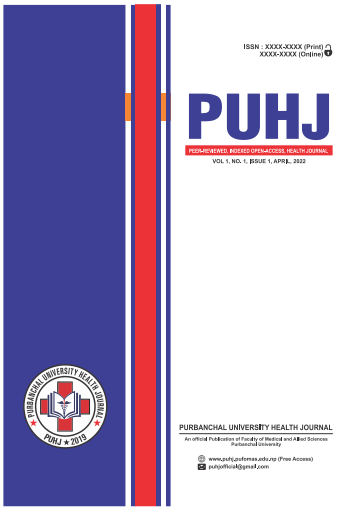

ISSN : 2961-1636 (Print)
2961-1644 (Online)

[1] Fellow, Musculoskeletal Onco surgery,UMMC, University Malaya, Malaysia
[2] Head of Department, Department of Orthopaedics, Nepal Medicity Hospital, Lalitpur
[3] Lecturer, Department of Orthopaedics, KMCTH, Kathmandu, Nepal

***Corresponding author**
Sagun Basnyat
Email ID:
sagunbasnyat@hotmail.com
ORCID iD:
https://orcid.org/0000-0002-3730-330X

Submitted :
3 October 2020

Accepted :
14 January 2021

Published:
30 April 2022

OA 6

Citation:
Sagun Basnyat, Shishir Lakhey, Krishna Raj Khanal. Functional outcome of Dynamic Hip Screw versus Proximal Femoral Nail in treatment of intertrochanteric fracture of the femur. Purbanchal University Health Journal. 2022 April;1(1)1:34-38

DOI:
https://doi.org/10.3126/puhj.v1i1.81629

Functional outcome of Dynamic Hip Screw versus Proximal Femoral Nail in treatment of intertrochanteric fracture of the femur

Sagun Basnyat[1*], Shishir Lakhey[2], Krishna Raj Khanal[3]

Abstract

Introduction: Internal fixation is the most appropriate treatment for intertrochanteric fractures. The mainstay treatment of intertrochanteric fracture is fixation with either an extramedullary weight bearing device like DHS (Dynamic Hip Screw) or an intramedullary weight sharing device like PFN (Proximal Femoral Nail). The functional superiority of intramedullary devices over extramedullary devices has already been established. We carried out this study to evaluate the functional outcome of these implants in stable intertrochanteric fractures.

Objective: The objective of the study was to evaluate the functional outcome of Proximal Femoral nail versus Dynamic Hip Screw fixation in Intertrochanteric fracture in Nepalese population aged 50 years and above.

Method: A prospective comparative cross-sectional hospital based study was conducted on 30 patients admitted with intertrochanteric fracture, who were allocated alternatively with DHS or PFN surgery and were followed up for 1 year. The intertrochanteric fractures of Boyd and Griffin type II and III were included in study. The parameters studied were the demographic profile, type and mechanism of injury, tip apex distance, duration of hospital stay, time of union and functional outcome as measured by Harris Hip Score and Palmer and Parker Mobility Score.

Result: The study did not find a statistically significant difference in the functional outcome between these two methods of treatments as measured by Harris Hip Score. However, there was a better functional outcome among the age group 81years and above when operated by PFN.

Conclusion: Patients with Boyd and Griffin type 2 and 3 intertrochanteric fractures will have almost the same mobility score after surgical fixation via either DHS or PFN. However, PFN has better functional outcomes among those aged 81 years and above. These patients will have almost the same mobility score after surgical fixation by either DHS or PFN.

Keywords: Dynamic Hip Screw; Harris Hip score; Proximal Femoral nail

Introduction

Intertrochanteric fracture is one of the commonest fractures encountered by orthopedic surgeons in day to day practice which commonly occurs in the elderly. The reported mortality due to hip fractures is 15% to 30% and it carries significant risks when treatment is delayed or is conservative[1]. The treatment goals for these patients should include restoration of anatomical alignment and maintenance of fracture reduction by internal fixation which is done to allow early mobilization and rehabilitation of patients[2]. With increase in longevity of life in all contemporary societies, the incidence of intertrochanteric fractures is steadily increasing. Horowitz[3] reported a mortality rate of 34.6% for trochanteric fracture treated by traction and 17.5% in internal fixation. The implants designed for fixation of trochanteric fracture can be extramedullary weight bearing device like the Dynamic Hip Screw or an intramedullary weight sharing device like the Proximal Femoral Nail[1].Continued improvement in intramedullary nail design have demonstrated equivalent and even superior result over DHS[4].However no clear difference in functional outcome has been demonstrated.In view of these differences with the two types of implants, we took up the study to compare the results of DHS and PFN in the treatment of intertrochanteric fractures.

Method

This prospective comparative hospital based clinical study was done over a period of 18 months (November 2012 to April 2014) to compare the functional outcome of intertrochanteric fractures treated with DHS versus PFN. In the study duration, 30 patients aged more than 50 years who presented at Kathmandu Medical College Teaching Hospital were treated with either DHS or PFN." These patients were randomly allocated for DHS and PFN after obtaining an informed written consent. Patients with pathological fractures, polytrauma, type 4 according to Boyd and Griffin[5], having another fracture in the same limb and those who did not give written consent for the study were excluded from the study. After all preoperative preparation, standard PFN and DHS procedures were carried out among the patients randomly. [6] Postoperatively all patients were managed with appropriate analgesics and antibiotics. Check x ray and physiotherapy were done as per patients' comfort. The patient was followed after two weeks for removal of sutures. All patients were reviewed at 6, 12, 18 and 24 weeks. Union time was noted, and the mobility score was calculated using Palmar and Parker score[6]. The final follow up was at 12 months and the function of hip was assessed using Harris Hip Score.[7.] The data were collected using Harris hip score and questionnaire which were not validated.Ethical approval was obtained from the institutional review board. Consent were obtained before participation into the study

The data was analyzed by SPSS software version 11.5 for windows. All values were compared using student's test to show relationships between the variables.

Result

In each DHS and PFN groups, there were 15 patients with mean age of 70.67± 13.5 years. There were no patients with type I fracture according to Boyd and Griffin.

Three patients (10%) got injured in a road traffic accident, while the rest of the patients i.e. 27 (90%) sustained injury as a result of fall from standing height. Mean duration of hospital stay was 11.8±5.45 days in the PFN group and 11.67±3.49 days in the DHS group. The mean hospitalization time was not statistically different in patients managed by two different techniques. (p=0.937)

The mean preinjury mobility score of Palmar and Parker was 8.0± 1.3 in DHS group and 8.53± 0.99 in PFN group which was not significantly different (p value0.219). The mean Palmar and Parker score at final follow up was 7.8± 1.52for DHS group and8.4± 1.24for PFN group which was not significantly different (p=0.247

The Harris Hips scores and union time were comparable in both groups. (p-value = 0.082.)

(Table 1: Outcomes in patients in the two groups)

	DHS	PFN	p value
HHS	90.07±3.6	89.8± 5.6	0.879
Union time (months)	4.01±0.85	3.46±0.81	0.082

In the DHS group, 53.3% of patients had excellent outcomes and 46.7% had good outcomes according to HHS whereas in the PFN group, 60% of patients had excellent, 33.3% patients had good and 6.7 % of patients had fair outcomes. The overall functional outcome as

shown by HHS is not statically significant between PFN and DHS group (p=0.89, CI=95%) which has been tabulated in Table1. We further analysed our results among different age groups. We found that there was a better functional outcome in the PFN group at age more than 81years (p=0.004). We recommend further studies to establish this finding using a larger sample size in multiple centres. The overall functional outcome as shown by HHS is not statistically significant between PFN and DHS group.Total of 6 patients (20%) developed complications. In DHS group 1patient (6.7%) developed preoperative common peroneal nerve palsy which was during application of upper tibial traction. In PFN group 5 patients (33.3%) developed one or the other complications. In this group, 1 patient required blood transfusion for blood loss, 2 patients developed superficial infection and 1 patient each developed hyperkalemia and acute renal failure postoperatively. However, the occurrence of complication between two groups was not statistically significant (p value=0.169)

Figure 1: Xray Showing Union using DHS in AP and Lateral View at 12 months

Figure2: X-ray Showing Union using PFN in lateral and AP View at 12 months

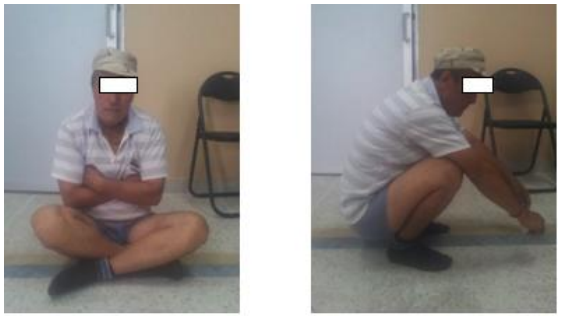

Figure3: patient sitting cross legged and sitting at 12 month (PFN)

Figure4: patient sitting cross legged and sitting at 12 months (DHS)

Discussion

Intertrochanteric fracture treatment in elderly is a challenging job for orthopedic surgeons because of associated complications and morbidity. We assessed the functional outcome in these patients using two different and most commonly used methods of fixation.

We did not detect the difference in union time and functional outcomes in two groups.We did not detect any difference in hospital stay duration in two groups. Most of the studies on intertrochanteric fractures suggested identical hospital stays in both the groups. [8-10]

We found the mean union time was comparable in two groups with 3.46±0.81weeks and 4.01±0.85 weeks respectively for PFN and DHS, in our study. Similar study by Saudan M et al[12] also found the comparable radiological union time in fractures treated with either DHS or PFN. In this series, the mean time of consolidation of fracture was 4.8± 2.2 months in DHS and 4.6 ±2.0 months in PFN group(p value =0.7). Few other studies also suggested the similar trend.[6,13]

We evaluated the functional outcome using Palmar and Parker mobility score and Harris Hip Score. The studies from Parker et al[8]and Pajarinen et al[14] showed there was significant

better mobility for those who were treated with nails. In these two studies there were significantly more patients than in our study. Had our sample size been sufficiently large, we might have detected the significant difference.

Mean Harris Hip Score at 12 months was calculated along with the p value for comparison of the mean in two different groups of patients. The mean HHS was not significantly different in DHS and PFN groups (90.07 vs 89.8) as suggested by p value of 0.879. Review of other literatures showed that the literature is divided and no uniform consensus is found regarding the superiority of one method of fixation over other for type 2 and 3 fractures in terms of HHS.

Karn NK et al[6] in his 94 patients found HHS significantly higher in the PFN group compared to DHS (94 vs 90) with p value of 0.019. He had included an unstable fracture also in his series. In the background of unstable fractures and reverse oblique fractures, the better functional outcome of the nail is obvious as it is an intramedullary device with superior biomechanics. In our study we had excluded type 4 fractures, so the outcome difference was not observed between DHS and PFN.

In the study of Bhakat et al[15], the HHS at 12 months was 92.57 ±3.58 for PFN and 92.1± 3.12 for DHS.Similarly, another study by R Kumar[11] also found similar scores in two groups (93 ±2.1 vs 93 ±2.7 for DHS vs PFN respectively) at 12 months.

The complication rate was not significantly different in two groups. The common complications were blood loss and superficial wound infection. Similar complications have been reported in the literature. Complications like loss of reduction, implant failures and superficial infections have been reported in other researches also in both DHS and PFN group.[10,14,15]We did not find all of these complications in our study, which could be due to small sample size.

Conclusion

DHS and PFN have similar union time and functional outcome as given by HHS, in Boyd and Griffin type 2 and 3 intertrochanteric fractures. These patients will have almost the same mobility score after surgical fixation by either DHS or PFN. However, PFN has better functional outcome in age group 81 and above which can be further explored with a larger sample size.

Recommendation

The future recommendation from our study was that this study should be done in large sample size to confirm the preliminary finding in favor of PFN.

Conflict of interest

The author declares no conflict of interest.

Acknowledgments

I would Like to thank the entire orthopedic department of KMCTH in helping me finish this project, which was done as part of my thesis.

References

1. Lavelle DG. Fractures and Dislocations of Hip. Campbell's Operative Orthopaedics 2008;3(1-2):3237-308. DOI: https://doi.org/10.1016/B978-0-323-03329-9.50055-6
2. Halder SC. The Gamma Nail for Peritrochanteric Ffractures. J Bone Joint Surg Br 1992;74(3):340-4. DOI: https://doi.org/10.1302/0301-620X.74B3.1587873 PMID:1587873
3. Horowitz BG. Retrospective Analysis of Hip Fractures. Surg Gynecol Obstet. 1966;123(3):565-70. PMID: 5912870
4. Bhandari M, Schemitsch E, Jonsson A, Zlowodzki M, Haidukewych GJ. Gamma Nails Revisited: Gamma Nails Versus Compression Hip Screws in the Management of Intertrochanteric Fractures of the Hip: A Meta-Analysis. J Orthop Trauma. 2009;23(6):460-4. DOI: https://doi.org/10.1097/BOT. 0b013e318162f67f PMID:19550235
5. Cirotteau, Y , Boyd HB, Griffin LL. classification: A Refinement Proposal. European J Orthopaedic Surgery and Traumatology. DOI: https://doi.org/10.1007/s00590-002-0033-6 PMID:24573894
6. N K Karn AJ, P. Nepal, M Singh, N Das. A Prospective Randomized Control Trial Comparing Proximal Femoral Nail and Sliding Hip Screw in The Management of Trochanteric Fracture of The Femur. Health Renaissance 2011;9(3):7-11. DOI: https://doi.org/10.3126/hren.v9i1.4354
7. Mahomed NN, Arndt DC, McGrory BJ, Harris WH. The Harris Hip Score. The J Arthroplasty. 2001; 16(5):575-580. DOI: https://doi.org/10.1054/arth.2001.23716 PMID:11503116
8. Parker MJ, Palmer CR. A New Mobility Score for Predicting Mortality After Hip Fracture. J Bone Joint Surg Br 1993;75(5):797-8. DOI: https://doi.org/10.1302/0301-620X.75B5.8376443 PMID:8376443
9. Parker MJ, Bowers TR, Pryor GA. Sliding Hip Screw Versus the Targon PF Nail in the Treatment of Trochanteric Fractures of the Hip: A Randomised Trial of 600 Fractures. J Bone Joint Surg. Br 2012;94(3):391-7. DOI: https://doi.org/10.1302/0301-620X.94B3.28406 PMID:22371549

10. Avakian Z, Shiraev T, Lam L, Hope N. Dynamic Hip Screws versus Proximal Femoral Nails for Intertrochanteric Fractures. ANZ J Surg. 2012;82(1-2):56-9. DOI: https://doi.org/10.1111/j.1445-2197.2011.05929.x PMID:22507497
11. R Kumar RNS, B N Singh. Comparative Pprospective Study of Proximal Femoral Nail and Dynamic Hip Screw in Treatment of Intertrochanteric Fracture Femur. J Clinical Orthopaedics and Trauma 2012; 3(3):28-36. DOI: https://doi.org/10.1016/j. jcot.2011.12.001 PMID:25983453 PMCid:PMC387-6488
12. Saudan M, Lubbeke A, Sadowski C, et al. Pertrochanteric Fractures: Is There an Advantage to An Intramedullary Nail?: A Randomized, Prospective Study of 206 Patients Comparing the Dynamic Hip Screw and Proximal Femoral Nail. J Orthop Trauma 2002;16(6):386-93. DOI: https://doi.org/10.1097/00005131-200207000-00004 PMID:1214282z
13. Orcun Sahin HD, Rahmican A. Dynamic Hip Screw Versus Proximal Femoral Nail for Treatment of Trochanteric Hip Fractures: An Outcome Analysis. Eur J Orthop Surg Traumatol 2012;22(8):473-80 DOI: https://doi.org/10.1007/s00590-011-0873-z
14. Pajarinen J, Lindahl J, Michelsson O, Savolainen V, Hirvensalo E. Pertrochanteric Femoral Fractures Treated with a Dynamic Hip Screw or a Proximal Femoral Nail. A Randomised Study Comparing Post-operative Rehabilitation. J Bone Joint Surg Br 2005;87(1):76-81. DOI: https://doi.org/10.1302/0301-620X.87B1.15249
15. Ujjal Bhakat RB. Comparative Study between Proximal Femoral Nailing and Dynamic Hip Screw in Intertrochanteric Fracture of Femur. Open Journal of Orthopaedics 2013;3:291-95. DOI: https://doi.org/10.4236/ojo.2013.37053