

ORIGINAL RESEARCH

Assessment of functional and radiological outcome of T3 proximal femur nail in the treatment of intertrochanteric fracture of femur

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ABSTRACT

Background: The present study was undertaken for assessing the functional and radiological outcome of T3 proximal femur nail in the treatment of intertrochanteric fracture of femur.

Materials & methods: A total of 20 patients were enrolled. Type of anaesthesia to be used was decided by the anesthesiologist. Operations were performed on a fracture table under anaesthesia. Closed reduction performed under C-arm was 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. Follow up was done and radiological and functional outcome of the patient was assessed. All the results were analyzed by SPSS software.

Results: Mean Harris hip score at preoperative time, postoperative 2 months, 4 months and 6 months was 50.3, 68.6, 74.5 and 87.4 respectively. Significant results were obtained while comparing the mean Harris hip score at different postoperative follow-up time intervals. According to Harris hip score grading, excellent, good, fair and poor outcome was seen in 20 percent, 50 percent, 25 percent and 5 percent of the patients respectively.

Conclusion: T3 is the new generation nail used for fixation of intertrochanteric fractures and is a dependable implant for the fixation. It has good to excellent outcomes

Key words: Outcome, Intertrochanteric fracture, Femur

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INTRODUCTION

Hip fracture contributes to both morbidity and mortality in the elderly. The demographics of world populations are set to change, with more elderly living in developing countries. Proximal femoral Fractures account for a large proportion of hospitalization among trauma cases. An overwhelming majority of these patients (>90%) are aged above 50 years. Each of femur fracture types require special methods of treatment and have their own set of complications and controversies regarding the optimal method of management. These fractures occur in the region between the head of femur and inter trochanteric region.¹⁻³

Inter trochanteric fractures of femur occur in the area between the greater and lesser trochanter and may involve these two structures. Inter trochanteric fractures make up 45% of all hip fractures. This region consists of weight bearing trabeculae and has

a good amount of cancellous bone and vascularity thus minimizing the risk of avascular necrosis and non-union. Inter trochanteric (I/T) fractures can be classified in many ways viz. Evan's classification, AO classification, Jenson's classification all of them divide this fracture into stable fractures and unstable fractures (reverse oblique and coronal split fractures).⁴ Incidence of proximal femoral fractures among females is 2 to 3 times higher than males, also the risk of sustaining a proximal femoral fracture doubles every 10 years after age 50 years. Other risk factors for proximal femoral fractures include osteoporosis, maternal history of hip fractures, excessive consumption of alcohol, high caffeine intake, physical inactivity, low body weight, previous hip fractures, psychotropic medicines.^{4,5} Unstable inter trochanteric fractures are notorious for their complications and high failure rates following treatment with conventional DHS. The goal of

treatment of these fractures is stable fixation, which allows early mobilization of the patient. These fractures are associated with substantial morbidity and mortality. Associated co-morbid medical problem like diabetes, hypertension, pulmonary, renal and cardiac problems add to the insult of the fracture.⁶ PFN, introduced by the AO/ASIF group in 1997, has become prevalent in treatment of intertrochanteric fractures in recent years because it was improved by addition of an antirotation hip screw proximal to the main lag screw. However, both benefits and technical failures of PFN have been reported. AO/ASIF modified the PFNA design and introduced PFNA2 to prevent the complications arising from geometrical mismatch.^{6, 7} Hence; under the light of above obtained data, the present study was undertaken for assessing the functional and radiological outcome of T3 proximal femur nail in the treatment of intertrochanteric fracture of femur.

MATERIALS & METHODS

The present study was undertaken for assessing the functional and radiological outcome of T3 proximal femur nail in the treatment of intertrochanteric fracture of femur. A total of 20 patients were enrolled.

Inclusion criteria:

- Patients above 20 years of age.
- Patients of either gender (male/female).
- Patients with intertrochanteric fractures (classified as 31A2.1 to 3 and 31A3.1 to 3 according to the AO classification for long bones).

Informed consent was taken as per the performa. Type of anaesthesia to be used was decided by the anesthesiologist. Operations were performed on a

fracture table under anaesthesia. Closed reduction performed under C-arm was 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. Follow up was done and radiological and functional outcome of the patient was assessed. All the results were analyzed by SPSS software.

RESULTS

Mean age of the patients was 58.1 years. 80 percent of the patients were males while the remaining were females. Right side involvement occurred in 60 percent of the patients while left side involvement occurred in 40 percent of the patients respectively. Mean duration of surgery was 55.7 minutes. Mean duration of hospital stay was 11.3 days. Mean Harris hip score at preoperative time, postoperative 2 months, 4 months and 6 months was 50.3, 68.6, 74.5 and 87.4 respectively. Significant results were obtained while comparing the mean Harris hip score at different postoperative follow-up time intervals. According to Harris hip score grading, excellent, good, fair and poor outcome was seen in 20 percent, 50 percent, 25 percent and 5 percent of the patients respectively.

Table 1: Duration of surgery

Duration of surgery (minutes)	Number
Mean	55.7
SD	6.2

Table 2: Duration of hospital stay (days)

Duration of hospital stay (days)	Number
Mean	11.3
SD	1.87

Table 3: Harris hip score at different follow-up time intervals

HHS Score	Mean	SD	P- value
Preoperative	50.3	5.61	0.001 (Significant)
Postoperative 2 month	68.6	4.89	
Postoperative 4 month	74.5	4.46	
Postoperative 6 month	87.4	5.32	

Table 4: Final functional outcome according to Harris hip score

Outcome	Number of patients	Percentage
Excellent	4	20
Good	10	50
Fair	5	25
Poor	1	5
Total	20	100

DISCUSSION

The treatment of intertrochanteric fractures, especially unstable fractures in the elderly remains a challenge for orthopaedists. There is no consensus on the ideal implant for its treatment. The main goal of treatment is a stable fixation that promotes early postoperative mobilisation and better healing. Evidence indicates that intramedullary nail is one of the best implants available for its fixation and hence, better clinical outcomes. Intertrochanteric fractures are relatively common among the elderly, 90% of such fractures occurring in those aged over 65 years. Most elderly patients with intertrochanteric fractures have osteoporosis. This type of geriatric fracture has relatively high mortality and causes severe impairment of function. So, the main aim of surgery is early mobilisation of the patient. Unstable intertrochanteric fractures are those with significant disruption of the posteromedial cortex due to comminution, reverse oblique fractures or those with the subtrochanteric extension.⁸⁻¹⁰

It is crucial to use a less invasive implant which allows early weight-bearing and has low complication rates. The selection of an implant is mainly decided by the fracture pattern (stable or unstable). Though there are many implant designs for the fixation of these types of fractures, most of them have many demerits such as mechanical disadvantages, less hold on the osteoporotic bone and early failures. PFNA devices have been introduced recently as an intramedullary option and PFNA-2 is its newer design. These devices were developed to achieve better fixation strength, particularly in the presence of osteoporosis. PFNA has many advantages such as shorter operative time, minimal fluoroscopy time, minimal blood loss and early weight-bearing. Other advantages are fewer chances of implant failure, easier helical blade insertion (compared with a cumbersome lag screw and derotation screw insertion in PFN), lesser chances of postoperative hip pain, and better performance than any other implant.¹⁰⁻¹²

Mean age of the patients was 58.1 years. 80 percent of the patients were males while the remaining were females. Right side involvement occurred in 60 percent of the patients while left side involvement occurred in 40 percent of the patients respectively. Mean duration of surgery was 55.7 minutes. Mean duration of hospital stay was 11.3 days. Mean Harris hip score at preoperative time, postoperative 2 months, 4 months and 6 months was 50.3, 68.6, 74.5 and 87.4 respectively. Jamshad OP et al evaluated the role and result of PFNA-2 in the treatment of unstable intertrochanteric fractures in geriatric patients. A prospective analytical study was conducted in 35 patients with unstable intertrochanteric fractures. They were followed-up clinically and radiologically for one year. The quality of fixation was assessed, by neck-shaft angle and Tip Apex Distance (TAD). A functional assessment was

done with the Harris Hip Score (HHS). The mean follow-up period was 13 months (range, 12- 14). The mean age of patients was 65.6 years and the majority were female patients (62.85%). Functional results according to modified HHS were found to be excellent in 6 (17.1%) patients, good in 14 (40%) patients, fair in 12 (34.3%) patients and poor in 3 (8.6%) patients. The average HHS in this study was 81.6. PFNA-2 helps in achieving biological reduction and good stability which enables early mobilisation and prevention of excessive collapse. A good functional outcome could be achieved when the radiological parameters are restored, i.e., TAD <25 mm and neck-shaft angle difference <5° (compared to the opposite side).¹³

In the present study, significant results were obtained while comparing the mean Harris hip score at different postoperative follow-up time intervals. According to Harris hip score grading, excellent, good, fair and poor outcome was seen in 20 percent, 50 percent, 25 percent and 5 percent of the patients respectively. Huang C et al compared the clinical efficacy of PFNA combined with cerclage cable and without cerclage cable and finally recommend a stable internal fixation method to provide the basis for clinical therapy. They screened 120 cases, 51 of whom were treated with cerclage cable, 69 without cerclage cable. The follow-up period was one year. HHS, BI, and RUSH scores were given within the specified time. They divided the patients into the PFNA+cable (PFNA combined with cerclage cable) group and the PFNA group. The time of fracture healing and weight-bearing in the PFNA+cable group was shorter than that in the PFNA group. With regard to HHS, BI, and RUSH, the PFNA+cable group was higher than the PFNA group at 1 month, 3 months, 6 months, and 12 months after operation. For HHS rating, the PFNA+cable group has a higher excellent rate than the PFNA group, which was 96.1% and 84.1%, respectively. All the results mentioned above were statistically significant. Compared with the group without cerclage cable, the application of cerclage cable can reduce the incidence of complications. From the comparison between the two groups, it can be seen that the surgical method of PFNA combined with cerclage cable can not only help to improve the stability of fracture reduction, shorten the time of fracture healing and postoperative weight-bearing, and significantly improve patients' self-care ability but also reduce the incidence of postoperative complications.¹⁴

CONCLUSION

T3 is the new generation nail used for fixation of intertrochanteric fractures and is a dependable implant for the fixation. It has good to excellent outcomes.

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