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ORIGINAL ARTICLE

Comparison of Proximal Femoral Nail versus Dynamic Condylar Screw in Treating Reverse Oblique Intertrochanteric Femoral Fractures

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ABSTRACT

Aim: Comparison of proximal femoral nail versus dynamic condylar screw in treating reverse oblique intertrochanteric femoral fractures.
Study Design: Retrospective study
Place and duration of study: CMH Kharian, Allama Iqbal International Hospital Kharian and Madni Hospital Gujrat from 1st January 2020 to 31st December 2022.
Methodology: Sixty five patients who had suffered from reverse oblique intertrochanteric femoral fractures and were either treated through proximal femoral nail or by dynamic condylar screw were included. Patients who were treated with proximal femoral nail were placed in group 1 while those treated with dynamic condylar screw were placed in group 2. The comparative outcomes between both groups were than analyzed and documented in a well-structured questionnaire.
Results: There was no significant variance in the mean age of the patients in group 1 (proximal femoral nail) and group 2 (dynamic condylar screw) with a value as 65.53±3.1 and 59.35±3.2 years respectively. There were more females in both groups than males however with no significant variance. Non-union and implant breakage observed in the dynamic condylar screw cases were 5/32 and PFN cases 2/33 respectively; with a significant p value difference. The fixation revision was required in 5case with dynamic condylar screw implant failure while it was 2 in cases of proximal femoral nail. The rate of infection was higher in dynamic condylar screw patients.
Practical Implication: There was no advantage of open reduction by dynamic condylar screw over the closed proximal femoral nail reduction. Proximal femoral nail reduction and fixation presented to be a better option for treating reverse oblique intertrochanteric femoral fractures.
Conclusion:A high rate of non-union is presented in dynamic condylar screw treated cases.Proximal femoral nail fixation presented to be a better option for treating reverse oblique intertrochanteric Femoral Fractures
Keywords: Intertrochanteric, Intramedullary, Femur, Reverse Oblique fractures

INTRODUCTION

Intertrochanteric fractures are the most common fractures of the proximal femur occurred due to ground level falls especially in elderly population, these fractures extending from extra-capsular basilar to lesser trochanter region and the incidence of trochanteric femur fractures observed in higher number in patients who had history of osteoporosis. Studies have predicted that in year 2050, approximately 4.5-6.2million fractures will occur in all over the globe and more than 50% will occur in Asian region[1-4].

Unstable fracture patterns has also been observed in sub trochanteric area, femur shaft dislocate medially and also types of oblique fractures. Trochanteric fractures are mostly operated however, certain contraindications are also found in their operative methods. These usually happen due to severe comorbidities in perioperative and even in intraoperative period. Furthermore, unstable trochanteric fracture poses serious management challenge for surgeons due to high postoperative associated risks and sometime even mortality[5-7].

Extramedullary fixation such as dynamic hip screw, dynamic condylar screw, DHS, DCS, CHS and intramedullary fixation including IMHS, PFNA, PFN and intramedullary hip screw are the available treatment options and both of them have their own benefits and drawbacks. Though, extramedullary sliding screw was once considered a gold standard for these types of fractures, intramedullary devise have surpassed the previous ones due to their effectiveness. Therefore, studies have suggested that extramedullary fixation should be opting with caution due to poor functional outcomes and higher risk of associated complications[8,9]. However, few studies found no significant difference in both surgical procedures for intertrochanteric fractures[10,11]. Present study was designed for the comparative analysis of proxim.

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MATERIALS AND METHODS

This retrospective study was conducted at CMH Kharrian, Allama Iqbal International Hospital Kharian and Madni Hospital Gujrat where in patients information was taken from the medical file data available. A verbal consent of all the enrolled patients was obtained. Those patients who had suffered from reverse oblique intertrochanteric femoral fractures and were either treated through proximal femoral nail or by dynamic condylar screw were included in this study. The patients having a follow-up upto almost three years post-surgery were included in this study. Those patients who had any surgery immediately or having severe osteoporosis, diabetes or any bone related disease history were not included in this study. Those patients having a proximal open fracture or with concomitant-lower extremity fracture, pathologicalfractures, were excluded from the study. Those patients who were treated with Proximal Femoral Nail were placed in group 1 while those treated with dynamic condylar screw were placed in group 2. A total of 65 patients were included depending upon convenient sampling technique. Out of these 65 cases there were 33 patients in Group 1 and 32 patients in group 2. All surgeries were conducted on a traction table securing spine positioning of patientsand applying C arm fluoroscopy. Trauma surgeons with a professional experience performed all surgeries. In cases of closed fracture achieved internal fixation was done through intramedullary-implant PFN nail having spiral blade (12mm) and 4.9mm distal screws for locking through minimal invasive procedure through medial-border of greater trochanter. In cases with dynamic condylar screw vastus-lateralis splitting was performed. Open-fracture reduction was attained,as well as the length of the plate was curtained in accordance to the extension of fracture. After the surgery the treatment included early mobilization as well as deliverance of heparin (low molecular weight) for preventing DVT for up to 2 weeks. Weight bearing was permitted post 4 weeks of surgery and in accordance with radiological imaging results. Data regarding fracture reduction quality grading including five-to-ten-degree

varus, valgus and or ante/retroversion was observed. Neck shaft as well as bone union period and posteromedial support presence were also assessed and compared within groups. The comparativeoutcomes between both groups were than analyzed and documented in a well-structured questionnaire. Data was analyzed through SPSS version 26.0 wherein student T test was applied on all the aforementioned variables. A variance in p value of <0.05 was taken as significant.

RESULTS

There was no significant variance in the mean age of the patients in group 1 (proximal femoral nail) and group 2 (dynamic condylar screw)with a value as 65.53±3.1 and 59.35±3.2 years respectively. There were more females in both groups than males however with no significant variance. There was also no significant difference in the affected side which required treatment (Table 1).

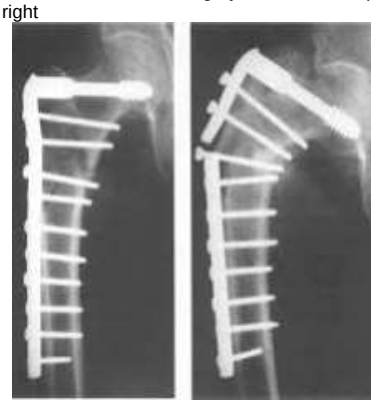
Table1: Demographic and clinical presentation of group 1 and group 2 patients

Variables	Group 1	Group 2	P value
Age (years)	65.53±3.1	59.35±3.2	0.56
Gender			
Males	14	15	0.71
Females	19	17	
Side Affected			
Left	16	18	0.66
Right	17	15	

The mean time of the follow-up in group 1 (proximal femoral nail) and group 2 (dynamic condylar screw) was 13.7 months and 18.5 months respectively with a range between 12 month to 35 months. The reduction was achieved with any of the two methods and results were compared (Figs. 1-2).

Fig 1: Fracture reverse oblique and shaft proximal femur left fixed with PFN with satisfactory fracture healing

Fig. 2: DCS failure after 3 months of surgery in reverse oblique fracture of proximal femur right



No significant risk in context with neck-shaft angle alteration, posteromedial-cortical discontinuation, lateral-butterfly fragmentation observance as well as poor quality of postoperative reduction was seen in any of the treated patients. Non-union and implant breakage was observed in the dynamic condylar screw cases 5/32 and 2/32 respectively; with a significant p value difference. Thefixationrevision was required in 5 cases with dynamic condylar screw implant while it was 2 in cases of proximal femoral nail. The rate of infection was higher in dynamic condylar screw patients (Table 2).

Table 2: Comparison between Group 1 and Group 2 complications

Variable	Group 1 (n=33)	Group 2 (n=32)	P value
Implant breakage	0	3	
Lag screw cutout	2	1	
Z-effect/reverse Z-effect	5	1	
Nonunion	0	5	
Infection	2	4	0.15
Revision surgery for fixation	2	5	0.035

DISCUSSION

Intertrochanteric fractures are the most common type of extracapsular fractures of the proximal femur. Various operative procedure options are available for the fixation of intertrochanteric fractures. Extramedullary and intramedullary fixation methods are usually opted by the surgeons. However, certain complication risks are also associated with both type of surgical procedure which sometime also leads to poor functional outcomes.[12-14]In present study, comparative analysis was made for finding better operative procedure for intertrochanteric fractures.

Functional outcomes of both surgical methods as assessed by using Harris hip scoring system which showed better outcomes in patients who were fixed with proximal femur nail. Fracture union time was also comparatively less in proximal femur nail group as compared to the dynamic condylar screw. These results are inconsistent with already published data[15-17]. Mean union time was also significantly less in PFN group as compared to DCS group. These results are also in line with the previous data[18,19].

When complication in both surgical methods was compared, overall incidence of complications was observed to be higher in dynamic condylar screw group in contrast to proximal femoral nail group. In current study, non-union was recorded in few patients and majority of the patients showed higher union rate. These findings are well supported by the present literature[20,21]. Implant failure was also observed in more patients in DCS group as compared to the PFN group. Similar results have been reported elsewhere[22]. The patients having a follow-up upto three years post-surgery were included in this study. Those patients who had any surgery immediately or having severe osteoporosis, diabetes or any bone related disease history were not included in this study. Those patients having a proximal open fracture or with concomitant-lower extremity fracture, pathological fractures, were excluded from the study. Those patients who were treated with Proximal Femoral Nail were placed in group 1 while those treated with dynamic condylar screw were placed in group 2. A total of 65 patients were included depending upon convenient sampling technique. Out of these 65 cases there were 33 patients in Group 1 and 32 patients in group 2. All surgeries were conducted on a traction table securing spine positioning of patients and applying C arm fluoroscopy. Trauma surgeons with a professional experience performed all surgeries. In cases of closed fracture achieved internal fixation was done through intramedullary-implant PFN nail having spiral blade (12mm) and 4.9mm distal screws for locking through minimal invasive procedure through medial-border of greater trochanter. In cases with dynamic condylar screw vastus-lateralis splitting was performed. Medical resources, diagnosis, and treatment must improve in developing countries. There are limited resources available: lack of access to medical and health resources to the patients about disease; limited knowledge and

trainings, and awareness about disease. The trainings should be conducted to improve the health literacy and how to access the medical resources for patients in Pakistan[23,29].

CONCLUSION

A high rate of non-union is presented in dynamic condylar screw treated cases. A closed fracture-reduction and fixation in proximal femoral nail treated cases seems as a critical constraint for preventing serious complications. There was no advantage of openreduction by dynamic condylar screw over theclosed proximal femoral nail reduction. Proximal femoral nail reduction and fixation presented to be a better option for treating reverse oblique intertrochanteric femoral fractures.

Conflict of interest: Nil

Ethical consideration: This study was approved by hospital ethical committee.

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