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TO EVALUATE THE FUNCTIONAL AND RADIOLOGICAL OUTCOME OF FRACTURE NECK OF FEMUR TREATED WITH CANNULATED SCREW FIXATION

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ABSTRACT **PURPOSE:** To evaluate the functional and radiological outcome of fracture neck of femur treated with cannulated screw fixation. **METHODS:** 23 patients who underwent cannulated screw fixation at KVG Medical College, from 2014 to 2021 having traumatic intra-capsular fracture neck of femur were included in the study. The functional outcome was assessed using Harris Hip Scoring system and the radiological outcome was assessed using the Radiographic Union Score for Hip (RUSH). **RESULTS:** In our series of 23 patients of fracture neck of femur in young adults age 12-57 years treated surgically by internal fixation with cannulated cancellous screw. According to Harris hip scoring system, we had excellent results in 66% cases, good in 22% cases, fair in 9% and poor in 4%. Two patients developed non-union and one patient developed avascular necrosis of femoral head. **CONCLUSIONS:** The fracture neck of femur in young adults with CC screw fixation gave excellent to good functional outcome in 88%

KEYWORDS : fracture neck of femur, cannulated screw fixation, Harris Hip Scoring.

INTRODUCTION

Femoral neck fractures account for about half of all fractures around the hip. In the elderly, it is frequently a fragility fracture caused by osteoporosis; however, in the younger age group, it usually results from a high-energy trauma sustained in a road traffic accident. [1]

The basic goal of fracture management is to return the patient to his or her pre-fracture level of function. Avascular necrosis and late segmental collapse might occur even after the fracture has been united, resulting in a poor functional outcome. As a result, Dickson termed this fracture "Unsolved fracture" in 1953. [2]

Internal fixation is still the preferred treatment for these fractures in all age groups, especially in displaced fractures in younger patients where preserving the femoral head is the priority. The degree of vascular compromise is directly proportional to fracture displacement, which inhibits bone healing and leads to complications. As a result, intracapsular fracture neck of femur is classified as an orthopaedic emergency which requires prompt adequate reduction with rigid internal fixation.

Internal fixation with cannulated cancellous (CC) screws following adequate reduction is the preferred method to treat femur neck fractures because it results in reduced blood loss, a shorter surgical time, and a shorter stay in the hospital. Thus parallel screw fixation at present is considered as the standard procedure.

OBJECTIVES OF THE STUDY

- To evaluate the functional and radiological outcome of fracture neck of femur treated with cannulated cancellous (CC) screw fixation.
- To enumerate the complications associated with CC screw fixation.

MATERIALS AND METHODS

The study included 23 patients who underwent cannulated screw fixation at KVG Medical College, from 2014 to 2021 having traumatic intra-capsular fracture neck of femur.

Follow–up was done for over a year. They were classified using Garden's classification. [4]

The functional outcome was assessed using Harris Hip Scoring system. [5]

The radiological outcome was assessed using the Radiographic Union Score for Hip (RUSH). [6]

INCLUSION CRITERIA

- All non-pathological intracapsular femoral neck fractures treated with CC screw fixation.
- All Garden stage I to IV fractures.
- Patients with a minimum of 1 year follow-up.

EXCLUSION CRITERIA

- Ipsilateral concomitant femoral fracture.
- Ipsilateral acetabular fractures.
- Pathological fractures.
- Patients lost to follow up.
- Length of time between fracture and fixation of more than seven days.

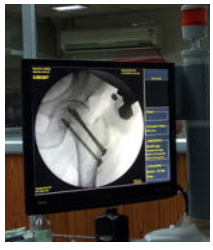
SURGICAL PROCEDURE

The patients were placed in a radiolucent traction table. The foot of the affected limb was placed in the fracture table's foot holder. Closed reduction was performed by first externally rotating the hip joint, then abducting it, then applying longitudinal traction to the limb, and finally reducing it by internal rotation and adduction of the limb.

The reduction was confirmed using AP and lateral views with an image intensifier. The heel-palm test and Garden's alignment index were used to confirm the adequacy of reduction.

The fractures were stabilized with 2 or 3 partially threaded 6.5 cc screws. After applying compression bandage and boot & bar, patient were shifted toward

The Garden Alignment Index is an expression of the angle of the compression trabeculae on the anteroposterior roentgenogram in relation to the longitudinal axis of the femoral shaft over the angle of the compression trabeculae on the lateral roentgenogram in relation to the femoral shaft.



POST OP AND FOLLOW-UP

Non-weight bearing ambulation was advised for first 8 weeks, followed by partial weight bearing ambulation from 8th to 12th week, and full weight bearing after 12 weeks if radiographs showed signs of union.

Follow-ups were performed on 4th, 8th, 12th, 16th, 24th and 48th weeks. At all follow-ups, symptoms such as pain or swelling were noted, and a thorough clinical examination was performed to look for tenderness and active range of motion of the hip. X-rays were repeated to look for signs of union (trabecular continuity across the fracture site), neck shaft angle, screw backing out or breaking of screws.

PRE –OP POST- OP FOLLOW-UP

HARRIS HIP SCORE [5]

Question	Score
1. Please describe any pain in your hip:	
A. No pain	44
B. Slight pain or occasional pain	40
C. Mild, no effect on ordinary activity, pain after unusual activity, uses aspirin or similar medication	30
D. Moderate pain that requires pain medicine stronger than aspirin/similar medications. I'm active but have had to make modifications and/or give up some activities because of pain	20
E. Marked or severe pain that limits activity and requires pain medicine frequently	10
F. Totally disabled—wheelchair or bed ridden	0
2. Amount and type of support used:	
A. None	11
B. Cane for long walks	7
C. Cane all the time	5
D. 2 canes	2
E. 1 crutch	3
F. 2 crutches or walker	0
G. Unable to walk	0
3. Limp. This should be judged at the end of a long walk using the type of support chosen in question 2.	
A. None	11
B. Slight	8
C. Moderate	5
D. Severe	0
4. Distance that you can walk. This should be judged with the aid of a support if you use one.	
A. Unlimited	11
B. 5–6 blocks	8
C. 1–4 blocks	5
D. In the house only	2
E. Unable to walk	0
5. Climbing stairs:	
A. Normally	4
B. Need a banister or cane or crutch	2
C. Must put both feet on each step/severe trouble climbing stairs	1
D. Unable to climb stairs	5
6. Shoes and socks:	
A. Can put on socks and tie a shoe easily	4
B. Can put on socks and tie a shoe with difficulty	2
C. Cannot put on socks and shoes	0
7. Sitting:	
A. Comfortable in any chair	5
B. Comfortable only in high chair, or can sit comfortably for only 0.5 hour	3
C. Cannot sit for 0.5 hour because of pain	0

THE RADIOGRAPHIC UNION SCORE FOR HIP (RUSH) [8]

1) Cortical Index - Bridging

Cortex	No Cortical Bridging Score=1	Some Cortical Bridging Score=2	Complete Cortical Bridging Score=3	Total Score (Range, 4 to 12)
Anterior Cortex	□	□	□	
Posterior Cortex	□	□	□	
Medial Cortex	□	□	□	
Lateral Cortex	□	□	□	
Overall Score				

2) Cortical Index – Disappearance of the Fracture Line

Cortex	Fracture Line Fully Visible Score=1	Some Evidence of the Fracture Line Score=2	No Evidence of the Fracture Line Score=3	Total Score (Range, 4 to 12)
Anterior Cortex	□	□	□	
Posterior Cortex	□	□	□	
Medial Cortex	□	□	□	
Lateral Cortex	□	□	□	
Overall Score				

3) Trabecular Index – Consolidation

	No Consolidation Score=1	Some Consolidation Score=2	Complete Consolidation Score=3	Total Score (Range, 1 to 3)
Amount of Consolidation	□	□	□	

4) Trabecular Index – Disappearance of the Fracture Line

	Fracture Line Fully Visible Score=1	Some Evidence of the Fracture Line Score=2	No Evidence of the Fracture Line Score=3	Total Score (Range, 1 to 3)
Fracture Line	□	□	□	

OVERALL RUSH SCORE (Range, 10 to 30):

RESULTS

- In our study of 23 patients of fresh fracture neck of femur in age group of 12-57 years treated surgically by internal fixation with cannulated cancellous screw. 16 [69.56%] patients were male and 7 patients were female [30.43%]
- Majority 15 Patients [65.21%] affected were due to road traffic accident, 8 patients [34.78%] due to fall.
- Garden's classification system was used for operative evaluation. The most common type of injury type was Type 3 i.e.; 10 patients [43.47%]. 9 patients [39.13%] had undisplaced fractures i.e.: Garden stage 1 & 2, and 14 patients [60.87%] had displaced fractures i.e.: Garden stage 3 &4.
- Out of the 23 patients, 4 patients (17.39%) were operated on first or second day, 17 patients (73.91%) on 3rd or 4th day and only in case of 2 patients (8.69%) the delay for surgery since fracture was five days to seven days.
- The average time taken for union was 3.5 months. 18 patients showed union in 3-5 months [78.26%]. Two patients [8.69%] did not have radiological signs of union till 9 months of follow-up, 1 patient had AVN of femoral head.
- Excellent results were achieved in 15 cases [65.21%], good in 5 cases [21.73%], fair in 2 cases [8.69%] and poor result in 1 case [4.34%].

DISCUSSION

- Our study has a male predominance with 65.21% and male: female ratio of 2.28:1. The findings are comparable to the study by Vijay V et al. [9]
- In the current study, Garden's classification system was used for operative evaluation. The most common type of injury was type 3 [10 cases] and 2[7 cases]. Our study is comparable to that of M.F. Swiontkowski et al.[10]
- The functional results of the present study (using harris hip score 1- 100) were comparable with that of MP Singh et al and Sibaji Chaudhuri[11] with 65.21% having excellent results, 21.73% having good, 8.69% having fair results and poor results in 4.34%.
- Osteonecrosis remains the main complication following internal fixation of intracapsular fractures. In our series one patient (4.34%) had definitive evidence of osteonecrosis within 48 weeks of fracture. Asnis SE et al [13] reported thirteen patients (11%) with evidence of osteonecrosis at the end of 2 years in his series of 141 patients.
- There was two cases [8.69%] of non-union in our series. Thus we had a 92% rate of union. Asnis SE et al [13] reported 5 patients (4%) of non-union in a series of 141 patients.

CONCLUSION

- The study included 23 cases of femoral neck fractures that were treated surgically with closed reduction and internal fixation with cannulated cancellous screws.
- In conclusion, 88 percent of the patients with fracture neck of femur treated surgically with closed reduction and fixation with cannulated cancellous screws had excellent to good functional outcome.
- As a result, even for displaced fractures, this would be the best procedure for managing fracture neck of femur in adults under 65 years of age. The review of data and our study all point to fracture fixation as soon as possible to avoid poor results.

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