynamic hip screw (DHS). Intramedullary implants can either be inserted from distal to proximal (condylocephalic nails) or from proximal to distal (cephalocondylic nails). Commonly used is the Gamma nail, the proximal femoral nail (PFN) and Intramedullary hip screw (IMHS). Of all these DHS is the most commonly used implant and is considered the gold standard.<sup>6-9</sup>

In the present study, a total of 28 subjects were included in the present study, out of which, 14 underwent DHS treatment while the remaining 14 underwent PFN treatment. Mean age of the patients of the DHS group and PFN group was 79.4 years and 80.4 years respectively. 64.3 percent of the patients of DHS group and 71.4 percent of the patients of the PFN group were males. Among the patients of the DHS group, fall and road side accident (RSA) were the mode of trauma among 9 (64.3%) and 5 (35.7%) patients respectively. In the patients of the PFN group, fall and RSA were responsible for trauma in 8 (57.1%) and 6 (42.9%) patients respectively. In a comparative study of unstable per- and intertrochanteric fractures, it was concluded that Proximal femoral nail (PFN) was associated with shorter operation time (43 vs. 61 min) and a considerable shorter in-patient stay (20 vs 24 days). Full-weight-bearing immediately after the osteosynthesis was possible for 98 % of the proximal femoral nail (PFN) patients and 81% of the dynamic hip screw (DHS) patients. The DHS osteosynthesis in unstable trochanteric fractures is associated with a higher incidence of complications.<sup>10</sup>

In the present study, among the subjects of the DHS group, in 9 patients (64.3%), complete union occurred in 10 to 14 weeks' time, while in 5 patients (35.7%), complete union occurred in 14 to 18 weeks' time. Among the subjects of the PFN group, in 10 patients (71.4%), and 4 patients (29.6%), complete union occurred in 10 to 14 weeks and 14 weeks to 18 weeks' time respectively. No significant difference was obtained while comparing the complete union cases in between PFN group and DHS group (P- value > 0.05). Mean HHS among the patients of DHS group and the PFN group were found to be 84.81 and 85.15 respectively. No- Significant results were obtained while comparing the mean HHS in between the DHS group and the PFN group (P- value > 0.05). D. Hernández-Vaquero et al in 2005 studied 47 reverse oblique intertrochanteric femoral fractures that were treated with gamma nails between 1992 and 2000 A logistical regression analysis of our series showed that an incorrect position of the hip screw in the femoral head

was the only predictor for complications. Thus, we consider that the gamma nail is a good option for the treatment of these complex fractures.<sup>11</sup>Pajarinen J et al (2005) treated 108 patients with a pertrochanteric femoral fracture using either the dynamic hip screw or the proximal femoral nail in this prospective, randomised series. We compared walking ability before fracture, intra-operative variables and return to their residence. Patients treated with the proximal femoral nail (n = 42) had regained their pre-operative walking ability significantly (p = 0.04) more often by the four-month review than those treated with the dynamic hip screw (n = 41). Peri-operative or immediate post-operative measures of outcome did not differ between the groups, with the exception of operation time. The dynamic hip screw allowed a significantly greater compression of the fracture during the four-month follow-up, but consolidation of the fracture was comparable between the two groups. Two major losses of reduction were observed in each group, resulting in a total of four revision operations. Their results suggested that the use of the proximal femoral nail may allow a faster post-operative restoration of walking ability, when compared with the dynamic hip screw.<sup>12</sup>

## CONCLUSION

Under the light of above mentioned results, the authors conclude that both PFN and DHS can be used with equal efficacy for treating patients with inter-trochanteric fractures of femur.

## REFERENCES

1. Dhanwal DK, Dennison EM, Harvey NC, Cooper C. Epidemiology of hip fracture: Worldwide geographic variation. *Indian Journal of Orthopaedics*. 2011;45(1):15-22.
2. Mittal R, Banerjee S. Proximal femoral fractures: Principles of management and review of literature. *J Clinic OrthopaedTraum*. 2012;3(1):15-23.
3. Evans EM. The treatment of intertrochanteric fractures of the femur. *JBJS* 1949;31-B:190-203.
4. Agrawal P, Gaba S, Das S, Singh R, Kumar A, Yadav G. Dynamic hip screw versus proximal femur locking compression plate in intertrochanteric femur fractures (AO 31A1 and 31A2): A prospective randomized study. *Journal of Natural Science, Biology, and Medicine*. 2017;8(1):87-93.
5. Zhang K, Zhang S, Yang J, et al. Proximal Femoral Nail vs. Dynamic Hip Screw in Treatment of Intertrochanteric Fractures: A Meta-Analysis. *Medical Science Monitor: International Medical Journal of Experimental and Clinical Research*. 2014;20:1628-1633.
6. Muller ME, Allgower M, Schneider R. The comprehensive classification of fractures of long bones, 3rd edition. New York, Springer-Verlag; 1990: 118.
7. Steinberg GG, Desai SS, Kornwitz NA, Sulvan TJ. The intertrochanteric hip fracture. A retrospective analysis. *Orthopedics* 1988; 11(2): 265-73.

8. Watson JT, Moed BR, Cramer KE. Comparison of the compression hip screw with the Medoff sliding plate for intertrochanteric fractures. *ClinOrthop* 1998; 348: 79-86.
9. Jacobs RR, McClain O, Armstrong HJ. Internal fixation of intertrochanteric hip fractures: A clinical and biomechanical study. *ClinOrthop* 1980; 146: 62-70.
10. Klinger HM, Baums MH, Eckert M, Neugebauer R. A comparative study of unstable per- and intertrochanteric femoral fractures treated with dynamic hip screw (DHS) and trochanteric butt-press plate vs. proximal femoral nail (PFN). *ZentralblChir* 2005; 38: 401-5.
11. D. Hernández-Vaquero . D. Pérez-Hernández .A.Suárez-Vázquez . J. García-García . M. A. García-Sandoval Reverse oblique intertrochanteric femoral fractures treated with the gamma nail *International Orthopaedics (SICOT)* (2005) 29: 164–167
12. Pajarinen JI, Lindahl J, Michelsson O, Savolainen V, Hirvensalo E. Pertrochanteric femoral fractures treated with a dynamic hip screw or a proximal femoral nail. A randomised study comparing post-operative rehabilitation. *J Bone Joint Surg Br.* 2005 Jan;87(1):76-81.