Original Article

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To Evaluate The Outcome of Proximal Femoral Nail A2 in Management of Inter-trochanteric Fractures of Femur in Elderly

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Abstract

Introduction: The incidence of inter-trochanteric fracture in the elderly is rising because of increased age and with low bone mineral density. The presence of osteoporosis in inter-trochanteric fractures is important because the fixation of the proximal fragment depends entirely on the quality of the cancellous bone present. The surgical stabilization of inter-trochanteric fractures remains a persistent challenge. The purpose of this study is to study the effectiveness and drawbacks of one such newer intramedullary device, Proximal Femoral Nail Antirotation in the management of inter-trochanteric fractures.

Materials and Methods: Patients who underwent PFNA for inter-trochanteric fractures at a tertiary care center Agra, who have given written and informed consent. Patients fitting into inclusion criteria would form the study group. Data collected by interviews, observation of clinical and radiological findings and assessment of function done using Harris hip score.

Results: The study comprised 24 patients, with a mean age of mean age 63 years who suffered fracture inter-trochanteric femur, due to either trivial fall (75%) or RTA (17%) and managed by cephalomedullary nailing using Proximal Femoral Nai Antirotation at our center. The majority of the patients had the quality of reduction; the Majority of patients took 12 to 22 weeks for union with mean union time of 14 weeks. Patients were asked to follow up routinely, with post-operative follow up ranging from a minimum of 11 months to 18 months. At the final follow up following results obtained according to Harris Hip Score, were 55% patients excellent, 30.50% patients good, 12% patients fair, 2.50% patients poor.

Conclusions: The inter-trochanteric fracture in elderly patients treated with cephalomedullary nailing using proximal femoral nail-anti-rotation, which has the biomechanical advantage of the helical blade providing bone compaction, increasing surface area and better anchorage in the femoral head, which showed favorable outcome by retarding rotation and varus collapse and prevents medialisation by acting as a central pillar.

Keywords: Inter-trochanteric fractures; Proximal femoral nail A2; Harris Hip Score.

Introduction

Inter-trochanteric fractures are one of the most common injuries occurs predominantly in patients over fifty years of age. They are three to four times more common in females (who are osteoporotic); fall on the ground being the most common mode of injury [1]. Conservative treatment usually progresses to malunion with varus and external rotation deformity which may lead to short limb gait and a high rate of mortality due to complications of recumbence and immobilization. The aim of the treatment of an inter-trochanteric fracture is the restoration of the patient to his or her pre-injury status as early as possible [3].

The main problems for the orthopedic surgeon treating this fracture are instability and the complications of fixation that result from instability. Stability refers to the power of the internally fixed fracture to resist muscle and gravitational forces around the hip that tend to force the fracture into a varus position. Intrinsic factors like osteoporosis and comminution of the fracture and extrinsic factors like choice of implant and insertion technique both of these factors contribute to the failure of internal fixation.

The type of implant used has an important influence on future complications of fixation. Sliding devices like the dynamic hip screw have been most commonly used for fixation. However, if the patient bears weight early, especially in comminuted and unstable fractures, these devices can penetrate the head or neck, bend, break or separate from the shaft.

Intra-medullary devices (proximal femoral nail) have been reported to have an advantage in such fractures as their placement allowed the implant to lie closer to the mechanical axis of the extremity, thereby decrease the lever arm and bending moment on the implant.

A new generation of proximal femoral nails with helical blades has been developed which have the advantage of larger contact area and compression between the blade and the cancellous bone, therefore better stability against varus collapse, especially in patients with osteoporotic bones (elderly patients).

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Materials and Methods

The study was conducted at tertiary care centre from January 2017 till October 2018 where 24 patients with osteoporotic intertrochanteric fractures were selected.

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Figure 1: Pre-Op X-ray

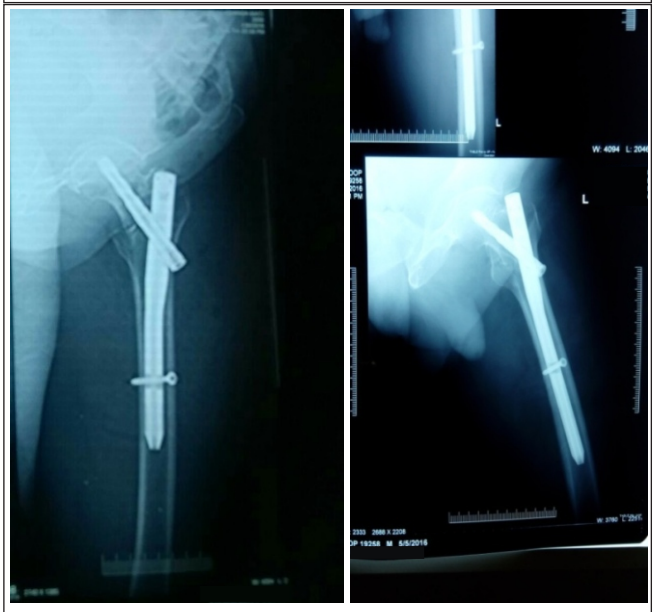

Figure 2: Post-Op X-ray

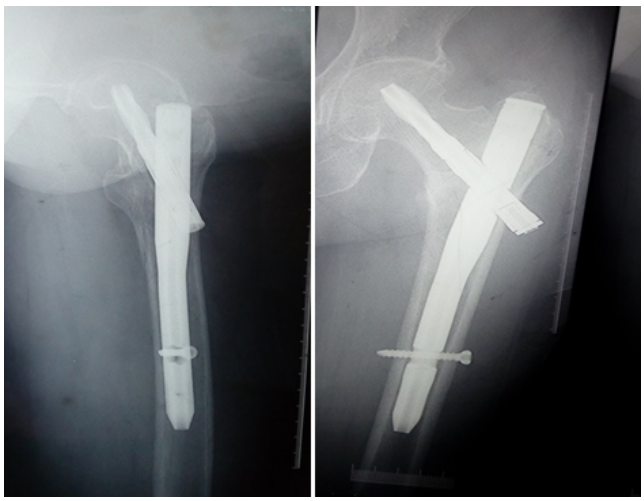

Figure 3: At 3 Months Follow-up

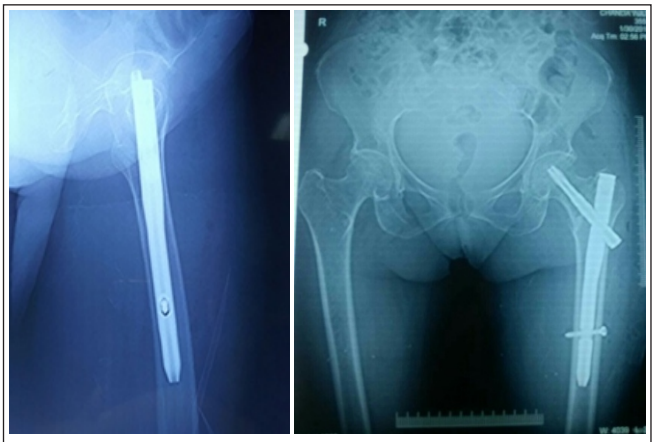

Figure 4: At 9 Months Follow-up

Figure 5: At 10 month followup (Squatting, Standing, One leg front, SLR)

Patient with inter-trochanteric fracture attending S.N. Medical college was evaluated preoperatively and functional results were assessed postoperatively. All elderly patients with intertrochanteric fractures and who were able to walk before the fracture were included in the study. Patient with pathological fracture, active infection, unstable medical illness, non-traumatic disorder, previous surgery of proximal femur, polytrauma and ongoing chemotherapy or irradiation treatment due to malignancy were excluded from the study.

A total of 24 elderly patients with intertrochanteric femur fractures managed with proximal femoral nail antirotation for a prospective study. Evaluation of cases was done as per the history, mode of injury. All necessary preoperative radiograph (fig. 1) and hematology profile were done on admission. Type of surgery and details were noted. The immediate post-operative radiographs were evaluated (Fig. 2). At 6 weeks, 12 weeks (fig. 3), 6 months and 1 year (fig. 4) all the cases were again evaluated through clinical (fig. 5) and radiological methods for any morbidity and mortality. Harris hip score had been used in our study for regular follow-up and evaluation on each follow-up visit.

Results

The age of the patients ranged from 50 to 82 with fractures most common in the 5th and 6th decade and an average age of 63 years. Out of 24 patients, 14 (58%) patients were females and 10 (42%) patients were males showing female preponderance because osteoporosis is a common problem among postmenopausal women. There were 13 (54%) patients with left-sided intertrochanteric femur fractures and 11 (46%) were right-sided. In our study, 18 (75%) patients sustained injury following trivial fall on the ground, 4 (17%) patients sustained an injury due to road traffic accident and 2 (8%) due to other miscellaneous causes. The mean time from injury to surgery time was 5.3 days ranging from 2 to 30 days. Of the 24 cases treated with PFNA 2 (8%) took <49 minutes, 4 (17%) took 50-59 minutes, 9 (38%) took

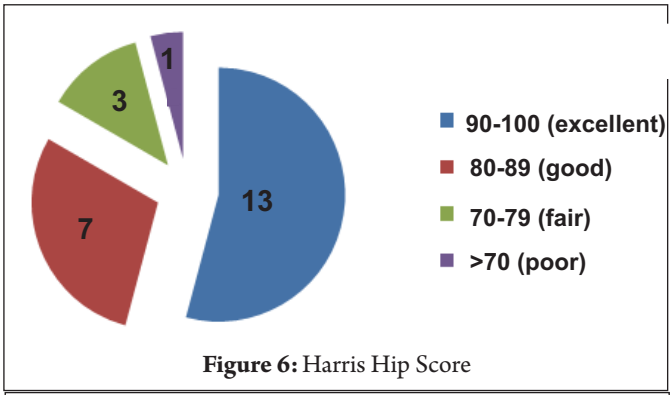

Figure 6: Harris Hip Score

Table 1: Showing postoperative complications

Complications	Number of patients	Percentage
Varus collapse	1	4
Medial thigh pain	3	12.5
Femoral shortness	4	16

ranged from 4 to 14 days. At the end of the study 24 cases show follow up of 14.3 months ranging from 11 to 18 months. Out of 24 cases of intertrochanteric femur fractures in elderly managed by proximal femoral nail anti-rotation 13 (55%) patients had excellent outcomes, 7 (30.5%) had good results, 3 (12%) had fair outcome and 1 (2.5%) patient had a poor result.

The average Harris hip score at the end of the study showed a mean value of 91, ranged from 65 to 98 with almost 20 (83%) patients showing an excellent or good outcome. And 100% fractures got united with a good component position and the average time to bone healing was 14 weeks (range 12 – 22 weeks) (Fig. 6).

Of the 24 cases operated, 4 cases suffered shortening in the affected side averaged about 0.25 cm ranged from 0 to 1 cm (Table 1).

Discussion

Results of our study in term of average age (year), fracture to surgery time (days), duration of surgery (min.), blood loss (ml), average fluoroscopy time (second), average hospital stay (days), harris hip score are comparable to other study group like that of Sadic et al [4], Jin-song pu et al [5], Chaoling et al [6], Sahin S et al [7], and Kumar et al [8]. Table 2 summarizes all previous studies and our study.

Table 2: Comparison of other studies with our study

Study	Age (average) Years	Fracture to surgery time (Days)	Duration of surgery (Minute)	Blood loss (ml)	Average Fluoroscopy time (Second)	Average hospital stay (Days)
Sadic et al [5]	75.9	3.7	73.1	22.8	63	12.5
Jin-Song Pu et al [6]	-	-	31A2-53 31A3-78	31A2-80 ml 31A3-200 ml	A2 -113 A3 -152	11
Chaoling et al [7]	80	-	31A2-48 31A3-61	31A2-50 ml 31A3-150 ml	A2 -128 A3-159	7
Sahin S et al [8]	72	8	37.8	225 ml	-	13.5
Kumar et al [9]	61	6	32	-	-	6
Present Study	**63**	**5.3**	**63**	**84 ml**	**70**	**5.6**

60-69 minutes, 7 (29%) took 70-79 minutes and 2 (8%) took >80 minutes. The average time duration was 63 minutes with ranging from 45–85 minutes. Of the 24 cases treated with PFNA 8 (33%) bleed about 60-79 ml blood, 5 (21%) bleed about 80-99 ml, 3 (13%) bleed about 100-119 ml blood, 6 (25%) bleed about 120-139 ml blood, 1 (3%) bleed about 140-159 ml and 1 (3%) patient bleed more than 160 and required intraoperative blood transfusion. The average blood loss was 84 ml, ranged from 60 to 180 ml. Of the 24 cases treated with PFNA 3 (12.5%) cases required <50 s of fluoroscopy time, 3 (12.5%) cases required 51-60 s required fluoroscopy time, 9 (37.5%) cases required 61-70 s fluoroscopy time, 6(25%) patients required 71-80 s fluoroscopy time and 3 (12.5%) patients required 81-90 s fluoroscopy time. The average fluoroscopy used for the 70 s ranged from 50 s to 90 s. All the fracture united an average of 14 weeks ranging from 12 to 22 weeks. Of the 24 cases, average post-op hospital stay was of 5.6 days,

Conclusion

In our study, all 24 cases of intertrochanteric fracture in the elderly got united with good component position and the average time of fracture union was 14 weeks. Deep infection or failure or breakage due to implant fatigue didn't occur in any patient. Mechanical failure such as bending or breaking of the implant or intraoperative or postoperative fracture were not noted screw cutout was also not observed. Although follow-up times were not adequate to obtain long-term outcomes, the 18-month results of the PFNA fixations were satisfactory. The results showed that the PFNA provided reliable fixation for elderly patients. The operative procedure for the PFNA was easy as compared to other intramedullary implants, so blood loss and operative time were less than others. In our study the intraoperative variables and the systemic complications were similar to those encountered by other authors [10, 11]. Most patients (86%) recovered with a harris hip score of excellent

to good grade and fracture healing occurred in all patients at the final follow-up. There were few postoperative complications associated with mechanical failure. No cases of implant breakage and fatigue were seen during the follow-up period. The helical blade decreased the incidence of cut-out effectively.Therefore, PFNA 2 osteosynthesis is the method of choice for surgical treatment of osteoporotic intertrochanteric femoral fractures (high union rate, early postoperatively mobilization and minimum operation time).

References

1. *Kaufer H. Mechanics of the Treatment of Hip Injuries. Clin Orthop. 1980;146:53-61.*
2. *Kyle RF, Gustilo RB, Premer RF. Analysis of six hundred and twenty - two intertrochanteric hip fractures. A retrospective and prospective study. J Bone Joint Surg. 1979;61A: 216-21.*
3. *Kaufer H, Mathews LS, Sonstegard D. Stable Fixation of Intertrochanteric Fractures. J Bone Joint Surg. 1974;56A:899-907.*
4. *Sommers MB, Roth C, Hall H, Kam BC, Ehmke LW, Krieg JC,et al. A laboratory model to evaluate cutout resistance ofimplants.*
5. *Sadic S et al. Proximal Femoral Nail Antirotation in Treatment of Intertrochanteric Hip Fractures:a Retrospective Study in 113 Patients Med Arh. 2015 Dec; 69(6): 353-356.*
6. *Jin-Song Pu & Lei Liu & Guang-Lin Wang & Yue Fang & Tian-Fu Yang Results of the proximal femoral nail anti-rotation (PFNA) in elderly Chinese patients International Orthopaedics (SICOT) (2009) 33:1441–1444 DOI 10.1007/s00264-009-0776-3.*
7. *Chaoliang Lv, MD;Yue Fang, MS; Guanglin Wang,MD; Tianfu Yang, BS; Hui Zhang, MD; Yueming Song,MD. The New Proximal Femoral Nail Antirotation Asia: Early Results. Orthopaedics:10.3928/1477447-20110317-26*
8. *Sahin S, Ertürer E, Oztürk I, Toker S, Seçkin F, Akman S. Radiographic and functional results of osteosynthesis using the proximal femoral nail antirotation (PFNA) in the treatment of unstable intertrochanteric femoral fractures. Acta Orthop Traumatol Turc. 2010;44(2):127-34. doi: 10.3944/AOTT.2010.2237.for pertrochanteric fracture fixation. J OrthopTrauma. 2004;18(6):361–8.5*
9. *Kumar GN et al. Treatment of Unstable Intertrochanteric Fractureswith Proximal Femoral Nail Antirotation II: Our Experience in Indian Patients the Open Orthopaedics Journal, 2015, 9, 456-459*
10. *Jacobs RR, McClain O, Armstrong H J. Internal fixation of intertrochanteric hip fractures: a clinical and bi omechanical study. Clin Orthop. 1980; 146:62 –70.*
11. *Simpson AH, Vart y K, Dodd C A. Sliding hip screws: modes of failure. Injury. 1989;20:227-31.*

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