

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

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ABSTRACT

Introduction: Traditionally femoral neck fractures are treated with CC screws and intertrochanteric fracture are being treated with DHS screw. Basicervical fracture are in between of them so there is controversy that whether these fracture should be treated with DHS or CC screws. Objective: To compare the outcome of basicervical neck femur fractures treated with Dynamic Hip Screw (DHS) with derotation screw or cannulated cancellous screw alone.

Material and Method: Group A was treated with standard Dynamic Hip Screw (DHS) with one cancellous cannulated screw of 6.5 mm as derotation screw and group B was treated with standard multiple cancellous cannulated screw of 6.5 mm as used in standard neck femur osteosynthesis. Each group was having 30 patients.

Result: Out of 30 patients in group A, 86.66% showed fair to excellent result while in group B 83.33% patients showed fair to excellent result. So DHS group has slightly better result than CC screw group. DHS group has significantly less (13.33%) complication rate than CC screw group (33.33%) specially none of patient in DHS group has nonunion while 3(10%) cases in CC screw has nonunion.

Interpretation: Keeping in mind, early weight bearing, lesser hospital stay, less number of complications and a better Harris hip score as compared to CC screw group, we recommend DHS with derotation screw as a better and more stable implant for treatment of basicervical fracture neck femur.

Keywords: Dynamic Hip Screw, Cannulated Cancellous Screw, Derotation Screw, Basicervical Fracture.

fracture.

There are only few studies has been published for the comparison of above two method, so aim of the study was to compare the functional outcomes of DHS with derotation screw and CC screw alone for the treatment of fracture of basicervical neck femur.

MATERIAL AND METHODS

Subjects

The present study was a hospital based prospective randomised study on patients with basicervical fracture of neck femur admitted in department of orthopaedics, RNT Medical College and MBG Hospital during January 2013 to December 2014. Patients reported with Closed basicervical fracture neck of femur and who were ready to give informed consent for study were included in the study. Patients with compound fractures, infections, unsuitable skin condition like blebs, burns, and bedsores, inability to walk before fracture, and high anesthetic risk were excluded from study. The study protocol was approved by the institutional ethical review board.

Material

Patients were allotted in two groups on random number basis. Each group was having 30 patients.

Group A was treated with standard Dynamic Hip Screw (DHS) with one cancellous cannulated screw of 6.5 mm as derotation screw (Figure-1)

Group B was treated with standard multiple cancellous cannulated screw of 6.5 mm as used in standard neck femur osteosynthesis (Figure-2).

Procedure

After initial resuscitations, demographic data, medical history, radiologic investigation findings, physical examination findings including vital physiological parameters were assessed prior to enrollment. Radiographs of the concerning hip in anteroposterior and lateral view as well pelvis with both hips in full internal

INTRODUCTION

Basal fracture neck of femur represents an intermediate form between femoral neck and intertrochanteric fractures. Parker et al¹ defined basal fracture femoral neck in which the line runs along the line of the anterior attachment of the capsule. This area is a transition zone between intracapsular femoral neck and extracapsular intertrochanteric fracture.² This raises the question of whether a basilar femoral neck fracture, from the point of view of fixation, should be considered a high intertrochanteric or a low transcervical femoral neck fracture.

Traditionally femoral neck fractures are treated with CC screws and intertrochanteric fracture are being treated with DHS screw. But as these kind of fracture are in between of them so there is controversy that whether these fracture should be fixed with DHS with derotation screw or cancellous screws alone. DHS with derotation screw comprises multiplicity of the screws, usually required for rotational stability of neck fracture and sliding capacity, which is required for impaction of trochanteric

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rotation anteroposterior view were taken. One gram of ceftriaxone injection was given intravenously as a prophylactic antibiotic therapy. Patient was given spinal/ epidural/ general anaesthesia according to patient's fitness and time required for surgery. The patient was taken in supine position on the fracture table. Close reduction done by Whitman's³ or Leadbetter's⁴ technique.

DHS with derotation screw or CC screw was done as per standard technique described in literature according to allotted group. Ten doses of prophylactic injectable antibiotics were administered starting from the first injection the night before surgery followed by oral antibiotics for 1 week.

After Treatment

Initially antibiotics and analgesics were given round the clock parenterally. Sitting with support, quadriceps exercises and knee bending was initiated on the second day. The suction drain was removed after 48 hrs and patient discharged with advice for above exercises and to sit with or without support. Stitches were removed on the 14th post operative day.

Non weight bearing mobilization was initiated on the second day whereas patient weight bearing was started depending upon the type of fracture, reduction and fixation achieved. Patients were the regularly followed up clinically as well as radiologically.

Follow up protocol

Patient was followed up at monthly interval. In further follow up, patient was evaluated clinico-radiologically. If the fracture site showed evidence of union the patients was gradually allowed to sit at the corner of bed and to start knee bending exercises. When good control of quadriceps obtained the patient was trained for four point gait with help of crutches. We proceeded in sequence from two crutches to one crutch or one cane and continue it as long as the patient needed it. Up to six months patient was followed at monthly interval.

Evaluation at final follow up

In radiological assessment we observed for union, avascular necrosis, coxa vara, absorption of neck of the femur, implant failure and osteo-arthritis changes.

Though a lot of assessment systems are available, we adopted modified Harris Hip Score⁵ for assessment of our results. The results were classified excellent, good, fair or poor according to points obtained as follows:

Excellent: HHS between 90-100, Good: HHS between 80-89, Fair: HHS between 70-79, Poor: HHS less than 70.

STATISTICAL ANALYSIS

Microsoft office 2007 was used to make tables. Descriptive statistics like mean and percentages were used to infer results.

RESULTS

It was a prospective study between the management of fracture basicervical neck of femur by DHS + CC screw(group A) and CC Screw alone(group B). Total of 30 patients were studied in each group with mean age of 54.66 years for group A and 51.33 years for group B. Most common mode of injury was history of fall. Most of the patients achieved union at the end of study except 3 patients in CC screw group got nonunion. The mean Duration of surgery for Group A was 62.6 mins and for group B was 51.3 mins. The average amount of blood loss in group A was around 150 ml and in group B was around 75 ml.

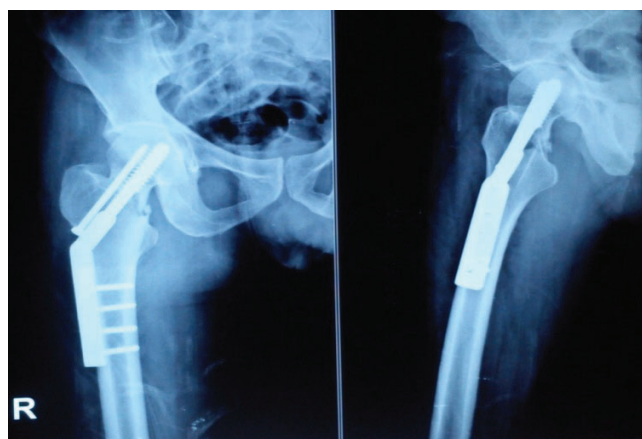


Figure-1: DHS with derotation screw (Group I)



Figure-2: Multiple cancellous screw fixation (Group II)

Complications	DHS+CC(Total30)	CC Screw(Total30)
Backout of Screw	2(6.67%)	4(13.33%)
Screw penetration	1(3.33%)	2(6.67%)
Non union	0	3(10%)
Osteonecrosis	1(3.33%)	1(3.33%)
Total	4(13.33%)	10(33.33%)

Table-1: Complications

Average time taken by fracture to unite in DHS group was 13.1 week and in CC screw group it was 14.5 weeks. Patients were made to walk with partial weight bearing after six weeks in CC group and 3 weeks in DHS group, while full weight bearing allowed at 9-12 weeks in CC group and 6 weeks in DHS group (with considering the clinical and radiological status of each individual patients).

DHS group has significantly less (13.33%) complication rate than CC screw group(33.33%) specially none of patient in DHS group has nonunion while 3 (10%) cases in CC screw has nonunion (Table-1).

Out of 30 patients in each group, 86.66% showed fair to excellent result in group A while 83.33% patients in group B showed fair to excellent result. So DHS group has slightly better result than CC screw group (Table-2).

DISCUSSION

The treatment of femoral neck fractures has been debated for many years. The main question is whether to fix or replace the

Modified Harris Hip Score ⁴	Method of fixation		Total
	DHS with derotation screw	CC Screws	
Excellent (90-100)	8(26.67%)	4 (13.33%)	12 (20%)
Good (80-89)	7(23.33%)	8 (26.67%)	15 (25%)
Fair (70-79)	11 (36.67%)	13 (43.33%)	24 (40%)
Poor (less than70)	4(13.33%)	5 (16.67%)	9 (15%)
Total	30 (100%)	30 (100%)	60 (100%)

Table-2: Final Results

femoral neck. Many published papers have shown that a primary hip replacement is superior to internal fixation for the treatment of femoral neck fractures when performed in a relatively healthy and mentally competent elderly patient. However, the treatment for patient under 70 years old is controversial, as the younger the patient is, the more the surgeon is obliged to pursue internal fixation. Internal fixation are association with high rates of failure due to loss of fixation, osteonecrosis, and nonunion but the patient has the chance of regaining his physiologically normal hip. Tronzo et al⁶ identified more than 100 different available implants for osteosynthesis of femoral neck fractures. However, if a surgeon chooses osteosynthesis, he must choose between two techniques: multiple cannulated cancellous screws (CC screw) or a dynamic hip screw (DHS). Management of the fracture neck of femur is still a dilemma for orthopedic surgeon, and remains unsolved fracture as far as treatment is 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.

It was prospective randomised study on patients with basicervical fracture of neck femur. 60 fresh cases of closed basicervical fracture neck of femur (>20 yrs, either sex) were included in this study. All patients were divided randomly into 2 groups. Group A treated by DHS with Derotation screw and group B treated by CC screw alone.

Most of the patients in our study in both the groups were between 50-70 years. In this study about 65% were males and 35% were females. There was no significant difference in gender of patients in this study in both the groups. But most of the patient had history of fall in both the groups. Factors responsible for this was reported by Cummings and Nevitt⁷ in 1994 are inadequate protective reflexes, diminished soft tissue shock absorbers e.g. muscle and fat, inadequate bone strength at the hip account of osteoporosis or osteomalacia.

Average hospital stay for DHS group was 14.6 days while in CC group was 17.56 days. Patients who developed complications such as wound infection, bedsores, uncontrolled medical problems etc., in the postoperative period had to stay longer in the hospital. All the patients in our series could go home within 3 weeks after surgery

In our study there were less complication who were treated with DHS with derotation screw in comparison to treated by CC screw alone. In group A there were 2 superficial infection and 1 deep infection and in group B 2 superficial infection and no deep infection. In group A, 2 cases of screw backout were noted while 4 cases of screw backout were noted in group B. 1 case of screw penetration was noted in A group and 2 cases were noted in group B. Out of 60 cases 2 cases developed Osteonecrosis one in each group.

3 (10%) cases went to nonunion in CC group while none in the DHS group. Nonunion was probably due to improper implant fixation and early weight bearing in CC group. It is comparable to incidence by KBL Lee et al⁸ and E.M. Toh et al⁹ studies but far less than K Guruswamy et al¹⁰ study however it was more than reported by J.S. Nagakumar et al.¹¹

The distance patient could walk with or without support and the amount of movements at the hip joint are the major factors affecting results in western studies but ability to squat and sit cross legged are major factors affecting results in Indian studies. Final results at 6 months after operation in our series were analysed by modified Harris hip scoring system.⁵ Majority of our patients had good pretreatment functional status: 97% were independent in their activity of daily living, one patient (3%) was independent with walking device. Aim of surgery was to return them to preoperative function.

Osteosynthesis with DHS with Derotation screw and CC screws preserve a living femoral head that is better than a replacement, furthermore these procedures are less invasive than arthroplasty. Total joint replacement or hemiarthroplasty can be performed with similar results if osteosynthesis fails.

In our series total Harris hip score at the end of six months ranged from 41.4% to 100%. Thus 86.7% and 83.34% of the hips were classified as having a fair to excellent result and 13.3% and 16.6% of the patients had a poor result for group A and B respectively.

The poor results in this series were due to mild 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.⁹ and K. Guruswamy et al.¹⁰)

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

CONCLUSION

In conclusion, osteosynthesis with DHS with derotation screw and CC screws alone fixation preserve living femoral head that is better than a replacement.

Though the blood loss, soft tissue trauma, duration of surgery and cost of treatment are more in the DHS group than the CC screw group, but keeping in mind, the early weight bearing, lesser number of complications specially nonunions and a better Harris hip score as compared to CC screw group, we recommend DHS with derotation screw as a better and more stable implant for treatment of basicervical fracture neck femur.

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