

## ORIGINAL ARTICLE

# A Comparative Study of Proximal Femoral Nail versus Dynamic Hip Screw Fixation for Unstable and Complex Intertrochanteric Fractures of the Femur

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## Abstract

**Aims & objectives:** The study is to compare the clinical, radiological and functional results of Dynamic hip screw (DHS) and Proximal femoral nail (PFN) for the treatment of complex and unstable intertrochanteric hip fractures. **Materials & Methods:** Seventy patients (34 male and 36 female, mean age, 71 years) surgically treated for intertrochanteric fractures were divided into two groups. The outcome for each group was analysed, and union rates and failures, complications (early and late), functional outcomes (using Harris hip score) and blood transfusion rates were recorded. The results were statistically compared. **Results:** The mean union rates, early and late complication rates between treatment groups revealed statistically significant differences. It was observed that higher union rates and better Harris hip scores were associated with group 2 as compared to 1. Complication rates and blood transfusion rates were higher for group 1 as compared to group 2. **Conclusion:** In unstable and complex intertrochanteric fracture femur PFN fixation was a better alternative to DHS fixation with higher union rates, lesser rates of complications and of blood transfusion.

**Keywords:** Intertrochanteric fractures, Proximal femoral nail, hip screw

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## Introduction

Fractures of Hip are one of the commonest injuries sustained by the aged. These occur predominantly in patients over 60 years of age [1,2]. Morbidity and mortality increases with age, Hip fractures are 3 to 4 times more common in women than in men but mortality is more in males as compared to females [3]. For many, this fracture is often a terminal event resulting in death due to cardiac, pulmonary or renal complications. Approximately 10 to 30% of patients die within 1 year of fracture. (Kyle et al 1980)[4]. Incidence of trochanteric fractures is more in the female population compared to the male due to osteoporosis. In a Swedish study of more than 20,000 patients, the incidence of hip fractures in women doubled every 5.6 years after the age of 30 yrs. Earlier, little attention was paid to these fractures, as these occur

through cancellous bone with excellent blood supply, healed regardless of treatment. However conservative treatment usually resulted in malunion with varus and external rotation resulting in a short leg gait and limp, and a high rate of mortality due to complication of recumbency and immobilization like bedsores, deep vein thrombosis and respiratory infections. Earlier DHS fixation was most commonly used for all intertrochanteric fractures but with advent of Proximal femoral nailing the trend has slightly changed.

Hence the present study was done at our tertiary care centre to compare the functional outcome of unstable intertrochanteric fractures treated randomly with proximal femoral nail (PFN) v/s dynamic hip screws plating (DHS) using Harris Hip Score and to evaluate the advantages, disadvantages and complications associated with fixation of unstable intertrochanteric

fractures with proximal femur nailing and dynamic hip screw.

## Materials and Methods

The prospective study was conducted in a tertiary institute by collecting data of 70 cases of unstable and complex intertrochanteric fracture that have undergone proximal femur nail and dynamic hip screw randomly at B. Y. L. Nair Hospital from December 2014 to April 2016 and followed up till October 2016. The data collected from medical record department of B. Y. L. Nair Hospital. The comparison in terms of: Union- defined as appearance of bridging callus and disappearance of fracture line. Same post op mobility protocol was followed for both groups of patients. On post Op follow neck-shaft angle will be calculated and variations as noted. Any intraoperative or postoperative blood transfusion was noted. Any complications if any arise during follow up were noted. Early- intra Op blood loss, immediate post op blood transfusions, infection. Late- infection, hip pain, re-admission, screw cut out, varus collapse were also seen. Data was statistically analysed to reach a conclusion. Analysis is descriptive with limitation. As patients were analysed till time of discharge, patient was followed up only till next 6 months post operatively.

### Inclusion Criteria

- Surgically fit post traumatic patients more than 50 years of age who has been diagnosed as having unstable intertrochanteric fractures which include postero medial large separate fragmentation, basicervical patterns, reverse obliquity, displaced greater trochanteric fractures and failure to reduce fracture before fixation or with subtrochanteric extension.

### Exclusion Criteria

- Patients who had less than 6 months of follow-up
- Bilateral fractures
- Pathological or compound fractures
- Fractures associated with polytrauma
- Pre-existing femoral deformity preventing hip screw osteosynthesis or intramedullary nailing and Sub-trochanteric fractures
- Fractures extending 5 cm distal to the inferior border of the lesser trochanter were excluded from study group
- Patients admitted for reoperation.

## Results

Total 70 patients were analysed clinically and functionally with help of harris hip scoring and radiologically for union rates at 6 weeks and 6 months post surgery. Mean age was 71.1 years. 49% were male while 51% cases were female. 50% cases were treated with PFN and another 50% cases by DHS. Union was as per the table - 1. No complication was observed in majority of the cases (78%) table-2. History of blood transfusion was present in 26% cases. Association of modality of treatment and union is shown in table- 3. Association of modality of treatment and complications are shown in table - 4. Association of modality of treatment and h/o blood transfusion is expressed in figure- 1. Association of Modality of Treatment and Harris Hip Score at 6 Weeks and at 6 months is expressed in table 5 & 6 respectively.

**Table 1: Union**

Union	Frequency	Percentage
United	63	90
Failed	7	10.0
<b>Total</b>	<b>70</b>	<b>100.0</b>

**Table 2: Complications among patients**

Complications	Frequency	%
Screw Cut Out & Varus Collapse	7	10.0
Infection	4	5.7
Z Effect	4	5.7
No	55	78.6
<b>Total</b>	<b>70</b>	<b>100.0</b>

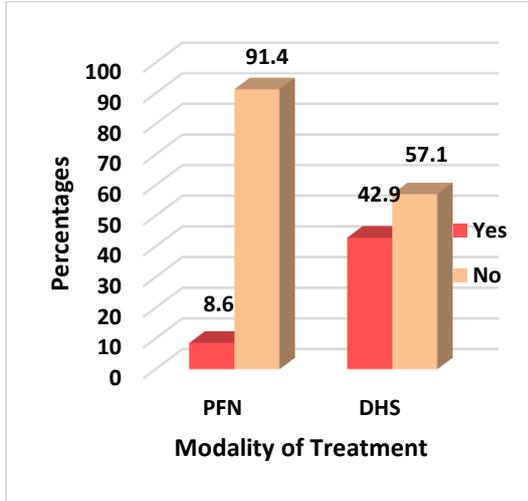
**Table 3: Association of Modality of treatment and union**

Modality Treatment	Union		Total
	United(%)	Failed(%)	
PFN	34 (97.1)	1 (2.9)	35 (100)
DHS	29 (82.9)	6 (17.1)	35 (100)
<b>Total</b>	<b>54 (74.3)</b>	<b>11 (15.7)</b>	<b>70 (100)</b>
<b>Fisher's Exact p= 0.018 (Significant)</b>			

**Table 4: Association of Modality of Treatment and Complication**

Modality Treatment	Complications		Total
	Yes (%)	No (%)	
PFN	5 (14.3)	30 (85.7)	35 (100)
DHS	10 (28.6)	25 (71.4)	35 (100)
<b>Total</b>	<b>15 (21.4)</b>	<b>55 (78.6)</b>	<b>70 (100)</b>
<b>Fisher's Exact p= 0.244 (Non Significant)</b>			

**Figure- 1: Modality of Treatment & h/o Blood Transfusion**



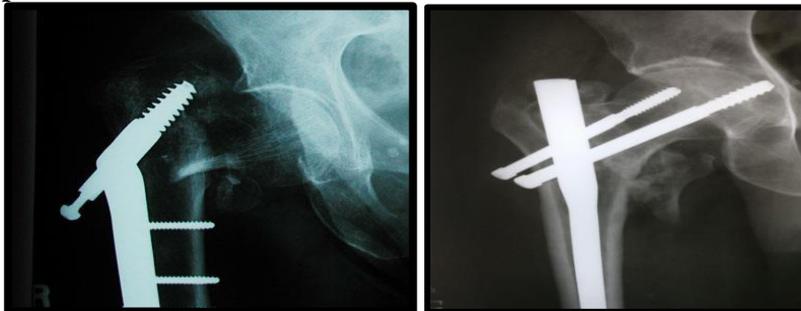
**Table 5: Association of Modality of Treatment and Haris Hip Score at 6 Weeks**

Modality Treatment	HHS (6 weeks)		p value
	Mean	SD	
PFN	45.4	2.6	<0.001(Very Highly Significant)
DHS	39.5	2.2	
<b>t = 10.972 df = 68</b>			

**Table 6: Association of Modality of Treatment and Haris Hip Score at 6 months**

Modality Treatment	HHS (6 months)		p value
	Mean	SD	
PFN	90.3	4.4	<0.001(Very Highly Significant)
DHS	81.6	5.0	
<b>t = 7.702 df = 68</b>			

**Complications**



**Unstable IT fracture post DHS fixation**



**Unstable IT fracture post PFN fixation**



## Discussion

In this study all 70 patients operated with DHS and PFN belong to the age group 60-80 years with average age in DHS group 69.74 and PFN group 72.3. In our study 51% patients were females and 49% were male in each group. KYLE series 58% were females and 42% were males. SISK gives higher incidence in female.

We have used AO classification in series because it appears to be more descriptive. In our study in DHS group maximum patients were of AO type 31-A2.3 which was 54% of the total and other two types were 22% each. In AO type 31-A3.1 was 31%, A2.2 was 20% & 31-A2.3 was 49.1 %.

In our study there was 1 case of fixation failure in PFN group due to poor technical performance. 4 cases of Z effect due to longer proximal cannulated cancellous screws. Cases of Z effect were managed conservatively with protected weight bearing & fracture united. In DHS group there were 7 cases screw cut out, all were revised with hemiarthroplasty as they were of >65 years old. Hence failure rate seen more with DHS as compared to PFN requiring revision surgeries.

Several authors reported on the complication of femoral shaft fracture with intramedullary nail and recommended against its use but in our study no such complication occurred. Complication rate is seen to be higher in DHS than PFN but is not statistically significant.

Considering the fact that additional surgical exposure can theoretically prolong the operative time and thus the blood loss in DHS than PFN it can also be noted that in our study, history of blood transfusion post operatively in DHS group the p value for which was significant according to Pearson Chi-Square test with p value 0.004.

All the patients were subjected to HHS at 6 weeks & 6 months. At 6 weeks-mean score in PFN was higher 45.4 as compared to 39.5 in DHS group. At 6 months-mean score in PFN group was higher 90.3 as compared to DHS 81.6 Ideal management of intertrochanteric fractures has been debated for several years.

Several modalities have been suggested to improve upon the clinical outcome in these difficult situations. In the present study prospective comparative evaluation has been done between DHS and PFN for overall clinical

outcome of patients with unstable intertrochanteric fractures. The total no of patients were 70, Group 1 consisted of 35 patients with DHS fixation & Group 2 consisted of 35 patients with PFN fixation.

## Summary & Conclusion

- In old age fracture occurs just with fall because of osteoporosis.
- Reconstruction of medial buttress is important in comminuted fractures as we observed improperly reduced fractures went into varus collapse mainly in DHS group.
- In AO type 31-A2.3 fractures dominated in DHS & in PFN group.
- Union rate was better in PFN group as compared to DHS group in terms of weeks and in more no of patients and difference was statistically significant.
- Complication rate and requirement of revision surgery was more in DHS group but this was not found to be statistically significant.
- Intra operative blood loss leading to post operative blood transfusion was significantly more in DHS group which correlated with P value less than 0.05.
- Limb length shortening was found more in DHS group but not statistically significant.
- Harris Hip Score and hence the functional outcome was found to be more in PFN group as compared to DHS which was statistically significant.

To conclude, the PFN group in our study performed much better in view of union rates, complications, blood transfusion & functional outcome based on HHS than the DHS group. Our conclusion from the two study supported the use of PFN for unstable and complex intertrochanteric fracture femur with lesser failure rates, lesser blood loss, less shortening, early union, less revision surgery & better functional outcome. However, during implantation of PFN a more precise technical performance is required for better outcome.

As the AO group has correctly stated. "Internal fixation is difficult technique. The operator should be properly trained and asepsis should be rigid. We must warning of the abuse of a

treatment which in inexperienced hands can lead to most unhappy results.”

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**Conflict of Interest:** None declared

**Source of Support:** Nil

**Ethical Permission:** Obtained

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