MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2024.8.194.197

Comparative Evaluation of Internal Fixation using Dynamic Hip Screw (DHS) and Primary Hemiarthroplasty in Unstable Trochanteric Fractures

[1]Ravi Ranjan Singh, [2]Abhishek and [3]Bharat Singh

[1,3]Department of Orthopaedics, Nalanda Medical College and Hospital, Patna Bihar, India

[2]Department of Orthopaedics, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India

OPEN ACCESS

Key Words
Internal fixation, dynamic hip screw, primary hemiarthroplasty

Corresponding Author
Abhishek,
Department of Orthopaedics, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India

Author Designation
[1,2]Senior Resident
[3]Professor

Received: 19 April 2024
Accepted: 3 June 2024
Published: 15 July 2024

Citation: Ravi Ranjan Singh, Abhishek and Bharat Singh, 2024. Comparative Evaluation of Internal Fixation Using Dynamic hip Screw (DHS) and Primary Hemiarthroplasty in Unstable Trochanteric Fractures. Res. J. Med. Sci., 18: 194-197, doi: 10.36478/makrjms.2024.8.194.197

Abstract
Fractures of the trochanteric region are some of the most common fractures encountered by an orthopaedic surgeon. The Dynamic hip screw (DHS) may result in cut-out, risk of instability and delayed weight bearing. Different types of arthroplasty such as the Leinbach and bipolar hip arthroplaties were then used. Hence; the present study was undertaken for comparatively evaluating efficacy of internal fixation using dynamic hip screw (DHS) and primary hemiarthroplasty in unstable trochanteric fractures. A total of 60 patients with unstable trochanteric fractures were analyzed and broadly divided into two study groups with 30 patients in each group as follows: DHS group: Patients treated with Dynamic hip screw and PHA group: Patients treated with primary hemiarthroplasty. All the patients underwent treatment according to their respective groups. Pre-operative and post-operative follow-up radiographs were analyzed. Harris hip score (HHS) was analyzed at follow-ups. Incidence of complications was analyzed and compared. Mean HHS among the patients of DHS group and PHA group on final follow-up was found to be 76.13 and 90.69 respectively. While comparing the mean HHS among the patients of the two study groups, significant results were obtained. Three cases of non-union and two cases of delayed union were encountered in the DHS group while none of the patients of the PHA group exhibited non-union or delayed union. Incidence of complication was significantly higher in the DHS group. In patients undergoing treatment for unstable trochanteric fractures, better outcome with lesser complications are associated with primary hemiarthroplasty in comparison to dynamic hip screw.

INTRODUCTION

Fractures of the trochanteric region are some of the most common fractures encountered by an orthopaedic surgeon. With increase in life expectancy, the incidence of these fractures is also increasing. Unstable trochanteric fractures are those having comminution of the posteromedial buttress, exceeding a simple lesser trochanteric fragment or those with subtrochanteric extension. Unstable trochanteric fractures are a major cause of concern in the elderly due to the associated increase in morbidity and mortality[1-3].

Due to problems caused by these fractures and an increase in the number of elderly persons, which leads to a significant increase in the incidence of these fractures, it is absolutely necessary to use an effective and appropriate treatment modality for such patients. Various treatment modalities have been introduced to date for the reduction of intertrochanteric fractures, including DHS, proximal femoral nail, bipolar hemiarthroplasty, trochanteric fixation nail (TNF) and external fixation, all of which have their specific advantages and disadvantages[4-6]. The Dynamic hip screw (DHS) may result in cut-out, risk of instability, and delayed weight bearing. Different types of arthroplasty such as the Leinbach and bipolar hip arthroplaties were then used. For unstable osteoporotic trochanteric fractures, hemiarthroplasty using a cone prosthesis can transfer the axial load from the hip to the middle femur[7-8]. Hence; the present study was undertaken for comparatively evaluating efficacy of internal fixation using dynamic hip screw (DHS) and primary hemiarthroplasty (PHA) in unstable trochanteric fractures.

MATERIALS AND METHODS

The present study was conducted between October 2018 to March 2020 in the Department of Orthopaedics, Nalanda Medical College and Hospital, Patna Bihar, India. For assessing and comparing the efficacy of internal fixation using dynamic hip screw (DHS) and primary hemiarthroplasty in unstable trochanteric fractures. A total of 60 patients with unstable trochanteric fractures were analyzed and broadly divided into two study groups with 30 patients in each group as follows.

DHS group: Patients treated with Dynamic hip screw; and PHA group: Patients treated with primary hemiarthroplasty All the patients underwent treatment according to their respective groups. Pre-operative and post-operative follow-up radiographs were analyzed. Harris hip score (HHS) was analyzed at follow-ups. Incidence of complications was analyzed. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Student t test and chi-square test was used for evaluation of level of significance.

RESULTS AND DISCUSSIONS

In the present study, a total of 60 patients with unstable trochanteric fractures were analyzed and broadly divided into two study groups with 30 patients in each group. Majority of the patients of both the study groups belonged to the age group of more than 50 years. 23 patients of DHS group and 21 patients of the PHA group were males. Road traffic accident and fall from height were the main etiologic factor. Mean HHS among the patients of DHS group and PHA group on final follow-up was found to be 76.13 and 90.69 respectively. While comparing the mean HHS among the patients of the two study groups, significant results were obtained. Three cases of non-union and two cases of delayed union were encountered in the DHS group while none of the patients of the PHA group exhibited non-union or delayed union. Incidence of complication was significantly higher in the DHS group.

The most common instruments utilized for trochanteric fractures are compression hip screws with side plate attachments, such as dynamic hip screw (DHS) and intramedullary fixation instruments. Two basic processes are change in design of implant and altered reduction method for reaching greater stability. Such devices should establish the fracture across distorting efforts until union formation. There are some undisciplined characteristics in lowering operation-contributed adverse events, such as pattern of fracture, existence of other chronic disorders and bone density. Nevertheless, operation-related adverse events can be diminished by more advanced methods using new fixator instruments, enhancement of the technical operative process, and reduction of hospital stay duration[6-9].

In the present study, mean HHS among the patients of DHS group and PHA group on final follow-up was found to be 76.13 and 90.69 respectively. While comparing the mean HHS among the patients of the two study groups, significant results were obtained. Anand MR et al analyzed the short term follow up results of unstable Intertrochanteric fractures in elderly treated with bipolar hemiarthroplasty and dynamic hip screw (DHS) fixation.42 elderly osteoporotic patients with unstable intertrochanteric fractures were divided into two groups with group A-bipolar prosthesis (21 cases) and group B-DHS (21 cases). Patients were evaluated clinically using the Harris hip score during their follow up period. In both groups, the most common Singh's index was grade III, 61.90%in both group A and group B. They concluded that bipolar hemiarthroplasty may be an efficient option in elderly osteoporotic intertrochanteric fractures[9].

Table 1: Demographic data

Parameter	Age group (years)	DHS group (n=30)	PHA group (n=30)
	<40	3	4
	40 to 50	5	4
	51 to 60	10	11
	>60	12	11
Gender	Males	23	21
	Females	7	9

Table 2: Etiologic profile

Etiology	DHS group (n=30)	PHA group (n=30)
Trauma	6	6
Fall from height	7	4
Road traffic accident	15	17
Others	2	3

Table 3: Comparison of HHS

HHS	DHS group	PHA group
Mean	76.13	90.69
SD	12.88	7.46
t-value	-1.442	
p- value	0.000 (Significant)	

Table 4: Comparison of complications

Complications	DHS group	PHA group
Infection	6	2
Bedsore	2	1
Delayed union	2	0
Non union	3	0

In the present study, three cases of non-union and two cases of delayed union were encountered in the DHS group while none of the patients of the PHA group exhibited non-union or delayed union. Incidence of complication was significantly higher in the DHS group. Emami M *et al* compared treatment outcomes of intertrochanteric fractures reduced with dynamic hip screws (DHS) and bipolar hemiarthroplasty in elderly patients with background medical conditions. 60 patients with intertrochanteric fractures, who were 45-60 years old, were randomly divided into DHS and bipolar groups. HHS (86±9 vs. 75±7.6), range of flexion (105±11 degrees vs. 90±17 degrees) and external rotation (35±7 degrees vs. 20±7 degrees) were significantly higher in the bipolar group compared to the DHS group ($P<0.05$). However, there were no significant differences in pain severity between the two groups. Reduction of intertrochanteric fractures in elderly patients with background medical conditions is more effective and less problematic with the bipolar technique compared to DHS and is better tolerated by patients, because this technique is associated with improvements in functional status and hip joint movement range[10]. D'Arrigo et al evaluated 16 female and five male patients with a mean age of 75.8 years, of whom 14 patients had failure of a previous nail fixation procedure, five had failure of a plate fixation, one of hip screw fixation and one of Ender nail fixation. In 19 out of 21 patients, a THA was performed and a marked progression was reported comparing pre- and postoperative outcomes. Wu et al reported on 14 intertrochanteric hip fractures with failed DHS. They were managed by reuse of a lag screw inferiorly in the femoral head, cement augmentation and subtrochanteric valgus osteotomy[11-12].

CONCLUSION

From the above results, authors concluded that in patients undergoing treatment for unstable trochanteric fractures, better outcome with lesser complications are associated with primary hemiarthroplasty in comparison to dynamic hip screw.

REFERENCES

1. Wolfgang, G..L., M.H. Bryant and J.P.O. Neill, 1982. Treatment of intertrochanteric fracture of the femur using sliding screw plate fixation. Clin Orthop Relat Res., 163: 148-158.
2. Parker, M.J. and H.H. Handoll, 2006. Replacement arthroplasty versus internal fixation for extracapsular hip fractures in adults. Cochr Datab Syst. Rev., Vol. 19, No. 2.10.1002/14651858. cd000086.pub2.
3. Forte, M.L., B.A. Virnig, R.L. Kane, S. Durham, M. Bhandari,*et al.*, 2008. Geographic variation in device use for intertrochanteric hip fractures. J. Bone Joint Surg.-Am., 90: 691-699.
4. Simpson, A.H.R.W., K. Varty and C.A.F. Dodd, 1989. Sliding hip screws: Modes of failure. Injury, 20: 227-231.
5. Kayali, C., H. Agus, S. Ozluk and C. Sanli, 2006. Treatment for unstable intertrochanteric fractures in elderly patients: Internal fixation versus cone hemiarthroplasty. J. Orthop. Surg., 14: 240-244.
6. Edwards, P.K., R.M. Queen, R.J. Butler, M.P. Bolognesi and C.L. Barnes, 2016. Are range of

motion measurements needed when calculating the harris hip score? J. Arthroplasty, 31: 815-819.
7. Reindl, R., E.J. Harvey, G.K. Berry and E. Rahme, 2015. Intramedullary versus extramedullary fixation for unstable intertrochanteric fractures. J. Bone Joint Surg.-Am., 97: 1905-1912.
8. Anglen, J.O and J.N. Weinstein, 2008. Nail or plate fixation of intertrochanteric hip fractures: Changing pattern of practice. J. Bone Joint Surg. Am., 90: 700-707.
9. Anand, M.R. and N.S. Ramachandren, 2020. A comparative study on functional outcome of unstable intertrochanteric fractures in elderly treated with bipolar hemiarthroplasty and dynamic hip screw fixation: A short term perspective analysis. Int. J. Res. Orthop.s, 6: 319-322.
10. Emami, M., *et al.,* 2013. Comparison of Intertrochanteric Fracture Fixation with Dynamic Hip Screw and Bipolar Hemiarthroplasty Techniques. Arch Bone Jt Surg., 1: 14-17.
11. D'Arrigo, C., D. Perugia, A. Carcangiu, E. Monaco, A. Speranza and A. Ferretti, 2009. Hip arthroplasty for failed treatment of proximal femoral fractures. Int. Orthop., 34: 939-942.
12. Wu, C.C., C.H. Shih, W.J. Chen and C.L. Tai, 1998. Treatment of cutout of a lag screw of a dynamic hip screw in an intertrochanteric fracture. Arch. Orthop. Trauma Surg., 117: 193-196.