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Evaluation of Functional and Radiological Outcome of PFN A2 in Intertrochanteric Fractures of Femur

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ABSTRACT

The incidence of intertrochanteric fracture is rising because of increase in survival of elderly population with osteoporosis and also the increase in the number of motor vehicle accidents. The treatment of choice is normally surgical with internal fixation. The surgical options for these fractures commonly include fixation with dynamic hip screw or cephalomedullary nailing. Due to its advantages over DHS, cephalomedullary nailing is the predominant procedure in many parts of the world. Various varieties of cephalomedullary nails are available. Standard PFN-240mm is introduced by AO/ASIF in 1996 and it is the reference nail for other varieties of PFN. PFN-A is a modification of standard PFN and introduced by AO/ASIF in 2003 to address the complications of PFN. PFN-A2 is a modification of PFN-A to suit Asian population. In this study we are evaluating functional and radiological outcome of PFN A2. This is a prospective study conducted on patients of intertrochanteric fracture reported to a tertiary health care center. After obtaining informed and written consent, patients who met inclusion and exclusion criteria were involved in the study and surgical fixation of fracture with PFN A2 is performed. Operating time, intra operative blood loss is analysed. Patients are followed up till 1-year post op in different intervals, functional outcome using Harris hip score, fracture union and complications are assessed. The mean age of the patients with IT fracture is 71.29 years with male gender and right sided predominance. The mean operating time is 66.8 minutes., mean blood loss is 237.2 ml and mean time of radiological union is 13.14 weeks. Post-operative Harris hip score at post op 6 weeks is 66.77, at post op 3 months is 73.75, at post op 6 months is 83.86 and at post op 1 year is 88.81. PFN A2 is one of the implants of choice for the treatment of IT with less intra operative blood loss, less operating time, good Harris hip score and with significant less complication rates. We recommend the use of PFN A2 for all IT fractures.

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Key Words
Intertrochanteric fracture, proximal femoral nail antirotation 2 (PFN A2), harris hip score, osteoporosis, advantages

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INTRODUCTION

Intertrochanteric (also known as peritrochanteric) fractures are defined as extra capsular fractures of the proximal femur that occur between the greater and lesser trochanter[1]. It usually occurs in the elderly population as a result of trivial trauma (fall from standing height), due to poor bone quality (osteoporosis). It is also seen in young adults with high velocity injuries[1]. With increase in population and life expectancy, the incidence of intertrochanteric fractures has sharply risen among the geriatric population[2]. There were an estimated 1.66 million hip fractures world-wide in 1990. According to the epidemiologic report, this worldwide annual number will rise to 6.26 million by the year 2050[3]. The treatment of choice is normally surgical. The surgical options for these fractures commonly include fixation with dynamic hip screw (DHS) or cephalomedullary nailing. Due to its advantages over DHS, cephalomedullary nailing is the predominant procedure in many parts of the world[4]. Various varieties of cephalomedullary nails are available. Short cephalomedullary nails are indicated for IT fractures not extending beyond lesser trochanter[5]. Standard PFN-240mm is introduced by AO/ASIF in 1996 and it is the reference nail for other varieties of PFN[6]. PFN-A is a modification of standard PFN and introduced by AO/ASIF in 2003 to address the complications of PFN. PFN–A2 is a modification of PFN-A to suit Asian population[7]. The aim of our study is to compare and analysed the functional outcome, radiological union and complications of intertrochanteric fractures of femur treated with PFN A2.

MATERIALS AND METHODS

This is a prospective study conducted on patients of intertrochanteric fracture reported to the tertiary referral health care center in Karnataka, India, from July 2022 to June 2024. This study included patients of age >18 years with intertrochanteric fractures. IT fractures associated with ipsilateral segmental or other level femur fracture, associated with ipsilateral other lower limb fracture, previous fracture in ipsilateral hip or femur, pathological fractures-other than osteoporosis, ongoing chemotherapy or irradiation treatment due to malignancy, inability to walk before the fracture, refusal to provide informed consent and patients who are not fit for surgery were excluded. After obtaining informed and written consent, patients who met inclusion and exclusion criteria were involved in the study and surgical fixation of fracture with PFN A2 (Table 1) is performed. Operating time, intra operative blood loss is analyzed. Patients are followed up till 1-year post op in different intervals, functional outcome using Harris hip score, fracture union and complications are assessed. Total patients enrolled for study were 30. 5 patients' follow up was lost. Hence, result analysis was done with a total of 25 cases.

Table 1: PFN A2 Implant Specifications

Properties	PFN A2
Proximal nail diameter	16.5mm
Distal nail diameter	9,10,11,12mm
Nail length	240mm
Medio-lateral angle	5 degree
Lateral surface angulation	Flat lateral surface (Less lateral cortex impingement)
Fracture fixation	14mm Helical Blade
Distal locking bolt size	4.9mm
Distal locking slots	1- for both static and dynamic

Table 2: Harris Hip Score

	PFN A2	
Time points	Mean	SD
PO 6 weeks	66.77	5.78
PO 12 weeks	73.75	4.64
PO 6 months	83.86	5.52
PO 1 year	88.81	2.96

Table 3: Complications

Complications	PFN A2	%
Shortening	1	4.00
Screw cut out	0	0.00
Surgical site infection	2	8.00
Varus collapse	1	4.00

RESULTS AND DISCUSSIONS

In our study, the mean age of the patients with IT fracture is 71.29 years with majority being in 71-80 years of age group (38.67%), followed by 32% in 61-70 years of age group. Among the 25 patients with intertrochanteric fracture, 16 patients are males and 9 are females. In our study among 25 patients of intertrochanteric fractures, 14 patients had right side injury and 11 patients had left side injury. Right side is common side in our study. In our study, mean operating time 66.8 minutes; mean blood loss is 237.2 ml and mean time of radiological union is 13.14 weeks. In our study we analysed Harris hip at post op 6 weeks, 12 weeks, 6 months and 1 year. The results are tabulated in (Table 2). We noted shortening in 1 patient, surgical site infection in 2 patients and varus collapse in 1 patient as complications (Table 3).

In our study, the age range is 46-92 years. The average age of the patients is 71. 29 years which is comparable to Indian as well as foreign authors. In a study by Jha[8] the average age is 71.45 years and age range is 30 – 95 years which is comparable with our study. In our study, out of 25 patients, 16 are males and 9 are females. We have a male predominance. It is comparable with a study by Jha[8]. and a study by Devadoss[9] which also show male predominance. In our study, we had right side predominance. Study by Jha[8] also showed right side predominance which is comparable with our study. The average operating time is 66.80 minutes. In a study on PFN-A2 by Rai[10], average operating time is 87.6 minutes. The average intra operative blood loss is 237.20ml. In a study on PFN-A2 by Rai[10], average blood loss is 200ml. In our study, average radiological union time is 13.14 weeks. In a study on PFN-A2 by Basant[10], it is 13.8 weeks which is comparable with our study. In our study, the mean Harris hip score was

66.77 at 6 weeks, 73.75 at 3 months, 83.86 at 6 months and 88.81 at 1 year post-operative follow up. In a study on PFN by Mandice[11] Harris hip score at 6 months post op is 88.75 and in a study on PFN-A2 by Basant Rai[10], it is 85.08 at 6 months post op. In our study, 1 patient had shortening., 2 patients had surgical site infection and 1 patient had varus collapse. In a study on MS-PFN by Jha[8] out of 120 patients, 9 patients had shortening. And in a study on PFN-A2 by Rai[10], among 25 patients, 2 patients had shortening. In our study, no patient had complication of screw cut out.

CONCLUSION

PFN A2 is one of the implants of choice for the treatment of IT with less intra operative blood loss, less operating time, good Harris hip score and with significant less complication rates. We recommend the use of PFN A2 for all IT fractures.

REFERENCES

1. Attum, B. and H. Pilson., 2022. Intertrochanteric Femur Fracture.
2. Dhanwal, D.K., E.M. Dennison, N.C. Harvey and C. Cooper, 2011. Epidemiology of hip fracture: Worldwide geographic variation. Indian J. Orthop.s, 45: 15-22.
3. Kannus, P., J. Parkkari, H. Sievänen, A. Heinonen, I. Vuori and M. Järvinen, 1996. Epidemiology of hip fractures. Bone, 18: 57-63.
4. Mattisson, L., A. Bojan and A. Enocson, 2018. Epidemiology, treatment and mortality of trochanteric and subtrochanteric hip fractures: Data from the Swedish fracture register. BMC Musculoskeletal Disord., 19: 1-8.
5. Shannon, S.F., B.J. Yuan, W.W. Cross, J.D. Barlow, M.E. Torchia, P.K. Holte and S.A. Sems, 2019. Short Versus Long Cephalomedullary Nails for Pertrochanteric Hip Fractures: A Randomized Prospective Study. J. Orthop. Trauma, 33: 480-486.
6. Simmermacher, R.K.J., A.M. Bosch and C.V. der Werken, 1999. The AO/ASIF-proximal femoral nail (PFN): A new device for the treatment of unstable proximal femoral fractures. Injury, 30: 327-332.
7. Kim, S.S., H.J. Kim and C.S. Lee, 2020. Clinical outcomes of PFNA-II in the asian intertrochanteric fracture patients: Comparison of clinical results according to proximal nail protrusion. Injury, 51: 361-366.
8. V, J. and A. T, 2020. Modified Short Proximal Femoral Nail for Intertrochanteric Fractures of Femur in Indian Patients-our Experience. Malaysian Orthop. J., Vol. 14 .10.5704/moj. 2007.015.
9. Devadoss, A., 2018. Randomised comparative study in management of unstable intertrochanteric fracture with PFN V/S PFN A2 - functional and radiological out-come. Int. J. Orthop.s Sci., 4: 866-874.
10. Rai, B., J. Singh, V. Singh, G. Singh, B. Pal, D. Kumar and M. Poddar, 2022. Evaluation of the Outcomes of Proximal Femoral Nail Antirotation II in the Treatment of Trochanteric Fracture in Elderly Patients. Cureus, Vol. 14 .10.7759/cureus.24896.
11. Mandice, C.J., R. Khan and H. Anandan., 2018. Functional outcome of unstable intertrochanteric fractures managed with proximal femoral nail: a prospective analysis. Int J Res Orthop., Vol. 4.