

Original Research

Efficacy of two screws versus single helical screw in proximal femoral nailing for treatment of intertrochanteric fractures of femur: A comparative study

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ABSTRACT:

Background: To compare the efficacy of two screws versus single helical screw in proximal femoral nailing for treatment of intertrochanteric fractures of femur. **Materials & methods:** The present study included 40 cases of intertrochanteric fractures of skeletally mature adults out of which twenty each were operated upon with two screw proximal femur nail and single helical screw proximal femoral nail. Informed consent was taken as per the performa. Type of anaesthesia to be used was decided by the anaesthesiologist. Patients were discharged after primary complications were excluded. Follow up was done. At each visit clinical, radiological and functional outcome of the patient was assessed. **Results:** Mean time for partial weight bearing among patients of double screw and helical screw was 18.45 days and 14.74 days respectively (p-value < 0.05). Mean time required for fracture to unite among subjects of double screw group and helical screw group was 85.74 days and 88.32 days respectively (p-value > 0.05). **Conclusion:** PFN is an excellent implant in the management of intertrochanteric fractures.

Key words: Proximal femoral nailing, Helical, Screw

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INTRODUCTION

The morphology of the proximal femur, specifically the relationships among the head, neck, and proximal shaft, has been a subject of interest and debate in orthopaedic literature dating back to at least the middle of the 19th century. Hip fractures or fractures of proximal femur are one of the most frequent and appalling fractures affecting the elderly population with 90% occurring in >60 years age group. They comprise femoral neck and intertrochanteric fractures. 14% to 36% patients die within 1 year of experiencing them.^{1,2}

Intertrochanteric fractures are defined as fractures of proximal part of femur located between lesser and greater trochanter. Peritrochanteric area includes part of femur from extracapsular part of the neck to a point 5 cm distal to lesser trochanter. Weight bearing stress is unequally distributed throughout this area. Before the introduction of suitable fixation devices, treatment of intertrochanteric fractures was non operative, consist of prolonged bed rest in traction until fracture

healing occurred followed by a lengthy programme of ambulation training.^{3,4}

One goal of operative treatment is strong stable fixation of the fracture fragments. Unstable peritrochanteric fractures are technically much more challenging than stable fractures, a stable reduction of these type of fractures requires providing medial and posterior cortical contact between the major proximal and distal fragments to resist varus and posterior displacing forces.⁵

Dynamic Hip Screw with side plate assemblies. From the 1980s to 2000, sliding hip screws (SHSs) became the gold standard for hip fracture fixation. Keeping in mind the higher age of patients who suffer from intertrochanteric fractures and most of these patients also have osteoporosis it has been proposed to use a comparatively recent modification of this screw PFN which has a helical blade (in place of two screws) and is supposed to give better hold in osteoporotic neck of femur.^{6,7} The present study was under taken to fix all the intertrochanteric fractures of femur with two

screw PFN and single helical screw PFN with a view of comparing results and clinical outcomes of two.

MATERIALS & METHODS

The present study included 40 cases of intertrochanteric fractures of skeletally mature adults out of which twenty each were operated upon with two screw proximal femur nail and single helical screw proximal femoral nail. Informed consent was taken as per the performa. Type of anaesthesia to be used was decided by the anaesthesiologist. Operations were performed on a fracture table under anaesthesia. Closed reduction performed under C-arm will be considered acceptable when anatomic or a slight valgus position is achieved on anteroposterior (AP) radiographic views and slight cervical anteversion was achieved on lateral radiographic views. For both implants, the desired position of the lag screw was in the central femoral neck on the lateral view and in the central inferior femoral neck on the AP view, with the tip between 5 and 10 mm from the subchondral bone.

Immediate postoperative radiographs were checked to determine if cortical congruence at the calcar region has been restored. Patients were discharged after primary complications were excluded. Follow up was done. At each visit clinical, radiological and functional outcome of the patient was assessed. All the results were recorded and compared.

RESULTS

Mean age of the patients of the double screw and helical screw as 61.5 years and 64.8 years respectively. Mean duration of procedure among patients of the double screw and helical screw as 45.78 minutes and 38.45 minutes respectively (p-value < 0.05). Mean time for partial weight bearing among patients of double screw and helical screw was 18.45 days and 14.74 days respectively (p-value < 0.05). Mean time required for fracture to unite among subjects of double screw group and helical screw group was 85.74 days and 88.32 days respectively (p-value > 0.05).

Table 1: Mean age of the subjects of both the study groups

Parameter	Double screw	Helical screw
Mean Age (years)	61.5	64.8

Table 2: Comparison of mean duration of procedure among subjects of both the study groups

Parameter	Double screw		Helical screw		P- value
	Mean	SD	Mean	SD	
Mean duration of procedure (minutes)	45.78	4.35	38.45	3.84	0.000 (S)

Table 3: Comparison of mean time when patients were allowed to partially bear weight among subjects of both the study groups

Parameter	Double screw		Helical screw		P- value
	Mean	SD	Mean	SD	
Mean time for partial weight bearing (days)	18.45	3.2	14.74	1.60	0.000 (S)

Table 4: Comparison of mean time required for fracture to unite among subjects of both the study groups

Parameter	Double screw		Helical screw		P- value
	Mean	SD	Mean	SD	
Time for fractures to unite (days)	85.74	2.94	88.32	2.74	0.117

DISCUSSION

Intertrochanteric fractures are extracapsular fractures of the proximal femur affecting the region between the greater and lesser trochanters. These fractures are most common in the elderly, accounting for approximately half of all fractures around the hip in this age group. 90% of hip fractures occur in individuals more than 65 years of age. These fractures classically occur through bones affected by osteoporosis and reduced bone mineral density. Demographic changes in the next 60 years will lead to a spurt of elderly population in Asian countries including India, leading to a steep increase in the incidence of intertrochanteric fractures in the near future. While in younger individuals these fractures occur as a result of high energy trauma, 90% of intertrochanteric fractures in the elderly result from a domestic fall. A direct fall onto the hip, along with an

absence of adequate protection in the form of surrounding fat and muscle, compound the presence of senile osteoporosis in causing an intertrochanteric fracture. The presence of osteoporosis becomes an important aspect in the management of these fractures because fixation of the proximal fragment depends to a large extent on the quality of cancellous bone present in the fragment. Also, loss of the postero-medial buttress renders these fractures unstable, and such fractures in highly osteoporotic bone are a challenge to manage, with failure rates ranging from 8%-25%.⁸⁻¹⁰ Hence; the present study was under taken to fix all the intertrochanteric fractures of femur with two screw PFN and single helical screw PFN with a view of comparing results and clinical outcomes of two.

Mean age of the patients of the double screw and helical screw as 61.5 years and 64.8 years

respectively. Mean duration of procedure among patients of the double screw and helical screw as 45.78 minutes and 38.45 minutes respectively (p-value < 0.05). Mean time for partial weight bearing among patients of double screw and helical screw was 18.45 days and 14.74 days respectively (p-value < 0.05). In a previous study conducted by James B et al, authors analyzed the functional outcome of Proximal Femoral Nailing in Inter-Trochanteric Fractures of Femur. 22 patients (age group >18 years) who had Inter-trochanteric fracture treated with Proximal Femoral Nailing were included in their study. The X-ray of the operated hip was taken whenever it was felt necessary and on 4th week, 8th week, 12th week and at 6th month. Functional outcome measures were done by using Harris Hip Scoring System (Modified) at the end of 6 months. 14 males and 8 females in the age group of 47-82 years with the mean age of 62.09 years were included. Unstable inter-trochanteric fractures were commonly seen. Excellent results were seen in 13 patients. Intraoperative and post-operative complications were seen in 9 patients. They concluded that PFN is an excellent implant for the treatment of trochanteric fractures.¹⁰

Mean time required for fracture to unite among subjects of double screw group and helical screw group was 85.74 days and 88.32 days respectively (p-value > 0.05). Linga SS et al assessed functional outcome following PFN of unstable inter trochanteric femur fractures which includes the ability to sit cross leg and squat. As per Harris hip score, 25 patients (62.5%) had excellent or good results, 8 patients (20%) had fair and 7 patients (17.5%) had poor results. 74% (20 out of 27) regained their gainful working status. 80% (24 out of 30) were able to squat easily or with some difficulty and 74% (20 out of 27) patients were able to sit crossed leg with or without difficulty. 82% (23 out of 28) regained their unassisted walking status.¹¹ Zhang H et al compared the long-term functional and radiographic outcomes of two devices for the treatment of primary intertrochanteric fractures in elderly patients with osteoporosis. No between-group significant differences were noted in the patient demographics, operation variables, and postoperative Harris Hip Score. More radiographic complications were noted in terms of screw cut-out, femoral shaft fracture distal or around the tip of the main nail, and varus collapse of the femoral head in the PFNA group compared with that in the IT group.¹²

CONCLUSION

PFN is an excellent implant in the management of Inter-trochanteric fractures.

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