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A comparision and analysis of dynamic hip screw v/s multiple cannulated cancellous screws for neck femur fractures in young Indian population

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Abstract
Background: Femoral neck fractures are one of the problems in clinical treatment. The prognosis is uncertain. Currently, no internal fixation method is superior to other internal fixation methods in the treatment of femoral neck fractures. Therefore, the internal fixation system needs to be further explored. The aim of this study was to compare clinical outcomes of femoral neck dynamic Hip screw system and multiple cannulated compression screws in the treatment of femoral neck fractures.
Methods: This randomized control trial was conducted in the Department of Orthopedics, SURAT Municipal Institute of Medical Science, Surat.
Results: 6 months Post operatively Harris Hip score evaluations clearly state DHS as a superior implant to cancellous screws. Also, there was 1 fixation failure in DHS group whereas there were 3 fixation failure in Cannulated screw groups.
The surgery duration, radiation time and blood loss were significantly low with cannulated cancellous screws.
Conclusion: The results of present study support the hypothesis that DHS is a better implant than CC screws in management of fracture neck femur in young adults in pauwels type II and III in terms of functional outcome but complication rate does not depend on the implant selection, however a longer follow up will consolidate these results.
Although the surgery duration, radiation time, blood loss and infection rate is more in DHS. It gives a better result than CC screws based on radiological union and functional status of the patients.

Keywords: Femoral neck fracture, cannulated cancellous screw, dynamic hip screw

Introduction
Intracapsular fractures of neck femur has always presented a great challenge to orthopedic surgeons and remain in many ways the unsolved fracture as far as treatment and results are concerned especially in younger population. With increasing frequency of high energy trauma, the incidence of fracture of neck of femur is increasing in young adults [1, 2]. Fractures of the femoral neck are devastating injuries that most often affects the elderly and have a tremendous impact on the health Care system and society in general. In Western countries such cases are treated by total hip Arthroplasty because of the style and religious requirements. The people in our country are more interested to squat or sit in cross legged position. In addition to the cost factor the movements required are not possible with total hip replacement. It is therefore required by all means that the God gifted hip joint should be preserved.
In this context we undertook the present study to evaluate the immediate results of internal fixation fracture neck of the femur keeping in view the living condition of an average Indian.
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In younger patients, fixation is considered as a orthopedic emergency [3, 4]. Also, achieving and maintaining 100 percent anatomic reduction is mandatory. Both cannulated screw and DHS have the capacity for compression in the fracture site[5] but their strength for maintaining reduction is not the same.

Also, the configuration of cannulated screws also matters
This study tries to compare the results of fixation of femoral neck fracture with Dynamic Hip Screw and cannulated screw.

Aim and Objective
This study was taken up with the following aims and objectives:
- To evaluate the best results that can be obtained by applying two different ways of fixation in the treatment of femoral neck fracture in adults.
- To study the duration of union.
- To study the complications

Materials and Methods
A randomized control trial was carried out at Department of Orthopedics, SMIMER Medical College, Surat. During this period, 30 patients with neck femur fractures were identified, which were enrolled in the study based on the inclusion and exclusion criteria. The inclusion criteria were:
1. Patients with age between 15 and 59 years of age
2. Recent history of trauma
3. Patients willing to undergo surgery
4. No associated fracture in both lower limbs
5. Type ll and lll as per Pauwels classification

The exclusion criteria were
1. Patients with age less than 15 years or more than 60 years
2. Neglected fracture neck of femur
3. Patient not willing to undergo surgery
4. Pathological fractures
5. Pauwels type l

Table 1: Method of fixation

Complication	Method of fixation	
	DHS	CC
Infection (Superficial)	1	0
Infection (deep)	0	0
joint stiffness	0	0
Implant Failure	1	2
Varus deformity	0	1
Limping	0	0
None	12	12
Total	15	15

We had 15 patients in both group (DHS&CC). This study was mainly an observational prospective study. In both groups, at first, reduction of the fracture with a fracture table using C arm was done. Anatomic reduction is defined as a 160° angle between head and neck trabecular lines in the anteroposterior view of hip joint and 180° in the lateral view. Five degrees of varus and valgus from the anatomic position were acceptable [6]. In group A, fixations were done with cannulated screws. Three screws were inserted parallel to each other [2]. In group B, fixations were done with DHS and one cannulated screw of about 1.5 cm parallel and superior to the nail [7, 8]. The patients were ambulated with partial weight bearing for twelve weeks. Follow up visits were made every 3 months for atleast 1 year. Reduction failure was defined as a 5-degree increase in varus or valgus angle between the head and neck of the femur. Leg length discrepancy, Harris Hip Score, infection and unity of fracture site were evaluated. Nonunion was defined as lack of union after six months of follow-up [9].

Observation and Analysis
Total 30 cases of femoral neck fractures were entered in this study. Both Group A (cannulated screws) and Group B(DHS) had 15 cases each. The most common age group was in the range of 31 – 40 years, with a mean of 32.6 yrs. There were 11 Male and 4 Female in group A and 10 Male and 5 Female in Group B. The most common mode of injury was Road Traffic Accident in both groups. Right side was involved in 53% of the patient. There was higher distribution of patients in the strenuous (laborer) than moderate (household)/ sedentary age group.
There were 21 Transcervical fractures and 9 subcapital fractures. There were 10 relatively stable fractures and 20 relatively unstable fractures In most patients, level of osteoporosis was 2 or 3 according to Singhs Index We had 9 patients with associated injuries: >90% cases were operated within 1 week of injury. Average injury surgery interval was ~4 days. Average surgical and fluoroscopy time of CC screw fixation was low as compared to DHS.
Intraoperative blood loss was low in CC screw method of fixation Radiological union was said to be achieved on the evidence of obliteration of fracture lines and trabecular continuity between the two fragments on AP & lateral x- rays in three cortices.
21 cases showed union by 3 months, 6 cases at 4 months and 3 cases showed union after 4 months.

Table 2: Intra operative details

Intra operative details	Method of Fixation	
	DHS	CC
Mean surgical time (minutes)	90	70
Fluoroscopy Time	70	65
Blood loss (intra operative)	120 ml	80 ml

Outcome evaluation were measured according to the Harris Hip Score with the following results at 6 months post op.

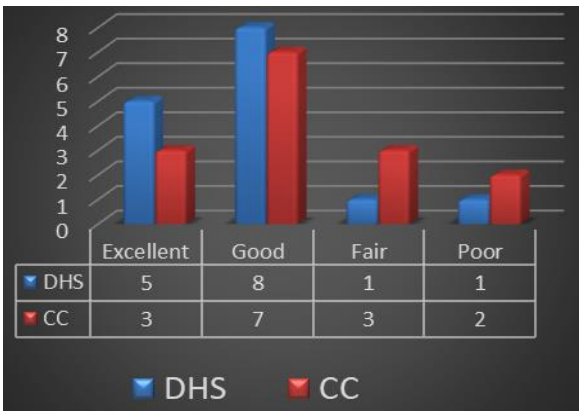

Fig 1: Show the DHS and CC

Table 3: Method of Fixation

Union	Method of Fixation		Percentage (%)
	DHS	CC	
8-10weeks	5(13.33%)	1(6.66%)	6(20%)
10-12weeks	9(59.94%)	11(73.26%)	20(66.66%)
12-16weeks	1(6.66%)	3(9.99%)	4(13.33%)
>17 weeks	0	0	0
Total	15	15	30

Pre OP

Post OP 1 month Post OP 3 month

Pre OP

Post OP 1 month Post OP 3 month Post OP 6 month

Standing Sitting

Squatting SLRT

Standing Sitting

Squatting SLRT

Discussion

It is clear that there is no statistical difference between Group A and Group B, so they are matched groups (age, sex, etc.)

There was 1 fixation failure in DHS group whereas there were 3 fixation failure in Cannulated screw groups.

Contrary to which, cannulated screws can be done with very low mean surgical time, fluoroscopy time and blood loss related to the surgical procedure.

Most of our patients 18 (60%) were able to walk without support at outdoors. Even the poor outcome cases had capacity to walk outdoors, if not independently, but with support of a walking aid. Limping is a common consequence of internal fixation. It is mainly due to the alteration in the abductor mechanism due to the impaction of neck on weight bearing. Exact cause cannot be attributed to this.

Various criteria were used to assess the functional results following internal fixation. How best the patient could be returned to the premorbid functional status has been the main criteria.

In India our customs demand squatting and sitting cross legged without difficulty. To achieve this patient should have good range of flexion, abduction, adduction, and external rotation at the hip and full flexion at the knee. The primary aim of surgery was to return them to this high level of function.

The marked contrast between the functional results and the radiological results is mainly because of the pain and limp which form major criteria in Harris hip scoring system, thus bringing down the number of good and excellent results in our study. Since pain and limp were present in most of our cases but none were severe enough to demand for any secondary surgical procedure.

Multiple cannulated screw can safely be used in treatment of femoral neck fracture which can be inserted with minimal invasive techniques. Hence, treating femoral neck fracture by using cannulated screw could provide good stability by compressing the fracture site by lag effect of the screw and maintaining reduction, with less blood loss, smaller skin incision and with small scarring which contribute to better cosmetic appearance and can achieve good fracture healing. DHS gives more stability and allows controlled collapse of fracture. DHS allows early weight bearing compared to CC screw group

However, the duration of surgery, radiation time and blood loss were more in DHS than CC screw group. Both techniques have their advantages and disadvantages; and both the techniques are precise, time tested & require reasonable amount of surgical skill for neck femur fixation. However, larger multicenter studies are needed for further evaluation of such procedure. Our results suggest that the outcome of femoral neck fractures seems to be highly correlated with the degree of dislocation of the initial fracture as well as any subsequent vascular damage, rather than the method of synthesis used. Therefore, we recommend performing the technique in which the surgeon is more expert.

Conclusion

The results of present study support the hypothesis that DHS is a better implant than CC screws in management of fracture neck femur in young adults in pauwels type II and III in terms of functional outcome but complication rate does not depend on the implant selection, however a longer follow up will consolidate these results.

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