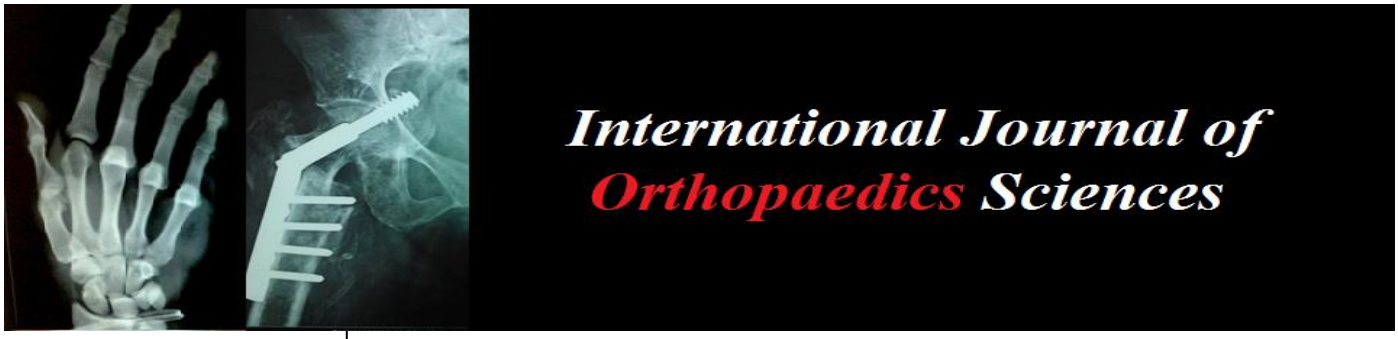

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Role of PFN A2 in unstable intertrochanteric fractures- A prospective study

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Abstract
Background: Intertrochanteric fractures are common osteoporotic fractures in elderly Above 65 Years. Common Modalities of Treatment Includes Sliding Hip Screw and Plate or Anintramedullary Device. PFN A2 Is A Newer Intramedullary Device With Significant Cut Out Resistance And Better Fixation In Osteoporotic Fractures.
Materials and methods: our prospective study includes 20 patients with unstable pertrochanteric fractutres. 12 male and 8 female patients were operated with PFN A2 within a period OD one week. All patients were followed for twelve months and outcome evaluated with Harris Hip Score.
Results: All fractures united on an average of 12 weeks. All patients were allowed to full weight bearing on an average by12 weeks on the basis of clinical and radiological union.
After analyzing functional outcome of all patients by Harris hip score the average score was found to be 83.2. We had 12 excellent results, 4 good results and 3 fair results.
Conclusion: PFN A2 has the advantage of minimal incision, shorter operative time, rapid rehabilitation, lower medical complications among other intramedullary devices.

Keywords: unstable intertrochanteric fractures, pertrochanteric fractures, PFN A2

Introduction
Intertrochanteric fractures are most commonly regarded as fracture of fragility. Most proximal femoral fractures occur in elderly individuals as a result of only moderate or minimal trauma. In younger patient these fractures usually result from high energy trauma. Chance of self-fall increases with age, which is further increased by decreased muscle power, decreased reflexes, poor vision and labile blood pressure [1, 3]. While non–operative treatment advocated for medically unfit patients causes debilitating varus and nonunions majority undergo operative treatment.
Unstable Intertrochanteric Fractures Include Posteromedial Comminution-No Medial Cortical continuity After Reduction [19, 17] Lateral Wall Comminution, Four Part Fracture, Displaced Large Fragment Including Lesser Trochanter, Reverse Oblique -Medial Displacement of Distal Fragment Due To Adductors, Fracture with Sub-Trochanteric Extension Our study is based on selecting an implant type that fits the patient anatomy and fracture type. We have selected PFN A2 in treating unstable intrtrochanteric fractures.

Material and Methods
Our prospective study was conducted in Government Tirunelveli Medical College & Hospital, Tirunelveli, from August 2016 to August 2018. Twenty consecutive patients suffering from unstable intertrochanteric fracture with lateral wall communition were treated with proximal femur nail Antirotation 2.

Inclusion Criteria
Age above 50 yrs
Boyd and griffin type 2, 3 and 4 fracture
Duration < 3wks

Exclusion Criteria

Age < 50 yrs
Fracture > 3 wks
Boyd and Griffin type 1

All patients were investigated for comorbidities and routine blood investigations were taken. Radiological investigations includes plain x -ray AP & Frog leg lateral view. CT with 3D reconstruction taken if needed.

Post-operative radiological outcome was assessed by periodic X rays of affected hip. Post-operative functional outcome was assessed by using Harris Hip Score.

Surgical Technique

Spinal anaesthesia is used in all cases. Paiens were mounted in fracture table and closed reduction done with c-arm. Operative parts painted and drapped. Incision is made 5 cm proximal to the tip of the trochanter. In AP view, the PFNA-II entry point is on the tip or slightly lateral to the tip of the greater trochanter in the curved extension of the medullary cavity, as the ML angle of the PFNA-II is 5°. In lateral view the entry point is in line with the axis of the intramedullary canal.

A reaming rod is inserted into the medullary canal to the desired insertion depth. The tip must be correctly positioned in medullary canal since it determines the final distal position of the long PFN A II. The PFNA-II is carefully inserted manually using slight bidirectional turns of the insertion handle as far as possible into the femoral opening.

The buttress nut is screwed on the golden protection sleeve for PFNA blade. Make sure the lateral side marking points towards the head of the sleeve. Screw the buttress nut up to the marking on the protection sleeve. The golden drill sleeve and the golden trocar is inserted through the protection sleeve. Advance the entire sleeve assembly for PFNA blade through the aiming arm to the skin until it clicks into the aiming arm.

A stab incision is made in the area of the trocar tip. The sleeve assembly is inserted as far as the lateral cortex. Insert a new guide wire through the golden drill sleeve into the bone. Verify both direction and position under image intensifier control in both AP and lateral view.

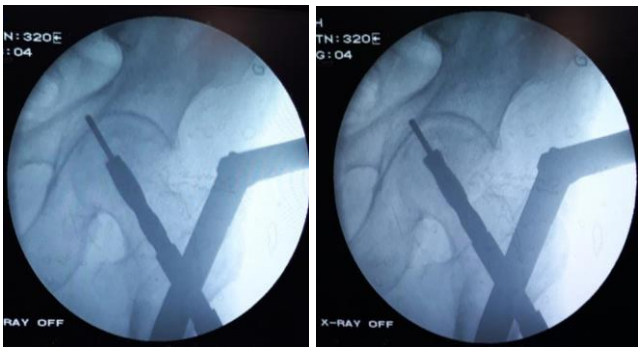


Fig 1:

In the AP and lateral view, the optimal position of the guide wire is the exact center of the femoral head. Insert the guide wire subchondrally into the femoral head at a distance of 10 mm below the joint level. Minimal distance to the joint is 5 mm. Advance the measuring device to the protection sleeve and determine the length of the required blade

While attaching the PFNA-II blade on the impactor, screw the impactor counterclockwise (note the mark “attach” on the impactor) into the end of the PFNA-II blade to unlock the blade. Push the PFNA-II blade gently towards the impactor while attaching the PFNA-II blade. Insert the blade-impactor assembly over the guide wire. Push the button on the protection sleeve, align the blade (note marking on the protection sleeve) and advance the blade impactor assembly further through the protection sleeve. Manually insert the blade over the guide wire advancing as far as possible into the femoral head. Insert the PFNA-II blade to the stop by applying gentle blows with the hammer. To lock the PFNA-II blade, turn the impactor clockwise (note lock marking on the handle) and tighten the blade. Verify PFNA-II blade locking intraoperatively. The PFNA-II blade is locked if all gaps are closed.

Post-Operative Protocol

- Immediate Post operative period
- Adequate analgesia with limb elevation
- For Type II fractures with stable fixation patient allowed weight bearing as tolerated from day 2 to 10.
- All patients were treated for osteoporosis with vitamin D, calcium supplements, and teriparatide in severe cases.
- Full weight bearing on adequate union in followup x-rays
- For unstable fracture patterns weight bearing delayed and partial weight bearing continued for 4 to 6 weeks with touch toe walking and full weight bearing in the following weeks as per the follow up x-rays.

Results

All cases were followed up for a minimum of 12 months and were assessed for clinical, radiological and functional outcome. The results were analysed. The observations of our study are as follows:

Most of the patients in our study were in the age group of 60-70 years.

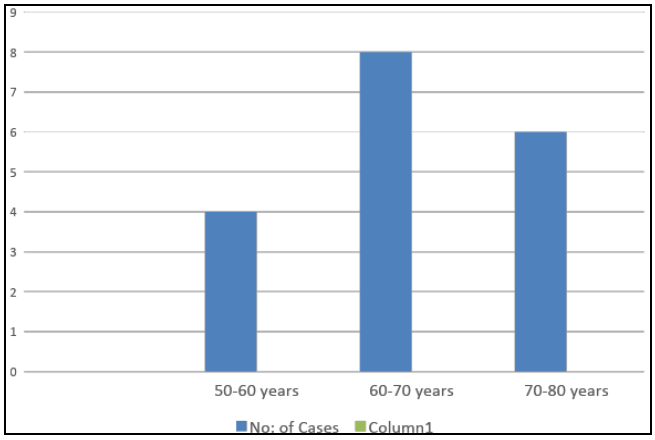


Fig 2:

There was a male preponderance with 12 males and 8 females. Fall from standing height was the most common mode of injury. In our study we encountered 3 patients of Boyd and griffin type 2, 3 and 4. 12 patients suffered fracture on left side and 8 patients suffered fracture on right side.

Two patients had systolic hypertension and type 2 diabetes mellitus. 2 patients had coronary artery disease and type 2 diabetes mellitus. 1 patient suffered from chronic kidney disease and systolic hypertension. 10 patients suffered from isolated systolic hypertension. 6 patients suffered from isolated diabetes mellitus. 1 patient was a known case of old healed pulmonary tuberculosis and completed Category 1 Anti TB treatment. All the patients had good preoperative mobility and were ambulating independently unassisted.

Majority of patients were operated within 7 days, the average being 7.6 days. Mean operating time was 40 minutes. Mean

blood loss was 100 ml. Mean length of incision was 5cm. Mean helical blade size was 80 mm. Average hospital stay was 7 days. Partial weight bearing in most of cases was allowed immediately on 3rd postoperative day on the basis of construct stability and bone quality. All fractures united on an average of 12 weeks. All patients were allowed to full weight bearing on an average by12 weeks on the basis of clinical and radiological union.

After analyzing functional outcome of all patients by Harris hip score the average score was found to be 83.2. We had 12 excellent results, 4 good results and 3 fair results.

Functional Outcome

Fig 3:

Complications

One female patient a known case of Type 2 diabetes mellitus suffered from superficial wound infection. One patient suffered pfn A2 helical blade loosening.

One patient had superficial wound infection and got healed after wound wash and 3 weeks of antibiotic.

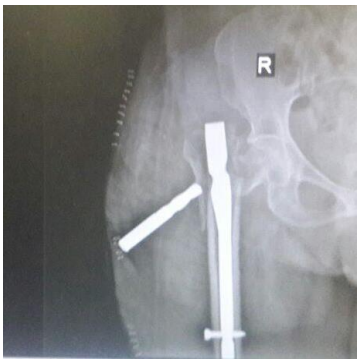


Fig 4:

One patient had implant failure because of helical blade pull out for whom revision with DCS done.

One patient had persistent hip pain and another had persistent thigh pain. Weight bearing was deferred in these patients and pain was relieved after radiological union.

Discussion

Intertrochanteric femur fractures contribute half of total hip fractures in the elderly age group of >60 years with increase in the life expectancy the incidence of intertrochanteric hip fractures in increasing. Various modalities of treatments are available like 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 complication. Majority of pertrochanteric fractures are fixed with either cphalomedullary nail or a sliding hip screw to decrease morbidity and mortality (urinary tract infection, bed sores, respiratory tract infection, and joint stiffness. 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.

Unstable Intertrochanteric Fractures Include Posteromedial Comminution-No Medial Cortical continuity After Reduction [19, 17] Lateral Wall Comminution, Four Part Fracture, Displaced Large Fragment Including Lesser Trochanter, Reverse Oblique -Medial Displacement Of Distal Fragment Due To Adductors, Fracture With Sub-Trochanteric Extension.

In these fractures lateral femoral wall integrity restored with a screw augmentation, or cerclage wiring allowed improved bony contact between proximal and distal fragments. Entry made just medial to tip of trochanter, avoiding varus, getting an anatomical reduction prior to nail insertion, holding the reduction with anteriorly placed k wires prior inserting a guidewire, choosing a longer nail in highly unstable fractures, or even open reduction to achieve bony continuity is advocated in unstable fracture pattern.

However treatment of osteoporosis is of paramount importance in rehabilitation and also prevention of newer fractures in the future.

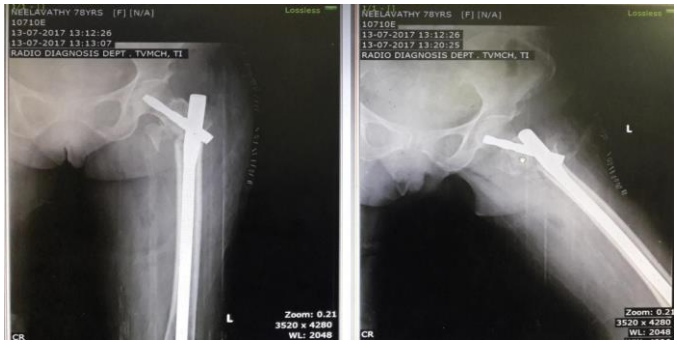
Conclusion

Fixation of trochanteric fracture with PFN A2 have following benefits

- Smaller Incision,
- Less Bood Loss &Shorter Operative Time Due To Usage Of A Single Helical Blade,
- Significant Cut Out Resistance Due To Impacted Helical Blade,
- Shorter Individuals With Short Neck Can Accommodate A Single Screw Rather Than Two In Other Devices.
- Rapid rehabilitation
- Decreased medical complications

Case 1:

Preoperative X-ray

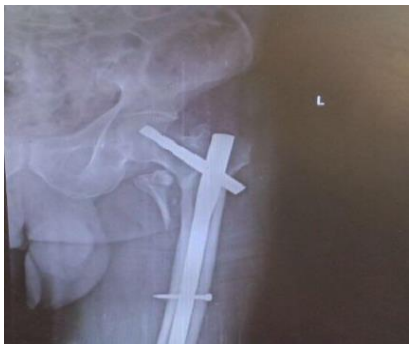


Post Op Xrays

Clinical Pictures

Case 2: 75 year male

Preoperative X-ray



Postoperative X-ray

3 months follow up

Clinical pictures

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