ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 6, Issue – 3, June – 2021 , Page No. : 218 - 223

The outcome of fracture neck of femur treated with cannulated screw

[1]Ashish Gohiya, Professor, Department of Orthopaedics, Gandhi Medical College, Bhopal Madhya Pradesh.
[2]Mohd Nadeem, Resident, Department of Orthopaedics, Gandhi Medical College, Bhopal Madhya Pradesh.
[3]Sourabh Alawa, Resident, Department of Orthopaedics, Gandhi Medical College, Bhopal Madhya Pradesh.
[4]Anil Baduke, Resident, Department of Orthopaedics, Gandhi Medical College, Bhopal Madhya Pradesh.
[5]Sanjiv Gaur, Professor and Head of Department of Orthopaedics, Gandhi Medical College, Bhopal Madhya Pradesh.
Corresponding Author: Mohd Nadeem, Resident, Department of Orthopaedics, Gandhi Medical College, Bhopal Madhya Pradesh.

Citation this Article: Ashish Gohiya, Mohd Nadeem, Sourabh Alawa, Anil Baduke, Sanjiv Gaur, "The outcome of fracture neck of femur treated with cannulated screw", IJMSIR- June - 2021, Vol – 6, Issue - 3, P. No. 218 – 223.
Type of Publication: Original Research Article
Conflicts of Interest: Nil

Abstract

Background: Neck of femur fracture is one of the commonest fractures seen round the globe in all ages in all races. It comprises 20% of all the fractures. It accounts for nearly 50% of all hip fractures with vast majority occurring in elderly patient after simple fall with force being transmitted to femoral neck via greater trochanter. Operative intervention has become the routine for all types of femoral neck fractures.

Materials And Methods: A three year prospective study was carried out in 68 consecutive patients between 2018 to 2020 in Gandhi Medical College, Bhopal, who is suffering from NOF fracture were selected. Closed reduction of fracture was done by either Whiteman Or Lead Better technique under image intensifier and internal fixation by three divergent cannulated screws.

Results: Study included 68 patients; minimum follow-up was 6 months. The demographic data shows that the mean age of subject group was 41.73 yrs. there was a male predominance. Union rate was 100%, time to union was 3 months in 46 cases. Total 5 patient had complication. 2 patients developed AVN, 2 patients had extrusion of screw while 1 patient had superficial infection. Functional outcome was assessed at the end of 6 month by Harris hip score with mean of 86.26+9.019. Out of 68 patients 24 (35.3%) patients had Excellent outcome, 29 (42.2%) patient had Good outcome,11(16.2%) patient had Fair functional outcome.

Conclusion: We conclude that cannulated screw fixation is a viable option of treatment for fractures of the neck of femur, the union rate is 100%. Majority of patients had good to excellent functional outcome. Young age, shorter injury to operation interval have better functional outcome. However, a longer follow-up in more number of patients is required to substantiate this statement

Keywords: Neck Fracture, NOF, Closed Reduction, Cancellous Screw fixation, Union, AVN.

Introduction

Neck of femur fracture comprises 20% of all the fractures. It accounts for nearly 50% of all hip fractures with vast majority occurring in elderly patient after simple fall.[1] Mechanism of injury in fracture neck of femur is simple fall with force being transmitted to the femoral neck via greater trochanter. Garden's and Pauwels classification are commonly used for femoral neck fracture.[2] It is often a fracture fragility due to osteoporosis in the elderly, though in the younger age group, it is usually result from high energy trauma sustained in road traffic accident. Treatment of femoral neck fracture varies according to the patterns and patient's age. Successful union with conservative management is uncommon. So, operative intervention has become the routine for all types of femoral neck fractures. For undisplaced femoral neck fractures, rigid internal fixation with early mobilization of patients is the method of choice. The younger patient age and increased functional demands for work and recreation activities mandate a surgical treatment that preserves the native hip. Various options exist for internal fixation of hip, including a sliding hip screw, side plate device and multiple cannulated parallel screws. Osteosynthesis with multiple cannulated screw fixation is less invasive technique, with less soft tissue stripping, resulting in low rate of morbidity and mortality.[3,4] Although evidence exists describing the superiority of parallel screws placement compares with other contemporary implants, controversy still persist as to the treatment of choice.

Material and methods

A three year prospective study was carried out in 68 consecutive patients between 2018 to 2020 in Gandhi Medical College, Bhopal, presents with NOF fracture were selected. Closed reduction of fracture was done by either Whiteman Or Lead Better technique under image intensifier and internal fixation by three divergent cannulated screws with 10 mm distance from each other. Fixation was done under spinal anaesthesia. Preoperatively, optimal 3 kg Buck's skin traction was given in affected limb.

Surgical procedure

All surgeries performed under spinal anaesthesia under aseptic precautions. Patient taken in operation theatre and positioned supine on the traction table with counter traction post placed between the patient's legs. Normal limb was held in wide abduction. Closed reduction of fracture was done by either Whiteman Or Lead Better technique under image intensifier. Reduction was, confirmed with AP and lateral view by C-arm and accuracy of reduction was confirmed by Garden's alignment index. Radiographic outline of femoral head and neck junction will have convex outline of femoral head meeting concave outline of femoral neck regardless on all views, if fracture reduced than produce image of "S"or reversed S curve and outline shows unbroken C curve then fracture is not reduced. A lateral longitudinal skin incision centred over greater trochanter measuring about 5 to 8cm starting from flare of greater trochanter and extended distally. Superficial fascia, fascia lata and vastus lateralis were then split in the line of skin incision. Origin of vastus lateralis was elevated sub periosteally at the base of the trochanter. After reduction 3 parallel cannulated screws with 10mm distance from each other by standard inverted triangle technique. Cancellous screw of size 6.5mm were used for fixation. Lower screw was 5mm longer than the upper screw. The screw should remain 5 mm in subchondral cortex.

Follow up

Follow up taken at interval of 1month, 3months and 6 months. Partial weight bearing was started on 6th post operated week and full weight Bearing stared after radiological union. At each follow up x-ray of operated hip was taken for radiological analysis, And functional outcome was analysed by Harris Hip scoring system.

Observation and result

The following observation and result were made from data collected during the study of treatment of fracture neck of femur of 68 patients in Department of Orthopaedics at Hamidia hospital, Bhopal. The demographic data shows that the mean age of subject group was 41.73 yrs. (range of age 15yrs to 65 yrs.), there was a male predominance (M:F = 37:31) shows maximum cases of both male and female (27% male and 29% female) in age group of 46-55, While minimum cases in male (16.2%) belong to 15-25 age group and minimum cases in female belong to 26-35 age group. Distribution of cases according to Pauwels's classification. Majority 43 patients (63.2%) of fracture were Pauwels's type II followed by type III 16 patients (23.5%) while 9 patients (13.2%) had Pauwels's type I fracture. Observation of injury operation interval revealed that majority of cases were operated between 2 – 7 days, only 3 cases were operated beyond 7 days. 24(35.3%) cases were operated within 24hours of trauma. In majority of fractures(66) close reduction was achieved, only in 2 cases open reduction was required.

The union rate was 100 % and the time to union in majority of fractures was 3 months (67.65%, n=46), 19 fractures (27.94%) united in 4 months and 3 Fractures (4.41%) united in 5 months.

Complications seen in 5 patients of which, 2 patients developed AVN, 2 patients had extrusion of screw while 1 patient had superficial infection of suture line which was healed after debridement.

Functional outcome analysis showed mean Harris Hip Score of 86.26+9.019. Out of 68 patients 24 (35.3%) patients had excellent outcome, 29(42.2%) patients had Good outcome, 11(16.2%) patients had Fair and 4 (5.9%) Patient's poor outcome.

Table 1. shows comparison of functional outcome according to Pauwels's Classification

7 Out of total 9 Pauwels's type I fracture shows Good outcome. Out of total 43 Pauwels's type II fracture had excellent outcome in 18 patients, Good outcome in 16 patients, Fair outcome in 6 patients, poor outcome in 3 patients. Out of total 16 Pauwels's type III fracture had Excellent outcome in 4, Good outcome in 6, Fair result in 5, while poor outcome in 1.

Table 1: Analysis of functional outcome according to Pauwel's Classification

Pauwel's Classification	Outcome								Total	
	Excellent		Good		Fair		Poor			
	No.	%	No.	%	No.	%	No.	%	No.	%
I	2	8.3%	7	24.1%	0	0.0%	0	0.0%	9	13.2%
II	18	75.0%	16	55.2%	6	54.5%	3	75.0%	43	63.2%
III	4	16.7%	6	20.7%	5	45.5%	1	25.0%	16	23.5%
Total	24	100.0%	29	100.0%	11	100.0%	4	100.0%	68	100.0%

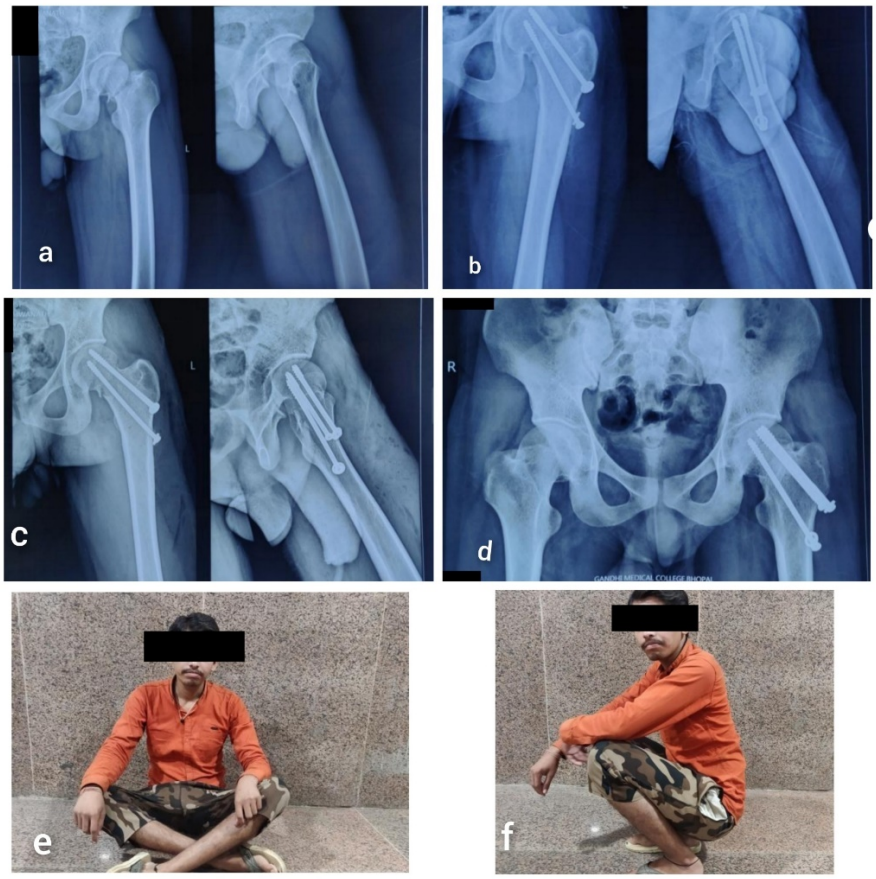

Figure 1: Case of fracture Neck of Femur. Pre-operative (a), Post-operative (b), Follow-up After 3 months (c), Follow-up after 6 months (d), cross leg sitting (e), squatting (f).

Discussion

Present study was conducted to analyse the outcome of cannulated cancellous screw fixation of fracture neck of femur in physiologically active patients and compare the observation of current study with the available literature.

In current study total 68 patients studied. Majority (27.9%) of the patients of both sexes were in age group of 46-55 years with a mean age of 41.73 years. Gala S et al (2017) studied 41 patients with average age of 41.5years.[64] Anand KS et al (2017) studied 10 patients, majority (50%) of them were in age group of 40-60 years.[62] Vijay V et al(2016) studied 25 patients, majority (60%) of them were in age group of 30-59 years with average age of 50 years.[60]The age distribution of current study is comparable with above mention studies. While Filipov et al (2011) studied 88 patients with average age of 76.9 years, majority (30.68%) of them were in age group of 80-89 years.[5] They studied over elderly population which leads to this discrepancyas compare to current study.

In current study distribution of patients according to Pauwel‟s classification, where majority 63.2% (n=43) of fracture were Pauwel‟s type II followed by type III 23.5%(n=16) while 13.2% (n=9) had pauwel‟s type I fracture. Khoo C.C et al (2014) reported maximum patients with fracture (56.6%) were pauwel‟s type II, followed by pauwel‟s type III (32.1%) and 11.3% were pauwel‟s type I fracture.[47] Gala S et al (2017) also reported maximum fractures (61%) were pauwel‟s type II, followed by pauwel‟s type III (19.5%) and 19.5% pauwel‟s type I fracture.[64] This

distribution of fracture type according to pauwel‟s classificationis comparable to current study.

In current study majority (95.6%) of fractures united within 3-4 months, with union rate of 100%. Filipov O et al (2011) reported union rate of 98.86%, Vijay V et al (2016) reported union rate of 96%, Anand K.S et al (2017) reported union rate of 80%, and Gala S et al (2017) reported union rate of 95%.[5,60,62,64] Union rate of current study is better than other studies.

In current study 5 patients had developed complications out of which 4 had developedafter appearance of radiological features of union. 2 patients (2.9%) developed AVN and 2 patients (2.9%) had Extrusion of the screw while 1 patient had superficial infection ofsuture line which was healed after debridement. Galal S et al (2017) reported AVN rate of 2.5% which is similar to current study.[64] Vijay V et al (2016) reported 8% AVN and 4% superficial infection.[60] Khoo C.C et al (2014) reported AVN rate of 16.98% which was very high may be due to long duration of study of 5 years.[47] While Anand K.S et al (2017) reported no patient with AVN may be due to short duration of study.[62]

In current study final outcome of cannulated cancellous screw fixation was assessed by Harris Hip score with mean Harris Hip Score of 86.26 +9.019. O. Filipov et al (2011) reported mean Harris Hip Score of 84.26 which is similar and comparable to current study.[5] In current study out of 68 patients 24 (35.3%) patients had Excellent outcome, 29(42.2%) patients had Good outcome,11(16.2%) patients had Fair and 4 (5.9%) Patients had poor outcome. Filipov et al (2011) reported excellent outcome in 42.04% patients, good in 23.86%, fair in 22.72% and poor outcome in 11.36% patients which is comparable to current study.[5] Vijay Vet al (2016) reported 72% had excellent and 16% had good outcome while Anand K.S et al (2017) reported 60% had excellent outcome and 20% had good outcome.[60,62] This better outcome as compare to current study may be due to very small sample size in these studies.

The main aim of cannulated cancellous screw fixation in fracture neck of femur was anatomical reduction, with stable fixation and return to pre-injury level of function. This objective was achieved with satisfactory outcome in 94.1% patients while poor outcome in only 5.9% patients.

In current study follow-up period of 6 months, we are aware that the follow-up in current study was small and further follow-up will be necessary to understand the other parts, specially the outcome affected by complication

Conclusion

This prospective observational study including 68 subjects concludes that in patients with fracture neck of femur treated with cannulated cancellous screw, the union rate is 100%. Majority of patients had good to excellent functional outcome. Young age, shorter injury to operation interval, and transcervical fractures have better functional outcome. However, a longer follow-up in more number of patients is required to substantiate this statement.

References

1. Parker MJ. The management of intracapsular fractures of the proximal femur. J Bone Joint Surg Br. 2000;82-B:937-41
2. Bartonícek J. Pauwels' classification of femoral neck fracture: correct interpretation of the original. Journal of Orthopaedic Trauma 2001; 15: 358- 60
3. Chen wC, Yu SW, Tseng IC, et al. Treatment if undisplaced femoral neck fractures in the elderly. J Trauma. 2005;58:1035-1039

4. Asnis SE, Wanek-Sgaglione L. Intracapsular fractures of the femoral neck Results of cannulated screw fixation. J Bone Joint Surg Am 1994 Dec 1;76(12):1793-803.
5. Filipov O. Biplane double-supported screw fixation (F-technique): a method of screw fixation at osteoporotic fractures of the femoral neck. European Journal of Orthopaedic Surgery & Traumatology. 2011 Oct 1;21(7):539-43.
6. Leadbetter GW. A treatment for fracture of the neck of the femur. J Bone Joint Surg. 1933 Oct 1;15(4):931-40.
7. Nagi ON, Gautam VK, Marya SK. Treatment of femoral neck fractures with a cancellous screw and fibular graft. J Bone Joint Surg Br. 1986 May;68(3):387-91.
8. Parker MJ, Porter KM, Eastwood DM, Schembi Wismayer M, Bernard AA. Intracapsular fractures of the neck of femur. Parallel or crossed garden screws?. J Bone Joint Surg Br. 1991 Sep;73(5):826-7.
9. Lindequist S. Cortical screw support in femoral neck fractures: a radiographic analysis of 87 fractures with a new mensuration technique. Acta orthopaedica Scandinavica. 1993 Jan 1;64(3):289-93.
10. Jarolem KL, Koval KJ, Zuckerman JD, Aharonoff G. A comparison of modified Knowles pins and cannulated cancellous screws for the treatment of non displaced or impacted femoral neck fractures. Bulletin (Hospital for Joint Diseases (New York, NY)). 1993;53(3):11-4.
11. Bout CA, Cannegieter DM, Juttmann JW. Percutaneous cannulated screw fixation of femoral neck fractures: the three point principle. Injury. 1997 Mar 1;28(2):135-9.
12. Krischak G, Beck A, Wachter N, Jakob R, Kinzl L, Suger G. Relevance of primary reduction for the clinical outcome of femoral neck fractures treated with cancellous screws. Archives of orthopaedic and trauma surgery. 2003 Oct 1;123(8):404-9.
13. Zlowodzki M, Weening B, Petrisor B, Bhandari M. The value of washers in cannulated screw fixation of femoral neck fractures. Journal of Trauma and Acute Care Surgery. 2005 Oct 1;59(4):969-75.
14. Khoo CC, Haseeb A, Singh VA. Cannulated screw fixation for femoral neck fractures: A 5-year experience in a single institution. Malaysian orthopaedic journal. 2014 Jul;8(2):14.
15. Vijay V, Srivastava N. Cannulated cancellous screws fixation in intracapsular fracture neck femur: a study with an emphasis on result of osteosynthesis. International Journal of Research in Orthopaedics. 2016 Jul;2(3):181.
16. Anand KS, Ranjan G, Mohpal R, Singh T, Krishna K, Singh S, Mohpal B, Mandal B. treatment of intracapsular fracture neck femur by cancellous hip screw fixation in adults. J. Evid. Based Med. Healthc. 2017; 4(35), 2132-2135
17. Galal S, Nagy M. Non-parallel screw fixation for femoral neck fractures in young adults. Journal of clinical orthopaedics and trauma. 2017 Jul 1;8(3):220-4.