International Journal of Orthopaedics Sciences

E-ISSN: 2395-1958
P-ISSN: 2706-6630
IJOS 2022; 8(2): 31-34

www.orthopaper.com
Received: 19-02-2022
Accepted: 21-03-2022

Dr. Muneeb Ul Islam
MS Orthopedics, GMC, Srinagar, Jammu and Kashmir, India

Dr. Mudasir Nazir Bhat
MS Orthopedics, GMC, Srinagar, Jammu and Kashmir, India

Dr. Marouf Aslam
MS Orthopedics, GMC, Srinagar, Jammu and Kashmir, India

Dr. Numan
MS Orthopedics, GMC, Srinagar, Jammu and Kashmir, India

Corresponding Author:
Dr. Muneeb Ul Islam
MS Orthopedics, GMC, Srinagar, Jammu and Kashmir, India

Comparison between proximal femoral nail (PFN) and dynamic condylar screw (DCS) in the treatment of reverse oblique fractures

Dr. Muneeb Ul Islam, Dr. Mudasir Nazir Bhat, Dr. Marouf Aslam and Dr. Numan

DOI: https://doi.org/10.22271/ortho.2022.v8.i2a.3113

Abstract
Introduction: A reverse oblique fracture is an unstable fracture that really is not a true classic hip fracture, because of its complications. The fracture starts from the medial proximal to the lateral distal and extends to include the lateral cortex distally. In reverse oblique fractured patients, early surgical treatment is required to avoid major complications such as mortality. Dynamic condylar screw (DCS) and proximal femoral nail (PFN) are currently the most commonly used implants for their fixation.
Aim and Objective: Comparison between dynamic condylar screw (DCS) and proximal femoral nail (PFN) for treating patients in reverse oblique fractures.
Materials and Methods: This prospective study was done on 45 patients with reverse oblique fractures admitted during the period of June 2020-May 2021 in the Orthopedics Department, Govt. Medical College Srinagar. Among 45 patients with reverse oblique fractures, 25 patients were treated using proximal femoral nail (PFN), and the remaining 20 patients were treated using dynamic condylar screw (DCS).
Results: The study comprised of 45 patients in the age group of 20-75 years, including 26 males and 19 females with a mean age of 53.15. Mechanism of injury was road accidents, fall from height and fall from standing height. Among 45 patients 19 (42.22%) belonged to age group of 61-75 years. In elderly patients with the presence of significant osteoporosis, a simple fall accounted for fractures.
Conclusion: The patients treated using PFN showed improved functional outcomes as compared to the patients treated using DCS.

Keywords: Reverse oblique fracture, fall from height, road accident, PFN, DCS

Introduction
Reverse oblique fractures are unstable with unique anatomical and mechanical characteristics. Reverse obliquity fractures of the proximal femur have biomechanical characteristics distinct from other intertrochanteric fractures. It is one of the most important causes of mortality and morbidity in the population [1]. The reverse oblique fracture has the opposite configuration. The fracture starts from the medial proximal to the lateral distal and extends to include the lateral cortex distally. In the older ones above 60 years, this particular fracture is caused by a simple fall during daily activity and osteoporotic bones [2]. In the younger generation, reverse oblique fractures are caused by high force impacts such as falls or hit. In reverse oblique fractured patients, the early surgical treatment is required to avoid major complications such as mortality. In advanced osteoporotic patients, these fractures are more likely to fail, or go into non-union [3], which leads to an increase in the length of hospital stay and healthcare costs [4].
Early surgical treatment is required in reverse oblique fractured patients, for which various implants have been designed. Out of various implants in our study, we have used intra-medullary implant (proximal femoral nail) and extra-medullary implant (dynamic condylar screw) [5].
The purpose of this study was to evaluate the functional outcomes of proximal femoral nails (PFN) and dynamic condylar screw (DCS) for the stable fixation of fractures in reverse oblique fractured patients.

Materials and Methods

This prospective study was done in the Orthopedics Department, Govt. Medical College Srinagar after approval from the hospital ethical committee. In this study, during the period of 12 months from June 2020 to May 2021, 45 patients between 20-75 years with reverse oblique fractures were enrolled. Patients were admitted through the Emergency Department. Diagnosis and classification of fracture were based on x-ray findings. A simple randomization technique was employed to categorized patients for either proximal femoral nail (PFN) treatment or dynamic condylar screw (DCS) treatment. Among 45 patients with reverse oblique fractures, 25 patients were treated using proximal femoral nail (PFN), and the remaining 20 patients were treated using dynamic condylar screw (DCS).

All the patients underwent surgical intervention as soon as possible. Patients were kept inward for 2 days. The post-operative rehabilitation protocol was identical for both groups. All patients had antibiotic prophylaxis for 48 hours and patients were mobilized as soon as possible, usually on the second postoperative day. They were advised to use crutches, allowing toe touch to the ground on the affected side. After discharge, all patients were advised to follow-up at 6-weeks, 3-months and 6-months.

At each visit fractures were evaluated through x-ray. At the follow-up of 6-weeks, patients were allowed to bear weight progressively. Functional outcomes were based on radiographic union, pain and walking capacity. The functional outcome was measured at the end of 6 months follow up.

Results

In this study total of 45 patients with reverse oblique fractures were enrolled. Among 45 patients, the number of male patients was 26 (57.77%) and the number of female patients was 19 (42.23%), as shown in diagram 1.

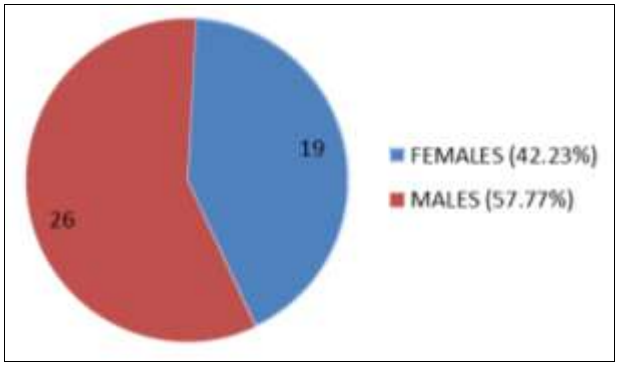

Fig 1: Gender distribution of patients

The enrolled patients were in the age group of 20-75 years, with a mean age of 53.15 years. Among 45 patients 19 (42.22%) belonged to the age group of 61-75 years. In elderly patients with the presence of significant osteoporosis, a simple fall accounted for fractures. The distribution of patients based on age group, mechanism and side of fracture is shown below in table 1, 2 and 3.

Table 1: Age distribution of patients

Age in years	No. of patients	Percentage
20-40 Years	10	22.23%
41-60 Years	16	35.55%
> 61	19	42.22%

Table 2: Distribution of patients on the basis of the fractured side

Side of fracture	No. of patients	Percentage
Left	32	71.11%
Right	13	28.89%

Table 3: Distribution based on Mechanism of fracture

Mechanism of fracture	No. of patients	Percentage
Road accidents	15	33.33%
Fall	27	60.00%
Others	3	6.67%

Clinical outcomes were measured in terms of time to full weight bearing, the appearance of the bony union, pain, need for analgesics, walking aids, and walking capacity. The clinical outcome was evidenced by pain-free walking. The results obtained in both groups are illustrated below in Tables 4, 5 and 6.

Table 4: Functional outcome

Mode of treatment	Excellent	Good	Fair	Non union
PFN	17	6	2	0
DCS	6	11	4	1

Table 5: Full weight bearing time

Mode of treatment	6 week follow-up	3 months follow-up	6 months follow-up
PFN	Full weight bearing	No pain	Back to daily activities
DCS	Partial weight bearing	Full weight bearing	Mild pain

Table 6: Post-Operative complications

	Dynamic condylar screw (DCS)		Proximal femoral nail (PFN)	
	No. of patients	Percentage	No. of patients	Percentage
Infection	3	15%	2	8%
Implant failure	None	0%	None	0%
Non union	1	5%	None	0%

Case 1: PFN

Case 2: PFN

Case 1: DCS

Case 2: DCS

Discussion

This study found that the most common age group of patients with reverse oblique fractures was 60 to 75. In our study the number of male patients with reverse oblique fractures was more than that of female patients [6, 7].

For the treatment of reverse oblique fractures, the need have spurred the development of various implants from extra-medullary to intra-medullary devices [8-13]. Proximal femoral nail (PFN) and dynamic condylar screw (DCS) are reliable fixation devices for treating reverse oblique fractures because of controlled impaction of the fracture too much more stable configuration during the post-operative period. However, a number of authors have reported the use of intra-medullar fixation of reverse oblique fractures [14, 15, 16, 17, 18, 19, 20, 21, 22].

The functional outcome in the current study was excellent for the majority of the patients treated with proximal femoral nail (PFN) and the functional outcome for the patients treated with dynamic condylar screw (DCS) was good. This implied that patients treated with proximal femoral nail (PFN) showed better improvement as compared to dynamic condylar screw (DCS).

Conclusion

In this study, on the basis of results, it is clear that the proximal femoral nail (PFN) is a better surgical intervention as compared to dynamic condylar screw (DCS) in the treatment of patients with reverse oblique fractures. The patients treated using proximal femoral nail (PFN) showed improved functional outcome as compared to the patients treated using dynamic condylar screw (DCS).

References

1. Waller I, Wai EK. Jaglal S, Kreder HJ. The effect of hospital type and surgical delay on mortality after surgery for hip fracture. J Bone Joint Surg BR. 2005;87:361-366.
2. Kumar A, Krishna YR, Kumar AB. Mechanical comparison of reconstruction nail and dynamic condylar screw in the treatment of unstable Subtrochanteric fracture *in vitro* study. Int. J Orthop Sci. 2019;5(4):646-51.
3. Bukhari SAH, Asghar A. Dynamic condylar screw fixation for comminuted proximal femur fractures. J Surg Pak Int. 2011;16 (4):149-52.
4. Thakar C, Alsousou J, Hamilton TW, Willett K. The cost and consequences of proximal femoral fractures which require further surgery following initial fixation. J Bone Joint Surg Br. 2010;92(12):1669-77.
5. Sahin EK, Imerci A, Kınık H, Karapınar L, Canbek U, Savran A. Comparison of proximal femoral nail antirotation (PFNA) with AO dynamic condylar screws (DCS) for the treatment for unstable peritrochanteric femoral fractures. Eur J Orthop Surg Traumatol. 2014;24:347-52.
6. Wei LKJ, Wei HW, Lin KP. Proximal femoral morphology and the relevance to design anatomically precontoured plates: a study of the Chinese population. Sci World J, 2014.
7. Sanju ST. Comparative study of subtrochanteric fractures managed by proximal femur nail and proximal femur locking plate, 2017.
8. Chaturvedi C, Banerji S. Study of Internal Fixation of Subtrochantric Fracture of Femur w ith Dynamic Hip Screw, Dynamic Condylar Screw and Proximal Femoral Nail. Int J Sci Res, 2015, 56(10).
9. Koval KJ, Cantu RV. Intertrochanteric fractures. In: Bucholz RW, Heckman JD, Court-Brown CM, eds. Rockwood and Green's fractures in adults. 6th Ed, vol. 2. Philadelphia: Lippincott Williams and Wilkins, 2006, 1793-825.
10. Baumgaertner MR, Chrostowski JH, Levy RN. Intertrochanteric hip fracture. In: Brown BD, Jupiter JB, Levine AM, Trafton PG, editors. Skeletal trauma: Fractures, dislocations, ligamentous injuries. Philadelphia: WB Saunders, 1998, 1833-81.
11. Sanders R, Regazzoni P. Treatment of subtrochanteric femur fractures using the dynamic condylar screw. J Orthop Trauma. 1989;3:206-13.
12. Sadowski C, Lübbeke A, Saudan M, Riand N, Stern R, Hoffmeyer P. Treatment of reverse oblique and transverse intratrochanteric fractures with use of an intramedullary nail or a 95° screw-plate. J Bone Joint Surg Am. 2002;84:372-81.
13. Leung KS, So WS, Shen WY, Hui PW. Gamma nails and dynamic hip screws for peritrochanteric fractures. A randomized prospective study in elderly patients. J Bone Joint Surg Br. 1992;74:345-51.
14. Barton TM, Gleeson R, Topliss C, Greenwood R, Harries WJ, Chesser TJS. A comparison of the long Gamma nail with sliding hip screw for the treatment of AO/OTA 31-A2 fractures of the proximal part of the femur. J Bone Joint Surg Am. 2010;92:792-798.
15. Bjorgul K, Reikeras O. Outcome after treatment complications of Gamma nailing: a prospective study of 554 trochanteric fractures. Acta Orthop. 2007;78:231-235.
16. Elis J, Chechik O, Maman E, Steinberg EL. Expandable proximal femoral nails versus 95_ dynamic condylar screw-plates for the treatment of reverse oblique intertrochanteric fractures. Injury. 2012;43:1313-1317.
17. Forte ML, Virnig BA, Kane RL, Durham S, Bhandari M,

Feldman R, Swiontkowski MF. Geographic variation in device use for intertrochanteric hip fractures. J Bone Joint Surg Am. 2008;90:691-699.
18. Honkonen SE, Vihtonen K, Jarvinen MJ. Second generation cephalomedullary nails in the treatment of reverse obliquity intertrochanteric fractures of the proximal femur. Injury. 2004;35:179-183.
19. Min WK, Kim SY, Kim TK, Lee KB, Cho MR, Ha YC, *et al*. Proximal femoral nail for the treatment of reverse obliquity intertrochanteric fractures compared with Gamma nail. J Trauma. 2007;63:1054-1060.
20. Ozkan K, Eceviz E, Unay K, Tasyikan L, Akman B, Eren A. Treatment of reverse oblique trochanteric femoral fractures with proximal femoral nail. Int Orthop. 2011;35:595-598.
21. Park SY, Yang KH, Yoo JH, Yoon HK, Park HW. The treatment of reverse obliquity intertrochanteric fractures with intramedullary hip nail. J Trauma. 2008;65:852-857.
22. Schipper IB, Steyerberg EW, Castelein RM, Van der Heijden FH, Den Hoed PT, Kerver AJ, *et al*. Treatment of unstable trochanteric fractures: randomized comparison of the Gamma nail and the proximal femoral nail. J Bone Joint Surg Br. 2004;86:86-94.