



## INTRACAPSULAR FEMORAL NECK FRACTURES; COMPARISON OF FUNCTIONAL OUTCOMES IN UNIPOLAR VERSUS BIPOLAR UN-CEMENTED HEMIARTHROPLASTY IN ELDERLY PATIENTS.

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**Article received on:**

02/10/2017

**Accepted for publication:**

15/03/2018

**Received after proof reading:**

00/00/2018

**ABSTRACT... Objectives:** To compare of functional outcomes in terms of post-operative mobility for unipolar versus bipolar un-cemented hemiarthroplasty in elderly patients with displaced intracapsular femoral neck fractures. **Study Design:** Randomized Control Trial. **Setting:** Department of Orthopedics Bahawal Victoria Hospital, Bahawalpur. **Period:** April 2015 to October 2016. **Methodology:** Sample size is (calculated by taking  $n^{\circ}=138$ , confidence interval 95, power of study 80,  $P1=33\%$ ,  $P2=13\%$ ) 69 in each group. Sampling technique used was non probability consecutive sampling. All patients who meet the inclusion criteria presenting to orthopedic unit of Nishtar Hospital Multan with fracture neck of femur were selected for study. Patients were divided into two groups randomly by lottery method and enrolled for unipolar or bipolar hemiarthroplasty. Chi-square test was used to compare outcome variable in both groups. A p-value  $< 0.05$  was considered statistically significant. Effect modifiers like age and sex was controlled by stratification. Chi square test was applied to see significant difference. **Results:** Overall, there were 100% ( $n=138$ ) patients in this study, both genders. The mean age of the patients was  $66.35 \pm 4.29$  years. (Range: 60 to 80years) Mean age and SD of group A (no walking aid) was  $54.52 \pm 3.10$  and in group B (walking aid)  $54.99 \pm 3.19$ . Time up go score was noted as successful 33.3% ( $n=46$ ) and 66.7% ( $n=92$ ) as unsuccessful. Walking aid was noted in 65.2% ( $n=90$ ) patients. Functional outcome was noted as good in 26.8% ( $n=37$ ) patients and noted as bad in 73.2% ( $n=101$ ) patients. Out of 100% ( $n=38$ ) patients, good outcome was 26.3% ( $n=10$ ) unipolar and 73.7% ( $n=28$ ) bipolar. Out of 100% ( $n=100$ ) Bad outcome was 59% unipolar and bipolar 41%. **Conclusion:** Functional outcome in term of mobility is better in case of bipolar prosthesis as compared to unipolar. Thus in our conclusion bipolar prosthesis is preferred procedure as compared to unipolar hemiarthroplasty in treating patients with displaced intracapsular femoral neck fracture.

**Key words:** Bipolar Hemiarthroplasty, Unipolar Hemiarthroplasty, Displaced Intracapsular Femoral Neck Fractures.

**Article Citation:** Ahmed MJ, Shahid M, Ahmed MH, Nazar B. Intracapsular femoral neck fractures; comparison of functional outcomes in unipolar versus bipolar un-cemented hemiarthroplasty in elderly patients. Professional Med J 2018; 25(9):1317-1322. DOI:10.29309/TPMJ/18.4373

### INTRODUCTION

Annual occurrence of hip fracture is 1.7 million and it is a major health issue in elderly people all over the world. Incidence is expected to get tripled within next 50 years<sup>1</sup>, because of the increasing age of population around the world and other elderly diseases like poor cognition and osteoporosis.<sup>2</sup> For treatment of displacing fracture of neck of femur in elderly, both unipolar and bipolar hemiarthroplasty has been approved.<sup>3</sup> Bipolar has an advantage over unipolar because it reduces acetabular erosion by creating movement at two poles and thus less movement between

prosthetic head and acetabulum.<sup>4</sup> But most commonly used treatment of displaced fracture of neck of femur is unipolar hemiarthroplasty due its less cost.<sup>5</sup> If complications are involved and there is need of second operation, unipolar becomes more expensive.

In a study by Bhushan M Sabnis, I J Brenkel, they compared the outcome of mobility for both unipolar and bipolar hemiarthroplasty and concluded results of 33% and 13% for bipolar and unipolar hip hemiarthroplasty.<sup>6</sup> Even though many previous studies have been conducted

and proved quite promising yet the treatment course is still the same. In our study, Timed Up and Go test<sup>7</sup> is used, through which future physical function in patients with hip fracture treated with unipolar or bipolar hemiarthroplasty can be determined early.<sup>8,9</sup> This study being a prospective randomized study and consisting of definitive group of patients has the power to answer the needs and also change the treatment course. Main objective of treatment of femoral neck fractures are lessening the mortality rate, morbidity rate, need of reoperation and early return to normal functional status. In active elderly patients, with femoral neck fracture management is controversial.<sup>10</sup> No common grounds have been set over the choice of treatment among unipolar or bipolar hemiarthroplasty, total hip replacement and internal fixation.

Cemented unipolar hemiarthroplasty is recommended by The Scottish intercollegiate guidelines.<sup>11</sup> Active patients aged 70-90 with fracture of femoral neck show unsatisfying results after unipolar prosthesis because of enhanced needs on that type of hip. The rationale of the study is to compare the functional outcomes of unipolar versus bipolar uncemented hemiarthroplasty in elder patients with intracapsular fractures of the neck of the femur and also studying the factors affecting the outcomes.

## MATERIAL AND METHODS

Our study design was Randomized Control Trial conducted in Department of Orthopedics Bahawal Victoria Hospital, Bahawalpur. From April 2015 to October 2016. Sample size is (calculated by taking  $n^6 = 138$ , confidence interval 95, power of study 80,  $P_1 = 33\%$ ,  $P_2 = 13\%$ ) 69 in each group. Sampling technique used was non probability consecutive sampling. Functional outcome was measured in terms of independent mobility (good outcome) and dependent mobility (bad outcome) measured by The Timed Up and Go Test and use of walking aid at 12<sup>th</sup> weeks. The Timed Up and Go Test is a test used to examine functional mobility in older adults. The test requires an adult to stand up, walk 3 m (10 ft), turn, walk back, and sit down. The time taken to complete this task is noted.

Inclusion criteria was patients with age greater than or equal to 50 years, patients diagnosed on X-ray showing Garden III and IV type displaced femoral neck fractures either at the time of presentation or within one week after injury or trauma, patient falling in ASA (American Society of Anesthesiologists), patients who were able to walk unaided/ without support before injury. Exclusion criteria was patients with un-displaced femoral neck fractures on X-ray, patients who are predisposed to severe osteopenia, patients with ipsilateral femoral shaft fracture, multiple trauma patients, patients with pre-existing arthritis, patients who refuse to participate in the study.

All patients who met the inclusion criteria presenting to orthopedic unit of Nishtar Hospital Multan with fracture neck of femur was selected for study. Ethical approval for this study was taken from Hospital Ethics Committee. All patients who were willing to participate then were asked to provide written consent to be randomized to one of the groups of the study. Patients were divided into two groups randomly by lottery method and enrolled for unipolar or bipolar hemiarthroplasty. All data was coded by study ID number for analysis, with the study coordinator having the only link to patient name and chart number. Patients in Group A were undergoing uncemented unipolar (Austin Moore) prosthesis. Group B patients were undergoing uncemented bipolar hemiarthroplasty on the basis of randomization. Prophylaxis for antibacterial and deep vein thrombosis was given.

The operative procedures were performed by a single selected team of surgeons of the Orthopedic Department of Nishtar Hospital Multan under spinal anesthesia and through posterior (Moor's) approach hemiarthroplasty was undertaken. The researcher of this study assisted the operative procedure. The patients were followed up to three months and their mobility level was assessed by an independent observer at 12<sup>th</sup> weeks according to instructions given in Annex.i, allowing one trial done before the test in time and recorded so that patients understand the procedure well. The observer was not to look at the file of the patient to know the type of surgery performed.

Final outcome was measured at the end of 12<sup>th</sup> week postoperatively. All the information including outcome variable was recorded on a specially designed Performa by the researcher (Performa attached). All the data was entered on SPSS for windows version 10. Mean and standard deviation was calculated for quantitative variables i.e. age and time up and go score. Frequencies and percentages were calculated for gender and outcome variable independent mobility versus dependent mobility. Chi-square test was used to compare outcome variable in both groups. A p-value < 0.05 was considered statistically significant. Effect modifiers like age and sex was controlled by stratification. Chi square test was applied to see significant difference.

## RESULTS

Overall, there were 100% (n=138) patients in this study, both genders. Gender distribution showed there were 50.7% (n=70) males and 49.3% (n=68) females. The mean age of the patients was 66.35±4.29 years. (Range: 60 to 80years). There were 48.6% (n=67) patients between 60-65 years and 51.4% (n=71) patients between 66-80 years. (Table-I) Mean age and SD of group A (no walking aid) was 54.52 ± 3.10 and in group B (walking aid) 54.99 ± 3.19.

Time up go score was noted as successful 33.3% (n=46) and 66.7% (n=92) as unsuccessful. Walking aid was noted in 65.2% (n=90) patients. Functional outcome was noted as good in 26.8% (n=37) patients and noted as bad in 73.2% (n=101) patients. Out of 100% (n=38) patients, good outcome was 26.3% (n=10) unipolar and 73.7% (n=28) bipolar. Out of 100% (n=100) Bad outcome was 59% unipolar and bipolar 41%. (Table-II).

No association was found between functional outcome with gender (p=0.391), time up to go score (p=0.342), walking aid (p=0.958), and stratified age (p=0.243), except good outcome (p=0.027) and bad outcome (p=0.011), after applying the chi-square. (Table-III).

Characteristics	Frequency	Percentage (%)
<b>Gender</b>		
Male	70	50.7
Female	68	49.3
Total	138	100.0
<b>Stratified Age</b>		
60-65 years	67	48.6
66-80 years	71	51.4
Total	138	100.0
<b>Mean±S.D</b>		
Age	66.35±4.29 years	

**Table-I. Demographic Variables: (n=138)**

Characteristics	Frequency	Percentage (%)
<b>Time up go score</b>		
Successful	46	33.3
Unsuccessful	92	66.7
Total	138	100.0
<b>Walking Aid</b>		
Yes	90	65.2
No	48	34.8
Total	138	100.0
<b>Functional Outcome</b>		
Good	37	26.8
Bad	101	73.2
Total	138	100.0
<b>Good Outcome</b>		
Unipolar	10	26.3
Bipolar	28	73.7
Total	38	100.0
<b>Bad Outcome</b>		
Unipolar	59	59.0
Bipolar	41	41.0
Total	100	100.0

**Table-II. Functional outcomes**

## DISCUSSION

Hip fractures comprise almost two third of the total duration of hospital stay as a result of fractures.<sup>12</sup> Because of short life expectancy of very elderly patients, choice of treatment and outcome evaluation is controversial. This is reason that early satisfaction becomes as much important as long term outcomes.<sup>13</sup> Hip fracture treatment is targeted to achieve early satisfactory, pre injury status as soon as possible, so that impairment of independence and quality of life can be avoided, also because annual mortality rate is more than 30%.<sup>14</sup>

Variable	Functional Outcome		Total	Chi-Square P-value
	Good	Bad		
Gender	Male	21	49	0.391
	Female	16	52	
Total	37	101	138	
Time Up Go Score	Successful	10	36	0.342
	Unsuccessful	27	65	
Total	37	101	138	
Walking Aid	Yes	24	66	0.958
	No	13	35	
Total	37	101	138	
Stratified Age	60-65 years	21	46	0.243
	66-80 years	16	55	
Total	37	101	138	
Good Outcome	Unipolar	2	12	0.027
	Bipolar	12	12	
Total	14	24	38	
Bad outcome	Unipolar	20	39	0.011
	Bipolar	10	31	
Total	30	70	100	

**Table-III. Association of functional outcome with other variables**

Three surgical options for hip fracture are internal fixation, total hip replacement and the one under discussion, hemiarthroplasty. Bipolar or unipolar hemiarthroplasty is thought to be most optimum technique to manage displaced femoral neck fracture as it produces significant results.<sup>15</sup>

In a study conducted by Khorami M et al reported that bipolar hemiarthroplasty have better mobility outcomes as compared to unipolar hemiarthroplasty.<sup>16</sup> Use of Austin Moore prosthesis in hemiarthroplasty is most common choice.<sup>17</sup> Bipolar prosthesis reduces acetabular erosion and increases life time and function of the prosthesis.<sup>18, 19</sup> In a study Jia Zet al reported that both techniques are equally effective bipolar hemiarthroplasty have n superiority over unipolar hemoarthroplasty.<sup>4</sup> As compared to bipolar hemiarthroplasty, bipolar hemiarthroplasty provides poorer or similar<sup>20</sup> results and also better pain control and function. Because of these reasons, bipolar type is recommended for active and elderly patients.<sup>21</sup> Although unipolar type is less expensive but bipolar hemiarthroplasty proves cost-effective seeing its effect on overall outcome.<sup>21</sup> Another study was conducted by Bhushan M Sabniset al and reported bipolar technique is better than unipolar.<sup>6</sup> But there is

no definite point of age to determine the use of unipolar or bipolar hemiarthroplasty.

Variety of results has been recorded for treatment of hip fracture by using hip replacement technique.<sup>22,23</sup> Cemented hemiarthroplasty is recommended by The Scottish Intercollegiate Guidelines and other various studies.<sup>18,24,25</sup> Quite appreciable short and long term results have been obtained by using cemented bipolar hemiarthroplasty.<sup>16</sup> In total hip replacement technique, use of uncemented hydroxyapatite coated femoral stems also give satisfactory long term outcome in the form of prosthesis survival.<sup>26</sup> In similar way satisfying midterm results are obtained by using uncemented hydroxyapatite coated bipolar hemiarthroplasty in femoral neck fracture patients of elder age.<sup>26</sup>

## CONCLUSION

Functional outcome in term of mobility is better in case of bipolar prosthesis as compared to unipolar. Thus in our conclusion bipolar prosthesis is preferred procedure as compared to unipolar hemiarthroplasty in treating patients with displaced intracapsular femoral neck fracture.

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*The world will not be destroyed by those who do evil, but by those who watch them without doing anything.*

– Albert Einstein –

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#### AUTHORSHIP AND CONTRIBUTION DECLARATION

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2	Maryam Shahid	Manuscript Writing, Data Collection.	
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