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Original Research Article

Outcome Assessment of Dynamic Hip Screw and Proximal Femoral Nail in Basicervical Fracture of Femur: A Comparative Study

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Abstract

Aim: The aim of the present study was to compare the functional outcome of Dynamic Hip Screw vs. Proximal Femoral Nail in basicervical fracture of femur.

Material & Methods: This Prospective study was conducted among 100 patients who were diagnosed to have Intertrochanteric Fracture of Femur of > 18 years old of either sex attending orthopaedic outpatients and inpatients Department of Orthopaedic. Patients were grouped into two groups by Convenient sampling technique. First group of patients were treated by dynamic hip screw fixation and Second group of patients were treated by Proximal femoral nailing with 50 patients in each group.

Results: There were 44% male and 56% in DHS group and 64% were male and 36% were females in PFN group. The mean age 68.42±8.36 and 67.93±8.42 in DHS and PFN group respectively. Type III intertrochanteric fractures were more common because most patients had low velocity injuries and road traffic accidents. In this study, right sided intertrochanteric fractures were more common. Among 100 patients with intertrochanteric fractures, patients developed less complication in PFN group than DHS group. Superficial infections more in DHS group (8%) than PFN group (6%) Screw cut -out noted in two patients of DHS group (4%) and two patients (4%) in PFN group. Patients who were lost to follow up were more in PFN group (10%) than DHS group (6%). Varus collapse founded in two patient of DHS group (8%) but not noted in PFN group. Deep infection founded in the patient among DHS group (2%) and not noted in PFN group Limb shortening noted in two patients of DHS group (4%) and No limb shortening noted in PFN group. In Group DHS, results were excellent in 58%, fair in 14%, good in 14%, and poor in 14%. In Group PFN, results were excellent in 72%, fair in 10%, and good in 10%.

Conclusion: We concluded that Proximal Femoral nailing is an appropriate device for both stable and unstable intertrochanteric fractures than dynamic hip screw in terms of minimal complication and good functional Harris hip score.

Keywords: Intraarticular fractures, plating, calcaneum, internal fixation

Introduction

Fractures of the proximal femur are significant cause of morbidity and mortality worldwide, especially in patients over the age of 50. [1] Overall, hip fractures in older adults are common, with femoral neck fractures accounting for 3.6% of all fractures. [2, 3] Basicervical fractures of femur are relatively rare injuries which account for only 1.8–7.6% of hip fractures. [4,5] Due to their anatomical location, they represent an intermediate form between femoral neck and intertrochanteric fracture.

Parker et al. defined it as a fracture in which the fracture line runs along the line of the anterior attachment of the capsule. Blair et al. specified it as a proximal femoral fracture through the base of the femoral neck at its junction with the intertrochanteric region. Due to this anatomical location, basicervical fracture represents an

intermediate form between femoral neck and intertrochanteric fractures. Earlier conservative treatment was given which usually delayed the active mobilization of the patient for about 4 weeks which lead to multiple secondary complications.

Nowadays treatment of choice for BC fractures is operative management. Various surgical procedures using different implants have been described to treat intertrochanteric fractures. The important purpose of surgical treatment have to be early mobilization to keep away from secondary complications, which is obtained by fixation of Dynamic Hip screw (DHS) or Proximal Femoral Nail (PFN).

There is currently limited evidence regarding optimal implant choice for basicervical fractures. Implant choice has been proposed to depend on the extent of displacement, fracture configuration, physiological age and bone quality. [3] Patient-reported outcomes following Basi cervical neck fracture treatment have also been reported to lag behind those of either more proximal femoral neck fractures or intertrochanteric fractures. [6,7]

The mechanism of injury in young patients is usually high energy trauma as compared to low energy in older patients. Moreover, poor bone stock in older patients makes the management and outcome of Basi cervical fractures in their age group a completely different scenario. No study has been documented in literature to the best of our knowledge comparing the clinical outcome of the two most common implants used to treat Basi-cervical fractures of neck of femur in young adults, i.e. DHS and PFN.

Hence the aim of study was to study and compare the functional outcome of Dynamic Hip Screw vs. Proximal Femoral Nail in basicervical fracture of femur.

Material & Methods

This Prospective study was conducted among 100 patients who were diagnosed to have Intertrochanteric Fracture of Femur of > 18 years old of either sex attending orthopaedic outpatients and inpatients Department of orthopaedic in Jawahar Lal Nehru medical College & Hospital, Bhagalpur, Bihar, India for one year. Patients were grouped into two groups by Convenient sampling technique. First group of patients were treated by dynamic hip screw fixation and Second group of patients were treated by Proximal femoral nailing with 50 patients in each group. Patients were diagnosed based on Clinical examination and Plain radiograph of part affected. We included patients sustained Intertrochanteric fracture of femur of age more than 18 years, and fracture types like Basicervical, Reverse oblique fractures, Displaced intertrochanteric fractures and also Sub trochanteric extension of intertrochanteric fractures. Patients of age less than 18 years of age, Patients with tumor, Patients with Pathological fracture, Patients with Intertrochanteric fracture of femur with shaft of femur fracture (segmental fracture) and patients with Bilateral Intertrochanteric fracture of femur were excluded from our study.

Intertrochanteric fractures are fixed with DHS by lateral approach 8 and regular femoral nailing. Duration of postoperative stay is 10 days for dynamic hip screw and 5 days for proximal femoral nailing. All patients were mobilized on the very next day of surgery. Postoperative check x-ray taken. Toe touch walking started on day one. Full weight bearing allowed only after evidence of full radiological union. 9 We assess the patients on Outpatient basis at 6 weeks, 3 months, 6 months, and 1year and then yearly follow up, postoperatively functional outcome of both fixations were assessed by using Harris - Hip Score (HHS).

Statistical Analysis

Data obtained was then assessed statistically using Mann–Whitney U test for significance of difference between quantitative data like duration, blood loss, Harris hip scores. Z-score for used for the significance of difference between independent proportions for qualitative demographic data. Applying the null hypothesis the observed difference was considered to be significant if the p-value was <0.05.

Results

Table 1: Distribution of patients in DHS and PFN

Gender	DHS	PFN
Male	22 (44)	32 (64)
Female	28 (56)	18 (36)
Mean age	68.42±8.36	67.93±8.42

There were 44% male and 56% in DHS group and 64% were male and 36% were females in PFN group. The mean age 68.42±8.36 and 67.93±8.42 in DHS and PFN group respectively.

Table 2: Distribution of patients based on diagnosis in DHS and PFN

Diagnosis	DHS	PFN
Type I IT Fracture Right	1 (2)	0
Type I IT Fracture Left	0	0
Type II IT Fracture Right	7 (14)	1 (2)
Type II IT Fracture Left	13 (26)	1 (2)
Type III IT Fracture Right	14 (28)	28 (56)
Type III IT Fracture Left	12 (24)	12 (24)
Type IV IT Fracture Right	3 (6)	3 (6)
Type IV IT Fracture Left	0	5 (10)

Type III intertrochanteric fractures were more common because most patients had low velocity injuries and road traffic accidents. In this study, right sided intertrochanteric fractures were more common.

Table 3: Complications

Complications	DHS	PFN
No complication	32 (64)	42 (86)
Superficial infection	4 (8)	3 (6)
Screw cut- out	2 (4)	2 (4)
Lost to follow up	5 (10)	3 (6)
Varus collapse	4 (8)	0
Deep infection	1 (2)	0
Limb shortening	2 (4)	0

Among 100 patients with intertrochanteric fractures, patients developed less complication in PFN group than DHS group. Superficial infections more in DHS group (8%) than PFN group (6%) Screw cut -out noted in two patients of DHS group (4%) and two patients (4%) in PFN group. Patients who were lost to follow up were more in PFN group (10%) than DHS group (6%). Varus collapse founded in two patient of DHS group (8%) but not noted in PFN group. Deep infection founded in the patient among DHS group (2%) and not noted in PFN group Limb shortening noted in two patients of DHS group (4%) and No limb shortening noted in PFN group.

Table 4: Functional outcome

Functional outcome	DHS	PFN
Excellent	29 (58)	36 (72)
Good	7 (14)	5 (10)
Fair	7 (14)	5 (10)
Poor	7 (14)	4 (8)

In Group DHS, results were excellent in 58%, fair in 14%, good in 14%, and poor in 14%. In Group PFN, results were excellent in 72%, fair in 10%, and good in 10%. The range of movement calculated by the HHS system treated by both the implants, i.e., PFN and DHS was good and was almost the same. The range of movements namely flexion, extension, external and internal rotation was good in most cases, excellent in a few. Very few there were fair results.

Discussion

Intertrochanteric fractures are predominately associated with trivial trauma among the geriatric patients. It is commonly encountered in orthopaedic surgeon day to day daily practices. Intertrochanteric fractures treated without surgical interventions, can result in malunion with coxa vara deformity, shortening of the limb, limping, bedsores and other secondary complications. [8] Earlier conservative treatment was given which usually delayed the active mobilization of the patient for about 4 weeks which lead to multiple secondary complications. Nowadays treatment of choice for intertrochanteric fractures is operative management. Various surgical procedures using different implants have been described to treat intertrochanteric fractures. The important purpose of surgical treatment have to be early mobilization to keep away from secondary complications, which is obtained by fixation of Dynamic Hip screw (DHS) or Proximal Femoral Nail (PFN). Intertrochanteric fractures are common in elderly patients, mainly due to trivial trauma. The percentage of intertrochanteric fractures differs from country to country. Increased incidence of varus deformity and also shortening leads to poor function. Surgical management of intertrochanteric fractures was introduced to improve functional outcomes and reduce complications from prolonged bed rest. [9,10]

There were 44% male and 56% in DHS group and 64% were male and 36% were females in PFN group. The mean age 68.42±8.36 and 67.93±8.42 in DHS and PFN group respectively. Type III intertrochanteric fractures were more common because most patients had low velocity injuries and road traffic accidents. In this study, right sided intertrochanteric fractures were more common. In their series Baumgartner et al [11] found that the operative times of the DHS group were 10 % higher than PFN group. Saudan and colleagues found in their series that there was no significant difference in the operating time between the two groups of patients. [12] In our study we found more operating time in the DHS group. Since PFN has narrow distal diameter, the event of femoral shaft fractures is no more a problem. [13] Moreover, rotation control is inherent in nail design and does not rely on multiple components. These intramedullary nails have smaller diameter lag screws and therefore require less proximal femoral reaming, thereby decreasing the chance of iatrogenic proximal femoral fractures. In our study, there were no cases of femoral shaft fractures or extension of the original fractures during or after surgery. 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. [14]

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. [15,16] As in present study we have included intertrochanteric fractures of type I, II and III as well as Sub trochanteric fractures according to Boyd and Griffin, Evans and Seinshemimers classification. But we have not included subtrochanteric fractures variable extension in to femoral shaft and also trochanteric and subtrochanteric fractures with ipsilateral fracture shaft femur. So, need for using long length proximal femoral nail was eliminated. The barrel plate used in the cases treated by DHS was generally 135° 4 holed plates. As per the fracture configuration and fracture line extension, the number of holes in the barrel plate increased. [17]

Among 100 patients with intertrochanteric fractures, patients developed less complication in PFN group than DHS group. Superficial infections more in DHS group (8%) than PFN group (6%) Screw cut -out noted in two patients of DHS group (4%) and two patients (4%) in PFN group. Patients who were lost to follow up were more in PFN group (10%) than DHS group (6%). Varus collapse founded in two patient of DHS group (8%) but not noted in PFN group. Deep infection founded in the patient among DHS group (2%) and not noted in PFN group Limb shortening noted in two patients of DHS group (4%) and No limb shortening noted in PFN group. In Group DHS, results were excellent in 58%, fair in 14%, good in 14%, and poor in 14%. In Group PFN, results were excellent in 72%, fair in 10%, and good in 10%. The range of movement calculated by the HHS system treated by both the implants, i.e., PFN and DHS was good and was almost the same. The range of movements namely flexion, extension, external and internal rotation was good in most cases, excellent in a few. Very few there were fair results.

Conclusion

We concluded that Proximal Femoral nailing is an appropriate device for both stable and unstable intertrochanteric fractures than dynamic hip screw in terms of minimal complication and good functional Harris hip score.

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