

Original Research Article

A study to assess proximal femoral nailing versus dynamic hip screw device in surgical management of intertrochanteric fractures: a comparative study

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ABSTRACT

Background: The incidence of inter trochanteric fracture is expected to have doubled by 2040. Inter trochanteric fractures account for about 45% to 50% of all hip fractures in the elderly population and out of these, near about 50% to 60% are classified as unstable intertrochanteric fractures. The goal of treatment is restoring mobility safely and efficiently, while minimizing the risk of medical complications and technical failure. This study as performed to assess functional outcome with dynamic hip screw and proximal femoral nail in intertrochanteric fracture management.

Methods: It was prospective observational study done for a period of 1 year from January 2016-January 2017 among patients who attended OPD or emergency department with intertrochanteric fracture. Two different implants were used dynamic hip screw (DHS) and proximal femoral nail (PFN).

Results: Excellent results in functional outcome was more in case of PFN (66.6%) compared to DHS (50%). The type of trauma in DHS group was road traffic accident in 38.8%, domestic fall in 50% and others such as assault was in 11.1% while in PFN group intertrochanteric fracture was seen in 61.1% due to domestic fall.

Conclusions: The functional outcome was more better with proximal femoral nail (PFN) compared to dynamic hip screw (DHS). Therefore, proximal femoral nail (PFN) should be preferred for management of intertrochanteric fractures.

Keywords: Fracture, Distal, Femoral, Hip, Implant

INTRODUCTION

An intertrochanteric fracture extends from the extra capsular basilar neck of the femur to the lesser trochanter. As there is an increase in life span and sedentary life style among the people of the society, there is a rise in incidence of the intertrochanteric fracture. Among the elderly, there is an increased incidence of osteoporosis which also leads to a higher incidence of intertrochanteric fracture in this group. About 90% of the elderly of more than 50 years of age are more prone to fall from height, which leads to the fractures and is seen more common

among the women rather than men. However, in the younger age group i.e. around 40 years, the fractures are more due to high speed vehicular accidents and more common on men. This is due to high mobility of the male genders in that age group.¹

It is estimated that there will be doubling of the incidence of the intertrochanteric fractures by 2040.² 45% to 50% of the elderly population will be effected and out of these. Nearly 60% will be unstable fractures.³ An unstable intertrochanteric fracture is that which has communication of the posteromedial buttress which

exceeds a simple lesser trochanteric fragment or the one with subtrochanteric extension.⁴ Among the elderly, these unstable fractures are the major cause of severe morbidity and mortality.⁵

The presentation of the intertrochanteric fracture usually depends on the type, cause and severity. A displaced fracture is usually symptomatic as there is a shortening and externally rotated limb leading to the inability of the patient to walk, while the undisplaced fracture has no deformity, thus not much pain and the patients are mobile.⁶ Thus it is essential to restore the mobility of the patients efficiently with the least complications. This is dependent on the quality of the bone as well as the type of the implant used for the treatment.⁷

The standard treatment for the treatment of trochanteric fractures has been DHS or sliding hip screw (SHS). However, due to a greater distance between the weight bearing axis and the implants, there is a certain biomedical disadvantage. Thus, to counter this, it is better to use intermedullary implants. The latest one to be used for the management of intertrochanteric fracture is proximal femoral nailing with more efficient intramedullary load transfer, less implant failure with maintenance of controlled impaction, less deformity and shortening of limbs, and less blood loss.⁹

Keeping this in view, the present study was done to assess functional outcome with DHS and PFN in intertrochanteric fracture management.

METHODS

This prospective observational study was done in Department of Orthopedics at Shadan Institute of Medical Sciences, Hospital and Research Centre, for a period of 1 year from January 2016-January 2017. During this study period we enrolled a total of 36 patients who presented with intertrochanteric fracture in OPD and in emergency hours. All the 36 were divided into two groups. One group of 18 participants were treated DHS and other group with 18 participants were treated with PFN. A pre-designed, pre-structured questionnaire was used after obtaining the Institutional ethical committee clearance as well as informed consent from all the patients. All the study participants who presented with inter-trochanteric fracture were initially treated with emergency care in casualty department. All the required clinical and radiological investigations were done. They were all evaluated with for any associated medical problems and they were referred to respective department and necessary treatment was given. A proper preoperative care was taken and they operated electively after fitness. A follow up was done at 2, 4, 6 weeks, 3 months, 6months, and 1 year to see the functional outcome after surgery using Harris hip score.

Patients belonging to the pediatric age group, those with Pathological fractures, polytrauma cases or patients who

were non-operatively treated intertrochanteric fractures of femur were excluded from the study. Statistical Analysis was done by entering the data into Microsoft Excel and using simple proportions.

RESULTS

Table 1 shows that majority of study participants were in the age group of >60 years (61.1%) those who were treated with DHS while those who were treated with PFN near about 72.2% were in the age group of >60 years. In DHS group 27.7% were in 41-60 years while in PFN group 16.6% were in the age group of 41-60 years. Majority of study participants in both the groups were males, in DHS (66.6%) and PFN (77.7%) respectively.

Table 1: Distribution of study participants according to age and sex (n=18).

	Dynamic hip screw (DHS)	Proximal femoral nail (PFN)
Age (in years)	N (%)	N (%)
20-40	02 (11.1)	02 (11.1)
41-60	05 (27.7)	03 (16.6)
>60	11 (61.1)	13 (72.2)
Sex		
Male	12 (66.6)	14 (77.7)
Female	06 (33.3)	08 (44.4)
Total	18	18

Table 2 show that those who were treated with DHS among them 44.4% were having right side injury while 55.5% were having left side injury. Among those who were treated with PFN 61.1% were having right side injury while 38.8% were having left side injury respectively. The type of trauma in DHS group was road traffic accident in 38.8%, domestic fall in 50% and others such as assault was in 11.1% while in PFN group intertrochanteric fracture was seen in 61.1% due to domestic fall which is more than DHS group which was followed by 33.3% due to road traffic accident and 5.5% due to other reasons.

Table 2: Distribution of study participants with other characteristics (n=18).

	Dynamic hip screw (DHS)	Proximal femoral nail (PFN)
Site of fracture	N (%)	N (%)
Right	08 (44.4)	11 (61.1)
Left	10 (55.5)	07 (38.8)
Type of trauma		
Road traffic accident	07 (38.8)	06 (33.3)
Domestic fall	09 (50)	11 (61.1)
Others	02 (11.1)	01 (5.5)
Total	18	18

Table 3 show that 38.8% of the study participants were having type–III intertrochanteric fracture among those who were treated with DHS while 33.3% were having type-IV intertrochanteric fracture who were treated with PFN.

Table 3: Distribution of study participants with type of intertrochanteric fracture (n=18).

Type of intertrochanteric fracture	Dynamic hip screw (DHS) N (%)	Proximal femoral nail (PFN) N (%)
Type I	03 (16.6)	02 (11.1)
Type II	04 (22.2)	05 (27.7)
Type III	07 (38.8)	02 (11.1)
Type IV	02 (11.1)	06 (33.3)
Type V	02 (11.1)	03 (16.6)
Total	18	18

Table 4 shows that the postoperative complications were minimal in both the groups. UTI was observed in 11.1% of the study participants who were treated with DHS while UTI was seen in 5.5% among PHN group. Non-union was seen in one (5.5%) study participants in DHS group while shortening was seen in PFN group in one study participant(5.5%). Thromboplebitis was seen in both the group in one study participants only.

Table 4: Distribution of study participants with complications.

Complications	Dynamic hip screw (DHS) N (%)	Proximal femoral nail (PFN) N (%)
Bed sore	01 (5.5)	01 (5.5)
Non union	01 (5.5)	00
Shortening	00	01 (5.5)
UTI	02 (11.1)	01 (5.5)
Thromboplebitis	01 (5.5)	01 (5.5)
Superficial infection	01 (5.5)	00
Total	06	04

Table 5: Distribution of study participants with outcome using Harris hip score (n=18).

Harris hip score	Dynamic hip screw (DHS) N (%)	Proximal femoral nail (PFN) N (%)
Excellent	9 (50)	12 (66.6)
Good	4 (22.2)	05 (27.7)
Fair	3 (16.6)	01 (5.5)
Poor	2 (11.1)	00
Total	18	18

Table 5 shows that the functional outcome after surgery during the follow up period at subsequent period with DHS and PFN was assessed using Harris hip score were it was found that excellent results in functional outcome was more in case of PFN (66.6%) compared to DHS (50%). In DHS poor score was found in 2 (11.1%) study participants which was not there in PFN group. Good score was more in PFN group (27.7) while in DHS good score was in 22.2%. The overall functional outcome was better with PFN compared to dynamic hip screw.

DISCUSSION

In present study it was observed that majority of study participants were in the age group of >60 years (61.1%) those who were treated with DHS while those who were treated with PFN near about 72.2% were in the age group of >60 years. In DHS group 27.7% were in 41-60years while in PFN group 16.6% were in the age group of 41-60 years. In another study done by Swamy et al, it was observed that majority of study participants were in the age group of 41-60 years such as 56% those who were treated with DHS and 53% those who were treated with PFN which is not similar with the present study findings.¹⁰ In another study majority of the study participants were in the age group of 50-80years which is similar to present study findings.⁹ In one study majority of the study participants were in the age group of 40-60years in both the groups accounting for 40%.¹¹

In present study majority of study participants in both the groups were males, in DHS (66.6%) and PFN (77.7%) respectively. Present study findings were consistent with other studies were 90% of males were seen in DHS group and 75% males were in PFN group.¹¹ In a study done by Swamy et al, 56% were males in DHS group and 50% males were in PFN group.¹⁰ In another study by Mansukhani et al, majority of males were present in both groups.⁷

The present study findings shows that those who were treated with DHS among them 44.4% were having right side injury while 55.5% were having left side injury. Among those who were treated with PFN 61.1% were having right side injury while 38.8% were having left side injury respectively. In another study 62.5% in DHS group were having right sided injury and 37.5% with left side injury which is not similar to present study findings.⁹ In PFN group 58.3% were having right side injury and 41.7% were having left side injury which is similar to present study findings.⁹ In Veergandham et al, study in DHS group 70% were having right side injury and in PFN group 35% were having right sided injury.^{10,11}

The type of trauma in DHS group was road traffic accident in 38.8%, domestic fall in 50% and others such as assault was in 11.1% while in PFN group intertrochanteric fracture was seen in 61.1% due to domestic fall which is more than DHS group which was followed by 33.3% due to road traffic accident and 5.5% due to other reasons. In another study domestic accident were the etiological factor for intertrochanteric fracture in

both the group DHS (65%) and PFN group (45%).¹¹ In a study done Kumar et al, 68.8% had domestic fall while 31.3% were having road traffic accident.⁹

In present study, 38.8% of the study participants were having type-III intertrochanteric fracture among those who were treated with DHS while 33.3% were having type-IV intertrochanteric fracture who were treated with PFN. In a study done by Swamy et al, majority of study participants in DHS group were having type-II type of intertrochanteric fracture which was similar with PFN group also which is not consistent with present study findings.¹⁰

The findings of present study show that postoperative complications were minimal in both the groups. UTI was observed in 11.1% of the study participants who were treated with DHS while UTI was seen in 5.5% among PFN group. Non-union was seen in one (5.5%) study participants in DHS group while shortening was seen in PFN group in one study participant (5.5%). Thrombophlebitis was seen in both the group in one study participants only. In another study UTI was observed in 10% of study participants in both the groups which was followed by superficial infection in both the groups.¹¹ In another study superficial infection was seen in 11% of study participants in DHS group.⁷ In one study in DHS group superficial infection was seen in 3.3% study participants.¹⁰ Non-union was seen in 3.3% in PFN group while shortening was seen in 6.6% in DHS group.^{9,10}

In the present study the functional outcome after surgery during the follow up period at subsequent period with DHS and PFN was assessed using Harris hip score were it was found that excellent results in functional outcome was more in case of PFN (66.6%) compared to DHS (50%). In DHS poor score was found in 2 (11.1%) study participants which was not there in PFN group. Good score was more in PFN group (27.7) while in DHS good score was in 22.2%. The overall functional outcome was better with PFN compared to Distal Hip Screw. In another study it was found that 62% were having excellent score with PFN which is consistent with the present study findings.⁹ In Swamy et al, study excellent core was seen in majority of study participants who were operated using PFN.¹⁰ Similar findings were observed that functional outcome was excellent in majority study participants in PFN group in a study done by Kumar et al and Chaitanya et al.^{12,13}

CONCLUSION

Two different implants were used in the present study for the management of intertrochanteric fracture. There were less complications among those who were treated with PFN as compared to DHS that too there was marginal difference. The functional outcome was more better with PFN compared to DHS. Therefore, PFN should be preferred for management of intertrochanteric fractures.

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