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Original article:

Efficacy of Dynamic Hip Screw with Femoral Nail System: An Institutional Based Study

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Abstract

Background: Hip fracture contributes to both morbidity and mortality in the elderly. The demographics of world populations are set to change, with more elderly living in developing countries. Although the effects of Proximal femoral nail (PFN) and dynamic hip screw (DHS) in treatment of intertrochanteric fractures have been reported, the results and conclusions are not consistent. Therefore; we conducted the present study to assess whether there is a significant difference between PFN and DHS fixation in treatment of intertrochanteric fractures.

Materials & Methods: The present study included assessment and comparison of efficacy of PFN and DHS fixation in treating patients with intertrochanteric fractures. A total of 28 patients with intertrochanteric fractures were included in the present study and were broadly divided into two study groups with 14 patients in each group as follows: DHS group; Patients treated with DHS fixation, PFN group; Patients treated with PFN fixation. Fixation was done in all the patients according to their respective study groups. Harris hip score was used for clinical and radiological assessment. Follow-up records of all the patients were obtained and were analyzed by SPSS software.

Results: Mean HHS among the patients of DHS group and the PFN group were found to be 80.15 and 84.35 respectively. No-Significant results were obtained while comparing the mean HHS in between the DHS group and the PFN group. Mean duration of surgery in the patients of DHS group and the PFN group were found to be 65.8 and 55.7 minutes respectively. Significant results obtained while comparing the mean duration of surgery in between the subjects of the DHS group and the PFN group.

Conclusion: PFN provides a significantly shorter surgery with a smaller incision that leads to less wound related complications.

Key words: Dynamic Hip, Femoral Nail, Fractures.

INTRODUCTION

Hip fracture contributes to both morbidity and mortality in the elderly. The demographics of world populations are set to change, with more elderly living in developing countries.[1]

Proximal femoral Fractures account for a large proportion of hospitalization among trauma cases. An overwhelming majority of these patients (>90%) are aged above 50 years.[2] Inter trochanteric fractures of femur occur in the area between the greater and lesser trochanter and may involve these two structures. Inter trochanteric fractures make up 45% of all hip fractures.[3-5]

Incidence of proximal femoral fractures among females is 2 to 3 times higher than males, also the risk of sustaining a proximal femoral fracture doubles every 10 years after age 50 years. The goal of treatment of these fractures is stable fixation, which allows early mobilization of the patient. These fractures are associated with substantial morbidity and mortality.[6, 7]

Generally, intramedullary fixation and extramedullary fixation are the 2 primary options for treatment of such fractures. The dynamic hip screw (DHS), commonly used in extramedullary fixation, has become a standard implant in treatment of these fractures. Proximal femoral nail (PFN) and Gamma nail are 2 commonly used devices in the intramedullary fixation. Previous studies showed that the Gamma nail did not perform as well as DHS because it led to a relatively higher incidence of post-operative femoral shaft fracture.[8- 10]

Although the effects of PFN and DHS in treatment of intertrochanteric fractures have been reported, the results and conclusions are not consistent.[10] Therefore; we conducted the present study to assess whether there is a significant difference between PFN and DHS fixation in treatment of intertrochanteric fractures.

MATERIALS & METHODS

The present study was conducted in the department of orthopedics of the GSVM Medical College, Kanpur, Uttar Pradesh, India and it included assessment and comparison of efficacy of PFN and DHS fixation in treating patients with intertrochanteric fractures. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. A total of 28 patients with intertrochanteric fractures were included in the present study and were broadly divided into two study groups with 14 patients in each group as follows:

DHS group; Patients treated with DHS fixation,

PFN group; Patients treated with PFN fixation.

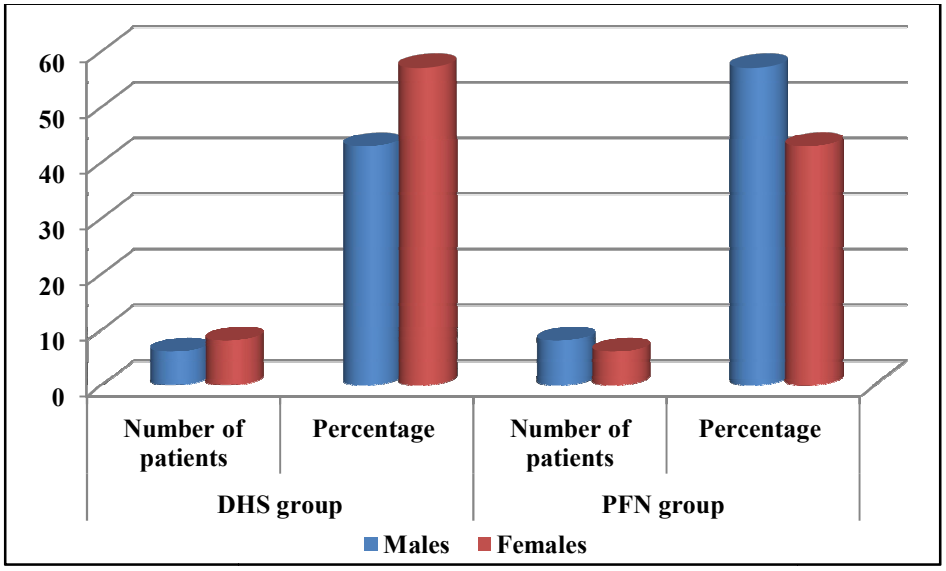
Before the starting of the study, detailed demographic and clinical data of all the patients was obtained. Till the day of surgery, patients were kept on skeletal/skin traction. Pre-operative antibiotics were given to the patients. Pre-operative planning was done to decide the type and length of implant to be used. Fixation was done in all the patients according to their respective study groups. Harris hip score was used for clinical and radiological assessment. Follow-up records of all the patients were obtained and were analyzed by SPSS software. Chi- square test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

RESULTS

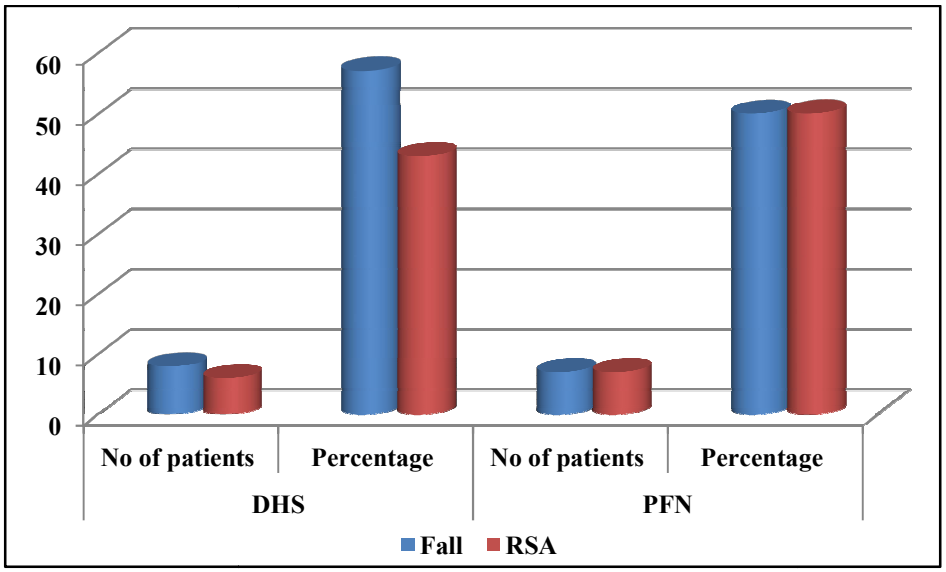
Among the patients of the DHS group, 8 (57.1%) of the patients were females, while 6 (42.9%) of the patients were males. Among the patients of the PFN group, 6 (42.9%) of the patients were females while the remaining 8 (57.1%) were males. Among the patients of the DHS group, fall and RSA were the mode of trauma among 8 (57.1%) and 6 (42.9%) patients respectively. In the patients of the PFN group, fall and RSA were responsible for trauma in 7 (50%) patients each respectively. Mean HHS among the patients of DHS group and the PFN group were found to be 80.15 and 84.35 respectively. No- Significant results were obtained while comparing the mean HHS in between the DHS group and the PFN group (P- value > 0.05). Mean duration of surgery in the patients of DHS group and the PFN

group were found to be 65.8 and 55.7 minutes respectively. Significant results obtained while comparing the mean duration of surgery in between the subjects of the DHS group and the PFN group (P- value < 0.05).

Graph 1: Distribution of subjects according to gender



Graph 2: Distribution of subjects of DHS and PFN group according to mode of trauma



RSA: Road side accident

Table 1: Comparison of mean HHS among DHS and PFN group patients

Group	Mean HHS	P- value
DHS	80.15	0.79
PFN	84.35	

HHS: Harris Hip Score

Table 2: Comparison of mean duration of surgery in between the DHS group and PFN group

Group	Duration of surgery	P- value
DHS	65.8	0.00*
PFN	55.7	

*: Significant

DISCUSSION

In the present study, a total of 28 patients were assessed and were broadly divided into two study groups with 14 patients in each group. Among the patients of the DHS group, 8 (57.1%) of the patients were females, while 6 (42.9%) of the patients were males. Among the patients of the PFN group, 6 (42.9%) of the patients were females while the remaining 8 (57.1%) were males. Endigeri P et al studied the outcome of intertrochanteric fractures treated with proximal femoral nailing by using Kyle's criteria. The study involved fifty cases of intertrochanteric fractures of femur that were treated with PFN. Fractures were classified using Orthopaedic Trauma Association classification. Patients were followed up at 4 weeks, 3 months, and 6 months and results were evaluated using Kyle's criteria. The study included fifty patients, 32 males and 18 females of age 38-94 years with an average of 57 years. Excellent and good results were found in 44 patients (88%). Intra- and post-operative complications were found in 12 patients (24%). From the results, the authors concluded that good fracture reduction was critical in the management intertrochanteric fractures with PFN.[11]

In the present study, among the patients of the DHS group, fall and RSA were the mode of trauma among 8 (57.1%) and 6 (42.9%) patients respectively. In the patients of the PFN group, fall and RSA were responsible for trauma in 7 (50%) patients each respectively. Kyavater BS et al compared the clinical and radio graphical results of the DHS and PFN for the treatment of Intertrochanteric hip fractures (Load bearing vs Load shearing). In our study we included 68 intertrochanteric fractures, out of which 34 are treated with DHS fixation and 34 are treated with PFN. The functional results are assessed with Harris Hip Score and observed 50.00% excellent results in DHS group and 67.64% excellent results in PFN group. They observed no statistically significant difference between two groups in view and time to union. They observed significantly better outcomes in PFN group for unstable inter-trochanteric fractures and in unstable fractures reduction loss is significantly lower in PFN group. They observed total duration of surgery is significantly lower in PFN group. They concluded that PFN may be the better fixation device\for most unstable inter-trochanteric fractures.[12]

In the present study, mean Harris hip score (HHS) among the patients of DHS group and the PFN group were found to be 80.15 and 84.35 respectively. No- Significant results were obtained while comparing the mean HHS in between the DHS group and the PFN group (P- value > 0.05). Li J et al retrospectively evaluated 188 patients with unstable intertrochanteric fractures treated with the proximal femoral nail antirotation (PFNA-II) (n=118) or proximal femoral nail antirotation (PFNA) (n=70). Follow-up evaluations were performed at 1, 3, 6, 9 and 12 months, and every year thereafter. According to residual valgus-varus deformation, the quality of the fracture reduction was graded as poor (>10° deformation), acceptable (5° to 10° deformation), or good (<5° deformation). The operative time, intraoperative blood loss, overall time of fluoroscopy, blood transfusion volume, postoperative drainage, length of hospital stay and postoperative complications were recorded. There was no significant difference in the postoperative blood transfusions, overall time of fluoroscopy, postoperative drainage, length of hospital stay, fracture reduction, the position of the implant and tip apex distance between the two groups. Due to its special design for the Asian population, PFNA-II offers a better match with the Chinese people's proximal femur anatomic structure. This study showed that the rate of complications using PFNA-II is lower than PFNA for the treatment of unstable intertrochanteric fractures in elderly Chinese patients, and the operation time is shorter.[13]

In the present study, mean duration of surgery in the patients of DHS group and the PFN group were found to be 65.8 and 55.7 minutes respectively. Significant results obtained while comparing the mean duration of surgery in between the subjects of the DHS group and the PFN group (P- value < 0.05). Ramesh R et al compared the clinical outcome of Trochanteric and Subtrochanteric fracture femur with Proximal Femoral Nail (PFN) versus Dynamic Hip Screw (DHS). A prospective study of 50 patients with Intertrochanteric and Subtrochanteric fracture among which 30 were treated with Proximal Femoral Nail and 20 with Dynamic Hip Screw at two Hospitals in Karnataka. At final follow up results were assessed with Modified Harris Hip score. Among the DHS Subtrochanteric fracture group, 1 patients showed excellent outcome, 2 patients showed good outcome and 3 patients showed fair outcome and 4 patient showed poor outcome. Fractures of the trochanteric region of the femur need a proper selection of implant based on fracture pattern. DHS has excellent results when used on stable fractures. For unstable fractures, PFN is the implant of choice. In case of Subtrochanteric fractures PFN had better results in both stable and unstable fractures compared to DHS with less failure rates and restoring better hip biomechanics.[14]

CONCLUSION

Under the light of above mentioned data, the authors conclude that PFN provides a significantly shorter surgery with a smaller incision that leads to less wound related complications. However; further studies are recommended.

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