

Original Research Article

# Primary total hip arthroplasty versus hemiarthroplasty for displaced neck femur fractures in older patients

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## Abstract

**Background:** Hip fractures in older patients are associated with impaired mobility, excess morbidity and mortality, and loss of independence.

**Objectives:** To determine whether total hip arthroplasty is associated with lower reoperation rates, mortality, and complications, and better function and quality of life than hemiarthroplasty for displaced fractures of the femoral neck in older patients.

**Materials and methods:** We prospectively as well as retrospectively studied 46 patients treated with total hip replacement or hemiarthroplasty. Pain, range of motion, hip function, Harris hip score and complications were assessed clinically while hip stability, femoral anteversion, acetabular cup inclination and acetabular erosions were assessed radiographically.

**Results:** In our study according to Harris hip score, group A (hemiarthroplasty group) showed 58.33% excellent to good result whereas 33.34% shows fair to poor result. In group B (total hip replacement group) 90.91% showed excellent to good result and 9.08% showed fair to poor result. In this study, the overall Harris hip score was 76.33 with SD±19.091 in hemiarthroplasty group and 86.45 with SD±6.363 in Total hip replacement group with p-value 0.0224(<0.05).

**Conclusion:** So we concluded in our one year of study that total hip replacement had better functional outcome in fracture neck of femur in elderly treated by either hemiarthroplasty or total hip replacement and total hip replacement is less painful than hemiarthroplasty.

## Key words

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Primary total hip arthroplasty, Hemiarthroplasty, Displaced neck femur fracture, Old patient.

## Introduction

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Hip fractures in older patients are associated with impaired mobility, excess morbidity and mortality, and loss of independence. With the reversing ageing pyramid and the high prevalence of osteoporosis, hip fractures remain a public health concern. Incidence estimates vary considerably among industrial countries [1-3]. Models aimed at projecting the contribution of hip fractures to the future global burden of disease produced inconclusive results [4], and depended on assumptions about the effectiveness of multifaceted interventions for preventing falls and managing osteoporosis [5-8].

The optimal surgical management of displaced femoral neck fractures in the elderly is the subject of an ongoing scientific and clinical debate. Hemiarthroplasty and total hip arthroplasty remain as widely accepted methods of hip replacement after fracture. In the long run some patients treated with Hemiarthroplasty require conversion to total hip arthroplasty because of activity limiting thigh pain due to acetabulum wear. Reported advantages of Hemiarthroplasty compared with total hip arthroplasty are reduced dislocation rates, less complex surgery, shorter operation times, less blood loss, and lower initial costs. Therefore, a number of authors prefer for displaced femoral neck fractures. In contrast, evidence is accumulating to support better function and superior patient satisfaction for Hemiarthroplasty patients treated with total hip arthroplasty. Consequently, after weighing the pros and cons other authors advocated total hip arthroplasty as preferable treatment.

## Aim and objectives

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A comparative analysis to evaluate the outcome of fracture neck femur in old age managed with hemiarthroplasty or total hip replacement.

## Materials and methods

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The study was conducted at a tertiary care hospital from August 2011 to July 2012. In this study 46 arthroplasty cases of the hip were performed. Out of these 46, 24 cases (16 female and 8 male) underwent hemiarthroplasty and 22 cases (14 female and 8 male) underwent total hip replacement.

All the patients with displaced fracture neck of femur of more than 60 years age will be managed with total hip replacement or hemiarthroplasty will be evaluated according to, age, sex, type of fracture, date of injury, mode of injury, time interval between injury and hospital presentation, details of primary treatment received, details of present illness, details of any comorbid illness, significant past history, significant personal history and family history. preoperative patients bone status was assessed by Singh's index [9] and C-C ratio [10]. Patients of both the group followed up at third, sixth and twelfth month.

Functional outcomes of both the group assessed by Harris hip score [11, 12], Pain and functional capacity were the two basic consideration. They were given 44 and 47 points for each respectively. Other two was the range of motion (5 points) and deformity (4 points). Then the data was analysed with the appropriate statistical methods. Chi Square test and Two Sample Proportion Tests were used to calculate the *P* value. Tests were considered significant if *P* values were less than 0.05.

## Results

Mean age of total hip replacement group was 71 (range 60 to 85 years) as compared to 72 (range 64 to 82 years) of hemiarthroplasty group ( $p=0.46$ ). In total hip replacement group 63.63% were females and 36.37% were males while in hemiarthroplasty group females were 66.67% and males were 33.33%. According to type of fracture. In hemiarthroplasty group 2 cases (8.33%) were garden type II, 14 cases (58.33%) type III and 8 cases (33.33%) of type IV, while In total hip replacement group 12 cases (54.54%) were garden type III and 10 cases (45.46%) of type IV. 42 cases (91.30) out of 46 had anemia followed by lung congestion and hypertension 8 cases (17.39%) each and these preoperative problems were equally distributed in both the groups. With preoperative radiography, bone quality was assessed by Singh's index and grouped into normal, borderline and osteoporosis. About 54.54% were normal to borderline and 45.46% were mild to moderate osteoporosis in total hip replacement group. In hemiarthroplasty group 58.33% were normal to borderline and 41.67% were mild to moderate osteoporosis (**Table - 1**). Both groups were comparable regarding their age, gender, type of fracture and associated medical illness. Thus there was no confounding factor as far as demographic characteristics are concerned.

In this study group A (Hemiarthroplasty group) showed mean Harris pain score is 36.75 with  $SD\pm 9.899$  whereas mean Harris pain score for group B (total hip replacement) was 41.27 with  $SD\pm 2.828$  and the t-score is -2.0641 and the p-value was 0.0449 ( $<0.005$ ), it showed that total hip replacement was less painful than hemiarthroplasty group. All the component pain, function, deformity and range of motion aggregated and form Harris hip score with maximum of 100 points. In our study group A (hemiarthroplasty group) showed 58.33% excellent to good result whereas 33.34% shows fair to poor result. In group B (total hip replacement group) 90.91% showed excellent to good result and 9.08% shows fair to poor result

(**Table – 2, Figure - 1**). In this study, the overall Harris hip score was 76.33 with  $SD\pm 19.091$  in hemiarthroplasty group and 86.45 with  $SD\pm 6.363$  in Total hip replacement group ( $p$ -value= 0.0224).

**Table – 1:** Baseline characteristics.

Characteristics	Hemiarthroplasty	Total hip replacement
No. of cases	24	22
Mean age (in years)	71	72
<b>Sex</b>		
Males	33.33%	36.37%
Females	66.67%	63.63%
<b>Side</b>		
Right	51.33%	54.54%
Left	48.67%	45.46%
<b>Type of fracture</b>		
Garden type II	8.33%	-
Garden type III	58.33%	54.54%
Garden type IV	33.33%	45.46%
<b>Mode of injury</b>		
Slipping on ground	51.33%	54.54%
Road traffic accident	48.67%	45.46%
<b>Bone quality(Singh's index)</b>		
Normal (grade 5 & 6)	33.33%	36.36%
Borderline (grade 4)	25.00%	18.18%
Mild (grade 3)	37.50%	31.82%
Moderate (grade 2)	4.17%	13.64%

Four superficial infection were present in hemiarthroplasty group and two superficial infection present in total hip replacement group. One dislocation present in total hip replacement group and no sciatic nerve palsy found in any group (**Table - 3**).

## Discussion

Because of elderly age and post-menopausal hormonal changes, females are more prone for

osteoporosis than males and so the fracture incidence was also high in female in this series of study. Surgery should be inserted as soon as the patients had the fracture, unless Immobility due to fracture if prolonged, will have its own

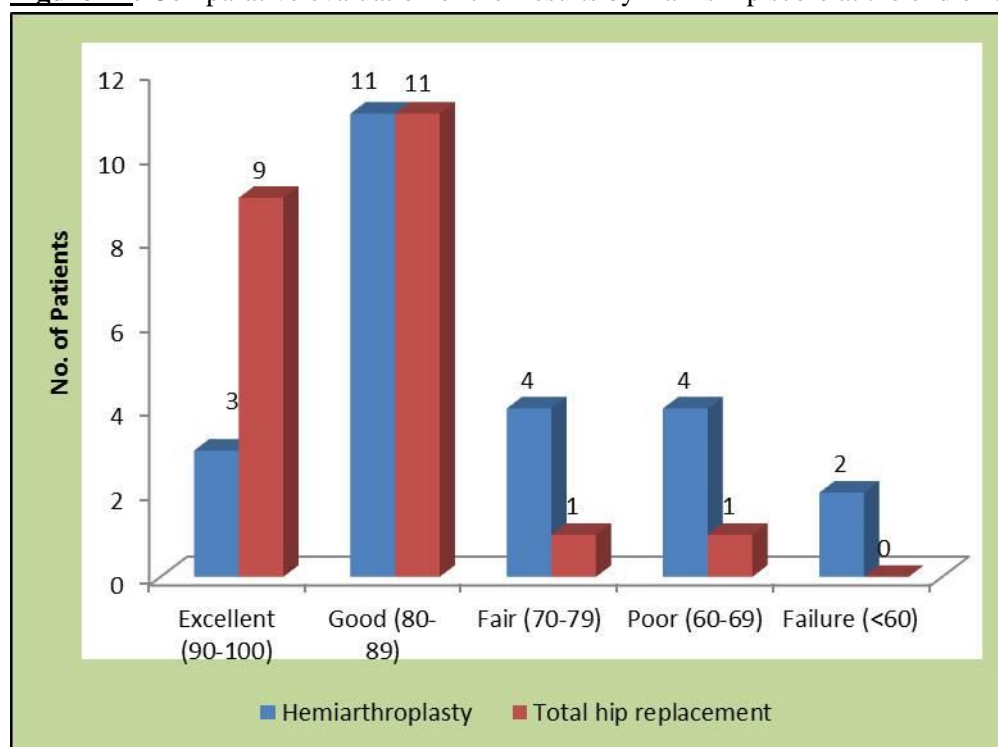
complications like bed sore, lung infection, decreased vitality etc., which may further delay the surgery and thus may go into the vicious cycle.

**Table - 2:** Comparative evaluation of the Results by Harris hip score at the end of one year.

No.	Grading	Hemiarthroplasty	Total hip replacement	Total	%
1.	Excellent (90-100)	3 (12.5%)	9 (40.91%)	12	26.09
2.	Good (80-89)	11(45.83%)	11 (50.00%)	22	47.83
3.	Fair (70-79)	4 (16.67%)	1(4.54%)	5	10.87
4.	Poor (60-69)	4(16.67%)	1 (4.54%)	5	10.87
5.	Failure (<60)	2(8.33)	-	2	4.35

t-score-(-2.3669), p-value-0.0224

**Figure - 1:** Comparative evaluation of the Results by Harris hip score at the end of one year.



Numerous studies [13-15] have addressed comparative evaluation of total hip replacement group to hemiarthroplasty group in fracture neck of femur in older age group. In this study the mean Harris hip score was 76.33 with SD±19.091 in hemiarthroplasty group and 86.45 with SD±6.363 in Total hip replacement group with p-value 0.0224(<0.05) and compared well with most other studies [16-20]. Skinner P, et al. [16] perform a prospective trial of 278 patients aged over 65 years, for the treatment of displaced

subcapital fractures found that Total hip replacement resulted in the least pain and most mobility at 1 year, while hemiarthroplasty was worst in these respects. Macaulay W, et al. [17], perform a study over 41 Patients found that Total hip arthroplasty is less painful at 12 months compared with hemiarthroplasty in treatment of displaced femoral neck fracture. Blomfeldt R, et al. [18], performed a four-year follow-up of a randomized controlled trial involving 120 elderly patients with an acute displaced femoral neck

fracture and confirm the better results in terms of hip function and quality of life after total hip arthroplasty as compared with hemiarthroplasty. Other studies like Cho M-R, et al. [19], Ravikumar, et al. [20] found the similar results. In our study we evaluated that the patients with associated medical illness had poor results and had more complication, similar result found by the Nera agabeti, et al. [21], but in our study as for the rate of complications was concerned we

could not found any significant difference between these two groups. Due to no case of sciatic nerve palsy with all cases done with same posterior approach, exact comparison with other studies could not be done. As in the present series there is only one dislocation or subluxation postoperatively in total hip replacement group, we could not correlate the degrees of restoration of femoral and acetabular angles and complication in terms of dislocation.

**Table - 3:** Comparative evaluation of immediate and late complication.

S.n.	Complications	Hemiarthroplasty	Total hip replacement	Total	%age
<b>1.</b>	<b>Immediate</b>				
(a)	Hematoma	2 (8.33%)	1(4.54%)	3	6.52
(b)	Respiratory problem	2 (8.33%)	1(4.54%)	3	6.52
(c)	Wound gaping	1 (4.16%)	1(4.54%)	2	4.34
(d)	Infection	4 (16.67%)	2(9.09%)	6	13.04
(e)	Sciatic Nerve palsy	0	0	0	0
<b>2.</b>	<b>Late</b>				
(a)	Painful hip	6 (25.00%)	2(9.09%)	8	17.39
(b)	Stem loosening	1 (4.16%)	1 (4.54%)	2	4.34
(c)	Late infection	4(16.67%)	1(4.54%)	5	10.87
(d)	Acetabular erosion	2 (8.33%)	-	2	6.52
(e)	Dislocation/subluxation	-	1(4.54)	1	2.17
(f)	Restricted ROM	4 (16.67%)	2 (9.09%)	6	13.04
(g)	Prosthetic removal	-	-	-	-

The results of the study should be interpreted in view of the following limitations. Due to the constraints of a time bound study and because of the stringent selection criteria, the sample size was small and hence the results are subjected to Type II error and they cannot be generalize.

### Conclusion

We concluded in our one year of study that total hip replacement had better functional outcome in fracture neck of femur in elderly treated by either hemiarthroplasty or total hip replacement and total hip replacement is less painful than hemiarthroplasty. The complications are correlated with time durations since surgery which shows proportional increase in complication with time.

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