



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.2530490>Available online at: <http://www.iajps.com>

Research Article

**COMPARATIVE ANALYSIS OF CLINICAL OUTCOME OF FIXATION
OF SUB-TROCHANTERIC FEMUR FRACTURES WITH ONG
PROXIMAL FEMORAL NAIL & DYNAMIC HIP SCREW****Najeeb ur Rehman Kalhoro¹, Ishtiaque Ali Memon², M. Yahya Memon³,
Muhammad Muneeb⁴ & Aatir H. Rajput⁵**Jejal Maa Hospital, Hyderabad¹Dept. of Orthopedic Surgery, Muhammad Medical College, Mirpurkhas²Indus Medical College Hospital, T.M.K^{3,4}Liaquat University of Medical & Health Sciences, Jamshoro⁵**Abstract:**

Background: Proximal femoral fractures are a subset of fractures that occur in the hip region and occupy large proportion of hospitalization amongst trauma cases. An overwhelming majority of these patients (>90%) are aged above 50 years. These are classified on the basis of anatomic location for example, femur neck fracture; inter trochanteric fracture and sub-trochanteric fracture. Each of these fractures require different modes of management and treatment. **Objective:** Therefore, the aim of the present study was to achieve fracture union by using two different kinds of internal fixation modality devices in similar type of fracture (sub-trochanteric), and to compare the clinical outcome of the fixation modalities (Long Proximal Femoral Nail & Dynamic Hip Screw). **Methods:** This prospective, comparative cohort was carried out at Muhammad Medical College Hospital, Mirpurkhas from January 2016 to August 2018 on a sample of 40 patients admitted at the orthopedic surgery department due to sub-trochanteric femur fractures (chosen via non-probability, consecutive sampling). All fractures were classified by the Seinsheimer Classification System. After taking written informed consent, patients were divided into two groups of 20 subjects each and treated with proximal femoral nailing (PFN) and/or dynamic hip screw (DHS). Data was collected using a self-structured questionnaire. Observations and expert evaluations were also noted. The data obtained was analyzed using MS. Excel 2013 and SPSS v. 21.0. **Result:** PFN emerged as the clear choice, with the operative and postoperative parameters both favoring it over DHS. PFN entailed a significantly less duration of surgery, length of incision and blood loss. PFN group patients also excelled with significantly less post-operative pain, less incidence of deep infection, less mean limb length discrepancy and more patients regaining their pre-injury walking capability with fewer complications. **Conclusion:** After carefully considering the results, it can be concluded that PFN is superior to DHS. The use of proximal femoral nail is helpful in treating sub-trochanteric fractures and should be preferred better than extramedullary plate fixation systems.

Keywords: Proximal Femoral Fracture, Sub-Trochanteric Fracture, Proximal Femoral Nail, Dynamic Hip Screw, and orthopedic Surgery.

Corresponding author:**Najeeb ur Rehman Kalhoro,**

Consultant Orthopaedic Surgeon, Jejal Maa Hospital, Hyd

QR code



Please cite this article in press Najeeb et al., *Comparative Analysis of Clinical Outcome Of Fixation Of Sub-Trochanteric Femur Fractures With Ong Proximal Femoral Nail & Dynamic Hip Screw.*, Indo Am. J. P. Sci, 2018; 05(12).

INTRODUCTION:

Hip fracture is a major threat and cause of disability, dependency and excess mortality among older adults. Indeed, hip fractures remain a persistent cause of excessive morbidity, reduced life quality and premature mortality among older adults. It can be defined as a break in the continuity in the upper quarter of the femur (thigh) bone. [1]

The extent depends on the forces which are involved. Most hip fractures occur in at femoral head, neck and trochanter. [2] It can be classified into intra-capsular (femoral head and neck) fractures that are contained within the hip capsule itself and extracapsular (intertrochanteric and sub-trochanteric) fractures. A femoral neck fracture includes sub-capital, trans-cervical and basi-cervical fractures.

Trochanteric fracture involves the proximal femur between the cervical region and the shaft and is commonly seen in the elderly people. With the rising life expectancy throughout the globe, the number of elderly individuals is increasing in every geographical region, and it is expected that the incidence of hip fracture will rise from 1.66 million in 1990 to 6.26 million by 2050. [3]

Sub-trochanteric typically defined as area from lesser trochanter to 5cm distal to it. Fractures with an associated intertrochanteric component may be called intertrochanteric fracture in which fracture is seen along the base of the femoral neck between the trochanters and peri-trochanteric (involving both greater and lesser trochanters). The frequency of these fractures has risen primarily due to the increasing life span and more sedentary life style brought on by urbanization. Trochanteric fractures are most commonly seen in younger population due to high velocity trauma, whereas in the elderly population it is due to trivial trauma.

Sub-trochanteric is a fracture with a fracture line running from an area within 5 cm distal to the lesser trochanter where the iliopsoas (hip flexor) attaches. [4, 5] The trochanteric fractures are managed by conservative methods and there is effective union of the fracture. If appropriate safety measures are not taken the fracture undergoes mal-union, which results in external rotation deformity at the fracture site with shortening and limitation of hip movements.

In addition, complications related to prolonged immobilization involving bedsores, deep vein thrombosis and respiratory infections may also take place. [6] Therefore, the aim of the treatment should be prevention of mal-union and early mobilization.

Surgery by internal fixation of the fracture is an ideal choice. There are different types of internal fixation devices available to treat trochanteric fractures. The most commonly used device is the dynamic hip screw with side plate assemblies. This is a collapsible fixation device, which allows the proximal fragment to settle on the fixation device, around its own position of stability. [7, 8]

The current implant for management of trochanteric fractures is proximal femoral nail, which is also a collapsible device with added rotational stability. This implant is a centro-medullary device which is biomechanically sound. It has merits like small incision is given with minimal blood loss. Sub-trochanteric fractures of femur possess clinical, structural, anatomical and biomechanical characteristics that distinguish them from intra-capsular fractures. [9]

Various internal fixation devices have been used in sub-trochanteric fractures, because of high incidence of complications reported after surgical treatment with each implant. Stable fractures can be well managed with dynamic hip screw alone with good results proven by various studies. [10, 11] It is seen that the unstable fractures are difficult to manage with dynamic hip screw alone. Complications like screw cut out, shortening of limb, deformity of proximal femur, and non-union are found to be higher in unstable fractures as compared with stable fractures. [12] Hence the need of the study was to evaluate the effectiveness and strength of proximal femoral nail and dynamic hip screw in the management of sub-trochanteric fractures.

METHODOLOGY:

This prospective, comparative cohort was carried out at Muhammad Medical College Hospital, Mirpurkhas from January 2016 to August 2018 on a sample of 40 patients admitted at the orthopedic surgery department due to sub-trochanteric femur fractures (chosen via non-probability, consecutive sampling). After taking written informed consent, patients were divided into two groups of 20 subjects each and treated with proximal femoral nailing (PFN) and/or dynamic hip screw (DHS). Data was collected using a self-structured questionnaire. Observations and expert evaluations were also noted. The data obtained was analyzed using MS. Excel 2013 and SPSS v. 21.0. One-way ANOVA test was applied to the data. Chi square test was done to calculate the p value with different variables. The Fischer's exact test was used for the comparison of paired categorical variables. A value of <0.05 was considered to be statistically

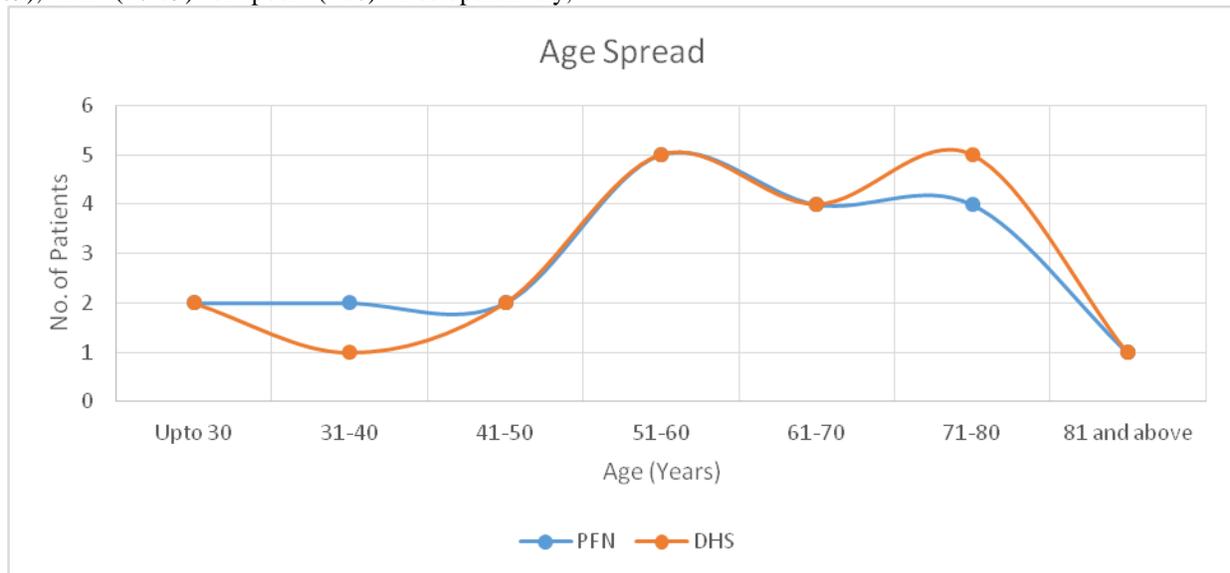
significant.

Patients with pathological fractures due to metastasis, tumors were excluded and also compound fractures were excluded from this study. The permission to conduct study was approved by the ethical committee of the institution. All subjects gave written informed consent to participate in the study. Pre-operative measures were also recorded carefully with radiographic evaluation. All fractures were classified by the Seinsheimer Classification System and 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). Postoperatively,

antibiotic prophylaxis was given in form of IV for 5 days and then through oral antibiotics for 9 days.

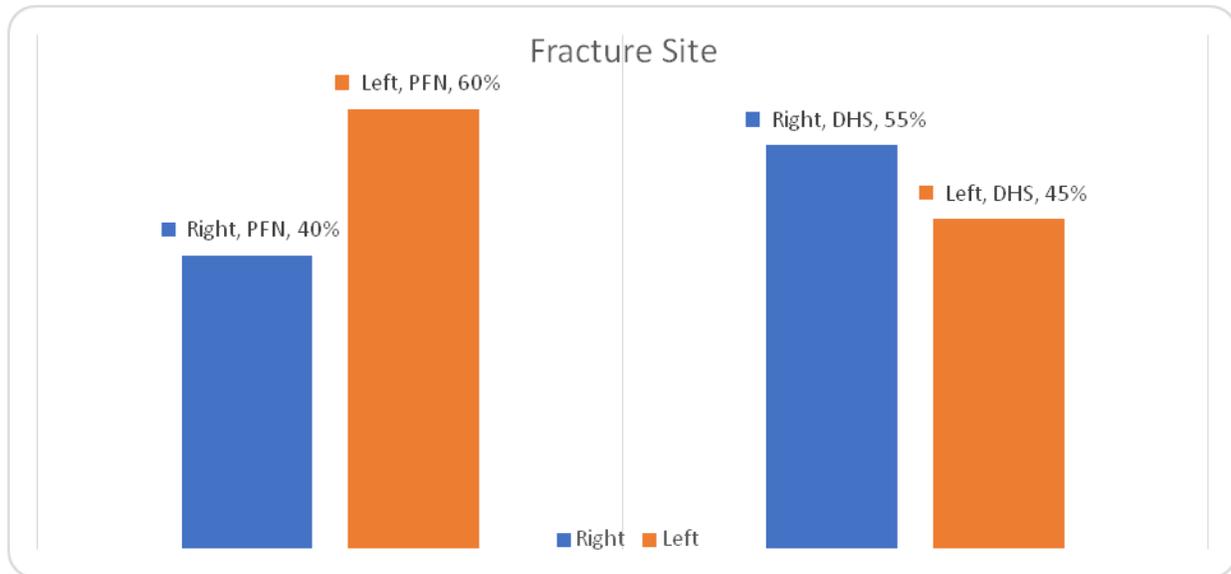
RESULTS:

Among the subjects enrolled into the study, 27 were males and 13 were females. The mean age of the sample stood at 56.6 for PFN and 58.5 for DHS. The youngest patient was 28 years old and the oldest was found to be 86 years of age. Patients with age of more than 50 years constituted 70% of the total subjects and rest constituted of 30% with age of less than 50 years.



Most of our patients were 50 years and above who had domestic fall (fall at home) and trivial trauma as the main reason behind the fracture while in road traffic accident (RTA), young patients were most commonly affected. Out of the 20 cases in PFN, 12 patients were found to have proximal femoral

fractures on the left side while 8 patients were having fracture on the right side. Amongst the 20 cases operated by DHS, 9 patients were found to have proximal femoral fractures on the left side while 11 patients were having fracture on the right side.



Blood loss was seen more in patients in DHS group as compared to the PFN group. Duration of surgery,

hospital stay and implant failure was found to be more among patients in DHS group.

Complication	PFN	DHS
Blood Loss	80 ml \pm 12.40 ml	180 ml \pm 36.28 ml
Duration of Surgery	60 min \pm 21 min	90 min \pm 34 min
Hospital Stay	12.94 days	14.76 days
Sliding	4.5 mm	6.4 mm
Shortening	4.2 mm	7.3 mm
Implant Failure	1	2
Non-Union	0	1
Mortality	0	0

As per the Harris hip score, in the DHS group overall, 5 patients had excellent results, 10 patients had good score, and 4 patients had fair results and 1 patient was recognized with poor score results. In the PFN group, 7 patients had excellent results, 12 patients had good score and 1 patient had fair and none had poor score results.

DISCUSSION:

Fractures of sub-trochanteric femur have always been taken as a major challenge by the community of orthopedic surgeons, not only for achieving fracture union, but for restoration of normal functions in the shortest possible time with minimal side-effects. The goal of management is to provide desired mobilization, rapid rehabilitation and fast reversion of individuals to pre-morbid home and work environment as a functionally and psychologically independent unit. [12] Internal fixation done through operative procedures allows for maximum rehabilitation and offers the best opportunity for functional recovery, and hence has become the

treatment of choice for fractures in the trochanteric region.

Different types of implants are available such as fixed nail plate devices, sliding nail/screw plates and intramedullary devices, out of which the compression hip screws are most commonly used and is considered to be gold standard but recently techniques of closed intramedullary nailing have gained popularity. [13] In the current study, an effort was made to evaluate success in terms of the clinical outcome of such fractures by using proximal femoral nail (PFN) and dynamic hip screw (DHS) implants and results were compared among both the groups.

Most of the patients in present study were from age group of 5th to 7th decade of life i.e. more than 50 years of age. Mean age in years was found to be 56.5 for group operated by PFN. Mean age in years for group operated by DHS was 58.5. Gallagher and Evans et al conducted a study in which they reported an eight fold increase in trochanteric fractures in men over 80 years and women over 50 years of age which

is in concordance with the present study. [14, 15] The trochanteric region is the most common site of senile osteoporosis because as the age advances hip joint being a major joint in the mechanism of weight bearing, this already weakened part cannot withstand any sudden abnormal stress. Additionally, space between bony trabeculae is enlarged and is filled with fat, whilst unsheathing compact tissue is dwindled out and calcar is degenerated. [16] Most of the patients in the present study were males. This clearly showed the preference and better acceptance of surgery by males and higher incidence of trochanteric fractures of femur in male population due to their more active lifestyles.

As ours is a periphery setup at Mirpurkhas, the majority of the patients in the series were male as they are more outgoing and engaged in activities like agriculture, driving of motor vehicles and are more likely to be involved or prone to accidents/fall. Females play a more dormant role and are involved more in household activities. [17] Young patients with sub-trochanteric fractures sustained trauma either as a result of road traffic accident or fall from height, there by reflecting the requirement of high velocity trauma to cause fracture in the young. In a study done by Keneth J. Koval and Joseph D. Zuckerman found that maximum of hip fractures were seen in the elderly as a result from a simple fall whereas in young adults, fractures were observed most often due to high energy trauma such as vehicular accidents or a fall from height which is also consistent with the present study. [18, 19]

In this study, the incisions given in fractures treated by Proximal femoral nailing (PFN) were small, the mean blood loss was relatively lesser as compared to those treated by Dynamic Hip Screw (DHS). But with meticulous dissection and taking care not to damage the perforator we could get a good exposure even in cases operated by DHS. Thus, even in our cases operated by DHS the mean blood loss measured was also comparable to that of PFN. [20, 21] Average time of union in all our 40 patients was about 16 weeks. Assessment of early callus formation at fracture site and its subsequent progress was done with the help of ultrasonography in few cases. This was performed at subsequent intervals of 14th and 28th postoperative days. Neo-vascularization and soft callus in early phases and consolidation of callus was noted in follow up ultra-sonographic study. [22]

CONCLUSION:

PFN emerged as the clear choice, with the operative and postoperative parameters both favoring it over

DHS. PFN entailed a significantly less duration of surgery, length of incision and blood loss. PFN group patients also excelled with significantly less post-operative pain, less incidence of deep infection, less mean limb length discrepancy and more patients regaining their pre-injury walking capability with fewer complications. After carefully considering the results, it can be concluded that PFN is superior to DHS. The use of proximal femoral nail is helpful in treating sub-trochanteric fractures and should be preferred better than extramedullary plate fixation systems.

REFERENCES:

1. Ansari Moein et al. Soft tissue injury related to the choice of entry point in ante grade femoral nailing; pyriform fossa or greater trochanter tip. *Injury* 2015; 36:1337-1342.
2. Harris WH. Traumatic arthritis of the hip after dislocation and acetabular fractures: treatment by mold arthroplasty. An end-result study using a new method of result evaluation. *J Bone Joint Surg Am.* 1969; 51:737- 55.
3. Shivraj. S. Konde, Santosh.S. Borkar, Abhijit Marathe, Rohit Shinde, Prashant Kamath. Dynamic hip screw and proximal femoral nail as a mode of surgical treatment in intertrochanteric fracture of femur in elderly patients. *International Journal of Contemporary Medical Research* 2018; 5:4-7.
4. Anne AK, Ekeland A, Odegard B et al. Gamma nail versus compression screw for trochanteric femoral fracture. *Acta Orthop Scand* 1994; 65: 127-130.
5. Larssoi S, Elloy M, Hansson LI. Fixation of unstable trochanteric hip fractures. A cadaver study comparing three different devices. *Acta Orthop Scand.* 1988; 59:658-63.
6. Kyle RF, Ellis TJ, Templeman DC. Surgical Treatment of Intertrochanteric Hip fractures with associated femoral neck fractures using a sliding hip screw. *J Orthop Trauma.* Jan 2005; 19, 1:1-4.
7. Omkarnath Gudapati, Srikanth S. The management of trochanteric fractures of hip using dynamic hip screw fixation. *International Journal of Contemporary Medical Research* 2016; 3:1946-1949.
8. Banan H, Al-Sabti A, Jimulia T, Hart AJ. The

- treatment of unstable, extracapsular hip fractures with the AO/ ASIF proximal femoral nail (PFN)—our first 60 cases. *Injury* 2002; 33:401-5.
9. Nue Moller B, Lucht U, Grymer F, Bartholdy NJ. Early rehabilitation following osteosynthesis with the sliding hip screw for trochanteric fractures. *Scand J Rehabil Med.* 1985; 17:39-43.
 10. Baumgaertner MR, Curtin SL, Lindskog DM. Intramedullary versus extramedullary fixation for the treatment of intertrochanteric hip fractures. *Clin Orthop Relat Res* 1998; 348:87-94.
 11. Berman AT, Metzger PC, Bosacco SJ et al. Treatment of the subtrochanteric fractures with the compression hip nail: a review of 38 consecutive cases. *Orthop Trans.* 1979; 3:255.
 12. Bergman GD, Winkist RA, Mayo KA, Hanson SE. Subtrochanteric fractures of the femur: fixation using the Zickel nail. *J Bone Joint Surg (Am).* 1987; 69: 1032- 1040.
 13. Gallagher JC, Melton LJ, Riggs BL et al. Epidemiology of fractures of the proximal femur in Rochester, Minnesota. *Clinical Orthop* 1980; 150:163-171.
 14. Evans E. The treatment of trochanteric fractures of the femur. *JBJS* 1949; 31B 190-203.
 15. SF Kumar, VK Bhasme, Akash Hosthota, Mayur Rabhadiya. Functional outcome of proximal femur fracture managed surgically using proximal femoral nail. *International Journal of Contemporary Medical Research* 2017; 4:22-24.
 16. Boidin C, Seibert F, Fankhauser F et al. The proximal femoral nail (PFN)-A minimal invasive treatment of unstable proximal femoral fractures. A prospective study of 55 patients with a follow-up of 15 months. *Acta Orthop Scand* 2003; 74: 53-58.
 17. Zuckerman JD, Comprehensive care of orthopaedic injuries in the elderly, Baltimore: Urban and Schwarzenberg, 1990.
 18. Koval KJ, Zuckerman JD. Hip fractures: I. Overview and evaluation and treatment of femoral-neck fractures. *J Am Acad Orthop Surg.* 1994; 2:141e149.
 19. Baumgaertner MR, Curtin SL, Lindskog DM, Keggi JM. The value of Tip-Apex distance, in predicting failure of fixation of peritrochanteric fractures of the hip. *J Bone Joint Surg (Am).* 1995; 77:1058-1064.
 20. Boyd HB, Griffin LL. Classification and treatment of trochanteric fractures. *Arch Surg.* 1949; 58:853.
 21. Butt MS, Krikler SJ, Nafie S, Ali MS. Comparison of dynamic hip screw and gamma nail: a prospective randomized controlled trail. *Injury* 1995; 26:615-8.
 22. Borens O et al. Long gamma nail in the treatment of subtrochanteric fractures. *Arch Orthop Trauma Surg* 2004; 124:443-7.