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Comparison of proximal femoral nailing (PFN) and proximal femoral locking plate (PFLP) for intertrochanteric femur fracture in elderly.

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ABSTRACT... Objective: To compare the functional outcome of PFN and PFLP for the treatment of unstable four part intertrochanteric femur fracture. **Study Design:** Randomized Controlled Trial study. **Setting:** Orthopedics Department, Dow International Medical College, Karachi. **Period:** February 2019 to January 2020. **Material & Methods:** 281 patients were included and assigned to each group PFNA and PFLP alternatively. Both groups were compared for functional evaluation by Harris hip score. **Result:** Duration of surgery, perioperative hemoglobin loss, and duration of fracture healing were significantly lower in PFNA group as compared to PFLP, $P < 0.05$. But Harris Hip score was significantly higher in PFNA group as compare to PFLP $P > 0.05$. **Conclusion:** PFN has better functional outcome. This makes it a better method of fixation as compared to PFLP in elderly intertrochanteric femur fracture.

Key words: Proximal Femoral Nail, Proximal Femoral Locking Plate, Unstable Intertrochanteric Fracture.

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INTRODUCTION

Extracapsular intertrochanteric femur occurs between the two trochanter. It accounts for 45 % of fracture around the hip joint.¹ The intertrochanteric region of femur consist weight bearing trabeculae and cancellous bone. This leads to a decrease incidence of AVN and non-unions as compare to intracapsular fracture.²

The incidence of intertrochanteric femur fracture increases with age.³ Male to female prevalence ratio 3:1.⁴ These fractures are mainly osteoporotic and occur after trivial injury in elderly population.⁵ If the bone stock is normal, we can use any implant for fixation for inter trochanteric femur fracture but if the bone is osteoporotic, best implant for fixation is still controversial.

MATERIAL & METHODS

This study was conducted at orthopedic department DOW Medical College Karachi from Feb 2019 to Jan 2020 after approval from hospital ethics committee. In randomized controlled study 281 patients were selected and assigned

to PFNA and PFLP group alternatively. In PFNA group 141 patients were included 51 male and 90 female. Mean age was 64.82 ± 4.12 (55-75 years). According to AO classification 38 patients were classified into type A1, 76 into type A2 and 27 into type A3. In PFLP group 140 patients were included, 45 were male and 95 were female. Mean age was 62.37 ± 3.18 (56-73). According to AO classification 39 were type A1, 81 were type A2 and 21 were type A3. The patients were informed about the importance and objective of this study prior to obtaining written and informed consent. Consent and other necessary requirement were done prior to initiation of study. Exclusion criteria included open fractures, pathological fractures, fracture in children and fractures more than two weeks old.

Before surgery patient were keep in skin traction and underwent local and systemic examination. Base line investigation for anesthesia assessment was done. Radiograph assessment were done to classify the fracture and extent of injury. Patients were assigned to each group alternatively. Type

of anesthesia was decided by anesthetist.

Operative Technique

The surgery was carried out in supine position with a lateral approach. For reduction and maintenance of reduction traction table was used. Use of image intensifier was done to assess the reduction and placement of implant.

Fracture pattern and position dictated the length of incision. After reduction the incision was given below the tip of trochanter and goes down according to the extent of fracture. The PFLP was fixed with screws ranging from 90 to 135 degrees. The rest of the plate was fixed with locking screws of 5mm or usual 4.5mm screws. PFLP may be fixed in a less invasive mode as well. Use of bone grafting and placement of implant in a bridging mode was used in comminuted fracture. The wound was closed in layers over the drain.

Reduction was closed with the help of traction table and checked under image intensifier. The procedure was carried out from an incision above the greater trochanter. The tip of the greater trochanter was the area from where the entry was made and passage of guide wire and reaming was done. The size of the nail 240 – 420mm, width 19mm and proximal width of 15 mm was selected as per configuration of fracture. The cervical screw of 8 mm and stabilizing screw of 6.4 mm were placed after the nail had been placed.

Complications and Harris hip score were assess at 6th month. Statistically using standard test. P value of less than 0.05 very consider significant. Data was analyzed using 22nd version of SPSS and Pearson chi square test.

Post-Operative Care

Antibiotics were administered for 24 – 48 hours. Drain was removed within 48 hours. Passive range of motion exercises were started on day one or two after surgery. Partial weight bearing was started on third post-operative day and full weight bearing was allowed as per type of fracture, degree of osteoporosis, radiographic evaluation. Regular follow-ups were advised on 2nd week, 1st, 3rd and 6th months with radiograph. Callus formation on three of four cortices is an evidence of union. Harris hip score was used to assess the functional status on final follow-up. It include function, pain, joint movement and joint deformity. Maximum score was 100, score with 90-100 was excellent, 80-89 was good, 70-79 was fair, and <70 was poor.

SPSS17.0 software was used for Statistical analysis. Crosstab method was used for analysis of difference in sex, age, and fracture type. Related parameters of the surgery, scores of hip function, fracture healing, and postoperative complications were analyzed with independent sample.

RESULTS

Duration of surgery, mean perioperative blood loss and mean duration of fracture healing were significantly high $p < 0.05$ in PFLP group as compare to PFNA group as shown in table.

	PFNA Group	PFLP Group
Total patient	141	140
Age	64.82 ± 4.12 (55-75 years)	62.37 ± 3.18 (56-73)

Table-I

Parameters	PFNA Group	PFLP Group	P-Value
N	141	140	
Mean duration of surgery (min)	75.12 ± 6.13	60.18 ± 5.12	< 0.05
Mean perioperative blood loss (ml)	360.83 ± 4.32	80.27 ± 3.56	<0.05
Mean fracture healing time	14.31 ± 3.12	12.41 ± 0.38	<0.05
Last follow-up Harris Hip score	91.06 ± 1.03	91.17 ± 1.06	>0.05

Table-II

DISCUSSION

Treatment of intertrochanteric femur fracture has changed significantly in last 3-4 decades.^{6,7} Non operative treatment will lead to number of complications which include bedsores, pneumonia, urinary infection, and deep venous thrombosis that that increases the morbidity and may lead to mortality.^{8,9} That is why we avoid non operative treatment and surgery will be the acceptable option.

Number of implant for fixation was used in the past but now get discarded.¹⁰ Still the treatment depends upon the type of fracture and general condition of the patient.¹¹

For the treatment of intertrochanteric fracture in elderly, the most important points in the favor of PFNA are acceptable fracture reduction, central intramedullary nail insertion and correct position of main nail through trochanter.¹² Acceptable fracture reduction is necessary for successful surgery and reduces perioperative complication.¹³ For helical blade, the blade should be in mechanical axis of hip to increases the pull out strength and reduces the chances of varus collapse.¹⁴

When using PFLP main points are appropriate reduction after incision and plate placement height.^{15,16} The proximal screw should have proper purchase in head through neck.^{17,18} Proximal femoral locking plate is very important tool to achieve and maintain reduction that is why it is very important to fix the plate at appropriate height. If we achieve the normal neck shaft angle, antiversión, and reduced lateral cortex of femoral neck.^{19,20} It is not necessary to deliberately reduce the lesser trochanter.²¹

In this study we choose two most commonly used implant for internal fixation in geriatric population. According to results both group achieved pre-operative functional status. The functional outcome was comparable to another study conducted at China.

With respect to duration of surgery, mean perioperative blood loss and mean duration of fracture healing time, PFNA is superior as

compare to PFLP. The result is comparable to another study conducted at China.

The reason for less blood loss is smaller incision. Usually we do not open fracture in PFNA so, the fracture get easily healed. There is a standardized procedure for PFNA that is why it is less technically difficult.

CONCLUSION

We concluded that PFNA is superior to PFLP in geriatric intertrochanteric femur fracture but degree of osteoporosis, fracture type and patient general condition should be consider before taking the decision.




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