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OUTCOME ANALYSIS OF PROXIMAL FEMORAL NAIL IN MANAGEMENT OF UNSTABLE INTERTROCHANTERIC FRACTURES

Orthopaedics

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ABSTRACT

There is no perfect implant for intertrochanteric fractures. Nowadays Proximal Femoral Nail (PFN) is getting popular in these fractures. In this study we tried to find and analyse the outcome of using PFN in 20 cases of unstable intertrochanteric fractures which were operated at our centre and completed the follow up till 6 months. These patients were analysed on various intra-operative and post-operative parameters. Functional assessment was done using Harris Hip Score. The mean age of patients in our study was 64 years. Average incision length was around 6.5cm and mean blood loss was 97ml. Average surgery duration was 71 minutes while average hospital stay was 18.1 days. Mean time to union was 14.9 weeks. All cases have achieved union. Varus malalignment was observed in one case. Harris Hip Score showed excellent results in 60% cases and good results in 30% cases. Our study indicates that PFN is a good implant for fixation of unstable intertrochanteric fractures. However it superiority over other implants can only be confirmed with larger comparative studies.

KEYWORDS

Unstable intertrochanteric femur fractures, Proximal Femur Nail, PFN.

INTRODUCTION:

Intertrochanteric fracture is one of the leading causes of morbidity and mortality in the elderly population.[1,2] Unstable fractures accounts for more than 50% of all intertrochanteric fractures. Comminution of posteromedial wall, reverse oblique pattern and subtrochanteric extension are considered an unstable type of fracture.[3] Intact lateral wall is also crucial for stability and its deficiency leads to excessive collapse and varus malposition.[4]

The design of implants with multiple options for fixation of intertrochanteric fracture have evolved over the years but still, there is a conflict that which implant is better for which type of trochanteric fractures.[5,6]

Dynamic Hip Screw (DHS) which is considered by many in stable intertrochanteric fractures has failure rates of around 5 to 21 percent in unstable intertrochanteric and subtrochanteric fractures.[7,8] Such failures are mostly caused by lag screw cut-out or by a telescoping displacement with medialization of femoral shaft due to lack of lateral support for proximal fragment.[9]

Proximal Femur Nail (PFN) is a cephalomedullary device and hence biomechanically more sound than DHS due to shorter lever arm. It is a load sharing device, is collapsible and has rotational stability. It is inserted with closed reduction technique.[10,11] However clinical reports of intramedullary nailing for unstable fractures are very limited.[7]

In this study we observe the efficiency of using PFN for fixation of unstable intertrochanteric fractures based on various intraoperative and postoperative variables.

MATERIAL AND METHODS:

The study was conducted after approval from ethics committee of our institute. Patients presenting with unstable intertrochanteric fractures of greater than 18 years of age were included in the study after getting an informed consent. Patients with open fractures or having pre-existing deformities of proximal femur were excluded from the study. We have considered AO types 31A2 and 31A3 as unstable fractures.

23 patients meeting the inclusion and exclusion criteria were admitted between August 2016 and February 2018. These patients were operated under spinal anaesthesia on traction table. Open reduction was performed if closed reduction was not possible. Entry point used for PFN was the tip of Greater Trochanter and entry made with awl. We have used long PFN in all the cases. The hip screw and antirotation screw were inserted with the help of aiming device tightly secured to insertion handle of the nail. Hip screw inserted in the lower half of femur neck to get hold of strong calcar. Distal locking done using free hand technique. All surgeries were done by experienced surgeons.

Sitting, Quadriceps exercises and active knee bending exercises were started from 2nd postoperative day. At follow up visits patients were evaluated for hip function, fracture union and complications. All patients were followed up till 6 months. Functional assessment using Harris Hip Score was done at 6th month.

RESULTS:

Out of 23 patients enrolled in our study 3 cases were lost to follow up. Hence final results are analysed on the basis of the remaining 20 cases. The mean age at presentation was 64 years. There were 14 males and 6 females. This injury was most commonly due to falls (80%). Mean injury to surgery interval was 11.2 days.

The mean length of incision was 6.5cm. It included the incision used in entry of nail and incision used for insertion of proximal and distal screws. Open reduction was required in 2 cases. The mean duration of surgery was 71minutes and mean blood loss was 97ml. Blood loss was calculated by adding loss in suction container and loss in mops used and subtracting the saline wash taken.

In 2 surgeries there was difficulty in proximal locking while in 1 surgery there was difficulty in distal locking which led to a peri-implant fracture. The mean period of hospitalisation was 18.1 days. Superficial surgical site infection was seen in one case while 1 case had upper respiratory tract infection and 1 case acquired urinary tract infection in the post op period.

All the cases have achieved union. The mean time to union was 14.9 weeks. Varus deformity occurred in one case. No other case had any deformity or limb length discrepancy. Mean Harris Hip Score was 90.25. Functional outcomes on the basis of it were Excellent in 60%, Good in 30% and Fair in 10 % cases.

Figure 1: Progress of a case over 6 months

Figure 2: Clinical photographs at 6 months

Figure 3: Peri-implant fracture

DISCUSSION:

The major alternative implants for unstable intertrochanteric femur fractures include DHS supplemented by Trochanteric Support Plate or K-wires and SS wires and Proximal Femur LCP. Both these devices are extramedullary devices and require open technique whereas PFN is a cephalomedullary device and is mostly done with a closed technique.

The mean incision length was 6.5cm. Nargesh A et al[8] reported mean incision length of around 8.5cm for PFN and 16.5cm for DHS. Ravishankar et al reported a mean incision length of 5-6cm for PFN.[12] In our study mean blood loss was 97ml. N. Selvam et al[2] reported mean blood losses of 97.5ml for PFN and 163ml for DHS and Nizamoddin Khateeb et al[5] reported mean blood loss of 120ml for PFN and 250ml for DHS. A smaller incision has advantages of less blood loss, less risk of post-operative infections and less soft tissue stripping which helps in the fracture healing.[6]

The mean duration of surgery for PFN was 71 minutes. The mean operating time was 88.3 minutes for TSP fixation, 79.8 minutes for Gamma nail and 75.1 minutes for DHS in unstable pertrochanteric fractures in the study conducted by Adams CI et al.[10] In 2 cases we encountered difficulty in proximal locking. This was due to ill-fitting of jig. In a case facture occurred at distal locking site during screw insertion. In this case only 1 distal screw was placed and above knee slab was applied for 3 weeks. Patient was followed up closely and eventually fracture healed well.

The systemic infections subsided with use of broad spectrum antibiotics. Superficial wound infection also subsided with i.v. antibiotics. Implant removal or debridement was not required in any case. The long injury to surgery interval and hospital stay in our study can be attributed to late presentation and comorbid conditions which led to delay in getting fitness for surgery. All cases achieved union with mean union time of 14.9 weeks. Varus deformity was seen in a case. The reason for varus deformity was inability to achieve proper reduction and failure to maintain neck shaft angle intraoperatively. Ozkan K et al[13] noted that it is important to place the inferior lag screw as close to inferior femoral neck cortex on AP view and both screws as close as possible to centre of the femoral head in lateral view. Varus fixation causes excessive loads on the implants and a possibility of implant failure.[14]

Mean Harris hip score in our study was 90.25. 60 % cases had excellent, 30 % cases had good and 10% cases had fair results. No cases were found with poor results.

CONCLUSION

Treatment of unstable intertrochanteric fractures has been challenging due to difficulty in obtaining and maintaining stable anatomical reduction. PFN has all the advantages of closed technique i.e. preservation of fracture hematoma in situ, minimal soft tissue dissection, short duration of surgery, less blood loss and less risk of postoperative infections. We have got excellent to good results after using PFN for unstable intertrochanteric fractures and achieved union in all our cases. Hence we may conclude that PFN is a good implant for such fractures. Our study is limited by small sample size and less follow up period. Further studies with more patients, longer follow up and with comparative groups of other implants are needed to establish the superiority of PFN over other implants.

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