

## ORIGINAL ARTICLE

**Comparison of Outcome of DHS (Dynamic Hip Screw) Vs Cannulated Screws in Managing Fracture of Neck of Femur**SYED HABIB ULLAH<sup>1</sup>, ZUBAIR KARIM<sup>2</sup>, MAZHAR MAHMOOD<sup>3</sup>, ABDUL MUNAF SAUD<sup>4</sup>, MOHAMMAD ABID<sup>5</sup>, MUHAMMAD TAHIR<sup>6</sup><sup>1,2</sup>Assistant Professor, Department of Orthopedic Surgery DG Khan Teaching Hospital, DG Khan<sup>3</sup>Assistant Professor, Orthopedics Allied Hospital Faisalabad<sup>4</sup>Senior Registrar, Department of Orthopedic Surgery Civil Hospital Bahawalpur<sup>5</sup>Associate Professor, Orthopedics Shahida Islam Medical College Lodhran<sup>6</sup>Statistical Analyst, Final Semester Department of Statistics The Islamia University of BahawalpurCorrespondence to: Syed Habib Ullah, Email: [drsyedhabib67@gmail.com](mailto:drsyedhabib67@gmail.com), Cell: 03467334123**ABSTRACT****Objectives:** To compare the outcome of DHS (dynamic hip screw) vs cannulated screws in managing fracture of neck of femur.**Study Design:** Randomized controlled trial.**Study Duration:** 22-06-2021 to 21-12-2021 (6 months)**Settings:** Department of Orthopedic, D.G Khan Hospital, D.G Khan.**Materials & Methods:** A total of 60 patients with fresh fracture neck of femur, 18 to 60 years of age of both genders were included. The DCS group was managed by internal fixation with Dynamic hip screw and CS group was treated by internal fixation with cannulated screws. All patients were followed for 3 months for outcome.**Results:** Total 60 patients of fracture of femur neck was recruited. Mean age and mean duration of fracture was  $44.42 \pm 12.45$  years and  $10.67 \pm 5.66$  days. In DCS group, mean age and duration of fracture was  $44.57 \pm 11.60$  years and  $10.23 \pm 5.86$  days respectively. In CS group, mean age and mean duration of fracture was  $44.27 \pm 13.46$  years and  $11.10 \pm 5.51$  days respectively. In DCS group, satisfactory outcome was found in 25 (83.33%) patients while in CS group, it was found in 13 (43.33%) patients. After applying chi-square test, it was noted that DCS group had significantly ( $P=0.003$ ) higher proportion of satisfactory outcome as compared to CS group.**Conclusion:** Results of this study showed that DCS group had significantly higher proportion of satisfactory outcome as compared to CS group in cases of femur neck fractures. Most of the patients were between 41-60 years of age but difference of satisfactory outcome between DHS group and CS group was not significant. Regarding male patients, significantly higher rate of satisfactory outcome was noted in DHS group as compared to CS group.**Keywords:** femur neck fracture, dynamic hip screw, cancellous screw.**INTRODUCTION**

The increase in population and traffic accidents lead to higher femoral neck fractures (FNF) in orthopedic setups.<sup>1</sup> By 2050, there would have been 21.3 million hip fractures globally, up from 1.26 million in 1990.<sup>2</sup> such fractures cause a negative impact on the independence and overall life of patient.<sup>3</sup> With an estimated 20 billion dollars spent on its management, the top 20 most expensive diagnosis in USA also include hip fractures which is a financial strain. By the year 2030, it is anticipated that there would be about 300,000 hip fracture cases yearly in the country.<sup>4</sup>

Hip fractures are linked to a number of problems, such as hospital-acquired infections, avascular necrosis, non-union, metal work failure and death.<sup>5</sup> The significance of highly effective surgical treatments in order to reduce relevant complications of FNF is admanant.<sup>6</sup> FNF can be treated in a variety of ways. According to earlier research, implant failure is related to FNF that occur after surgery.<sup>7</sup> For patients who are not dislocated or who are young, multiple cannulated screws (CS) and dynamic hip screws (DHS) are frequently employed. In non-displaced intracapsular fractures, CS was frequently utilized because it has excellent biomedical features like anti-rotation and is less intrusive.<sup>8</sup> For the purpose of fracture fixation, DHS was able to retain the anatomical reduction and neck-shaft angle.<sup>9</sup>

We planned this study to compare the satisfactory outcome in patients of FNF managed with DHS and CS. Results of this study may help us in choosing better technique with satisfactory outcome. In this way, we may be able to reduce the morbidity of the patients related to FNF.

**Operational Definitions: Femoral Neck Fractures:** all patients with any grades of Garden's classification.

Outcome was measured by Modified Merle d'Aubigne score at the end of 3 months post-operatively. Outcome was taken as satisfactory if the results were excellent, otherwise taken as unsatisfactory.

**MATERIAL AND METHODS**

This randomized controlled trial study was conducted at

Department of Orthopedic Surgery, D.G Khan Hospital D.G Khan from 22-06-2021 to 21-12-2021. Total 60 patients with fresh fracture neck of femur, 18 to 60 years of age of both genders were included. Patients with pathological fractures and pregnant females were excluded. Study was approved by ethical review committee and written informed consent was taken from every patient. Two groups (DCS and CS) were created randomly. The DCS group was managed by internal fixation with Dynamic hip screw and CS group was treated by internal fixation with cannulated screws. All patients were followed for 3 months for outcome.

For data analysis, SPSS V.20 was used. Mean and standard deviation was calculated for age and duration of FNF. Frequencies were calculated for gender and satisfactory outcome.

Satisfactory outcome of FNF was compared between the DHS group and CS group by using chi-square test. Data was stratified for age gender and duration of FNF. After stratification, chi-square test was applied to see the effect of these on satisfactory outcome. P-value  $\leq 0.05$  was considered as significant.

**RESULTS**

Total 60 patients of fracture of femur neck was recruited. Mean age and mean duration of fracture was  $44.42 \pm 12.45$  years and  $10.67 \pm 5.66$  days. In DCS group, mean age and duration of fracture was  $44.57 \pm 11.60$  years and  $10.23 \pm 5.86$  days respectively. In CS group, mean age and mean duration of fracture was  $44.27 \pm 13.46$  years and  $11.10 \pm 5.51$  days respectively.

Two age group (20-40 years and 41-60 years) were created. Total 21 (35%) patients belonged to age group 20-40 years while 39 (65%) patients belonged to age group 41-60 years. (Fig. 1)

Males were 30 (50%) females were 30 (50%). (Fig. 2)

In group  $\leq 14$  days duration of fracture, there were 45 (75%) while in  $>14$  days duration of fracture group, there were 15 (25%) patients. (Fig. 3)

In DCS group, satisfactory outcome was found in 25 (83.33%) patients while in CS group, it was found in 13 (43.33%) patients. After applying chi-square test, it was noted that DCS

group had significantly ( $P=0.003$ ) higher proportion of satisfactory outcome as compared to CS group. (Table 1)

In age group, 20-40 years, satisfactory outcome was noted in 8 (88.89%) patients and 4 (33.33%) patients respectively in DCS group and CS group. Chi-square test showed a significant ( $P=0.024$ ) difference of satisfactory outcome between DCS and CS groups. In age group 41-60 years, total 17 (80.85%) patients of DCS group and 9 (50%) patients of CS group found with satisfactory outcome. After applying chi-square test, it was noted that difference of satisfactory outcome between DCS group and CS group was not significant ( $P=0.087$ ). (Table 2)

In 12 (85.71%) male patients of DCS group and 5 (31.25%) male patients of CS group, outcome was satisfactory and difference was significant ( $P=0.004$ ). Among female patients, outcome was satisfactory in 13 (81.25%) patients of DCS group while in 8 (57.14%) patients of CS group. Chi-square test showed insignificant ( $P=0.236$ ) difference of satisfactory outcome between DCS group and CS group. (Table 3)

In group  $\leq 14$  days duration of fracture, outcome was satisfactory in 19 (82.61%) patients and 9 (40.91%) patients of DCS group and CS group. Chi-square test showed significant ( $P=0.006$ ) difference of satisfactory outcome between DCS group and CS group. In group  $>14$  days duration of fracture, outcome was found satisfactory in 6 (85.71%) patients of DCS group while in 4 (50%) patients of CS group. Difference was not significant ( $P=0.282$ ). (Table 4)

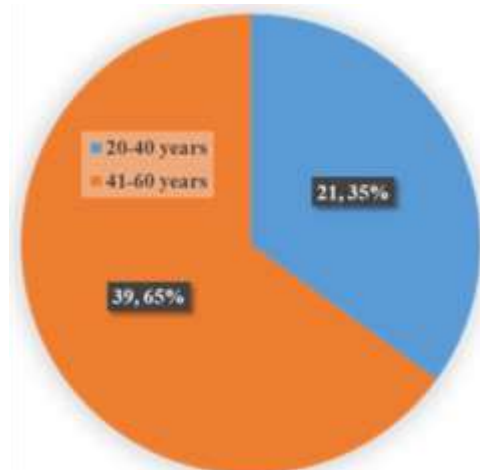


Fig. 1: Distribution according to age. (n=60)

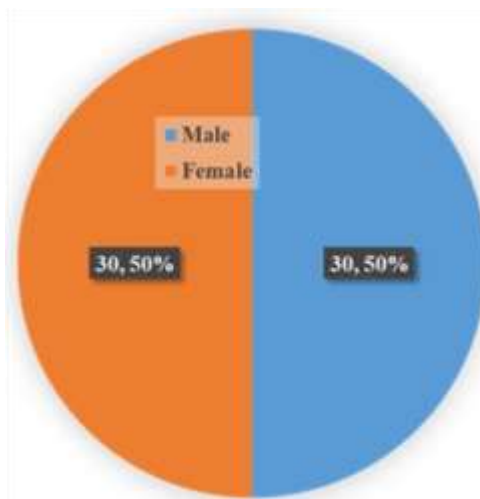


Fig. 2: Gender distribution (n=60)

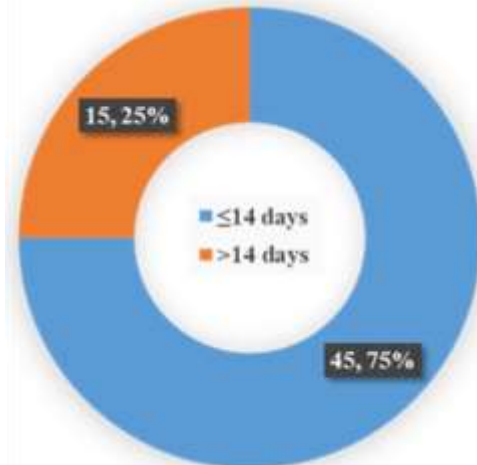


Fig. 3: Distribution of patients according to duration of fracture (n=60)

Table 1: Comparison of outcome between dynamic hip screw and cannulated screw in management of femoral neck fracture.

Group	Outcome		Total	P value
	Satisfactory	Unsatisfactory		
DCS	25 (83.33)	5 (16.67)	30	0.003
CS	13 (43.33)	17 (56.57)	30	

Table 2: Stratification of outcome in relation to age groups.

Group	Outcome		Total	P value
	Satisfactory	Unsatisfactory		
Age group 20-40 years				
DCS	8 (88.89)	1 (11.11)	9 (30)	0.024
CS	4 (33.33)	8 (66.67)	12 (40)	
Age group 41-60 years				
DCS	17 (80.85)	4 (19.05)	21 (70)	0.087
CS	9 (50)	9 (50)	18 (60)	

Table 3: Stratification of outcome in relation to gender.

Group	Outcome		Total	P value
	Satisfactory	Unsatisfactory		
Male				
DCS	12 (85.71)	2 (14.29)	14 (46.67)	0.004
CS	5 (31.25)	11 (68.75)	16 (53.33)	
Female				
DCS	13 (81.25)	3 (18.75)	16 (53.33)	0.236
CS	8 (57.14)	6 (42.86)	14 (46.67)	

Table 4: Stratification of outcome in relation to duration of fracture.

Group	Outcome		Total	P value
	Satisfactory	Unsatisfactory		
$\leq 14$ days				
DCS	19 (82.61)	4 (17.39)	23 (76.67)	0.006
CS	9 (40.91)	13 (59.09)	22 (73.33)	
$>14$ days				
DCS	6 (85.71)	1 (14.29)	7 (23.33)	0.282
CS	4 (50)	4 (50)	8 (26.67)	

## DISCUSSION

Young adults rarely suffer from femoral neck fractures, which typically happen after serious trauma. Approximately 2–3% of all femoral neck fractures occur in patients under the age of 50.<sup>10</sup> When treating a femoral neck fracture, the osseous and vascular structure, mechanism of injury, related injuries, fracture pattern, and therapeutic objectives are all taken into account.<sup>11</sup> The study found that osteonecrosis occurs in 20–90% of young people who suffer a femoral neck fracture.<sup>12</sup> Numerous osteosynthetic methods are available, such as internal fixation of free fibular grafts (vascularized or non-vascularized) and fixation with multiple cancellous cannulated screws, double angle barrel/blade plates for

fixation of valgus and displacement osteotomies, dynamic hip screws, and muscle pedicle grafts.<sup>13</sup>

We have conducted this study to compare the satisfactory outcome between internal fixation with Dynamic hip screw and internal fixation with cannulated screws in cases of fractures of femur of neck.

Total 60 patients of fracture of femur neck was recruited. Mean age and mean duration of fracture was  $44.42 \pm 12.45$  years and  $10.67 \pm 5.66$  days. In DCS group, mean age and duration of fracture was  $44.57 \pm 11.60$  years and  $10.23 \pm 5.86$  days respectively. In CS group, mean age and mean duration of fracture was  $44.27 \pm 13.46$  years and  $11.10 \pm 5.51$  days respectively. Males were 30 (50%) and females were 30 (50%). In study of Ahmad et al,<sup>14</sup> total 90 patients of fracture of femur of neck were selected and age range was 15-55 years. Out of 90 patients, males were 83.3% while females were 16.7%. In another study by Niemann et al,<sup>15</sup> total 31 patients with fracture of femur of neck were selected, 16 patients were females and rest were males and mean age was  $62.81 \pm 15.05$  years.

In DCS group, satisfactory outcome was found in 25 (83.33%) patients while in CS group, it was found in 13 (43.33%) patients. After applying chi-square test, it was noted that DCS group had significantly ( $P=0.003$ ) higher proportion of satisfactory outcome as compared to CS group. In study Arfee et al,<sup>16</sup> DHS was found to give superior results than CCS fixation in femoral neck fractures. Azhar Lakhani et al<sup>17</sup> showed excellent results in only 25.8% of CCS cases and 61.3% of DHS cases. In study of Singh et al,<sup>18</sup> total 43 patients with fracture of neck of femur were recruited. In DHS Group outcome was satisfactory in 85.7% patients and in CCS Group was 59%. In study of Tolga et al,<sup>19</sup> in DHS group and CCS group, outcome was satisfactory in 91% patients and 85% patients respectively. In study of Kumar et al,<sup>20</sup> 40 patients of fracture of femur of neck were managed with Multiple Cannulated Screws, outcome was found satisfactory in 82.5% patients. In study of Carlos et al,<sup>21</sup> total 96 patients of fracture of femur of neck managed with DHS, outcome was found satisfactory in 63% patients.

In another study of Stephen et al,<sup>22</sup> DHS group and CSS group, outcome was satisfactory in 75% and 70% patients respectively. In a study of Nitharwal et al<sup>23</sup>, among the 30 patients of DHS group and 30 patients of CS group, satisfactory outcome was noted in 86.66% patients and 83.33% patients. So DHS group has slightly higher proportion of satisfactory outcome than CS group.

## CONCLUSION

Results of this study showed that DCS group had significantly higher proportion of satisfactory outcome as compared to CS group in cases of femur neck fractures. Most of the patients were between 41-60 years of age but difference of satisfactory outcome between DHS group and CS group was not significant. Regarding male patients, significantly higher rate of satisfactory outcome was noted in DHS group as compared to CS group

## REFERENCES

1. Li L, Zhao X, Yang X, Tang X, Liu M. Dynamic hip screws versus cannulated screws for femoral neck fractures: a systematic review and meta-analysis. *Journal of Orthopaedic Surgery and Research*. 2020 Dec;15(1):1-9.
2. Niemann M, Braun KF, Ahmad SS, Stöckle U, Märdian S, Graef F. Comparing perioperative outcome measures of the dynamic hip screw and the femoral neck system. *Medicina*. 2022 Feb 26;58(3):352.
3. Dyer SM, Crotty M, Fairhall N, Magaziner J, Beaupre LA, Cameron ID, Sherrington C. A critical review of the long-term disability outcomes following hip fracture. *BMC geriatrics*. 2016 Dec;16(1):1-8.

4. Lim EJ, Shon HC, Cho JW, Oh JK, Kim J, Kim CH. Dynamic Hip Screw versus Cannulated Cancellous Screw in Pauwels Type II or Type III Femoral Neck Fracture: A Systematic Review and Meta-Analysis. *Journal of Personalized Medicine*. 2021 Oct 11;11(10):1017.
5. Li L, Zhao X, Yang X, Tang X, Liu M: Dynamic hip screws versus cannulated screws for femoral neck fractures: a systematic review and meta-analysis. *J Orthop Surg Res*. 2020, 15:352. 10.1186/s13018-020-01842-z
6. Cullen SE, Sephton B, Malik I, Aldarragi A, Crossdale M, O'Connor M. A Comparative Study of Dynamic Hip Screw Versus Multiple Cannulated Compression Screw Fixation in Undisplaced Intracapsular Neck of Femur Fractures. *Cureus*. 2022 Nov 17;14(11).
7. Tai TW, Lien FC, Lee PY, Jou IM, Lin CJ, Huang YH. Using a cannulated screw as a drill guide and sleeve: a simple technique for multiple-screw fixation for intracapsular femoral neck fracture. *Orthopedics*. 2010 Aug 11;33(8).
8. Zhang LL, Zhang Y, Ma X, Liu Y. Multiple cannulated screws vs. dynamic hip screws for femoral neck fractures. *Der Orthopäde*. 2017 Nov;46(11):954-62.
9. Brandt E, Verdonshot N, Van Vugt A, Van Kampen A. Biomechanical analysis of the sliding hip screw, cannulated screws and Targon® FN in intracapsular hip fractures in cadaver femora. *Injury*. 2011 Feb 1;42(2):183-7.
10. Ly TV, Swiontkowski MF. Management of femoral neck fractures in young adults. *Indian J Orthop*. 2008 Jan-Mar;42:3-12.
11. Blankenbaker DG, De Smet AA. Hip injuries in athletes. *Radiol Clin North Am*. 2010;48(6):1155-78.
12. Karaeminogullari O, Demirors H, Atabek M, Tuncay C, Tandogan R, Ozalay M. Avascular necrosis and nonunion after osteosynthesis of femoral neck fractures: effect of fracture displacement and time to surgery. *Adv Ther*. 2004 Sep-Oct;21:335-342.
13. Parker MJ, Blundell C. Choice of implant for internal fixation of femoral neck fractures. *Acta Orthop Scand*. 1998;69:138-143.
14. Ahmad T, Khan AS, Ali W, Ahmed W, Younas M, Shah L. Radiological Outcome of Fracture of Neck of Femur Treated with Two versus Three Cannulated Screws Fixation in Adults. *PJMHS*. 2022;16(03):1181-83
15. Niemann M, Braun KF, Ahmad SS, Stöckle U, Märdian S, Graef F. Comparing perioperative outcome measures of the dynamic hip screw and the femoral neck system. *Medicina*. 2022 Feb 26;58(3):352.
16. Arfee S, Arfee A, Arfee AA. Cannulated cancellous screws versus dynamic hip screw in femoral neck fractures: a comparison in productive age group at tertiary care hospital of North India. *Int J Res Orthop* 2021;7:44-7.
17. Lakhani AA, Mahajan N, Sonawane DV. A Comparative Study of the Management Of Fracture Neck Femur By Dynamic Hip Compression Screw With Derotation Screw Versus Three Cancellous Screws. *J Medic Thes*. 2014;2:5-8.
18. Singh M, Sonkar D, Verma R, Shukla J, Gaur S. Comparison of the functional outcome of DHS versus cannulated cancellous screws in pauwels type II and III fracture neck femur in young adults. *Int. J. Orthop. Sci*. 2017;3:745-9.
19. Tolga Kaplan, Akesen B, Demirağ B, Bilgen S, Durak K. Comparative results of percutaneous cannulated screws, dynamic compression type plate and screw for the treatment of femoral neck fractures. *Turkish Journal of Trauma & Emergency Surgery*. 2012; 18(1):65-70.
20. S Kumar, D Bagchi. Fractures Of The Neck Of The Femur- Treated With Multiple Cannulated Screws In Younger Patients –A Study Of 40 Cases. *The Internet Journal of Orthopedic Surgery*. 2009; 18(1).
21. Carlos Roberto Schwartzmann, Lucas Senger Jacobus, Leandro de Freitas Spinelli, Leonardo Carbonera Boschin, Ramiro Zilles Gonçalves, Anthony Kerbes Yépez, Rodrigo Py Gonçalves Barreto, and Marcelo Faria Silva Dynamic Hip Screw for the Treatment of Femoral Neck Fractures: A Prospective Study with 96 Patients *ISRN Orthopedics*, Article ID 257871, 2014, 7.
22. Stephen T. Gardner, Michael J. Weaver, Sett Jerabek, Edward Rodriguez, Mark Varhas, Mitchell B. Harris. Predictors of early failure in young patients with displaced femoral neck fractures. *The Harvard Orthopaedic Journal*. 2013, 15.
23. Nitharwal ML, Kumar S, Harshwal RK, Jain MP, Mehra AK. A Prospective comparative study of outcome of surgical management of basicervical fractures of femur with dynamic hip screw (DHS) with derotation screw and multiple cannulated cancellous (CC) screw. *International Journal of Contemporary Medical Research* 2016;3(7):2119-2122.