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Comparison of dynamic compression screw with trochanteric stabilization plate vs proximal femoral nail in intertrochanteric fracture

Asif Nawaz
Registrar, orthopedic 'B' ward Hayatabad Medical Complex Peshawar

Noor Rehman
Assistant Professor orthopedic 'B' ward Hayatabad Medical Complex Peshawar
Corresponding author email: Noorelum@yahoo.com

Aamir Kamran
Specialist registrar orthopedic 'B' ward Hayatabad Medical Complex Peshawar

Waseem Anwar
Associate Professor orthopedic 'B' ward Hayatabad Medical Complex Peshawar

***Abstract*---**Background: Fracture of hip is long considered a major contributor to disability. Unstable trochanteric fractures with coronal split continue to be a challenge for orthopaedic surgeons. Objective: Comparison of dynamic compression screw with trochanteric stabilization plate vs proximal femoral nail in intertrochanteric fracture. Methodology: The current study was prospective cohort study, carried out at the Department of Orthopedic Surgery, Hayatabad Medical Complex, Peshawar for duration of six months after approval of synopsis. Patients were divided into two groups each having 63 patients. Group DHS/TSP was treated by Dynamic hip screw with Trochanteric Stabilizing Plates and Group PFN was treated by Proximal Femoral nail. On each visit X-ray of hip Harris Hip Score was calculated. Data was analyzed by statistical analysis program (IBM-SPSS.Version.23). Results: In the current study, a total of 126 patients were enrolled. There were 63 patients in DHS/TSP group and 63 in PFN group. The mean age (SD) in DHS/TSP group was 56 (8.14) years while the mean age (SD) in PFN group was 58 (7.25) years. The mean (SD) incision length in DHS/TSP group was 7.60 (0.8) cm while in PFN group it was 4.68 (0.49) cm. The mean (SD) intra-operative time in DHS/TSP group was 90 (12.15) minutes while in PFN group it was 70 (8.99) minutes. The mean (SD) intra-operative blood loss in

DHS/TSP group was 220 (30.31) ml while in PFN group it was 112 (22.99) ml. The mean time (SD) of radiological union in DHS/TSP group was 13.5 (2) weeks whereas in PFN group it was 12 (3) weeks. The mean (SD) Harris Hip Score in DHS/TSP group at 3 months, six months and 12 months follow up was 54.50 (2.11), 90 (9.81) and 94 (12.3) respectively. The mean (SD) Harris Hip Score in PFN group at 3 months, six months and 12 months follow up was 36 (4.21), 83 (7.56) and 93 (9.26) respectively. Conclusion: The current research found no differences between PFNA and DHS with TSP in terms of radiologic and clinical results in intertrochanteric fractures. However, since PFNA is a less invasive as compared to DHS with TSP, it may be effective in patients who are old.

***Keywords*---**Dynamic compression screw, Trochanteric stabilization plate, Proximal femoral nail, intertrochanteric fracture.

Introduction

Fracture of hip is long considered a major contributor to disability. Intenrochanteric fractures are fractures involving through and in between both trochanters of upper end of femur with or without extension into upper femoral shaft. In 1990, 26% of all hip fractures occurred in Asia and this have been proposed to raise to 37% in 2025 and to 45% in 2050 [1]. Over 90% of hip fracture patients are older than 65-year-old and have pre-existing medical co-morbidities [2]. However the advance technology of high velocity transport have increased incidence in all ages and also have changed the pattern of intertrochanteric fractures so that there is no one treatment which can be agree upon [3]. Unstable trochanteric fractures with coronal split continue to be a challenge for orthopaedic surgeons. Near-anatomical reduction and optimal positioning of implants are of paramount importance for good outcome and reducing the risk of complications [4]. Hip joint fracture have a variety of complications ranging from the medical complication of heart related (35-42%), neurological (10%), pulmonary (4-7%), gastrointestinal (5%) to one year mortality rate of 14-36% in patients older than 65 years [2]. Implants are used to stabilize the trochanteric fractures in such fractures. Proximal femoral nails (PEN), Dynamic Hip Screws (DHS) and Trochanteric Stabilizing plates (TSP) have being used forstabilization in such fractures. The nail gives support to posteromedial wall and resists excessive fracture collapse therefore biomechanically PFN is a better choice of implant for fixation of unstable trochanteric fractures [5]. Failure rates of DHS for unstable fracture patterns have been reported to be as high as 50% [6, 7]. Trochanter stabilizing plate act as an adjunct to sliding screw plate devices and aim to restore the lacking lateral buttress. Encouraging results have been reported earlier [8]. However other studies did not find any difference between these [9]. There was no significant difference between two groups of Dynamic Hip Screw and Proximal Femoral Nail of patients in term of mobility only significant difference as regards to period of hospitalization (p=0.014) and blood transfusion (p=0.004) [10]. In another study, average time of union in proximal femoral nailing group was about 12±4 weeks, Harris hip score was 84.72 and Parker mobility score 7.95 while average time of union in Dynamic Hip Screw with Trochanteric stabilizing

plates group was about 14±4 weeks Harris hip score was 85.45 and Parker mobility score was 7.81 [9]. The rationale of my study is to compare the score of the patient in intertrochanteric fractures to confirm any difference between these two as studies showed difference results. The objective of this research was to compare the Dynamic compression screw with trochanteric stabilization plate and proximal femoral nail in complicated intertrochanteric fracture in terms of Harris Hip Score and weeks of fusion. Result of my study can be used by adopting one technique better for the patient betterment. Also the result can be used by orthopaedic surgeons for managing these patients based on this study results.

Material and Methods

The current study was prospective cohort study, carried out at the Department of Orthopedic Surgery, Hayatabad Medical Complex, Peshawar. The duration of our research was six months after approval of synopsis. The overall sample size in our research was 126 based on WHO calculator for sample size.

Inclusion Criteria

- All the patients with intertrochanteric fracture
- Age 15 to 75 years
- Both gender
- Welling for consent and follow-up

Exclusion Criteria

- All patients with open fractures
- All those who have previous fractures or surgery in affected hip

Data Collection Procedure

After permission from the ethical committee of the hospital the study was started. Oral consent was taken from all patient fulfilling inclusion and exclusion criteria. Confidentiality was maintained. Patient demographic data like age, gender and address was noted. The cause of the fracture was noted. All the conservative management like Basic life support etc. was done as per hospital protocol. The cause of fractures, type of fracture (OMOTA) was assessed. Patients were divided into two groups each having 63 patients. Group DHS/TSP was treated by Dynamic hip screw with Trochanteric Stabilizing Plates and Group PFN was treated by Proximal Femoral nail. The surgery was done by consultant orthopaedic of more than 3 years experiences. After surgery as per hospital protocol, Patient was advised to set in bed after 24 hours and then the routine physiotherapy was done to the hip joint as per ward protocol. Then patient was followed up 2 weekly, 1.5 months and 3 monthly. On each visit X-ray of hip Harris Hip Score was calculated. The data was put in the profoma designed for this research.

Data Analysis

Data was analyzed by statistical analysis program (IBM-SPSS.Version.23). Mean ±SD was presented for quantitative variables like age and Harris hip score in both

groups. Frequency and percentage was computed for qualitative variable like gender.

Results

In the current study, a total of 126 patients were enrolled. There were 63 patients in DHS/TSP group and 63 in PFN group. There were 40 (63.49%) female in 23 (36.51%) male in DHS/TSP group while the male in PFN group were 25 (39.68%) and 38 (60.32%) patients were female. (Figure 1)The mean age (SD) in DHS/TSP group was 56 (8.14) years while the mean age (SD) in PFN group was 58 (7.25) years. The mean (SD) incision length in DHS/TSP group was 7.60 (0.8) cm while in PFN group it was 4.68 (0.49) cm. The mean (SD) intra-operative time in DHS/TSP group was 90 (12.15) minutes while in PFN group it was 70 (8.99) minutes. The mean (SD) intra-operative blood loss in DHS/TSP group was 220 (30.31) ml while in PFN group it was 112 (22.99) ml. The mean time (SD) of radiological union in DHS/TSP group was 13.5 (2) weeks whereas in PFN group it was 12 (3) weeks. (Figure 2) Non union was not reported in both the group. The mean (SD) Harris Hip Score in DHS/TSP group at 3 months, six months and 12 months follow up was 54.50 (2.11), 90 (9.81) and 94 (12.3) respectively. The mean (SD) Harris Hip Score in PFN group at 3 months, six months and 12 months follow up was 36 (4.21), 83 (7.56) and 93 (9.26) respectively. (Table 1) In DHS/TSP group, superficial skin infection was observed in noted in 4(6.35%) patients whereas in PFN group it was noted in 3(4.76%). Cut out was observed in 3 (4.76%) patients in DHS/TSP group while PFN breakage was also observed in 3(4.76%) patient. Mortality was not observed in both the groups. (Table 2)

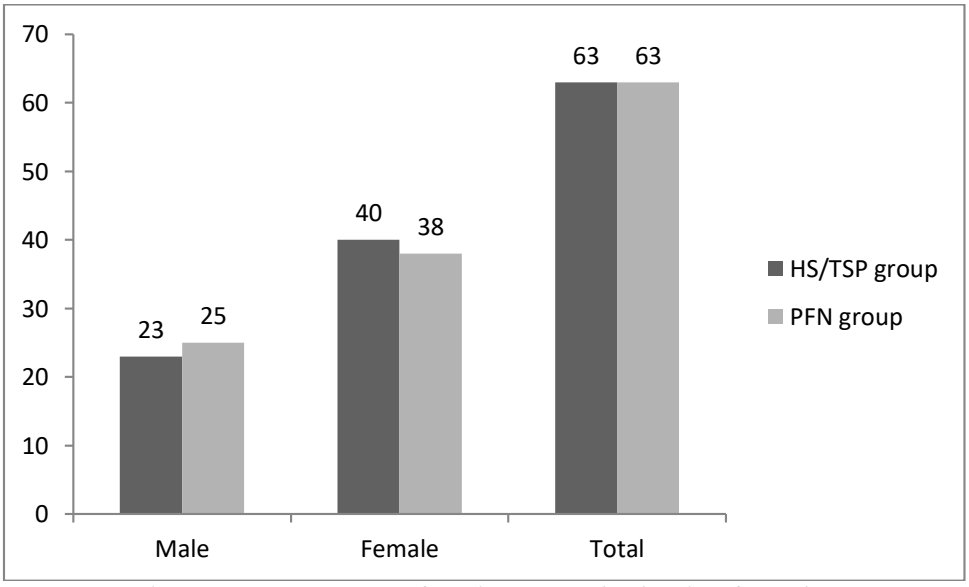

Figure 1: Frequency of patients on the basis of gender

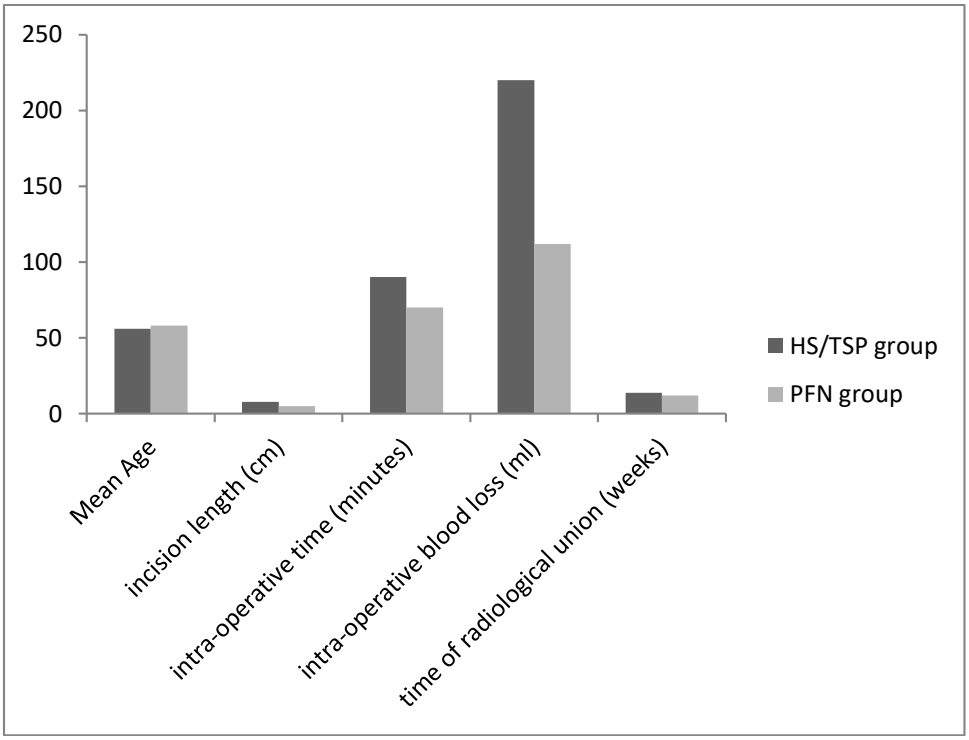

Figure 2: Comparison of mean age, incision length, intra-operative time, blood loss and time of radiological union between the two groups

Table 1: Comparison of both the groups based on Harris Hip Score

Harris Hip Score	HS/TSP group	PFN group
Three months	Poor 54.50 (2.11)	Poor 36 (4.21)
Six months	Good 90 (9.81)	Good 83 (7.56)
Twelve months	Excellent 94 (12.3)	Excellent 93 (9.26)

Table 2: Comparison of post-operative complication in both the groups

post-operative complication in	HS/TSP group	PFN group
superficial skin infection	4(6.35%)	3(4.76%).
Cut out	3 (4.76%)	3(4.76%)
Mortality	00 (00%)	00 (00%)

Discussion

PFN devices are now often employed in clinics and come in a variety of lengths, diameters, angles of the neck shaft, and numbers of cephalic screws, rotational control capabilities, and construction materials. Although there is more evidence that PFN is theoretically superior to DHS, there is still debate over whether PFN is a better option in comparison to DHS in the literature, particularly in clinical research [11]. According to literature no study has been conducted on the

comparison of PFN and DHS in intertrochanteric fracture. The objective of this research was to compare the Dynamic compression screw with trochanteric stabilization plate and proximal femoral nail in complicated intertrochanteric fracture in terms of Harris Hip Score and weeks of fusion.

In the current study, a total of 126 patients were enrolled. There were 63 patients in DHS/TSP group and 63 in PFN group. There were 40 (63.49%) female in 23 (36.51%) male in DHS/TSP group while the male in PFN group were 25 (39.68%) and 38 (60.32%) patients were female. The mean age (SD) in DHS/TSP group was 56 (8.14) years while the mean age (SD) in PFN group was 58 (7.25) years. The mean (SD) incision length in DHS/TSP group was 7.60 (0.8) cm while in PFN group it was 4.68 (0.49) cm. The mean (SD) intra-operative time in DHS/TSP group was 90 (12.15) minutes while in PFN group it was 70 (8.99) minutes. The mean (SD) intra-operative blood loss in DHS/TSP group was 220 (30.31) ml while in PFN group it was 112 (22.99) ml. The mean time (SD) of radiological union in DHS/TSP group was 13.5 (2) weeks whereas in PFN group it was 12 (3) weeks. Non union was not reported in both the group. The mean (SD) Harris Hip Score in DHS/TSP group at 3 months, six months and 12 months follow up was 54.50 (2.11), 90 (9.81) and 94 (12.3) respectively. The mean (SD) Harris Hip Score in PFN group at 3 months, six months and 12 months follow up was 36 (4.21), 83 (7.56) and 93 (9.26) respectively. In DHS/TSP group, superficial skin infection was observed in noted in 4(6.35%) patients whereas in PFN group it was noted in 3(4.76%). Cut out was observed in 3 (4.76%) patients in DHS/TSP group while PFN breakage was also observed in 3(4.76%) patient. Mortality was not observed in both the groups. In accordance with our study, another study reported comparable results. They included 60 patients in total for their investigation. Groups A and B each had 30 patients, and the division was done evenly and randomly. In group A the average age was 59.20 (5.94) years old, whereas in group B it was 58.80 (6.67). Both groups A and B included 19 (63.33%) and 17 (56.66%) male patients, respectively. Both groups A and B included 13 (43.33%) and 11 (36.66%) female patients, respectively. In groups A and B, the mean radiological union times were 13.4 weeks and 13.5 weeks, respectively ($P>0.05$) [12]. According to Bhakat et al., mop count and suction drain collection were used to assess blood loss. 116 ml and 213 ml of blood, respectively, were lost on average in the P.F.N. and DHS groups. PFN has lower blood loss [13]. In accordance with our findings, Kavin Kumar et al. found that the mean operating time in PFN and DHS with TSP was 62.5 minutes and 88 minutes, respectively. In terms of the length of the procedure, there was a statistically significant difference between the two study groups [14].

Conclusion

The current research found no differences between PFNA and DHS with TSP in terms of radiologic and clinical results in intertrochanteric fractures. However, since PFNA is a less invasive as compared to DHS with TSP, it may be effective in patients who are old.

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