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Determine Functional outcome of Unstable Intertrochanteric Femur Fracture treated by PFN-A2

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ABSTRACT

BACKGROUND: Intertrochanteric fractures of the femur are extremely common fractures occurring in elderly osteoporotic individuals and in younger age it occurs mostly due to high velocity trauma. There is no consensus regarding ideal implant to be used in management of intertrochanteric fractures.

Hence after doing literature review, we decided to treat patients using intra-medullary fixation with the following research question "Determine the functional outcome of intertrochanteric fracture using PFN_A2" [21]

MATERIAL AND METHODS: It is a prospective study of 50 patients of unstable intertrochanteric femur fracture treated with PFN-A2, with minimum follow-up of 6 months. All cases were analyzed according to Modified Harris Hip score, which includes Pain & Functional ability as its basic consideration for scoring system.

RESULTS: According to Modified Harris Hip score functional results were found to be excellent in 26(52%) of patients, good in 14(28%) of patients, fair in 7(14%) of patient & poor in 3 (6%) of patient poor outcome occurred due to patient related comorbidity and old age.

CONCLUSION: We hereby conclude that PFN-A2 gives excellent to good (80%) results in management of unstable intertrochanteric fracture which is confirmed by Modified Harris Hip Score.

Keywords: Unstable Intertrochanteric fractures, Proximal femoral nail, Modified Harris hip score

INTRODUCTION

Femoral intertrochanteric fractures [1] are one of the most frequently occurring fractures in the elderly, usually following trivial trauma. In the younger age group of people, in whom it is uncommon, it occurs almost always due to high velocity trauma. Intertrochanteric fractures are metaphyseal which has abundant blood supply, contributing to a higher union rate and less osteonecrosis compared to femoral neck fractures [2,3]. The treatment of intertrochanteric femur fractures and especially unstable intertrochanteric fractures in the elderly remains a challenge for orthopedic surgeons. There is not a consensus of opinion as to the ideal implant for treatment of intertrochanteric fractures. The ideal internal fixation device should be such that the patient can be mobilized at the earliest without jeopardizing the reduction, stability and union of the fracture. A form of pre-operative assessment and final assessment has been used. The results have been studied with a view to outline guidelines for better management of these fractures.

Intertrochanteric fractures [4,5] include: -

- 3-fragment fracture with postero-medial Communitions

- Fracture> 2 intermediate fragments (lateral wall blow out)
- Reverse oblique fracture
- Transverse oblique fracture
- Intertrochanteric fracture with subtrochanteric extension

AIMS AND OBJECTIVES

To determine the functional outcome of intertrochanteric fractures managed with proximal femoral nailing according to modified Harris Hip Score and the effect on activities of daily living.

MATERIALS AND METHODS

This is a prospective study of 50 cases of intertrochanteric femur fracture treated by PFN-A2 with minimum 6 months of follow up. All cases are evaluated according to Modified Harris Hip Score on residual effects on clinical ground at final examination. Informed consent was taken prior to the study. Pain & functional capacity are the two basic considerations for this scoring system. Points are given for pain, function, range of motion & absence of deformity.

a. **Inclusion criteria**

- All unstable types of fracture pattern AO/OTA type: 31A2.2 to 31A3.3 [(4)]
- Age between 31-90 years.
- Patient undergoing primary/index surgery.
- Men and women both included in study.
- Different mode of injuries i.e. falls from height, slippage & road traffic accident are included.

b. **Exclusion criteria**

- Age < 31 years.
- Pathological fractures.
- Previous surgery on proximal femur.
- Patients with intertrochanteric femur fracture treated with other modalities of internal fixation.
- Old non-unions and mal unions.

c. **Preoperatively**

Radiological confirmation of the diagnosis was carried out by taking anterior-posterior X-rays of hip and the fractures were classified according to AO/OTA Classification [(4)], unstable varieties include 31A2.2 to 31A3.3.

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d. **Intra-operatively**

Intertrochanteric fractures were treated by closed reduction on a fracture table and internal fixation using a proximal femoral nail (PFN-A2) [5,6,7,8] inserted under radiographic control.

PROCEDURE:

Patient was taken on traction table under Spinal/general anesthesia. Reduction achieved by traction, adduction and internal rotation. Sterile draping was done. 5cm incision taken proximal to greater trochanter. Entry point made with help of awl just medial to tip of greater trochanter. Guide wire advanced through the tip of greater trochanter and position confirmed with c-arm. Reaming done and PFN-A2 nail introduced under the vision of c-arm. Guide wire passed through neck of femur and Helical blade was introduced into the neck of femur with the help of jig following which traction was released and 5mm compression achieved at fracture site. Distal dynamic screw was advanced. Thorough wash and closure done in layers.

e. Post-operative regimen

Parenteral antibiotics, usually third generation cephalosporins were started immediately preoperatively and continued postoperatively. Static quadriceps exercises were encouraged from the first day and the knee was mobilized from the second day. Check X-rays were taken on the same day as soon as the patient was stabilized following the surgery.

Simultaneously active hip and knee strengthening exercises were also started. Toe touch walking were started from postoperative day two. The stitches were removed on 13th post-operative day.

Patients were first followed up usually at stitch removal if not already done or at one and a half months after discharge, if stitch removal was already done. Clinical assessment of fracture union, range of movement of hip and knee and radiological assessment of fracture union was done on subsequent follow ups. If union was found satisfactory and radiological union was found to be in progress, partial weight bearing was started as tolerated. Patients were next called after another 1 month and reassessment, both clinical as well as radiological, was done and if union was found to be progressing satisfactorily, full weight bearing was started as tolerated. Patients were next called every 3 months and reassessment, both clinical as well as radiological was done. Functional outcome was assessed using Modified Harris Hip Score [(9)].

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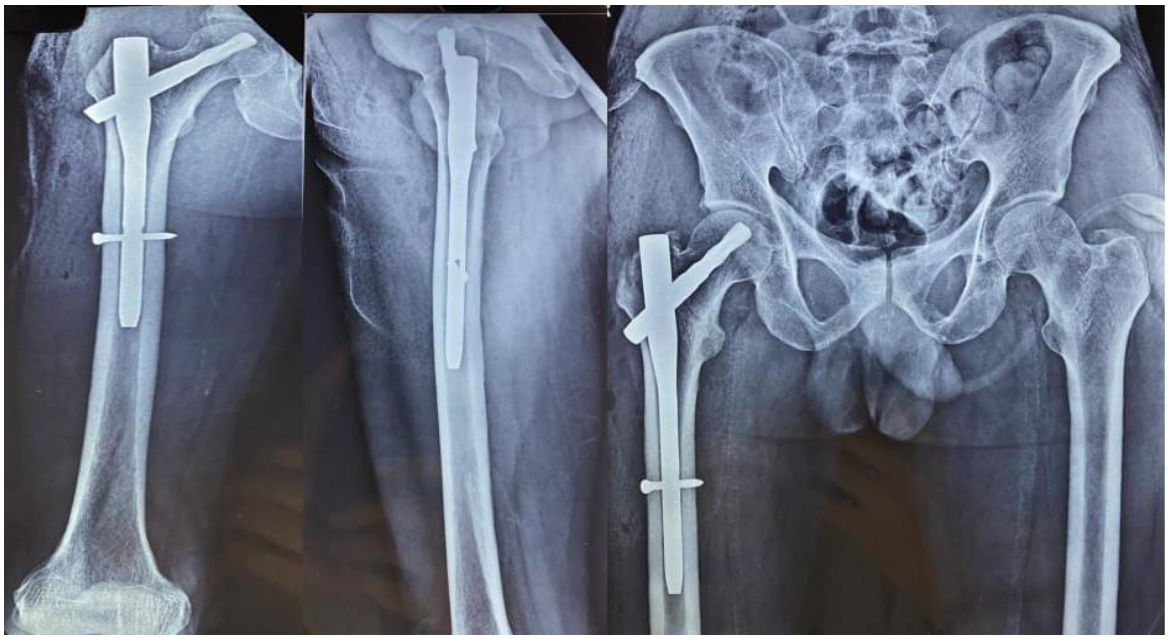

RESULTS

Fifty patients of intertrochanteric fracture underwent fixation with PFN-A2 during the study period of 15 months. Out of these 50 patients, 32 were female and 18 were male with age ranging from 31-90 years. The mean patient age was 65.8 years, 38 cases were admitted due to slip and fall, 5 patients due to fall from height and 7 cases were due to road traffic accident. The majority type of fracture was AO type A2.2. The mean duration of hospital stay was 12 days with minimum 5 and maximum of 35 days, the average blood loss was 80 ml and average time for the procedure was 50 minutes.

Forty-two patients had spinal anesthesia and 8 were given general anesthesia. The average drop in hemoglobin was 1.72g/dl. Ten patients were diagnosed with ASA 1, 15 were ASA 2, 23 were ASA 3 and 2 were ASA 4. Radiologically, we were able to achieve ideal fracture fixation and implant position in 86% of the cases and good or acceptable reduction in 94% of the patients.

In our study we came across intraoperative complications like fracture of greater trochanter, lateral cortex in one case and fixation in Varus angulation in other cases. Post-operatively we also encountered DVT in two of our patients and had limb shortening >2cms in 2 cases.

Distribution of cases according to age in years No. of patients (%, n=50)

Age	No. of patients	Percentage
31-40	2	4%
41-50	3	6%
51-60	7	14%
61-70	20	40%
71-80	13	26%
81-90	5	10%

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Functional results after clinical assessment by surgeon (according to Harris Hip Score)

Function	Score	No. of patients
Excellent	80-100	26(52%)
Good	61-80	14(28%)
Fair	41-60	7(14%)
Poor	<40	3(6%)
Total		50

DISCUSSION

Intertrochanteric fracture of femur occurs mostly in elderly age group and have poor outcome if there is prolong immobilization. There was a predominance of female patients in our study, like others reports in the literature (17,18). The mean patient age was 65.8 years in this study and the etiology of most of the fractures was low energy in nature, consisting of a domestic fall. Stable fixation that allows early mobilization is the treatment of choice. Opinions vary as to the best treatment for intertrochanteric fracture. Extramedullary devices such as dynamic hip screws are widely used locally even though intramedullary nails are increasingly utilized for unstable

trochanteric fractures due to its biomechanical advantages. The helical blade allows improved purchase in the femoral head by radial compaction of the cancellous bone around the blade during insertion [(12-14)]. Biomechanical tests have demonstrated that the blade has a significantly higher cut-out resistance & improved purchase in osteoporotic bone than commonly used screw systems [15].

There were two cases of superficial wound infection which was treated at its earliest with debridement and wash under the coverage of iv antibiotics. There were 3 cases who required post-op blood transfusion.

There was 1 case of lateral protrusion of the sliding blade in the present series. There were no cases of helical blade penetration into acetabulum or cut out in this study, a result of similar study is reported in literature [(19)].

A series of biomechanical and clinical studies have proven that the DHS as an extramedullary implant is inferior to intramedullary implants in the treatment of unstable fractures [10,11] From a biomechanical point of view, an intramedullary device inserted via a semi-closed procedure is to be preferred, especially in elderly patients. The ideal implant for the treatment of intertrochanteric fractures is an easily inserted, intramedullary device that allows for controlled impaction across the fracture zone while preventing fracture site rotation [16]. the device must achieve sufficient purchase in the femoral head in order to delay or resist cut-out. The helical neck blade has the advantages of fixation stability, autorotation and anti-Varus collapse [14].

Good reduction of the fracture, and optimal positioning and length of the hip helical blade are crucial to achievement of good outcomes with the PFN-A2 device. Further studies are needed to compare this new implant with extramedullary devices [(20)].

CONCLUSION

Modified Harris Hip score is a good score to evaluate functional outcome of the patients. We conclude that PFNA 2 implant is an optimal & better fixation device for most intertrochanteric fractures. Intramedullary placement allowed the implant to lie closer to the mechanical axis of the extremity, thereby decreasing the lever arm & bending moment on the implant. The helical blade confers additional benefits with osteoporotic trochanteric fractures by cancellous bone compaction ensuring rotational

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stability. The PFNA 2 requires shorter operative time, ease of implantation, a smaller incision and less surgical trauma. In addition to that, with early load sharing fixation, early weight bearing and ambulation, shortened hospital stay and improved rate of union with early resumption of independent life style, excellent functional outcome, it has distinct advantages over other modes of fixation in both unstable & stable intertrochanteric fractures provided the implantation procedure is scrupulously followed & fracture reduction is optimal.

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