



## Functional Outcome of Total Hip Replacement vs Hemiarthroplasty in Fracture Neck of Femur: A Prospective Study

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### Abstract

Fracture neck of femur remains an unsolved problem worldwide. There is no single uniformly accepted treatment for all types of fractures for all age groups. The annual incidence of fracture's as per US annual report is 201 and 197 in men and 511 and 553 in women per 100 000 population. With the improvement in living standards and health care facilities world over, the life expectancy is going high and so is the economic burden of geriatric fractures. For old age patients of fracture neck of femur, there is more or less consensus that it should be treated by prosthetic replacement of the head but controversy remains on the issue, whether one opts for a hemiarthroplasty or a total hip arthroplasty, each procedure has its proponents. Hence, this prospective study to compare results of two procedures was undertaken in Govt. Medical College Jammu from January 2014 to December 2017. Study included 90 patients of displaced fracture neck femur in more than 60 years age, divided in two groups A and B. Each group had 45 patients, group A patients underwent a total hip replacement and group B hemiarthroplasty. Patients were followed up for average 26.5 months in group A and 25.6 months in group B. The final functional results were evaluated as per HARRIS HIP SCORE. The average pain score of Group A was 40.2 and Group B 39.1, the average functional score of Group A was 38.0 as compared to 34.0 of Group B. Average range of motion was good in both groups in 82 and 71 percent of patients. The average HARRIS HIP SCORE was 89.4 in Group A and 84.4 in Group B, a significant point in favor of Total hip replacement, although rate of general complications, dislocations, blood loss, OT time was higher in Group A. We concluded that THR is a better choice than hemiarthroplasty but should be done in patients with longer life expectancy, good socioeconomic strata, active pre-injury status and high demand patients.

**Keywords:** Total Hip arthroplasty-Hemiarthroplasty-Fracture neck of Femur-Harris hip score.

### Introduction

Fracture neck of femur in elderly is associated with painful mobility, excessive morbidity and

mortality (Carpintero *et al.*, 2014). With the reversal of aging pyramid, osteoporosis, fragility of old age, the incidence of hip fractures is on the

rise, and therefore need for a more definitive early surgery to ensure these patients a painless immediate mobilization and make them ambulatory (Lems and Raterman, 2017, Mahishale, 2015). There is more often a consensus on the need of a prosthetic replacement in such patients but opinion differ on to the choice of total hip arthroplasty vs hemiarthroplasty (Marya et al., 2008). The present study was undertaken in Govt. Medical College Jammu, to compare the final functional results of two procedures in our region. The advantages of total hip replacement include long life of the implant, less chances of revising the surgery thereby addressing the high demand patients with longer life expectancy (Derar and Shahinpoor, 2015). There is a big percentage of patients who are already in late seventies, eighties or even more, and are usually weak, fragile, low demand, low life expectancy with compromised cardiopulmonary status, belonging to poor socio economic group (WHO, 2015). For these patient's a lesser invasive surgery like hemiarthroplasty will certainly be helpful. In this study both the procedures were done randomly and various patient related factors were also compared to enhance our understanding in our setup.

### Material and Methods

The study included 90 cases of Gardens Type III and IV femoral neck fractures in patients more than 60 years of age. Total hip replacement was in 45 patients (Group A) and Hemiarthroplasty in other 45 cases (Group B).

### Inclusion Criteria

1. Age more than 60 years.
2. Type Gardens III and IV.
3. Preinjury status ambulatory.
4. Consent for surgery and publication given.

### Exclusion Criteria

1. Age less than 60 years.
2. Non ambulatory bed ridden patients.
3. Pathological fractures, confirmed by CT or CT guided FNAC (optional)
4. Not fit for anaesthesia medically

5. Does not agree for publication.

### Procedure

Two pints of blood were arranged after proper grouping and cross matching. All the haematological, biochemistry and radiological investigations were done and Cardiac clearance was obtained routinely.

Prophylactic shot of antibiotic (Cefuroxime 1.5 gm) was administered half an hour before the surgery. Patient's were placed in strict lateral position and draped for major hip surgery. Hip was exposed through standard lateral approach as described by Hardinge (1982). Femoral head removed from acetabulum, size measured and sent for histopathology. Acetabulum cleared of all soft tissues, cartilage and prepared for seating the cup in case of THR. Neck cut made saving  $\frac{3}{4}$ " of calcar, medullary canal prepared with the braches, packed with saline soaked ribbon guaze (Itokazu *et al.*, 1997). Complete haemostasis ensured in acetabulum and high density polymer cup fixed in proper inclination and anteversion using bone cement. Trial stem with trial head used to check stability, ROM and limb length accuracy. Trial components replaced by original implant. In case of Hemiarthroplasty steps are same except acetabulum is not replaced. Wound closed in layers, 16 gaze suction drain put and A/S dressing done. Post op static exercises were encouraged and drain was removed after 24 hours. ROM exercises were started and the made to stand third day onwards depending upon patient's individual response. Stitches removed at two weeks, and chest X-ray taken and patient called for follow up on monthly basis or SOS.

**Observations****Table 1** Age Distribution

Sr.no.	Age Groups In Years	Number of cases		Percentage	
		Group A	Group B	Group A	Group B
1.	60-70	28	8	62.2%	17.7%
2.	70-80	16	30	35.5%	66.6%
3.	80-90	1	7	2.3%	15.7%
4.	>90	0	0	0	0

\*Maximum number of cases in group A (62.2%) fall in age group of 60-70 years, mean age 69 yrs.

\*Maximum number in group B (66.6%) falls in 70-80years, age group and mean age 74.7 yrs.

**Table 2:** Sex Distribution

S.No.	SEX	Number of Cases		Percentage	
		Group A	Group B	Group A	Group B
1.	MALE	25	27	55.5%	60%
2.	FEMALE	20	18	44.4%	40%

\*overall percentage of Males in two groups was 57.8% and Females was 42.2%.

**Table 3:** Type of Fracture

Type	Number of Cases		Percentage	
	Group A	Group B	Group A	Group B
Gardens IV	37	31	82.3%	68.8%

\*Type IV was common in both groups.

**Table 4:** Surgical Time

Time in Minutes	No. of Cases		Percentage	
	Group A	Group B	Group A	Group B
30-60	0	5	0	11.2%
60-90	5	28	11.2%	62.2%
90-120	40	12	88.8%	26.6%

\*Mean surgical time for Group A was 116 min while for Group B was 75 min

**Table 5:** Blood Loss

Blood loss in ml	Number of Cases		Percentage	
	Group A	Group B	Group A	Group B
100 – 200 ml	0	0	0	0
200 – 300 ml	0	12	0	26.7%
300 – 400 ml	4	18	8.9%	40%
400 – 500 ml	27	10	60%	22.2%
>500 ml	14	5	31.1%	11.1%

- Average blood loss in Group A 467.7 ml and in Group B 367.7 ml.

**Table 6:** Follow Up

Duration in Months	Number of cases		Percentage	
	Group A	Group B	Group A	Group B
12 – 18	10	8	22.2%	17.3%
18 – 24	13	11	28.8%	24.4%
24 – 32	16	12	35.5%	26.6%
32 – 42	6	14	13.5%	31.7%

\*Average Follow up in Group A 26.5 months, Group B 25.5 months

**Table: 7** Pain Score

Grade	Points (Maximum points 44)	Number of cases		Percentage	
		Group A	Group B	Group A	Group B
None	44	22	17	48.8%	37.5%
Slight	40	18	20	40%	44.5%
Mild	30	4	5	8.9%	11.1%
Moderate	0	1	3	2.3%	6.7%
Marked	0	0	0	0	0
Totally disabled	0	0	0	0	0

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Average Pain Score: Group A 40.2 and Group B 39.1

**Table 8:** Functional Score

Points	Number of cases		Percentage	
	Group A	Group B	Group A	Group B
47 – 37	22	20	48.8%	44.5%
36 – 26	20	18	44.5%	40.0%
25 – 15	3	4	6.7%	8.9%
Below 15	0	3	0	6.6%

\*Mean Functional Score in Group A = 38.0 and Group B = 34.0

**Table 9 :** Range of Motion

Degrees	Points	No. of Cases		Percentage	
		Group A	Group B	Group A	Group B
300 -210	6	15	14	33.3%	31.2%
209 – 160	5	22	18	48.8%	40%
159 – 100	3	5	7	11.1%	15.5%
99 – 60	2	2	4	4.5%	8.8%
59 – 30	1	1	2	2.3%	4.5%
29 – 0	0	0	0	0	0

Group A 82 % had good ROM ( 180-280), Group B 71% had good ROM( 170-260).

**Table 10:** Harris Hip Score

Result	Points	Number of Cases		Percentage	
		Group A	Group B	Group A	Group B
Excellent	90 – 100	8	6	17.7%	13.3%
Good	80 – 89	32	30	71.1%	66.7%
Fair	70 – 79	5	6	11.2%	13.3%
Poor	< 70	0	3	0	6.7%

Average Harris Hip Score : Group A 89.4 and Group B 84.4.

**Table 11: Complications**

Complications	Number of cases		Percentage	
	Group A	Group B	Group A	Group B
Redundant Cement	2	1	4.5%	2.3%
Dislocation hip	2	0	4.5%	0
Infection superficial	4	3	8.8%	6.9%
DVT	1	0	2.3%	0
Hypotension	3	0	6.9%	0

## Discussion

Results of fracture neck of femur are unpredictable because of certain inherent qualities like precarious blood supply, the temponaud effect of haematoma, inhibitory influence of synovial fluid, high shearing strain across the fracture, small proximal fragment apart from poor bone quality due to gross osteoporosis in old age patients (Gani *et al.*, 2008). Failure rates of internal fixation are high and hence chances of resurgery go high especially in old age. Therefore, there is a uniform consensus regarding choice of treatment in old age patients, i.e. replace the head by a prosthesis (Bartels *et al.*, 2018). But controversy again lies in the choice whether to do a total replacement of head and acetabulum or to replace the head of femur, both have their proponents (Jain *et al.*, 2017). In order to understand it better, we undertook this prospective study to compare the functional outcome of total hip arthroplasty vs hemiarthroplasty in our setup. Patients were divided in two groups, Group A consisted of 45 patients who underwent THR and Group B included 45 patients treated by Hemiarthroplasty. Results of two groups were compared. Majority (62.2%) of patients in Group A belonged to 7<sup>th</sup> decade, with mean age of 69 years, and majority of Group B patients (66.5%) were in 8<sup>th</sup> decade with mean age of 74.4 years. This was because patients with longer life expectancy were selected for THR considering, the implant has a longer life and vice versa. Males dominated (57.8%) in our study may be because of males reporting more in our region, although most studies report it to be common in females, in

US Melton *et al* (1999) reported an annual incidence of hip fractures as 201 and 197 in men as compared to 511 and 537 in females per 100 000 population. Right side involvement was high in both groups. Gardens type IV was common in both groups 82.3% and 68.8% respectively. There was no mortality in present series with an average follow up of 26.5 months. There were no major complications, redundant cement did not require intervention, superficial wound infections were treated by dressings and proper antibiotics after culture sensitivity test. Posterior dislocation of hip in 2 cases in group A were managed by closed manipulation under sedation and skin traction 3 weeks. DVT occurred in 1 pt. of group A treated by CVTS with anticoagulants. Severe hypotension occurred in 3 patients in group A and were treated in ICU with fluids and blood transfusion. There was no case of re-operation in our study, however a meta-analysis has shown in seven randomized trials and seven out of eight retrospective short studies totaling 1669 patients and 123 events, providing data on reoperation rates (Clarke *et al.*, 2014). Overall primary THR was associated with lower risk of reoperation as compared to hemiarthroplasty. The pooled reactive risk was 0.57 (95% confidence interval 0.34 to 0.96) a risk difference of 4.4% (95% confidence interval 0.25 to 8.5% in favour of THR. Most of trials give higher rates of general complications with THR than hemiarthroplasty. The waited mean difference in Harris Hip Score was 5.4 (95% confidence interval 2.7-8.2) which matched our Harris Hip Score difference of 5.0.

## Conclusion

The incidence of fracture neck of femur was maximum in 70-80 group, in 8<sup>th</sup> decade with male preponderance with right side affecting more frequently. Moreover, Garden Type IV was common than III. The study concluded with the notion that Total Hip Arthroplasty is certainly a better choice of treatment than hemiarthroplasty for fracture neck of femur in high demand patients with active pre-injury ambulatory status, medically fit to withstand a major prolonged surgery, from a good socioeconomic strata and have long life expectancy.

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