

# Early Functional Outcome of Total Hip Arthroplasty in Acute Displaced Neck of Femur Fracture in Elderly

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## ABSTRACT

**Objective:** To assess early functional outcome of total hip arthroplasty for displaced femoral neck fractures.

**Methods:** This descriptive study conducted in Jinnah Hospital Lahore Orthopaedic unit 2 from August 2015 to October 2017. Eighty-five patients with displaced femoral neck fractures were managed by cemented primary total hip arthroplasty. We included otherwise physically and mentally healthy patients who were community ambulators of the age group ranging from 55 to 80 years with an average age of 62.37 years. All the patients with infection, nonunion, pre-existing rheumatoid arthritis and pathological fractures were excluded from the study. A modified Hardinge approach was used in all patients and cemented total hip prosthesis was used. Every patient received pre-operative, intra operative and post-operative antibiotic regime. Low molecular weight heparin was administered prophylactically. All the patients underwent specific rehabilitation protocol and mobilized on the first post-operative day. Functional outcome in all patients was evaluated in terms of Harris hip score (HHS) after six weeks, 3 months and 6 months Paired t test was used to assess difference between means HSS at 3 weeks and 6 months for statistical significance with  $p < .05$ .

**Results:** A total of 57.6% (49) males and 42.4% (36) females with a mean age of  $62.37 \pm SD 28.42$  years ranging from 55 to 80 years were studied. A total of 45.9% (39) patients were operated on right and 54.1% (46) operated of left hips. The mean Harris hip score at six weeks was  $78.117 \pm SD 5.757$ , at three months was  $83.5294, \pm SD 5.785$ , and at six months was  $88.600, \pm SD 4.746$  ( $P < .000$ ).

**Conclusion:** Total hip replacement has a good functional outcome in displaced femoral neck fractures in otherwise healthy and lucid patients. On basis of better functional scores in our results we can infer that cemented total hip replacement offers early return to function so this procedure is suggested in elderly active patients with femoral neck fracture.

**Key words:** Hip fracture, total hip replacement, Harris hip score

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## INTRODUCTION

Intra capsular neck of femur fracture is a major health hazard around the world. The annual number is expected to increase from 1.7 million to 6.3 million by the year 2050.<sup>1</sup> In this part of the world we bear a special challenge owing to high incidence of osteoporosis.<sup>2</sup> Bone mass (osteopenia) reduced to a measure of one standard deviation at the hip causes twice the risk of hip fracture.<sup>3</sup>

Unfortunately, controversies still exist in the treatment of displaced femoral neck fractures in elderly population. All sorts of treatment for hip fractures carry high risks.<sup>4</sup> Various forms of treatments entail internal fixation, hemi arthroplasty (HA) and total hip arthroplasty (THA).<sup>5</sup> Reports of high incidence of nonunion and avascular necrosis after osteosynthesis has led total hip arthroplasty as the choice of treatment in elderly population in displaced femoral neck fractures.<sup>6</sup> There has been a debate between the hemi arthroplasty and total hip arthroplasty for the treatment of these fractures however the results of Meta analyses have shown in favor of total hip

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arthroplasty in terms of revision surgery.<sup>5</sup> We have conducted this study to show the early functional outcome in terms of Harris hip score<sup>7</sup> to evaluate the post operative recovery and functional rehabilitation of the patients undergoing total hip arthroplasty after displaced neck of femur fracture in elderly and in those patients who present late despite being in an age in which the internal fixation is indicated.

**METHODS**

This descriptive study was performed in Jinnah Hospital Lahore from august 2015 to October 2017. A sample size of 85 patients with displaced femoral neck fractures was calculated with 95% confidence interval, assumed improvement in HSS of SD +4.7 with acceptable difference of + 1 from base line. Fractures were managed by primary total hip arthroplasty. We included otherwise physically and mentally healthy patients who were community ambulators of the age group ranging from 55 to 80 years of either gender. All the patients included in our study presented to us through emergency and outpatient department with a history of fall, while most of them presenting early and with some exceptions who presented within two to three weeks of sustaining injury. The AP and Lateral views of xrays of hip joint were evaluated for classification. The fractures were classified according to Garden classification of intracapsular neck of femur fracture. Garden type 3 and 4 were included in our study All the patients with infection, nonunion, preexisting rheumatoid arthritis and pathological fractures were not included in the study. A modified Hardinge approach was used in all patients and cemented total hip prosthesis was used in all the patients. The prosthesis used had a Muller type cemented stem, the acetabular cup was made of UHMWPE with extended posterior wall. The metal head size used in all patients was 28mm in diameter. The prosthesis was implanted using second generation cementing technique. Every patient received pre-operative, intra operative and post operative antibiotic regime. DVT prophylaxis was given to each patient with Low molecular weight heparin for one week followed by oral aspirin 150mg per day for 28 days. All the patients underwent specific rehabilitation protocol and mobilized on the first post-operative day. Functional outcome in all patients was evaluated in terms of Harris hip score after six weeks, 3 months and 6

months by means of a standard performa in follow up visits. Clinical and radiographic examination of the hip was performed at every follow up visit. A mean improvement of score at 6<sup>th</sup> week from base line of 80–90 was considered as good, and 90–100 is an excellent. Paired t test was used to assess difference between means HSS at 3 weeks and 6 months for statistical significance with p < .05.

**RESULTS**

A total of 57.6% (49) males and 42.4% (36) females with a mean age of 62.37 + 5.918 years ranging from 55 to 80 years were studied. A total of 45.9% (39) patients were operated on right and 54.1% (46) operated of left hips. The mean Harris hip score at six weeks was 78.117 ,±SD5.757, at three months was 83.5294 + 5.785, and at six months was 88.600, ,±SD 4.746 (P< .000).A total of 02 (2.35%) hips got dislocated which were reduced on the same day under general anesthesia and manipulation. There were 2(2.35%) case which had superficial wound infection. It was treated after getting the culture and sensitivity following a four-week course of antibiotics. There was no case in which revision surgery was required in terms of dislocation, component malpositioning and infection at 6 months of follow-up.

**Table 1:** Demographic and Clinical profile of patients. (n=85)

Variables n= 85	Frequency	Percent
Age Mean = 62.553 SD = 5.918 Minimum= 55 Maximum = 85		
55 – 70	65	76.4
71 – 85	20	23.6
<b>Gender</b>		
Male	49	57.6
Female	36	42.4
<b>Fracture Side</b>		
Right	39	45.9
Left	46	54.1
<b>Complication</b>		
No complication	81	95.2
Dislocation of hip	2	2.4
Infection	2	2.4

**Table 2:** Functional Outcome in terms of Harris Hip Score:

Score	HHS 6 WEEK	HHS 3 MONTHS	HHS 6 MONTHS	Paired t statistics For HSS at 6 weeks and 6 months
Mean	78.1176	83.5294	88.6000	t=-19.605 p=.000
Std. Deviation	5.75783	5.78501	4.74643	
Minimum	64.00	68.00	72.00	
Maximum	90.00	94.00	96.00	

**DISCUSSION**

Our aim of treatment in femoral neck fracture treatment is early mobilization as quickly as possible to the pre-trauma status as well as minimizes the risk of complications and reoperation. There is a persisting debate between the proponents of total hip

replacement and hemiarthroplasty in displaced neck of femur fractures in elderly. Our study has positively shown good results in terms of Harris hip score, incidence of complications and revision surgery. The results of our study are comparable to the preexisting studies as shown in table 3.

**Table 3:** Summary of HSS of included five studies that compared groups of patients treated with HA and THA.

Author	Type	No (P)	HSS		
			3month	6month	1year
Cadossi et al <sup>12</sup>	HA	37	74.0 (43.7 to 93)	NG	73.1 (40 to 97.4)
	THR	41	72.3 (50.3 to 98)	NG	74.7 (56 to 98)
Giannini <sup>13</sup>	HA	26	71.6	NG	75.5
	THR	26	74.	NG	80.7
Hedbeck et al <sup>15</sup>	HA	60	NG	NG	79.4±12.3
	THR	60	NG	NG	87.2±9.4
Vanden et al <sup>17</sup>	HA	137	NG	NG	73.9 (23 to 100)
	THR	115	NG	NG	76.0 (44 to 100)

Our main outcome measure is Harris hip score which assesses the functional status of the patient. From three independent studies<sup>8-10</sup> it was revealed that hip function reached its peak after one year. Our results favored that the best yield as regards the Harris hip score was found at six months post operatively. The results were better as compared to three weeks and three months respectively. Although our study was not a comparative study but as compared to other study groups the hip scores are better than hemiarthroplasty group as conducted by Avery et al.<sup>11</sup> Hemiarthroplasty group accounts for 78.1 % revision surgery because of acetabular erosion according to meta-analysis by Zhao et al and after pooling the available data, a significant dominance of Harris hip score was found for total hip

replacement compared with hemiarthroplasty (SMD: -7.11, 95% -10.70, -3.53) one year postoperatively [5].

Our mean Harris hip score (83.58) at three months is better than Cadossi et al<sup>12</sup> (72.3) and Giannini et al<sup>13</sup> (74). At six weeks interval, our mean Harris hip score is 78.14. At this stage 9.87 % cases fall in poor category, 39.50 % fall in fair category, 49.38 % fall in good category, 1.23 % fall in excellent category.

At three months interval 3.62% fall in poor category, 14.45% cases fall in fair category, 73.49 % fall in good category, 8.43% fall in excellent category. At six months interval, there were no poor results 6.84% cases fall in fair category, 38.35 % cases fall in good category, 54.79 % cases fall in excellent category.

In comparison to a similar study by Kapil Mani<sup>14</sup> et al our Harris hip score is much better as our excellent result are 54.79% as compared to 40 % in that study and good result 38.35 % as compared to 45% in that study, which means our excellent results are much more than the other study.

Our study showed 2(2.35%) dislocation which is very consistent with the other studies. Hedbeck et al<sup>15</sup> reported no dislocation in 60 cases of THA following fracture neck of femur. Tidermark<sup>16</sup> compared internal fixation in femoral neck fractures with total hip replacement reporting incidence of 2% dislocation with a sample size of 55 cases.

Avery<sup>11</sup> et al reported 3 (7.5%) dislocations in 40 cases of THA. Van den et al<sup>17</sup> reported 8(6.95%) dislocations in 115 cases. Tidermark<sup>16</sup> compared internal fixation with total hip replacement for displaced femoral neck fractures in elderly. In internal fixation group the complication rate (36%) was much higher than THA group (4%); p value < 0.001, the revision procedures were 42% in Internal fixation group and 4 % in THA group; p value < 0.001. The indicators of quality of life strongly favor THA group. The result of this study is also consistent with our study in relation to THA.

In a meta-analysis of 8 randomized clinical trials by Zhao et al<sup>5</sup> suggesting total hip replacement as the treatment of choice in femoral neck fractures in active elderly patients on the basis of better functional scores and lower revision rates as compared to other procedures.

Referring to some recent additions in literature Wangl<sup>18</sup> concluded that in displaced neck of femur fractures in elderly THA was better than bipolar hemiarthroplasty in terms of revision rate due to acetabular erosion while bipolar hemiarthroplasty was better in terms of dislocation rate. In a more recent study by Ochi et al<sup>19</sup> recommended use of direct anterior approach and dual mobility cup in patients with high risk of dislocation. Hansson<sup>20</sup> in a comparative study showed significantly lesser revisions in cases under going THA with displaced femoral neck fractures as compared to hemiarthroplasty. They also showed 50% reduced mortality in favor of THA. According to a meta-analysis by Rozell et al<sup>21</sup> there is a moderate evidence to support THA in properly selected elderly patients with displaced femoral neck fractures.

## CONCLUSION

Total hip replacement has a good functional outcome in displaced femoral neck fractures in otherwise healthy and lucid patients. On the basis of better functional results, we can infer that cemented total hip replacement offers early return to function so this procedure is suggested in elderly active patients with femoral neck fracture.

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#### Authorship and Contribution Declaration

**Sher Afgan**, Conception and design of the study

**Irfan Ahmad**, Collected the data & interpreted the data

**Rashid Saeed**, Final approval of the version for publication

**Sajad Hussain**, Revised the manuscript critically for important intellectual content

**Sabih Ahmad**, Drafted the manuscript