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A Comparative Study between Proximal Femoral Nail and Proximal Femoral Nail Antirotation Ii In Intertrochanteric Fractures

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Abstract
Background: *Intertrochanteric fractures constitute a major public health burden. Surgical treatment is the gold standard for the age. The most commonly done surgery nowadays is PFN which has good results as well as lots of complications. One of the cause attributed is geometric mismatch in some selected populations.The PFN AII device was recently introduced and appears to be better suited to the typical Asian patient who has smaller femurs.*
Objectives: *- To measure and compare Modified Harris Hip Score,Time For Post-Operative Full Weight Bearing Mobilisation, Time For Radiological Evidence Of Union, Complications After Surgery by using proximal femoral nail or proximal femoral nail antirotation II for Intertrochanteric fractures.*
Methods:- *The patients presenting with intertrochanteric fractures treated by closed nailing who fulfilled the inclusion criteria were recruited, and either PFN or PFNA-II was done. Informed consent was obtained.All patients were assessed by using the Modified Harris Hip score at the follow-ups. Performa specially made for the study was used. Data collected at the end of the study was statistically compared and analysed with the similar studies done before.*
Results & Discussion:- *The mean age is 74 years. There were more females in this study. There was more of AO 31A2 as compared to AO 31A1 fractures. Radiation exposure,surgery time, blood loss were significantly less in PFNA-II group. Average hospital stay, side of fracture, Range of hip movements and radiological evidence of union were comparable.Back out of screw/blade was the most common postoperative complication and was more in PFN group. No cases of failed results were reported in either PFN or PFNA-II group according to Modified Harris Hip score at 24 weeks.*
Conclusion: *PFNA-II gives better results considering radiation exposure, surgery time ,blood loss when compared to the conventional PFN. Intra operative, post operative complications and functional results were comparable. Hence the novel PFNA-II gives hope for the ideal fracture and ideal patient provided fracture is well reduced.*
Keywords:- *Intertrochanteric fractures, Proximal Femoral Nail, Proximal Femoral Nail Antirotation –II*

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I. Introduction

The treatment of intertrochanteric hip fractures and especially unstable intertrochanteric fractures in the elderly remains a challenge for orthopaedic surgeon. There is not a consensus of opinion as to the ideal implant for treatment of intertrochanteric fractures. The main goal of treatment is stable fixation that promotes early postoperative mobilization.Intramedullary devices appear to be highly appropriate due to their biomechanical properties.The proximal femoral nail (PFN) device was introduced as an option for intramedullary management of intertrochanteric hip fractures in the presence of osteoporotic bone.But complications like femoral shaft fractures and Z effect are there in Asian population due to geometric mismatch of nail with proximal femur. The PFN AII device was recently introduced and appears to be better suited to the typical Asian patient who has smaller femurs.. The PFNA-II blade may thus be a more biomechanically suitable implant for unstable trochanteric fractures and trochanteric fractures associated with osteoporotic bone. Extra medullary versus intramedullary devices for stabilization of proximal hip fractures have been extensively reported in the literature. But fewer studies are present comparing the intramedullary nails in the Indian population.

II. Materials And Methods

It is a prospective comparative study over 18 months which was carried out from April 2017 to September 2018 in Jubilee mission medical college and research institute, Thrissur, Kerala. In this period,We measured and compared timing of full weight bearing mobilisation, time for radiological evidence of union,intra operative and postoperative complications, post-operative mobilization status by using either proximal femoral nail or proximal femoral nail antirotation II for Intertrochanteric fracture.

Source and Selection of Cases

All Patients presenting to institution's emergency department with Intertrochanteric Fracture willing for surgical management divided into two groups of 15 each based on simple random sampling. A detailed history is taken from the patients and/or bystanders. The general condition of the patients were assessed and also done the local examination.After the examination, x-ray of affected limb with femur from hip to knee joint in both anteroposterior and lateral views were taken along with chest xray PA view for surgery fitness. The limb was given a below knee skin traction as a temporary measure to relieve pain, counteract muscle spasm, reduce deformity and the patient was admitted with routine blood investigations. Oral, intramuscular or intravenous analgesics were given to relieve pain.

Inclusion criteria

Intertrochanteric fractures-AO/OTA 31A1,31A2 and 31A3 fractures.

Exclusion criteria

1. Open fracture
2. Unfit for surgery
3. Fracture more than three weeks
4. Multiple comorbidities
5. Head injury
6. Neurovascular injury
7. Low subtrochanteric fractures
8. Femoral shaft fractures
9. Isolated or combined medial femoral neck fractures

The nature of injury, the need for surgery,the operative procedures, its advantages and possible complications all were explained in detail to the patient and relatives and written and informed consent was obtained. All pre operative investigations were done. Injection TT was given.All consultations needed for fitness for surgery were obtained. A detailed pre anaesthetic check up was done.Physician opinions were taken for fitness of patients before surgery as and when necessary. X-ray were reviewed again and classified using Orthopaedic Trauma Association (AO/OTA) classification. All fractures were treated using a Proximal femoral nail or Proximal femoral nail antirotation II. Selections of patients were based on simple random sampling of all individuals willing for surgical treatment. Each individual is chosen randomly and entirely by chance. Regular follow ups were done. All patients were assessed by using the Modified Harris Hip score at 24 weeks. Performa specially made for the study was used. Data collected at the end of the study was statistically compared and analysed with the similar studies done before.

III. Results

There are 30 patients with intertrochanteric fracture who were treated in this hospital during the 18 month periodfromApril2017 to Septrember 2018.The present study consists of 30 cases with inclusion criteria of the fractures of the intertrochanteric region in age group 30-60 year treated by closed reduction and internal fixation using either proximal femoral nail(PFN) or proximal femoral nail antirotationII (PFNA II).The study is a prospective comparative study between the two groups. The mean age of the patients with Intertrochanteric fractures in both groups were within comparable limits and is approximately 74 years(range 50-92). There was more females in this study(F:M-19:11) explained by women's lower bone mass and density and higher frequency of falling.There was was more of AO 31A2-23(76.7%) as compared to AO 31A1-7(23.3%) classification.No differences in side of fracture were attributed. Average hospital stay was comparable(11-13 days). Radiation exposure, surgery time and blood loss were significantly less in PFN A-II group. Lesser image intensifier time seen in the PFNA-II group was attributed to lesser number of cephalic screws as compared to PFN. Average C arm shots for PFN A-II was 55 as compared to 67 of PFN. Duration of surgery is significantly low in PFNA AII group with mean time of 51 minutes as compared with 64 minutes in PFN. 67% of PFNA-II patients were independent ambulatory at the end of 6 weeks compared to 40%of PFN group.Range of hip movements and radiological evidence of union(80 to 93%) were comparable in both groups.Majority of patients

in both groups - 53.% of PFN group and 67% of PFNA-II group were able to fully weight bear after 10 weeks. There were no intraoperative complications in 11 cases of PFN and 14 cases of PFNA –II. Guide wire breakage and fracture of lateral cortex were slightly on higher side in PFN group which was not significant statistically. Back out of screw/blade was the most common postoperative complication in PFN group.Other postoperative complications were Varus Malunion And Limb Shortenning which were comparable. Modified Harris Hip score at 24 weeks distribution was assessed and 26.7% of good results were obtained with PFNA-II as compared to 13.3% in PFN group. Fair results of 66.7% were obtained in PFNA-II group as compared to 80% in PFN group. No cases of failed results were reported in either PFN or PFNA-II group.

IV. Discussion

The present study consists of 30 cases with the Intertrochanteric fractures treated by closed reduction and internal fixation by either proximal femoral nail or proximal femoral nail antirotation II over 15 months period extending from April 2017 to Septrember 2018 in a tertiary center, Jubilee Mission Medical College and Research Institute,Thrissur.There were 15 patients in PFNA II group and 15 in PFNgroup.All patients were followed up till end.

1 Age

The mean age of the patients with Intertrochanteric fractures in this study was 74.47±10.68 of which mean age of patients who had treatment with proximal femoral nail was 74.67±11.54 and proximal femoral nail antirotation-II was 74.27±10.15.

2 Gender Distribution

There were more females in this study(F:M-19:11) of which F:M is 9:6 in proximal femoral nail and 10:5 in proximal femoral nail antirotation II. But statistically it was not significant with P=0.705.

3 Type of Fracture

Type of Fracture distribution in two groups of patients studied was more of AO 31A2-23(76.7%) as compared to AO 31A1-7(23.3%).

4 Side

Side involved distribution in two groups of patients studied was comparable -16(53.3%) of left and 14(46.7%) cases of right sided intertrochanteric fractures were included which was not Significant with P value=1.000

5 Intraop Complications

Intraop Complications among two groups were compared.There were no intraoperative complications in 11 cases of PFN and 14 cases of PFNA –II. Guide wire breakage was the most common intraoperative complication in PFN group which was seen in 2 cases compared to nil cases of PFNA –II. Failure to achieve good reduction occurred in one case each of PFN and PFNA-II. Fracture lateral cortex was seen in a case of PFN compared to no cases in PFNA-II.

6 Radiation Exposure

C ARM Shots distribution in two groups of patients studied were 67.87±10.30 with proximal femoral nail and 55.47±8.20 for proximal femoral nail antirotation- II which is statistically significant with P value=0.001.the significantly lesser image intensifier time in the PFNA-II group could be attributed to lesser number of cephalic screws.

7 Duration Of Surgery

Duration of surgery in minutes in two groups of patients studied is significantly low in proximal femoral nail antirotation 2 group with mean time of 51.60±6.85 minutes as compared with 64.53±13.04 minutes in proximal femoral nail group.

8 Blood Loss

Blood loss (ml) distribution in two groups of patients studied is 105.67±18.50 millilitres in proximal femoral nail antirotation 2 group as compared to 140.00±43.79 millilitres in proximal femoral nail group which is statistically significant with a P value of 0.009.

9 Hospital Stay

Hospital Stay (days) distribution in two groups of patients studied is 12.93±3.33 days
in proximal femoral nail antirotation 2 group as compared to 11.47±3.66days
in proximal femoral nail group

10 Post Operative Mobility

Post operativeMobility status at 6weeks in two groups of patients were studied and compared and is listed as 16 (6 in PFN,10 in PFNA2)independently ambulatory, 9(6 in PFN,3 in PFNA2)ambulatory with support, 5(3 in PFN,,2 in PFNA2)non ambulatory at end of 24 weeks after surgery.Nearly 67% of patients with PFNA2 were ambulatory independently at the end of 24 weeks compared to 40% in PFNgroup.Similarly,nearly 20% of patients with PFNA2 were ambulatory with support at the end of 24 weeks compared to 40% in PFN group

11 Hip Flexion

HIP flexion in degrees in two groups of patients were studied.It is 87.40±11.44 in PFN group

As compared to 91.33±14.94 in PFNA2 group

12 Radiological evidence of union

Radiological evidence of union at 24 weeks in two groups is seen in 12(80%)cases of the PFNA-II group and 14(93.3%) cases of PFN group.

13 Time For Full Weight Bearing Mobilization

All patients of PFNA-II were able for full weight bearing mobilization before attaining 20 weeks post surgery.Only 20% of each category (3 each for PFN and PFNA-II)were able to fully weight bear before 10 weeks.Majority of patients in both groups -53.3% of PFN group and 66.7% of PFNA-II group were able to fully weight bear after a period of 10 weeks postoperative time.

14 Post Op Complications

Post Op Complications among two groups were compared.There were no Post Op complications in 11 cases of PFN and 12 cases of PFNA –II. · Back Out screw/blade was the most common intraoperative complication in PFN group which was seen in 2 cases compared to nil cases of PFNA –II.

Varus Malunion occurred in one case each of PFN and PFNA-II. Limb Shortenning was seen in a case of PFN compared to 2 cases in PFNA-II.

15 Modified Harris Hip score

Modified Harris Hip score at 24weeks distribution in two groups of patients studied is 77.54±4.84 for the PFNA-II group and 76.00±3.98 for the PFN group which is statistically not significant with a P value of 0.349.

The score is reported as 90-100 for excellent results, 80-89 being good, 70-79 fair, 60-69 poor, and below 60 a failed result. 26.7% of good results were obtained with PFNA-II as compared to 13.3% in PFNgroup.Fair results of 66.7% were obtained in PFNA-II group as compared to 80% in PFNgroup.No cases of failed results were reported in either PFN or PFNA-II group.

V. Conclusion

We have observed that PFNA-II gives better hopes considering Radiation exposure, surgery time and blood loss when compared to the conventional PFN.

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