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Research Article

Comparison of clinical and radiological outcome of patients with unstable intertrochanteric fracture treated with PFN A2 *vs* DHS

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Abstract

Background: Intertrochanteric fracture account for a common problem in elderly patients following trivial fall. Intertrochanteric fractures are the extracapsular fracture of the proximal femur at the level of the greater and the lesser trochanter. Unstable intertrochanteric fracture have comminution at the posteromedial cortex, thinner lateral wall thickness of <20 mm and reverse oblique fracture.

Materials and method: Around 30 cases of unstable intertrochanteric fracture treated with proximal femoral nail A2 or dynamic hip screw. Around 6 months follow up was done. Both the fractures were treated using lateral approach. For PFN A2 the awl and subsequently the guide wire were put either in the piriformis fossa or medial to the tip of greater trochanter. Then reaming done and PFN A2 nail put. For DHS, hardinge approach is used, derotational screw put and then guide wire put in posteroinferior quadrant or the center of the head of femur. Triple reaming done and Richard screw put and the DHS put. Post op physiotherapy is started on day 2 after surgery in all the patients.

Discussion: A PFN A2 in unstable intertrochanteric fracture has better outcome and lesser postoperative complications compared to DHS. Average time for full weight bearing walking is around 6 weeks.

Conclusion: PFN A2 in Unstable intertrochanteric fracture is better than DHS.

Keywords: unstable intertrochanteric fracture, proximal femoral nails a2, dynamic hip screw

INTRODUCTION

Intertrochanteric fractures are defined as extracapsular fracture of the proximal femur that occurs between greater trochanter and lesser trochanter. The calcar femoral is the vertical wall of dense bone that extends from posteromedial aspect of femoral shaft to posterior portion of femoral neck. This structure is important because it determine whether or not fracture is stable [1]. In young age, intertrochanteric fracture occurs due to high energy injury [2] such as car crash or fall from roof. It occur more common in old age group, does occur on low energy trauma due to weakening of bones as we age. Intertrochanteric fractures which are unstable have high morbidity [3,4]. Unstable intertrochanteric fractures have comminution at the posteromedial cortex, thinner lateral wall thickness of <20 mm, have sub trochanteric extension of the fracture and reverse oblique fracture.

MATERIALS AND METHODS

SUBJECT

The study involved the patients diagnosed with unstable intertrochanteric fracture was treated at our facility from June 2019 to June 2021. Patients were clinically examined and had restricted range of motion of affected limb and x-ray pelvis with both hip and cross table lateral view of the affected limb, were taken after stabilizing the fracture on Thomas splint to confirm the diagnosis (Figure 1).

INCLUSION CRITERIA

- All unstable types of fracture pattern AO/OTA type 31A2.2 to 31A3.3
- Age between 18-90 years
- Men and women both included in study
- Patient undergoing Primary or Index surgery
- Different mode of injuries i.e. fall from standing height, slippage, road traffic accident, fall from height are included
- Patients who are anesthetically fit for the surgery
- Comminuted lateral wall of proximal femur with lateral wall thickness less than 2.5 cm
- Pathological fracture

EXCLUSION CRITERIA

- Age<18 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

SURGICAL TECHNIQUE OF TREATING UNSTABLE INTERTROCHANTERIC FRACTURE

PFN A2 INSERTION

In case of PFN A2 insertion, and patient with unstable intertrochanteric fracture were positioned in supine position and put on traction table with adequate traction and counter-traction and fracture reduced and checked under C-arm image intensifier. Draping done in that position of the affected limb (Figure 2). And then longitudinal incision above around 1 cm from the greater trochanter going proximally around 4 cm. Split the subcutaneous tissue, fascia over the gluteus medius. Then tip of Greater Trochanter is felt with the index finger. Entry with the Awl taken slightly medial to the tip of the greater trochanter or piriformis fossa. The position of the Awl was confirmed under the image intensifier. Using straight Awl, the entry portal was centered on the anteroposterior and the lateral view to ensure that nail is in the mid plane of the femur. In lateral view the entry point is in vertical line of the femoral canal.

GUIDE WIRE INSERTION

After withdrawing the awl, insert a guide wire crossing the fracture site (Figure 3).

REAMING AND NAIL INSERTION

Gradually size of reamer increased and Reaming done one size bigger then the desired nail insertion. The nail is inserted directly over guide rod. The nail is passed slowly over fracture site in cases of comminuted fracture (Figure 4).

PROXIMAL SCREW INSERTION

After proper checking the nail in Anterioposterior (AP) and lateral position. Guide wire passed after taking incision, passed through sleeve crossing the fracture site into the head of the femur till the subchondral region and checked in AP and lateral view if it is central or posteroinferior position. If in position then rimming done with 8 mm reamer and adequate size screw put till the subchondral region. Taking the Tip apex distance less than 25 mm in both AP and Lateral view (Figure 5).

DISTAL SCREW INSERTION

With guide wire sleeve distal site marked and incision taken of around 2 cm size. Superficial and deep dissection is done. And distal screw inserted of adequate size. And checked in AP and lateral view. After that jig removed and whole nail checked in both AP and lateral view.

END CAP INSERTION

After checking the nail, if found adequate with end cap inserted over

Fig. 1. X-ray of patients showing unstable intertrochanteric fracture

the PFN A2 nail and was given, closure done (Figure 2).

DHS INSERTION

In case of DHS insertion patients were placed supine on the traction table with adequate traction and counter-traction, keeping the affected leg in adduction and internal rotation, the fracture is reduced and checked in C-arm in both Anteroposterior and Lateral view (Figure 6).

Lateral approach or modified hardinge approach is used. Incision starts from the greater trochanter going distally of around 5 cm length.

Fig. 2. Patient with unstable intertrochanteric fracture were positioned in supine position

Fig. 3. Guide wire crossing at fracture site

Fig. 4. Nail insertion over fracture site

Superficial dissection and Deep dissection done, tensor facia lata cut, vastus lateralis cut in reverse L shaped fashion starting proximally and going distally. The lateral proximal femur reached (Figure 7).

The level of insertion of the guide pin varies with the angle of plate used. The guide pin is inserted within 1 cm of the subchondral bone in the head of femur, positioned in the center or in the posteroinferior quadrant in the femoral head and confirmed under C-arm in both AP and Lateral view.

The guide pin placement instrument can be used to insert a parallel guide pin proximal to the primary guide pin. This provides temporary stability for unstable fractures, in which reduction can be lost if guide pin backs out during reaming. It also provides rotational stability to the fragment.

After the guide pin placement in central quadrant or posteroinferior quadrant, derotational screw if required put in the head of the femur.

Fig. 5. Screw insertion

Fig. 6. Position of patient during DHS insertion

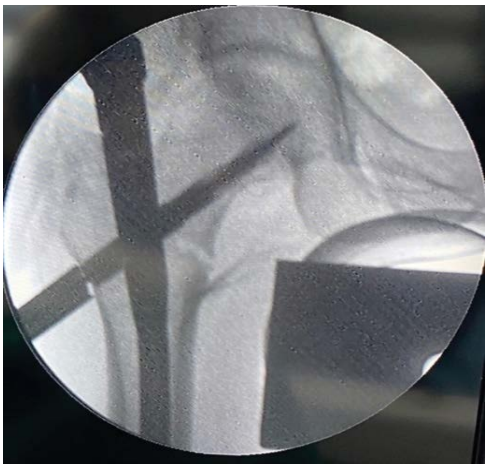

Fig. 7. Insertion of guide pin

Fig. 8. Compression screw put at the end of Richard screw

Triple reaming done after calculating the adequate size and checked in AP and lateral view. Lag screw inserted in the head of the femur and checked in C-arm in AP and lateral view. At the end of the screw insertion, the T- handle of the wrench should be parallel to the femoral shaft; and the DHS plate put over it. The distally cortical screws of 4.5 mm put. Then compression screw put at the end of Richard screw (Figure 8).

POST OPERATIVE MANAGEMENT

- The patient is kept in head low position with 2 blocks under the bed, to avoid post spinal headache
- Strengthening quadriceps and Hamstring, knee ROM and Ankle toe movement were started on POD 2 in all the patients
- The patients were discharged with the advice not to do full weight bearing on the affected limb till atleast 6 weeks. After which patient can do partial weight bearing for 1 week and full weight bearing subsequently as per pain tolerance by the patient
- Patients asked to follow up in OPD after 1 week, 3 weeks, 6 weeks, and after that every month for atleast 6 months
- Running and exercise were allowed depending on clinical and radiological union of fracture
- At the end of 6 months modified Harris hip score of the patient was calculated and the results were compared

RESULTS

Average waiting time of surgery was 3 days. Range 1-6 days. 24 patients in our study achieved the radiological union after the 6 months follow up of surgery. 6 patients developed complications of non-union due to Lag screw break or Lag screw cut out. Out of these 6 patients, 5 were treated with Dynamic hip screw and were treated with PFN A2.

The patient reported outcome was measured using the modified Harris hip score. Among patients treated with PFN A2, the score was considerably better than those treated with Dynamic hip screw.

Range of motion and strength of the injured limb were measured and recorded. These values were compared to the uninjured limb. The functional outcome of patients treated with PFN A2 was found to be better than the patients treated with DHS.

DISCUSSION

The present study aimed to evaluate the post-operative outcome of unstable intertrochanteric fracture treated with proximal femoral nail A2 vs Dynamic hip screw. Most of the patients treated were elderly age group mostly above 60, which highlights the fact that these fracture are much more common in elderly people [5].

In our study the mean range of motion of the injured limb and the Harris hip score were found to be better for the patients treated with Proximal Femoral Nail A2 than those treated with dynamic hip screw. Also the patients treated with Dynamic hip screw developed more complications like non-union due to screw break or screw cut out , compared to those treated with dynamic hip screw. Out of 15 patients treated with DHS 5 developed non-union compared to 1 patient in PFN A2 who developed non-union of the unstable intertrochanteric fracture. DHS often fails to give good results in the unstable and reverse oblique fracture, which limits its clinical use in unstable intertrochanteric fracture [6-9]. PFN A2 provides angular and rotational stability, which is especially important in osteoporotic bone, and allows early mobilization and weight bearing on the affected limb [10].

CONCLUSION

In conclusion the study shows that patients of unstable intertrochanteric fracture treated with proximal femoral nail A2 is superior clinical and radiological outcomes compared to the patients treated with dynamic hip screw.

References:

1. *Sun Q.Z., et al.: Comparison of clinical effect between reconstructing femoral calcar and proximal femoral antirotation nail for the treatment of unstable femoral intertrochanteric fracture in elderly patients. Chin J Ortho Traumatol. 2016;29:684-688.*
2. *Hwang L.C., et al.: Intertrochanteric fractures in adults younger than 40 years of age. Arch Orthop Trauma Surg. 2001;121:123-126.*
3. *Bannister G.C., et al.: The fixation and prognosis of trochanteric fractures: A randomized prospective controlled trial. Clin Orthop. 1990;254;242-256.*
4. *Bridle S.H., et al.: Fixation of intertrochanteric fractures of femur: A randomized prospective comparison of the Gamma nail and dynamic hip screw. J Bone Joint Surg Br. 1991;73:330-334.*
5. *Kregor P.J., et al.: Unstable pertrochanteric femoral fractures. J Ortho Trauma. 2014;28:S25-S28.*
6. *Bucholz R.W., et al.: Intertrochanteric Fracture. Lippincott Williams & Wilkins. 7th edition. 2009.*
7. *Radford P.J., Needoff M., Webb J.K.: A prospective randomized comparison of the dynamic hip screw and the gamma locking nail. J Bone Joint Surg Br. 1993;75:789-793.*
8. *Haidukewych G.J.: Intertrochanteric fractures: ten tips to improve results. J Bone Joint Surg Am. 2009;91:712-719.*
9. *Kaplan K., et al.: Surgical management of hip fractures: an evidence-based review of literature. II: Intertrochanteric fractures. J Am Acad Orthop Surg. 2008;16:665-673.*
10. *Mallya S., et al.: Comparison of radiological and functional outcome of unstable intertrochanteric femur fractures treated using PFN and PFNA-2 in patients with osteoporosis. Eur J Orthop Surg Traumatol. 2019;29:1035-1042.*