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INTERTROCHANTERIC FRACTURE OF FEMUR;
OUTCOME OF DYNAMIC HIP SCREW IN ELDERLY PATIENTS

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ABSTRACT... Background: Intertrochanteric (IT) fracture is common in elderly population. The dynamic hip screw is widely accepted in the treatment of IT fractures of the proximal femur. **Objectives:** To determine the outcome of dynamic hip screw in intertrochanteric fracture of femur in elderly patients. **Design**: A descriptive observational study **Setting:** Department of Orthopaedic Khyber Teaching Hospital, Peshawar. **Period:** From 7th Jan 2008 to 7th Jan 2009. **Material and Methods**: 113 consecutive patients with intertrochanteric fracture of the femur treated with dynamic hip screw. All patients were investigated and optimized for surgery. An accurate close reduction was done under fluoroscopic control. A dynamic hip screw (DHS) was inserted by a standard technique. Patients were reviewed clinically and radiographically on 2nd, 6th, 12th and 24th weeks. **Results:** We studied 113 Patients of intertrochanteric (IT) fracture, 13 patients were lost to follow up and the study was completed on 100 patients. Forty seven (47.0%) patients were male and 53 (53.0%) were female. Postoperatively seven patients (7%) suffered from infections, 3 (3.0 %) patients suffered from restricted hip joint movements. There was shortening of lower limb in 3 (3.0%) patients, 2 (2.0%) patients developed non union of the fracture site, 1 (1.0%) patient develop varus deformity. Seven (7.0%) patients had implant failure, 3 of which have lag screw cut-out through superior cortex, 3 patients have broken leg screw at barrel shaft junction and 1 patient has broken leg screw at 3 sites. 77 (77.0%) healed without complications. **Conclusion** It is concluded that the Dynamic Hip Screw is safe, suitable and reliable method of fixation for Boyd and Griffin type I and type II intertrochanteric fracture of femur.

Key words: Intertrochanteric, fractures, dynamic hip screw, Failure, Fixation.

INTRODUCTION

Hip fracture is the second most common cause of hospitalization for elderly patients[1]. Intertrochanteric fracture is common in elderly population. Ninety percent of IT fractures in the elderly patients result from a simple fall[2] and are a considerable burden to the health care system through their association with increased mortality

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and morbidity[3,4]. IT femoral fractures have been estimated to occur in more than 200,000 patients annually in the United States, with reported mortality rates ranging from 15% to 30%[5].

Hip fractures accounts for 30% of all hospitalized patients in the United States. The estimated cost for treatment is approximately $ 10 billion a year[5].

The goal of treating hip fracture is to return patients to their pre-fracture level of function without long-term disability and avoiding medical complications[5]. Rigid fixation with early mobilization of patients should be considered as the standard treatment[2,6,7]. Treatment options include nonoperative treatment and operative treatment. Operative options include reduction and internal fixation with dynamic hip screws, dynamic condylar screws and intramedullary fixation devices[5].
Although many devices can achieve rigid fixation, the Dynamic Hip Screw is the most commonly used device for intertrochanteric fractures[8,9,10]. DHS is widely accepted in the treatment of IT fractures of the proximal femur[11]. It utilizes controlled impaction during weight bearing to stabilize the fracture, thus facilitating healing[12]. Seventy five (75 %) percent of the patients regain normal pre-fracture activities after 30 weeks[13]

Significant mortality remains an issue, the overall fixation failure rate and re-operation rate for trochanteric fractures fixed with a sliding hip screw is low[14]. The final outcome of surgery for the survivors is good, with most patients returning to their pre-fracture level of accommodation and mobility, with minimal pain 1-year post-fracture[14].

METHODS

We conducted a descriptive observational study of 113 consecutive patients with intertrochanteric fracture of the femur treated with dynamic hip screw. This study was conducted from 7th January 2008 to 7th January 2009, on patients admitted to the Orthopaedic and Trauma unit of Khyber Teaching Hospital, Peshawar through causality or OPD. All consenting patients of both sex and age above 40 years having Intertrochanteric femur fracture who presented within two weeks after fracture were included in the study. Patients with open fractures, fracture treated previously by any means and pathological fracture were excluded.

Detailed patient history especially about mechanism of injury and pain were asked. Clinical examination for soft tissue status, deformity, shortening, neurovascular status of the limb and joint movements was done. Preoperative laboratory investigations including hemoglobin levels, total leukocyte count, urea, sugar, HBsAg, Anti-HCV, electrocardiograph and chest radiograph were done. Pelvic x-ray antero-posterior view and lateral view of the intertrochanteric region along with joint above and below the fracture site were obtained. Fracture was classified according to Boyd[15] and Griffin classification system. Skin traction was applied in all patients. Any medical problem was treated. All patients had prophylactic intravenous antibiotics.

An accurate close reduction was done under fluoroscopic control. DHS was inserted by a standard technique. Postoperatively antibiotic and pain relief was administered. Immediate post operative radiographs were obtained, Patients were mobilized on the 1st postoperative day; they were reviewed clinically and radiographically on 2nd, 6th, 12th and 24th weeks. Data was entered into a standard proforma.

RESULTS

We studied 113 Patients with IT fracture above the age of 40 years. 13 patients were lost to followed up due to death (ten cases) or relocation (three cases), and they were excluded from the study. 100 patients have completed the 6 months follow up and were included in this study. Fifty three patients were in age range of 56-70 years, mean age was 68 years. Out of 100 patients, 47 (47.0%) were male and 53 (53.0%) were female with male to female ratio of 1:1.12. Left side IT fractures were 43 (43.0%) and right side IT fractures were 57 (57.0%). Mechanism of injury was fall in 80 (80.0%) cases and road traffic accidents (RTA) in 18 (18.0%) cases, most of the patients with RTA have type-III or type-IV fractures, 2 (2.0%) cases had other causes. Among clinical presentation, all patients presented with pain, 61 (61.0%) patients had

swelling at upper thigh. External rotation was present in 8 (8.0%) patients. Ecchymosis was present in 52 (52.0%) patients. Fracture site was tender in 43 (43%) patients.

When classified by Boyd and Griffin classification of intertrochanteric fracture there were 39 (39.0%) cases of Type-I, 28 (28.0%) cases of Type-II and 19 (19.0%) cases of Type-III and 14 (14.0%) cases of Type IV fracture.

Postoperatively all patients were followed clinically and radiologically, clinically & radiological complications are given in table I and table II respectively.

Table-I. Clinical Complications in patients with IT fracture fixed with DHS

Clinical criteria	No of pts	%age
Infection	7	7.0%
Joint stiffness	3	3.0%
Rotation of leg	-	-
Shortening of leg	3	3.0%

Table-II. Radiological Complications in patients treated with DHS.

Radiological criteria	No of pts	%age
Implant failure	7	7%
Non union	2	2%
Varus deformity	1	1%

Twenty percent (20.0%) patients complained of postoperative pain at surgery site during the first 2 weeks, 18 of them were treated with oral analgesics 2 patients needed intramuscular analgesics like Diclofenac Sodium. Seven (7%) patients developed infections, 6 patients were settled with antibiotics only and 1 patient needed incision drainage and wound debridement. Three patients suffered from restricted hip joint movements, it resolved with physiotherapy. Three (3%) patient had more than 2cm shortening of the limb, these patients had unstable fracture.

Two (2.0%) patients developed non union of the fracture site. These patients have persistent tenderness in the hip region 6 month postoperatively, 1 patient was treated by refreshing of the fracture margins and bone grafting and fixed with the same type of device (DHS) and the other patient was treated by hemiarthroplasty. One patient developed varus deformity. Seven (7.0%) patients had Implant failure, 3 of which had lag screw cut-out through superior cortex, 3 patients had broken leg screw at barrel shaft junction, and 1 patient had broken leg screw at 3 sites which is a rare occurrence (Fig 1).

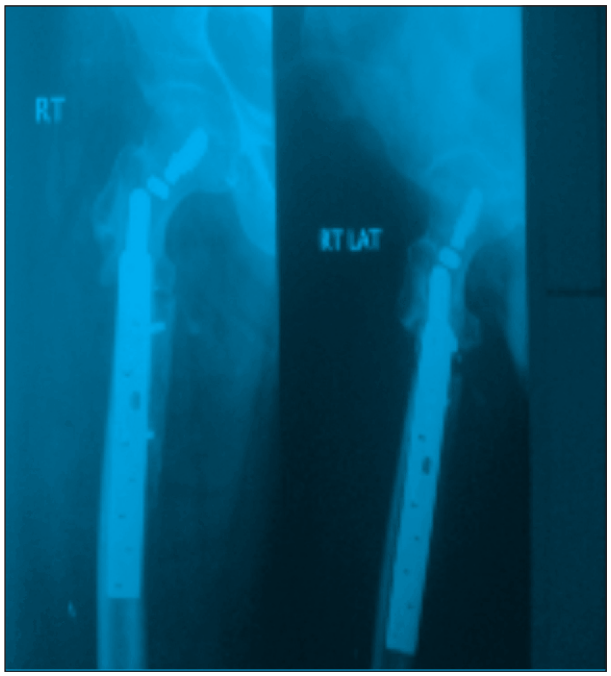

Fig-1. Implant failure (broken Leg Screw)

Final outcome of 100 patients of IT fractures treated with DHS, 77 (77.0%) healed without complications and 23 (23.0%) result in different types of complications. Final outcome is given in table III.

DISCUSSION

Proximal femoral fractures are common in the elderly and frequency is increasing with more ageing population[16-18]. Early operative treatment reduces both mortality and morbidity, giving the best chances of early independence and reducing the risk of prolong bed rest[19].

Table-III. Final out come of the IT fractures treated with DHS		
Final outcome	**No of pts**	**%age**
Heated without complications	77	77%
Implant failure	7	7%
Infection	7	7%
Joint stiffness	3	3%
Non union	2	2%
Shortening	3	3%
Warus deformity	1	1%

Extracapsular hip fractures can be fixed surgically with a variety of implants e.g. sliding hip screws (SHS) and intramedullary devices. SHS system consists of a lag screw and a plate with variable angle barrels. The lag screw is inserted into the femoral neck & head and bridges (fix) the fracture site and is attached to the barreled plate which is fixed to the lateral cortex of the femur with help of cortical screws. Sliding of lag screw in barrel allows the fracture to collapse & impact in the stable position. Intramedullary devices are inserted from the top of the femur into the medullary cavity and are fixed with the interlocking screws[20].

Intrameduallary nailing has not been shown to be superior to DHS fixation with respect to long-term outcomes of most patients with intertrochanteric fractures[21, 22]. DHS remains the implant of choice because of its favourable results and low rate of non-union and failure. It provides controlled compression at the fracture site[23].

The use of DHS has been supported by its biomechanical properties[24] which have been assumed to improve the healing of fractures[25]. Meta-analysis has suggested that the DHS should be favored for the treatment of pertrochanteric fractures[26, 27].

This study was conducted to know the outcome of fixation in patients in whom DHS was implant for IT fracture in patients above the 40 years of age. The patients were followed up to 6 months both clinically and radiologically for fracture healing or development any complication.

In our study mean age of the patients was 68 years; there were 47 (47.0 %) male & 53 (53.0 %) female patients. Left side IT fractures were 43 (43.0 %) & right side IT fractures were 57 (57.0 %). While in a study by Dominique et al[28] mean age of patients was 79.5 years, there were 15 (30.0 %) male and 35 (70.0%) female patients. Left side IT fractures were 24 (48.0 %) & right side IT fractures were 26 (52.0 %) in a total of 50 patients. In Leung[19] study mean age of patients was 78.27 years, there were 30 (32.26 %) male & 63 (67.74 %) female patients. Left side IT fractures were 50 (53.76 %) & right side IT fractures were 43 (46.24 %) in a total of 93 patients. Comparison of our study with these two studies is given in table no IV.

Lower mean age of patients in this study may be due to low life expectancy of population in our set up. There is increase number of male patients in this study as compared to previous studies. This may be because male patients are more exposed to trauma (RTA) and more male patients seek medical treatment in comparison to female patients in our setup.

Postoperatively 2 (2.0 %) patients develop nonunion which was comparable to the Dominique study where 1 (2.0%) patient had nonunion of the fracture site. Other postoperative complications were comparable to the study of Leung and are given in table no V.

Most of the postoperative complications were reported in patients having type III or type IV fractures.

In this study all Boyd and Griffin types of intertrochanteric fractures of femur were fixed with DHS. Excellent results were obtained in type I and II fractures, but poor results in type III and type IV fractures.

CONCLUSION

Intertrochanteric hip fracture is common in our geriatric population. Use of Dynamic Hip Screw is safe, suitable and reliable method of fixation for Boyd and Griffin type I and type II intertrochanteric fracture of femur in elderly patients in our set up but ineffective in type III and IV fractures.

Table-IV. Comparison of mean age, gender and side involvement							
Author	**mean age (years)**	**Gender**	**No. of pts**	**%age**	**Side**	**No. of pts.**	**%age**
Dominique et al.[28]	79.5	Male	15	30%	Left	24	48.0%
		Female	35	70%	Right	26	52.0%
Leung.[19]	78.27	Male	30	32.26%	Left	50	53.76%
		Female	63	67.74%	Right	43	46.24%
Out study	68	Male	47	47.0%	Left	43	43.0%
		Female	53	53.0%	Right	57	57.0%

Table-V. Comparison of postoperative complications				
Complications	**No. of complications**	**%age**	**No. of complications**	**%age**
Infection	7	7.0%	3	3.22%
Superior cut out	3	3.0%	3	3.22%
Implant breakage	4	4.0%	-	-
Shortening	3	3.0%	2	2.15%
External rotation	0	-	1	1.07%
Verus deformity	1	1.0%	2	2.15%
Joint stiffness	3	3.0%	-	-

Further studies with large data size and prolong follow up is recommended.

REFERENCES

1. Beaupre LA, Jones CA, Saunders LD, Johnson DWC, Buckingham J, Majumdar SR. **Best practices for elderly hip fractures patients: a systemic overview of the evidence.** J Gen Intern Med 2005;20(11):1019-25.
2. Koval JK, Cantu RV, Intertochanteric fractures In: Bucholz RW, Heckman JD, Court-Brown CM, editor. **Rockwood and Green fractures in adults.** 6th ed. Philadelphia Lippincott Williams & Wilkins 2006:1793-825.
3. Kanis J, Borgstrom F, De Laet C, Johansson H, Johnell O, Jonsson B, et al. **Assessment of fracture risk.** Osteoporos Int 2005;16:581-9.
4. Tidermark J. **Quality of life and femoral neck fractures.** Acta Orthop Scand 2003;309:1-42.
5. LaVelle DG. **Fractures and dislocations of the hip.** In: Canale ST, Beaty JH, editor. Campbell's operative orthopaedics. 11th ed. Philadelphia: Mosby 2008: 3237-308.
6. Kaufer H, Matthews LS, Sonstegard D. **Stable fixation of intertrochanteric fractures. A biomechanical evaluation.** J Bone Joint Surg 1974;56A:899–907.
7. Kyle RF, Gustilo RB, Premer RF. **Analysis of six hundred and twenty-two intertrochanteric hip fractures.** J Bone Joint Surg Am 1979 61:216–21.
8. Alobaid A, Harry EJ, Elder GM. **Prospective randomized trial of two techniques of insertion of a standard dynamic fixation device.** J Orthop Trauma 2004;18(4):207-12.
9. Bolhofner B, Russo P, Carmen B. **Results of intertrochanteric femur fractures treated with a 135-degree sliding screw with a two-hole side plate.** J Orthop Trauma 1999;13:5–8.

10. McLoughlin S, Wheeler D, Rider J. **Biomechanical evaluation of the dynamic hip screw with two- and four-hole side plates.** J Orthop Trauma 2000;14:318-23.

11. Davis TRC, Sher JL, Horsman A. **Intertrochanteric femoral fractures: mechanical failure after internal fixation.** J Bone Joint Surg 1990; 72-B: 26-31.

12. Moroni A, Faldini C, Pegreffi F, Kim AH, Vannini F, Giannini S. **Dynamic hip screw compared with external fixation for treatment of osteoporotic Pertrochanteric fractures: A prospective randomized study.** J Bone Joint Surg Am 2005;87:753-9.

13. Ahmad AA, Qasrani GH, Bhutta IA. **Unstable Intertrochanteric fractures of proximal Femur; Effect of different positions of reduction & internal fixation with dynamic hip screw in hip score (Larsson's) & resumption of daily activities.** Professional Med J 2002;9(3):279-84.

14. Chirodian N, Arch B, Parker MJ. **Sliding hip screw fixation of trochanteric hip fracture: Outcome of 1024 procedures.** Injury 2005;36:793-800.

15. Boyd HB, Griffin LL. **Classification and treatment of trochanteric fractures.** Arch Surg 1949;58:853–66.

16. Wallace WA. **The increasing incidence of fractures of the proximal femur: an orthopaedic epidemic.** Lancet 1983; i:1413-4.

17. Cummings SR, Rubin SM, Black D. **The future of hip fracture in United States: number, cost and potential effects of postmenopausal estrogen.** Clin Orthop 1990; 252:163-6.

18. Rockwood PR, Horne JG, Cryer C. **Hip fracture: a future epidemic?.** J Orthop Trauma1990;4:388-93.

19. Leung KS, So WS, Shen WY, Hui PW. **Gamma nail and dynamic hip screw for peritrochanteric fractures. A randomised prospective study in elderly patients.** J Bone Joint Surg 1992;73-B (3):345-51.

20. Parker MJ, Handoll HH. **Gamma and other cepha-locondylic intramedullary nails versus extramedullary implants for extracapsular hip fractures in adults.** Cochrane Database Syst Rev 2005 Oct19:(4).

21. Lorich DG, Geller DS, Nielson JH. **Osteoporotic pertrochanteric hip fractures. management and current controversies.** Instr Course Lect 2004;53:441–54.

22. Parker MJ, Handoll HH. **Gamma and other cehalo-condylic intramedullary nails versus extramedullary implants for extracapsular hip fractures.** Cochrane Database Syst Rev 2004;1:CD000093.

23. Gadegone WM, Salphale YS. **Proximal femoral nail – an analysis of 100 cases of proximal femoral fractures with an average follow up of 1 year.** Int Orthop2007;31(3):403–8.

24. Rosenblum SF, Zukerman JD, Kummer FJ, Ram BS. **A biomechanical evaluation of the gamma nail.** J Bone Joint Surg 1992;74-B:352-7.

25. Pajarinen J, Lindahl J, Michelsson O, Savolainen V, Hirvensalo E. **Pertrochanteric femoral fractures treated with a dynamic hip screw or a proximal femoral nail.** J Bone Joint Surg 1992;74-B:352–7.

26. Parker MJ, Handoll HHG. **Gamma and other cephalocondylic intramedullary nails versus extramedullary implants for extracapsular hip fractures.** Cochrane Musculskeletal injuries Group Cochrane Database of Systemic Reviews.2003;3.

27. Parker MJ, Pryor GA. **Gamma nailing versus DHS for extracapsular femoral fracture: a meta-analysis of 10 randomized trails.** Int Orthop 1996;20:163-8.

28. Hardy DCR, Descamps P, Krallis P, Fabeck L, Smets P, Bertens CL, et al. **Use of an Intramedullary Hip-Screw Compared with a Compression Hip Screw with a Plate for Intertrochanteric Femoral Fractures.** J Bone Joint Surg 1998;80-A6:618-30.