

To Evaluate Functional Outcomes of Dynamic Hip Screw with Derotation Screw versus Cannulated Cancellous Screw in Basicervical Fracture Neck of Femur in Adults

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Abstract: Introduction: To Evaluate the Functional Outcome of Basicervical neck of femur Fractures treated with Dynamic Hip Screw (DHS) and derotation screw or cannulated cancellous screw alone. To evaluate the results of above procedures in terms of benefits and complications according to harris hip score. Methodology: Type of Study: Prospective analytic study. Study Place: Department of Orthopaedics, MaharanaBhupal Government hospital attached with Ravindranath Tagore Medical College, Udaipur. Duration of Study: December 2021 to November 2022. Patient Population: All patients with basicervical fracture of neck of femur who was require surgical treatment. Study was designed on CONSORT Guidelines. Inclusion Criteria: 1. Age 18 to 50 years. 2. Closed basicervical fracture neck of femur. 3. Patient giving informed consent to participate in the study. Exclusion Criteria: 1. Below 18 or above 50 years of age. 2. Compound fractures. 3. Infections, unsuitable skin condition like blebs, burns, and bedsores. 4. Inability to walk before the fracture. Result: In our study 60 fresh cases of closed basicervical fracture neck of femur (>18 yrs, either sex) were enrolled. In this study most of the patient about 60% were males & 40% were females. Thus 90% & 86.7% of the hips were classified as having a satisfactory to excellent result and 10.0% & 13.3% of the patients had a poor result for group A & B respectively. In our study total Harris hip score at the end of six months ranged from 41.4% to 100%. in our study 83.34% of patients returning to their premorbid ambulatory status and 96.4% of patients having good pain relief at six months of follow up. Conclusion: In our study blood loss, soft tissue trauma, duration of surgery & cost of treatment are more for the DHS group comparatively the CC group, but over all stability given by the DHS group superior than the CC group.

Keywords: DHS, CC, CONSORT, Basicervical, Harris HIP Score

1. Introduction

Fractures of the proximal femur are a significant cause of morbidity and mortality worldwide, especially in patients over the age of 50. 1 Overall, hip fractures in older adults are common, with femoral neck fractures accounting for 3.6% of all fractures. The treatment of a subset of these fractures, basicervical femoral neck fractures, is still controversial due to challenges in classification and limited evidence regarding treatment outcomes.

Basicervical fractures are relatively rare compared to other femoral neck fractures, accounting for only 1.8–7.6% of all hip fractures. There exists some heterogeneity in how basicervical fracture are defined, but one common definition is fractures of the base of the femoral neck that occur medially from the intertrochanteric line above the lesser trochanter. There is currently limited evidence regarding optimal implant choice for basicervical fractures. Implant choice has been proposed to depend on the extent of displacement, fracture configuration, physiological age and bone quality. Arthroplasty procedures are favored for older adults, as it may allow for earlier weight - bearing.

Traditionally, most intracapsular neck femur fractures in young adults have been treated with Cannulated cancellous screws (CCS) whereas inter trochanteric (extracapsular) fractures have been managed well in the past with the Dynamic Hip Screw (DHS). But since the basicervical fractures are an intermediate between them, so a controversy exists whether to use CCS or DHS for stabilization of these

fractures. Moreover, these fractures have long been considered to be inherently unstable which makes the ideal choice of implant for their fixation more difficult.

The recent surge in use of intramedullary devices for fixation of proximal femoral fractures has led some authors to investigate the use of cephalomedullary nails like the Proximal Femoral Nail (PFN) also in basicervical fractures.

Basal fracture neck of femur represents an intermediate form between femoral neck and inter trochanteric fractures these are more complicated in comparison to other type of proximal femur fractures. Two principal options exists either any kind of DHS with derotation screw or ccs alone.

Aim and Objectives

- 1) To Evaluate the Functional Outcome of Basicervical neck of femur Fractures treated with Dynamic Hip Screw (DHS) and derotation screw or cannulated cancellous screw alone.
- 2) To evaluate the results of above procedures in terms of benefits and complications according to harris hip score.

2. Materials and Methods

- 1) **Type Of Study:** Prospective analytic study.
- 2) **Study Place:** Department of Orthopaedics, Maharana Bhupal Government hospital attached with Ravindranath Tagore Medical College, Udaipur.
- 3) **Duration of Study:** December 2021 to November 2022.

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4) **Patient Population:** All patients with basicervical fracture of neck of femur who was require surgical treatment. Study was designed on CONSORT Guidelines.

5) **Inclusion Criteria**

- Age 18 to 50 years.
- Closed basicervical fracture neck of femur
- Patient giving informed consent to participate in the study.

6) **Exclusion Criteria**

- Below 18 or above 50 years of age.
- Compound fractures
- Infections, unsuitable skin condition like blebs, burns, and bedsores.
- Inability to walk before the fracture.
- High anaesthetic risk.

Initial management:

- Vital parameters were monitored
- Any associated limb, chest, abdominal and head injury were ruled out.
- Fluid replacement with intravenous route and intramuscular pain killer were given.
- A brief history regarding date of injury, any associated injury or disease was taken.
- A below knee traction was applied.

Pre operative preparation of the patient:

- Pre operative investigations including haemoglobin, total leucocytes count, differential leucocyte count, erythrocyte sedimentation rate, serum urea, serum creatinine, blood sugar level, chest X - ray and ECG was done as apart at pre anaesthetic preparation.
- Radiographs of the concerning hip in anteroposterior and lateral view as well pelvis with both hips in full internal rotation anteroposterior view were taken.
- The fracture was classified according to Pauwels and Garden's classification appropriate operation was chosen considering type of fracture, patient's age occupation and general condition.
- The limb was cleaned by povidine - iodine scrub and shaved from umbilicus to toe including genitalia on previous evening of surgery.
- One gram of ceftriaxone injection was given intravenously as a prophylactic antibiotic therapy.

Anaesthesia

Patient was given spinal/ epidural/ general anaesthesia according to patient's fitness and time required for surgery.

3. Operative Techniques

Close reduction and internal fixation

The patient taken in supine position on the fracture table. Close reduction done by Whitman's or Leadbetter's technique.

In Leadbetter technique the affected limb is fixed at the hip to 90 degrees with the thigh slightly rotated internally with the traction applied in the line with the femur. Then the limb

circumducted into abduction, maintaining the internal rotation, and is brought down to table level in extension. Reduction was evaluated under guidance of C arm. Then the foot tied to the foot plate with the extremity in only 15 to 20 degrees of abduction, neutral flexion and extension and firm internal rotation of approximately 20 degrees. This position places the head, neck and trochanter on a horizontal plane. Another technique for manipulation and closed reduction was described by Whitman. In this technique we had to apply traction on the limb in extension, followed by internal rotation in extension and abduction, followed by abduction and internal rotation. With the patient supine on the fracture table, the normal extremity is tied to the foot plate and fractured extremity is tied to the foot plate in an externally rotated position. Then it was abducted approximately 20 degree and enough traction was applied to region slightly more than normal length. The extremity was then rotated internally with the patella facing internally 20 to 30 degrees. The reduction was checked by image intensifier television. On the anteroposterior view, an anatomical position or a slight valgus relationship of the head and neck was accepted. On lateral view only slight variation from anatomical position were permitted.

Using a power drill, gradually advance a positioning guide wire. The telescoping wire guide was also used to direct the guide wire and minimize deflection. Confirm placement of the guide wire with image intensification; it had to be parallel to the anteversion wire in both anteroposterior and axial views. Remove the anteversion wire. If the bone was dense, predrill the lateral cortex with a 2 mm drill bit. Place the parallel guide over the positioning wire through one of the central diamond - patterned positioning holes. Adjust the position of the guide by replacing it over the positioning guide wire through one of the adjacent holes. Inserted a guide wire into the subchondral bone of the femoral head through each of the outer triangle placement holes. Removed the parallel guide and the positioning guide wire. Using the direct measuring device, determined the insertion depth of the three guide wires. To calculate drilling depth, subtracted 10 mm from the reading to prevent penetration of the joint. To calculate screw length, subtracted 5 mm to compensate for the 5 mm screw head that remains outside of the near cortex. In dense bone, placed a 4.5 mm cannulated drill bit and drill sleeve over the guide wire. To avoid drilling over the guide wire threads, drilled to the determined depth and confirm this by image intensification. Care taken not to direct the drill bit directly over the bone, but to let it follow the guide wire. Because of their hollow cross section and long length, cannulated drill bits were more prone to breakage than solid bits; use axial force, avoid bending, and advance the drill bit slowly to minimize the possibility of breakage. Passed the cannulated tap over the guide wire and tapping done the near cortex. In dense metaphyseal bone, it was necessary to tap over the entire nonthreaded portion of the guide wire. Selected a screw so that the thread engages only the opposite fragment. Using the cannulated screwdriver, inserted the large cannulated screw over the guide wire. Confirmed fracture reduction with image intensification. If necessary, used a washer to prevent the screw head from sinking into the near cortex. Removed and discarded the guide wire. Repeated the screw insertion technique for the remaining screws. To prevent loss of

reduction, drilling, tapping, and insertion of each screw before proceeding to the next. The wound was washed with povidine iodine solution. The wound was closed in layers. Povidine iodine dressing was done and compression was applied.

4. Results

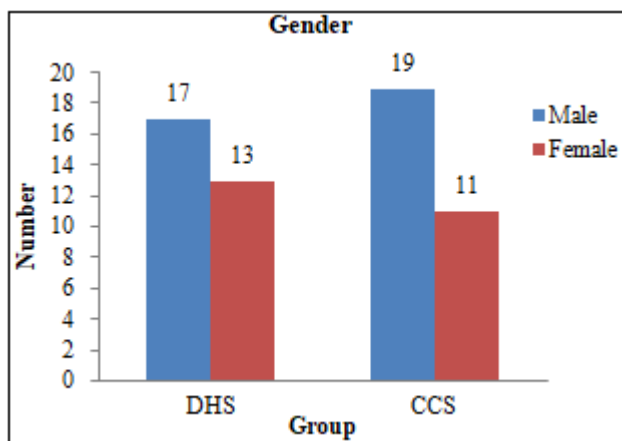
The following observations were made from the data collected during the study of treatment of fracture basicervical neck of femur in adult by using DHS with derotation screw & CC Screw alone in Dept of Orthopaedics, RNT Medical College, Udaipur (Raj).

Age & Sex Incidence

In our study Most of the patients were in the age group of 18 - 50 years with the mean age of 37.60 years for DHS with Derotation Screw group A and 38.70 years for Multiple Cancellous Cannulated Screw group B. In our series there were 17 male & 13 female patients in Group A and 19 male & 11 female patients in Group B, this shows preponderance of male over females.

Gender			Group		Total
			DHS	CCS	
Sex	Male	Count	17	19	36
		% within Group	56.7%	63.3%	60.0%
	Female	Count	13	11	24
		% within Group	43.3%	36.7%	40.0%
Total		Count	30	30	60
		% within Group	100.0%	100.0%	100.0%

	Value	df	P
Pearson Chi - Square	.278 ^a	1	.598
Fisher's Exact Test			.792



Harris Hip Score for Group A

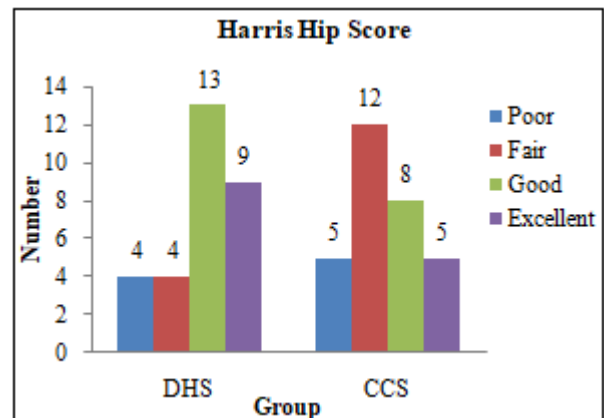
Out of 30 patients, 30.0% patients had excellent results, while 13.3 % patients had poor results.

Score	Frequency	%	Result
<69	4	13.3	Poor
70 - 79	4	13.3	Fair
80 - 89	13	43.3	Good
>90	9	30.0	Excellent
Total	30	100	-

Harris Hip Score for Group B

Out of 30 patients in group B, 16.66% patients had poor results while 16.7% patients had excellent result. 40.0% patients had fair outcome.

Score	Frequency	Percentage	Results
<69	5	16.66	Poor
70 - 79	12	40.0	Fair
80 - 89	8	26.66	Good
>90	5	16.7	Excellent
Total	30	100	-



5. Discussion

The treatment of displaced femoral neck fractures has been debated for many years. The main question during decision making is whether to fix or replace the femoral neck. Many recently published papers have shown that a primary total hip replacement is superior to internal fixation for the treatment of displaced femoral neck fractures when performed in a relatively healthy and mentally competent elderly patient. However, the optimal treatment for a young or adult patient under 50 years old is controversial, as the younger the patient is, the more the orthopaedic surgeon is obliged to pursue internal fixation.

Several studies have attempted to identify predictive factors of failure in femoral neck fracture treatment. There is little agreement among these studies regarding which fractures are more likely to fail because they analysed both displaced and nondisplaced fractures, different clinical and radiological factors, different implants for internal fixation, different weight - bearing times, and so forth.

Management of the fracture neck of femur is still a dilemma for orthopedic surgeon, and remains in many ways the unsolved fracture as far as treatment and results are concerned. Basal fracture neck of femur represents an intermediate form between femoral neck and intertrochanteric fractures these are more complicated in comparison to other type of proximal femur fractures.

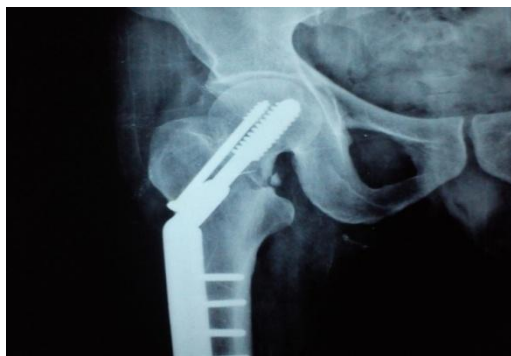
We conducted the present study of the management of the fracture Basicervical neck femur with DHS with Derotation Screw and CC Screw alone. Aims and objectives of the studies were, to compare the Functional Outcome of Basicervical neck femur Fractures treated with Dynamic Hip Screw (DHS) with derotation screw or cannulated cancellous

screw alone. To evaluate the results of above procedures in terms of benefits and complications.

It was hospital based prospective randomised study on patients with basicervical fracture of neck femur. 60 fresh cases of closed basicervical fracture neck of femur (>18 yrs, either sex) were included in this study.

All patients were divided randomly into 2 groups. Group A treated by DHS with Derotation screw & group B treated by CC screw alone.

Patients were discharged after 7 days & followup after 6 weeks, 3 months, 6 months & 9 months. The short term functional results were analyzed by using Harris hip scoring system at six months.



6. Conclusion

A review of literature on Basicervical fracture neck of femur has been presented. Its pertinent anatomy, traumatic and biomechanical principles has been reviewed. Thirty cases of the each group of fracture neck of femur who were treated include Internal fixation with DHS with Derotation screws & CC Screw alone have been presented. The follow up results are analyzed and discussed.

In our series total Harris hip score at the end of six months ranged from 41.4% to 100%. Thus 90% & 86.7% of the hips were classified as having a satisfactory to excellent result and 10.0% & 13.3% of the patients had a poor result for group A & B respectively.

The poor results in our series were due to slight to moderate pain in the hip or thigh and limp after Internal fixation and were found more commonly in patients who had backing out of the screws. We did not emphasised on exact parallel placement of screws in our study nor on the number of

screws, in spite of this satisfactory results were seen in our study which is also supported by other studies (E. M. Toh et al. and K. Guruswamy et al.)

The success of internal fixation no doubt depends on preoperative planning and proper attention to surgical details to achieve the optimum biomechanical conditions.

In conclusion, Osteosynthesis with DHS with Derotation screw & CC screws alone fixation provides the patient a healed fracture with a living femoral head that is always better than a replacement; this can be achieved for a majority of patients with a procedure that is less invasive than arthroplasty. In patients who have treatment failure, total joint replacement or hemiarthroplasty can still be performed with results as good as or better than those of primary hemiarthroplasty.

Though the blood loss, soft tissue trauma, duration of surgery & cost of treatment are more for the DHS group comparatively the CC group, but over all stability given by the DHS group superior than the CC group. So patients who were treated by DHS with Derotation screw discharged early than the CC screw group, so chances of bedridden complications has been decreased

References

- [1] Johnell, O, Kanis, JA. An estimate of the worldwide prevalence, mortality and disability associated with hip fracture. *Osteoporos Int* 2004; 15: 897–902.
- [2] Papadimitriou, N, Tsilidis, KK, Orfanos, P, et al. Burden of hip fracture using disability - adjusted life - years: a pooled analysis of prospective cohorts in the CHANCES consortium. *Lancet Public Health* 2017; 2: e239–e246.
- [3] Guo, J, Dong, W, Jin, L, et al. Treatment of basicervical femoral neck fractures with proximal femoral nail antirotation. *J Int Med Res* 2019; 47: 4333–4343.
- [4] Watson, ST, Schaller, TM, Tanner, SL, et al. Outcomes of low - energy basicervical proximal femoral fractures treated with cephalomedullary fixation. *J Bone Joint Surg Am* 2016; 98: 1097–1102.
- [5] Su, EP, Su, SL. Treatment options for displaced femoral neck fractures in the <60 - year - old, active patient. *Semin Arthroplasty* 2016; 27: 55–59.