ORIGINAL RESEARCH PAPER

Orthopaedics

# A COMPARATIVE STUDY BETWEEN DYNAMIC HIP SCREW AND PROXIMAL FEMORAL NAIL IN THE MANAGEMENT OF TROCHANTERIC AND SUB-TROCHANTERIC FRACTURES.

KEY WORDS:

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## INTRODUCTION

- Hip fractures continue to be a significant contributor to increased morbidity, decreased quality of life, and early mortality in older persons. It is known as a discontinuity in the upper portion of the femur's (thigh bone) continuity.[1]
- The magnitude is determined by the forces that are involved. The trochanter, neck, and femoral head are where most hip fractures happen.[2]
- It may be divided into two categories: extracapsular (intertrochanteric and Subtrochanteric fractures) and intracapsular (femoral head and neck fractures).
- Elderly patients frequently get trochanteric fractures, which affect the proximal femur between the cervical area and the shaft. The number of senior people is growing in every part of the world as a result of the increased life expectancy, and it is predicted that the incidence of hip fracture would increase from 1.66 million in 1990 to 6.26 million by 2050.[3]
- Conservative management techniques are used to treat trochanteric fractures, and the fracture successfully heals.
- If suitable precautions are not followed, the fracture malunites, which causes an external rotation deformity at the site of the fracture as well as a shortening and restriction of hip motion.
- In addition, bedsores, deep vein thrombosis, and respiratory infections may potentially develop as a result of extended immobility.[5]
- Therefore, early mobilisation and malunion avoidance should be the main goals of the therapy. The best option is surgery with internal fixation of the fracture. The dynamic hip screw with side plate assembly is the most often utilised device. Because it is a collapsible fixation device, the proximal fragment can settle on it and find its own stable location.[6,7]
- The proximal femoral nail, a collapsible device with improved rotational stability, is the implant currently used to treat trochanteric fractures.
- This implant is a biomechanically sound centro medullary device. It offers advantages including a tiny incision and less blood loss. Clinical, morphological, anatomical, and biomechanical factors set apart pertrochanteric and subtrochanteric fractures of the femur from intracapsular fractures.[8]

## AIM

The purpose of the study was to assess the efficiency and toughness of the dynamic hip screw and proximal femoral nail in the treatment for fractures of the trochanteric and subtrochanteric fracture.

## MATERIAL AND METHODS

- This is a longitudinal study of 20 cases of intertrochanteric and subtrochanteric fractures, admitted to Career Institute of Medical Sciences, Lucknow.
- The patients were treated with proximal femoral nailing (PFN) and/or dynamic hip screw (DHS) and were categorised randomly into two groups, each of 10 patients, 10were treated by dynamic hip screw and 10 were treated with proximal femoral nail (PFN)

### Inclusion Criteria

- Patients who came to emergency department and OPD department with intertrochanteric fractures older than 60 years of age.
- Patients presented with polytrauma.
- Intertrochanteric fractures and intertrochanteric with subtrochanteric extension.

### Exclusion Criteria

- Patients with pathological fractures due to metastasis, tumours were excluded.
- Patients with compound fractures were also excluded from this study
- Patients with past history of symptomatic hip disease such as osteoarthritis.
- Inter-trochanteric fracture of the femur in younger patients.
- Harris hip score was used to assess patient rated outcomes. Results are graded as excellent (90-100), good (80-89), fair (70-79) or poor (<70)

### Statistical Analysis

- The statistical analysis was done with the help of statistical software SPSS version 28 and Microsoft excel was used for preparing graphs and tables.
- Sampling done – Random Sampling
- Study Type – Prospective study

## RESULTS

| RESULTS AGE WISE DISTRIBUTION AGE GROUP | NO. OF PATIENTS (DHS GROUP) | NO. OF PATIENTS (PFN GROUP) | TOTAL |
|---|---|---|---|
| 60-65 YEARS | 4 | 3 | 7 |
| 66-70 YEARS | 2 | 5 | 7 |
| 71-75 YEARS | 3 | 0 | 3 |
| 76 YEARS AND ABOVE | 1 | 2 | 3 |
| TOTAL | 10 | 10 | 20 |
| Most of the patients of DHS Group were between 60 – 65 yrs of age with mean age as 67.5 years and in PFN Group were of 66-70 years of age with mean age as 68.2 years | | | |

### Intra – Op And Post – Op Findings Of Patients Treated For Trochanteric Fracture Of Femur

| FINDINGS | DYNAMIC HIP SCREW | PROXIMAL FEMORAL NAIL |
|---|---|---|
| Mean duration of operation in minutes | 69.9 | 48.2 |
| Mean blood loss (in ml) | 162 | 94 |
| Mean length of incision (in cms) | 9.1 | 5.6 |
| Mean nail diameter (in mm) | - | 9.8 |
| Mean duration of hospital stay in days | 7.2 | 6.5 |
| Pain in hip (after 2 months) | 3 | 2 |
| Pain in thigh (after 2 months) | 0 | 2 |
| GreaterTrochanterSplintering | 0 | 2 |

i.e.48.2 mins (calculated from the time of incision to that of skin closure), less blood loss i.e. 94ml as compared to DHS Group having 162 ml blood loss.2 cases of splintering of Greater Trochanter were noticed in PFN Group

| OUTCOME | DYNAMIC HIP SCREW | PROXIMAL FEMORAL NAIL |
|---|---|---|
| Mean Harris Hip Score after 6 weeks | 68.3 | 79.5 |
| Mean Harris Hip score after 20 weeks | 80.5 | 84.2 |
| Mean Duration of Union (In Weeks) | 18.5 | 15.6 |

**Clinical Outcome Of Patients Treated For Trochanteric Fracture Of Femur**

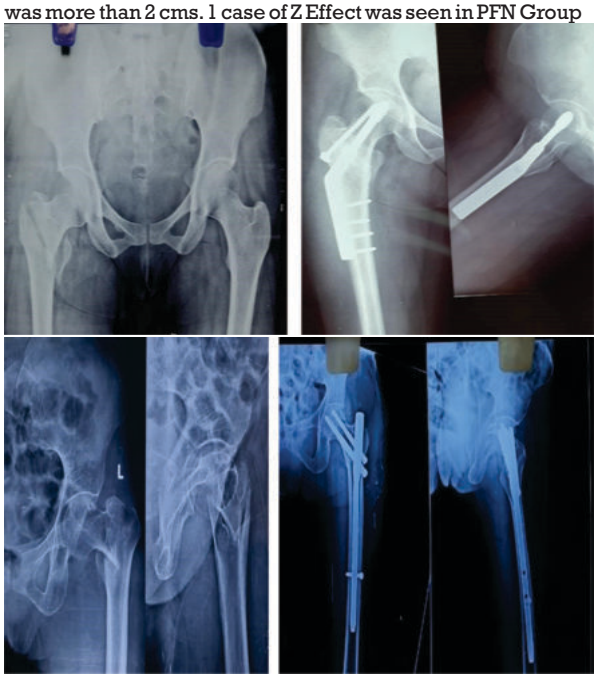
At six weeks following surgery, the PFN group's mean HARRIS hip score is higher. However, after 20 weeks, it virtually equalises in both groups.

Early recovery and weight bearing were achieved in the PFN group.

Post Operative Complications Of Patients Treated For Trochanteric Fracture Of Femur

| COMPLICATIONS | DYNAMIC HIP SCREW | PROXIMAL FEMORAL NAIL |
|---|---|---|
| Infection | 1 | 0 |
| Lag screw cut out | 2 | 1 |
| Femoral shaft fracture | 0 | 0 |
| Shortening >2 cm | 1 | 0 |
| Varus displacement >10 degree | 2 | 0 |

There was one case of infection in DHS Group and 2 cases of lag screw cut out of which 1 presented with shortening which was more than 2 cms. 1 case of Z Effect was seen in PFN Group



## DISCUSSION

- The objective of management is to quickly return persons to their premorbid homes and workplaces as a functionally and psychologically autonomous unit through desired mobilisation, rapid rehabilitation, and fast reversal.[9]
- The majority of the patients in our study were older than 60 years and ranged in age from the sixth to seventh decade of life. For the PFN-operated group, the mean age in years was determined to be 68.2 years. The average age of the DHS-operated group was 67.5 years.
- In a research, Gallaghar and Evans et al. observed an eight-fold rise in trochanteric fractures in men over 80 years of age and women over 50 years of age.[10,11]
- Since the hip joint is a key joint in the mechanics of weight bearing, senile osteoporosis most frequently affects the trochanteric area as people age. Weakened parts are not able to handle abrupt or unusual stresses. Additionally, space between bony trabeculae is enlarged and is filled with fat, whilst unsheathing compact tissue is dwindled out and calcar is degenerated.[12]
- According to a study by Keneth J. Koval and Joseph D. Zuckerman, the majority of hip fractures in elderly people were caused by simple falls, while in young adults, fractures were most frequently caused by high energy trauma, such as car accidents or falls from great heights, which is also supported by the current study.[13,14]
- In this study, proximal femoral nailing (PFN) fractures required smaller incisions and had less overall blood loss than fractures treated with dynamic hip screws (DHS). But even in DHS-operated instances, with careful dissection and attention to not harm the perforator, we could acquire a satisfactory exposure.
- All 20 of our patients had unions on average after roughly 17 weeks. Regarding the criteria for timing of fracture union in various research, there is considerable disagreement. Some people combine radiological and clinical information, whereas others use only radiological union. In a few instances, ultrasonography was used to assess the early stages of callus development at the fracture site and their progression. At following intervals of 14 and 28 postoperative days, this was done. In a subsequent ultrasonographic scan, consolidation of the callus and early stages of neo-vascularization and soft callus were identified.[15]

## CONCLUSION

- Smaller incision, reduced blood loss, and lower morbidity were main benefits of PFN.
- PFN was discovered to be the preferred implant in osteoporotic bones.
- DHS group saw higher varus collapse and shortening in unstable conditions than PFN group.
- When compared to PFN, the learning curve for DHS was less steep.
- The DHS group had less radiation exposure than the PFN group.
- The DHS group experienced fewer implantrelated problems during surgery than the PFN group.
- Both groups' rates of fracture union were comparable, with early immobilisation occurring in the PFN group.
- DHS was discovered to be the preferred implant for stable fractures. However, the balance swings in favour of PFN for unstable fractures.
- The mean duration of operation is more in DHS group then the in PFN group and in the DHS group its more in unstable fractures.

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