

FUNCTIONAL OUTCOME AND ANALYSIS OF INTERTROCHANTERIC FEMUR FRACTURE TREATED WITH PROXIMAL FEMORAL NAIL A-2

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Abstract

Background: Intertrochanteric fractures are common among elderly patients with severe osteoporosis after trivial fall injury. Proximal Femoral Nail A2 (PFN A2) is a newer intramedullary device with significant cut out resistance and better fixation in osteoporotic patients. **Material & Methods:** The present study was conducted in Department of Orthopaedics, Government Villupuram medical college, 20 patients with intertrochanteric fracture are treated with PFN A2 were included in this study. All patients are followed up for minimum period of 6 months. Functional and radiological evaluation were done at 6 weeks, 12 weeks, and 24 weeks functional outcome were evaluated using Modified Harris Hip Score. **Results:** All fractures united on average of 12 to 14 weeks. All patients were allowed to assisted weight bearing on 2nd day. Mean operating time was 40 minutes. All patients were fixed with 180 mm long femoral nail with appropriate lag screws. We had observed excellent and good results among 18 and 2 patients respectively. No complications were reported among the study participants in the present study. **Conclusion:** PFN A2 has advantage of very short operating time, minimal X -ray exposure, and rapid rehabilitation and good functional outcome.

INTRODUCTION

Intertrochanteric fractures are very common in the geriatric age group, but infrequent in the younger age group. Improper treatment leads to coxa-vara deformity, limb shortening and limb flaccidity. The primary aim of treatment is to restore pre-injury condition reduce hospitalization, facilitate early mobilization while also reducing the incidence of post-op complications. Complications with intertrochanteric fractures arise primarily from fixation rather than union or delayed union this is because the intertrochanteric area is made up of cancellous bones. Fixation failure can occur as a result of osteoporosis, implant choice and preference of surgical insertion technique.^[1-3]

Proximal femoral nailing (PFN) is one of the most commonly preferred method of management of intertrochanteric fractures. The proximal femoral nail (PFN) is an intramedullary implant commonly used been reported to have benefited in such fractures because its placement is close to its mechanical-axis

of the body and thus it reduces the lever arm aspect on the implant. In addition, they also take very little time to insert with little blood loss, allow early weight-bearing movement post-surgery, and result in less short long-term follow-up. Cadaveric studies showed the biomechanical functioning of PFNA fixation were a helical blade was compared with a sliding hip screw.^[4-8] They have reported that the PFNA, had better biomechanically stability due to better impaction between femoral head and neck. PFN Anti-rotation-II is a modification of the conventional PFN which reduces even the minimal complications associated with Conventional PFN. The present study was undertaken to determine the role of PFNA 2 in the management of intertrochanteric fracture of femur and its functional and radiological outcomes among the population.^[9-11]

MATERIALS AND METHODS

This study was conducted in Department of Orthopaedics, Government Villupuram medical

college, between Jan 2018 and Jan 2022. During this period 20 cases of intertrochanteric fracture were treated with PFN A2. The total study population comprised of 20 study participants. The intertrochanteric fractures were classified based on Boyd and Griffin classification.^[12]

In the present study, patients with intertrochanteric fractures (Type I, Type II), Fractures among geriatric population aged more than 65 years were included in the study. Elders aged less than 65years and those with Boyd and griffin classification type III and IV were excluded from the study.

Initial assessment – Pre-op

After obtaining informed consent and clearance from the institutional ethics committee, a detailed history about socio-demographic characteristics, mode of injury and initial treatment was obtained. Fractures were classified by Boyd and griffin classification. Preoperative evaluation of all patients were done. Comorbidities were identified and managed as per physician advice. Radiological evaluation was done with plain x-ray of the fractured limb.

Intra-op

Epidural anesthesia was used in all cases, patients were mounted on fracture table and closed reduction was done under fluoroscopy guidance. 3 cm skin incision above the greater trochanter is placed. Entry point made on tip of greater trochanter. We used 180 mm long PFN nail for all patients to prevent perforation of anterior cortex in case of bent femur. Tip apex distance of 10mm to 15mm was maintained in all cases. Neck screw placed in center and inferior aspect. Distal lock placed and closed in usual manner.

Post-op

All patients were examined for neurovascular status in immediate post-operative period. Adequate analgesia with epidural catheter was ensured. Patients were initially managed with intravenous fluids, blood transfusion was done when required. The operated limb was immobilized using upper tibial pin traction or skin traction to maintain the length & alignment of the fractures. Intravenous antibiotics were administered to all the patients for 5 days followed by oral antibiotics for 5 days. All patients were provided with vitamin D and calcium supplements. Among the

patients assisted weight bearing was started on day 2 and full weight bearing was initiated after adequate union was observed in the follow up x-rays. All patients were followed up at the end of 1, 2, 6, and 12months. At each follow-up, the radiographs of the upper femur and hip were taken to assess the fracture union and the complications. The functional results were calculated according to the Modified Harris hip score.^[13]

RESULTS

During the period from Jan 2018 and Jan 2022, a total of 20 cases of type 1 and type II (Boyd and Griffin classification) intertrochanteric fractures were operated. We observed that 6 were male (30%) while 14 (70%) were female. The mean age of the study participants was 67 ± 3 (Range from 65 months to 87 years).

Majority of the fractures were left sided 12 (60%) and 8 were right sided (40%) fractures. Most of participants had accidental fall 17 (85%) while the cause of fracture was road traffic accidents in 15% of the study participants. Majority of the fractures were classified as type II (80%).

The time duration of surgery of the patients varied from 38 mins to 95 mins with a mean of 45 ± 5 mins. Majority of patients were operated on within 6 days, the average being 4.8 days. Mean blood loss was 220 ml. The mean length of the incision was 5 cm. All patients are fixed with 180mm long femoral nail with appropriate lag screws.

The average hospital stay was 7 days. Partial weight-bearing in most cases was allowed immediately on the 2nd postoperative day based on construct stability and bone quality. All fractures united on an average of 12.4 weeks (12 to 14 weeks). All patients were allowed to full weight bearing on an average by 12 weeks based on the clinical and radiological union. According to Modified Harris Hip scores, out of 20 cases, the functional outcome was excellent in 18 cases (90%), good in 2 cases (10%). In the present study we did no encounter any complications.

Table 1: Characteristics of the study participants (n=20)

	Frequency (n=20)	Percentage
Gender		
Male	6	30
Female	14	70
Fracture Site		
Left	12	60
Right	8	40
Boyd and Griffin classification		
Type I	4	20
Type II	16	80
Co-morbidities		
Type 2 Diabetes Mellitus	2	10
Hypertension	2	10
Cause of Injury		
Accidental fall	17	85
Road traffic accident	3	15

Table 2: Modified Harris Hip Scores

	Frequency (n=20)	Percentage
Modified Harris hip score		
Excellent	18	90
Good	2	10
Fair	0	0
Poor	0	0

DISCUSSION

Intertrochanteric femur fractures contribute 50 percent of total hip fractures in the elderly age group of >60 years. Various modalities of treatments are sliding hip screw, cephalomedullary nails, dynamic condylar screw, hemiarthroplasty and trochanteric stabilization plate. The goal of treatment being early mobilization of patients to prevent fracture disease and its complication. Most common surgical technical complications include poor reduction, varus malalignment, poor implant placement and cut-out, medial migration of distal fragment and peri-implant fracture.^[14-16]

The mean age of the study participants was 67± 3. Studies conducted by Thyageswaran et al,^[17] Boldin et al,^[18] have also reported similar findings. We observed that in our study majority (70%) were female. Various studies conducted by Prakash et al,^[19] Cleveland et al,^[20] Huang et al,^[21] and Zhao et al^[22] have also reported an increased female predominance among the intertrochanteric fractures. This has been attributed to factors like wider pelvis, decreased mobility and senile osteoporosis.^[23,24]

Majority of the fractures were left sided 12 (60%) fractures. Prakash et al,^[19] had also observed an increased incidence of fractures in the left side. Most of participants had accidental fall 17 (85%). Manjunath et al,^[25] in their study had observed that the cause for inter trochanteric fractures were trauma in the younger population, while among the geriatric age group fall was the most commonly observed cause. Similar findings were also reported by Prakash et al,^[19] Purohit, et al,^[26] and Chandra et al.^[27] Majority of the fractures in our study were classified as type II (80%), various studies have also reported that type II fractures as the commonest form of intertrochanteric fractures.^[19-25]

The ideal position of the screw was found to be in lower center and centre-centre position in the study by Kane et al^[28] and this resulted in stable fixation. Tao et al,^[29] emphasized that regardless of the implant choice and its characteristics, the inserting technique is the key factor for stable fixation without complications. The entry point for PFNA-2 should be 5 mm medial to the greater trochanter tip for achieving adequate fixation and thus minimizing complications. There were no cases of non-union reported in our study comparable to karapinar et al^[30] wherein there was no reported cases of non-union.

In our study we observed that the usage of PFN-A2 nailing technique was a good choice considering factors like reduced operating time, decreased blood

loss, early rehabilitation and lower incidence of complications. Various studies both global and regional have also reported have also observed similar findings in their studies. Hence ascertaining the fact the PFN-A2 could be considered as the gold standard in the management of intertrochanteric fractures.

CONCLUSION

Our findings suggest that fixation of trochanteric fracture with PFN A2 has a variety of benefits namely minimal Incision, Less Blood loss, Shorter Operative Time, Minimal radiography exposure, Significant Cut Out Resistance, early rehabilitation and decreased medical complications. Based on our findings we conclude that the proximal femoral nail anti-rotation 2 (PFN-A2) was an ideal implant for intertrochanteric fractures.

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