

Dynamic Hip Screw versus Proximal Femoral Nailing In Treatment of Intertrochanteric Fractures in Elderly

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Original Research Article

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Article History

Received: 10.06.2018

Accepted: 18.06.2018

Published: 30.06.2018

DOI:

10.21276/sjams.2018.6.6.30



Abstract: Dynamic Hip Screw fixation is still considered as a standard treatment for intertrochanteric fractures; however, some researchers have proposed Proximal Femoral Nailing as the alternative surgical treatment. The aim of this study was to compare Proximal Femoral Nailing versus Dynamic Hip Screw. Methods: In this study 60 patients with Intertrochanteric fractures admitted in Prathima Institute of Medical Sciences, Karimnagar from December 2015 to November 2017 were included, who underwent PFN fixation (20 patients) and DHS fixation (40 patients). All patients were screened after surgery for parameters like union, time of weight bearing, return to preinjury status, overall function result as well as for complications such as shortening, varus, external rotation Results: About some parameters like cutting length, surgery duration, bleeding there were significant differences between two groups. In six months follow up period 2 patients from nail and 8 patients from DHS group had nonunion. Also, from the point of radiologic and clinical parameters, like anterior thigh pain, cutout, medialization of the distal fragment, collapse of the neck, walking recovery and daily activities were significant between two groups. Conclusion: We recommend Proximal Femoral Nail as first choice for Intertrochanteric femur fractures due to early weight bearing, early union of fracture, lesser incidence of complications, early return to work, better overall functional results.

Keywords: Intertrochanteric fracture, Proximal Femoral Nail (PFN), Dynamic Hip screw (DHS).

INTRODUCTION

Intertrochanteric fracture of femur is the most common hip fracture in elderly age, accounting for more than 50 percent of hip injuries [1]. Due to increase in the average age of population, number of these fractures is growing up. Morbidity and mortality associated with these fractures is high because of age factor and over 90% of the hip fracture patients have preexisting medical comorbidities. Both factors have an important influence in its prognosis and treatment [2]. Most common mode of injury is accidental fall at home on physical examination; limb is shorted and externally rotated. The outcome may be extremely poor if there is prolonged bed-rest. Even with optimal care, elderly trauma patients suffer a higher morbidity and mortality rate when compared to general population. The best treatment of Trochanteric fracture still remains controversial [3-5]. Although various methods of treatment are available ranging from conservative management to arthroplasty, Dynamic hip screw (DHS) and Proximal femoral nail (PFN) are most common treatment methods used today. Hence the aim

of this study is primarily to compare functional recovery of patients treated with Dynamic hip screw (DHS) and Proximal femoral nail (PFN).

MATERIALS AND METHODS

This is a randomized comparative study, carried out from December 2015 to November 2017. 60 surgically fit patients of isolated intertrochanteric fractures of femur with age more than 50 years were included in this study of which were treated with Proximal Femoral nail and 40 with DHS. All the patients were subjected to clinical and radiological examination along with routine pathological investigations. Boyd and Griffin classification was used to mark type of fracture. Type of implant was randomly selected for each patient. All patients underwent standard operative procedure under anesthesia. In case of PFN, standard length of 240 mm was used for all cases. Duration of surgery, blood loss, number of blood transfusions and perioperative complications were recorded for each patient. Post-operative cases of DHS were mobilized out of bed with

no weight bearing on operated leg as soon as they are comfortable to do so. Toe touch weight bearing as allowed after 6 weeks. Full weight bearing was after radiological union. Post op cases of PFN were allowed to weight bear as tolerated as soon as they can. Patients were followed every 6th week until radiological union of fracture seen. Statistical analysis was done using descriptive statistical methods like mean, percentages and proportions, Chi-square test was used to find the association between two attributes and unpaired t-test was used to find the association between two variables. A p-value of less than 0.05 was considered to be statistically significant.

RESULTS

A comparative study of total of 60 patients of intertrochanteric fractures of femur who are treated with Proximal Femoral nail (20 cases) and Dynamic Hip Screw (40 cases).50% of cases in DHS and PFN series were in the age group of 61-70yrs. Mean age was 67.4 In DHS and 63.6 in PFN. Out of 60 patients, 33 were male and 27 were female. 21 males and 19 females underwent DHS, 12 males and 8 females underwent PFN. Most common mode of injury is domestic fall at home (70%) followed by RTA.

Table-1: Case Distribution as per (Boyd and Griffin classification)

TYPE OF FRACTURE	DHS	PFN
TYPE I	4 (10%)	0
TYPE II	20 (50%)	6 (30%)
TYPE III	6 (15%)	9 (45%)
TYPE IV	10 (25%)	5 (25%)
TOTAL	40	20

Mean operative time was less in PFN while setting time was little more. Operative blood loss was 246 ml as compared to 141 ml in PFN. This was calculated the sponges used (a normal size sponge

when fully soaked accommodate about 100 ml blood). Reduction of Hb level after operation was 2 gm% in DHS while it was 1.4 gm% in PFN.

Table-2: Operative and Postoperative Details

S.No	Parameters	DHS series	PFN Series	
I	Mean setting time(min)	14	18	
II	Mean operative time(min)	46	35	
III	Type of anaesthesia	spinal	80%	85%
		general	20%	15%
IV	Mean blood loss	Operative	246	141
		Wound drainage	133	0
V	Mean Hb (in gram %)	Preoperative	11.3	11.4
		Postoperative	9.3	10.0

All the fractures in PFN series were closed reduced, 6 fractures in DHS series were open reduced. Chest infection was noticed in one patient in both series. One patient in each series has got urinary tract infection. Superficial infection was noted in one patient in PFN series and 3 patients of DHS series. 13 cases were followed up to 6 months, 30 cases up to 12

months and 17 cases up to 18 months. External rotation deformity was noted in 1 patient in PFN series and 3 patients in DHS series. Varus rotation deformity was noted in 1 patient in PFN series and 3 patients in DHS series. Shortening was observed in 1 patient in PFN series and 3 patients in DHS series.

Table-3: Time of Osseous Union

Time of union (in weeks)	DHS series		PFN series		Total	
	No of cases	Percentage	No of cases	Percentage	No of cases	Percentage
<12	2	5	6	30	8	13.3
12-16	8	20	9	45	17	28.3
16-20	26	65	3	15	29	48.3
20-24	2	5	1	5	3	5
>24	2	5	1	5	3	5
Total	40		20		60	

p=0.005

Majority of fractures in the series of DHS united in 16-20 weeks while in PFN series it was 12-16 weeks.

Table-4: Overall Functional Results

Grades of result	DHS series		PFN series		Total	
	No of cases	Percentage	No of cases	Percentage	No of cases	Percentage
IV Excellent	22	55	14	70	36	60
III Good	12	30	4	20	16	26.7
II Fair	6	15	2	10	8	13.3
I Poor	-	-	-	-	-	-

DISCUSSION

Intertrochanteric femur fractures are recognized as one of major challenges by the orthopedic surgeons worldwide, not solely for achieving fractures union, but for restoration of optimal function in the shortest possible time with minimal complications. Accordingly, management has drifted to towards early mobilization, early rehabilitation and early return to premorbid status [6]. Operative treatment in the form of internal fixation permits early rehabilitation and offers the best chance of functional recovery, and hence has become the treatment of choice for virtually all fractures in the trochanteric region. Amongst the various types of implants available i.e. fixed nail plate devices, sliding nail/screw plate and intramedullary devices, the compression hip screw are most commonly used (still remains the GOLDSTANDARD) but of late, closed intramedullary nailing is gaining popularity [7]. In this study an attempt was made to survey, evaluate, document and quantify our success in the management of such individuals by using Proximal femoral nail (PFN) and Dynamic Hip Screw (DHS) implants and compare the result in these two groups. The study was conducted on 60 patients (20cases of PFN and 40 cases of DHS) of Intertrochanteric femur fractures from December 2015 to November 2017. Two thirds of Intertrochanteric femur fractures in this study were treated with DHS and one third with PFN. Mean age of PFN series 63.6yrs. Mean age of DHS series is 67.4yrs. Mean age in years both groups combined 65.5yrs. This signifies the fact that patients from these age groups are involved in low energy trauma like domestic fall. Gallagher *et al.* [8] reported an eight-fold increase in trochanteric fractures in men over 80 years and women over 50 years of age. Most of patients from present study were males. This contrasts with Cleveland *et al.* [9] study which had 87.7% of female patients. Mode of injury is domestic fall at home in 15 cases (75%) of PFN and 28 cases (70%) of DHS. Rests of the injuries were due to Road Traffic Accident (RTA). Keneth J. Koval and Joseph D. Zuckerman [10] observed that 90% of hip fractures in the elderly result from a simple fall. Hip fractures in young adults were most often due to high energy trauma such as motor vehicular accidents or a fall from height. Out of 20 PFN cases, 13(65%) were right side fractures and 7(35%) left side fractures. Of 40 DHS cases, 25(62.5%) were right side fractures and 15(37.5%) left side fractures. 50% of cases treated with DHS are Boyd and Griffith type II and 45% of cases treated

with PFN are Boyd and Griffith type III. Open reduction was done in 15% of cases of DHS and closed reduction was done in 100% PFN cases. Superficial wound infection was seen in 1 PFN case and 3 DHS cases, all healed by the time of suture removal. Hip and knee ROM exercises were started on 2nd postoperative day. Non weight bearing with crutches was allowed early in case of PFN (<1 week) and > 1 week in case of DHS. The partial weight bearing was started early and full weight bearing in <6weeks in PFN while it was >6weeks in DHS. B Mall *et al.* [11] in 30 patients' series, average time of ambulation was 14 days. In case of GS Kulkarni *et al.* [12] series, ambulation was usually started 11-12 days after the suture removal. Average follow up was 9.07 months in DHS while it was 14.62months in PFN series. In PFN series, external rotation (>15 degree) was noted in 1 case (5%), shortening in 1 case(5%) and varus in 1 case(5%). 3 cases (7.5%) of varus deformity and 3 cases of shortening (7.5%) were noted in DHS series. In KD Harrington *et al.* [13] series, coxa vara was noted in 4 cases and limb shortening in 56 cases out of 72 cases. Average time taken for fracture union in our study is 16-24 weeks in DHS series and 12-16 weeks in PFN series. Patients returned to pre-injury functional status in 87.5% DHS cases and 95% PFN cases. Excellent overall functional result was observed in 70% PFN cases and 55% DHS cases.

CONCLUSION

Although the long term conclusion cannot be drawn at this stage, our limited follow up study indicates that proximal femoral nail fixation is a superior to dynamic hip screw fixation in inter trochanteric fractures because of early full weight bearing, early union of fracture, lesser incidence of complications like shortening, early return to work, better overall functional results with PFN.

REFERENCES

1. Carpintero P, Caeiro JR, Carpintero R, Morales A, Silva S, Mesa M. Complications of hip fractures: a review. World journal of orthopedics. 2014 Sep 18;5(4):402.
2. Menzies IB, Mendelson DA, Kates SL, Friedman SM. The impact of comorbidity on perioperative outcomes of hip fractures in a geriatric fracture model. Geriatric orthopaedic surgery & rehabilitation. 2012 Sep;3(3):129-34.
3. Norris R, Bhattacharjee D, Parker JM. Occurrence of secondary fracture around intramedullary nails

- used for trochanteric hip fractures: A systematic review of 13,568 patients. *Injury*. 2012; 43(6): 706-711.
4. Anglen JO, Weinstein JN, American Board of Orthopaedic Surgery Research Committee. Nail or plate fixation of intertrochanteric hip fractures: changing pattern of practice: a review of the American Board of Orthopaedic Surgery Database. *JBJS*. 2008 Apr 1;90(4):700-7.
 5. Takigami I, Matsumoto K, Ohara A, Yamanaka K, Naganawa T, Ohashi M, Date K, Shmizu K. Treatment of trochanteric fractures with the PFNA (proximal femoral nail antirotation) nail system. *Bull NYU Hosp Jt Dis*. 2008 Oct 1;66(4):276-9.
 6. Knobe M, Gradl G, Ladenburger A, Tarkin IS, Pape HC. Unstable intertrochanteric femur fractures: is there a consensus on definition and treatment in Germany?. *Clinical Orthopaedics and Related Research®*. 2013 Sep 1;471(9):2831-40.
 7. Konstantinos GM, Vasileios G, Miltiadis G, Vasileios M, Vasileios K, Leonidas B. Comparing two intramedullary devices for treating trochanteric fractures: A prospective study. *Journal of Orthopaedic Surgery and Research* 2010; 5:9: 1-8.
 8. Gallagher JC, Melton LJ, Riggs BL et al. Epidemiology of fractures of the proximal femur in Rochester, Minnesota. *Clin Orthop Relat Res*. 1980; 150:163-171.
 9. Mather Cleveland: A ten-year analysis of intertrochanteric fractures, *JBJS* 63B, 218,1983
 10. Kenneth J. Koval and Joseph D. Zuckerman: Rockwood and Green's Fracture in Adults, Chapter 39, 5th Edition, 2001-edited by Robert W. Bucholz and James D. Heckman, J.B. Lippincott Company, Vol 2,1635-1663.
 11. B. Mall, Susheel Kumar Pathak, Vineet Malhotra: Role of dynamic compression hips screw in trochanteric fracture of femur. *Indian Journal of Orthopaedics*, July 1999; 33 (3):226-28.
 12. Kulkarni GS. Treatment of trochanteric fractures of hip by modified Richard's compression and collapsing screw, *Indian Journal of Orthopedics* 1984; 18 (1): 30.
 13. Harrington KD, Johnston JO. The management of comminuted unstable intertrochanteric fractures. *JBJS*. 1973 Oct 1;55(7):1367-76.