

## Original Research Article

# Proximal femur fractures - effect of preoperative mental status of patients on postoperative mobility of patients

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## ABSTRACT

**Background:** In the elderly population, proximal femur fractures are most common which can result in increase of morbidity and mortality. Pre and postoperative mobility patterns, also depends upon the Mental Status of the patient. Incidence of Mental health disorders of patient can increases with age and co morbidities. The aim of the study was to evaluate the effect and relationship of preoperative mental status, on postoperative mobility in proximal femur fracture patients. On null hypothesis; there exists no co-relation between pre-operative mental status on pre and postoperative mobility those had surgery for proximal femur fractures.

**Methods:** This is a retrospective study, carried out during the period of 14<sup>th</sup> March, 2016 to 14<sup>th</sup> March, 2017 at BIRRD (T) Hospital. All the patients who underwent proximal femur fracture surgeries were included in the study. Patients were evaluated for Abbreviated Mental Score Test pre-operatively. Mobility patterns were before injury and after surgery evaluated in patients with proximal femur fractures. Postoperatively patients were followed up to one year.

**Results:** 50 patients were included into the study, where 12 patients could not present to follow-up due to various reasons, thus we have complete data of 38 patients. There is significant reduction in mobility status of individuals i.e. from 6.18 (preoperative pre fracture mobility) to 5.36 (postoperative mobility). Average abbreviated mental test score is 7.55. There exists a correlation between the variables.

**Conclusions:** Null hypothesis remains rejected. There is statistically significant relationship between the variables (pre and postoperative mobility, and abbreviated mental test score), which appears to be positive correlation.

**Keywords:** Proximal femur fractures, Pre and postoperative mobility score, Abbreviated mental score test, Delirium

## INTRODUCTION

Proximal femur fractures are the most common cause of morbidity, and mortality in elderly patients (>50 years).<sup>1</sup> These include fracture neck of femur, Trochanteric fractures. Most of these fractures are due to osteoporosis (senile osteoporosis).<sup>1</sup> Prognosis and mobility of the patients depends upon fracture pattern, anesthesia, surgeon and fixation factors, pre-operative mobility pattern, co morbidities and mental status of patients.

Around 25% of patients with hip fractures will have severe to moderate cognitive impairment, 15-25% with mild cognitive impairment.<sup>2</sup> patients with severe cognitive impairment are institutionalized (20%) and 50% of patients require walking aids and sometimes immobile.<sup>2</sup>

Abbreviated mental score test (AMT) can be used for quick assessment and can act as guide for mental status of elderly patient undergoing surgery.<sup>4</sup> This not only helps

us in identifying cognitive impairment, but also in the assessment post-operative prognosis regarding mobility and return to daily activities of living.<sup>3</sup>

The present study proposed a null hypothesis that there is statistically no significant correlation between the mobility status (pre and postoperative mobility) and mental score test of patient. Here we intend to find out pre-operative mental status influence on postoperative mobility in patients with proximal femur fractures particularly in Indian population.

**METHODS**

The study was carried out in BIRRD (T) Hospital, from 14<sup>th</sup> March, 2016 to 14<sup>th</sup> March, 2017 over a period of One year. All the patients admitted with proximal femur fractures were included into study after satisfying inclusion and exclusion criteria. Patients were followed postoperatively for one year. Most of the Indian patients

are from rural background with poor literacy status and farming as main occupation. Abbreviated Mental Score Test used in European population needed modification to Indian context.<sup>4</sup> This modified version is used routinely in BIRRD (T) hospital for practical reasons and ease of communication with elderly trauma patients

**Inclusion criteria**

Inclusion criteria were individuals with age >50 years; unilateral fractures.

**Exclusion criteria**

Exclusion criteria were age < 50 years; psychiatric illness, non-cooperative patients; patients with childhood illness like polio, cerebral palsy; conservative and native treatment of fractures; pathological fractures other than osteoporosis; patients with fractures other than proximal fractures; patients rejected by anesthetist for surgery.

**Table 1: Abbreviated mental test score used in Europe and Western countries and modified context used in BIRRD (T) Hospital, and score varies from 0-10.**

S.No	European/Western context	Modified context used in BIRRD (T) Hospital	Score given
1.	State your age?	State your age?	1
2.	What is the time to the nearest hour?	State time of day in terms of (Morning, noon, evening and night)?	1
3.	Give the patient an address, and ask him or her to repeat it at the end of the test.?	Name the Village and Mandal from where you are coming from? And repeat this at the end of test	1
4.	What is the year?	What is the year? What is season? What is the month in Indian calendar in your native village?	1
5.	What is the name of the office or doctor you are seeing today?	Name the institute where you are admitted at present?	1
6.	Can the patient recognize two persons (the doctor, nurse, home help, etc.)?	Recognize the two person in the vicinity? (patient attendants, doctors, nurses)	1
7.	What is your date of birth? (day and month sufficient)	What is (Date of Birth, date of Marriage, Date of birth of first sibling, Date of birth of grandchild corrected to nearest year) appropriately?	1
8.	In what year was the 9-11 terrorist attack?	What is the year when you voted last?	1
9.	Name the present president of the USA?	Name the present prime-minister, chief-minister of your state?	1
10.	Count backwards from 10 down to 1?	Count numbers backwards from 10 to 1 in his own language by closing and opening of fingers?	1

**Table 2: Assessment of new mobility score before fracture (varies from 0-9).<sup>9</sup>**

Mobility	No difficulty	With an Aid	With help of another person	Not at all
<b>Able to get about the house</b>	3	2	1	0
<b>Able to get out of house</b>	3	2	1	0
<b>Able to go shopping</b>	3	2	1	0

Patients were evaluated for pre and postoperative mobility status.

**Statistical analysis**

Chi test, Correlation test, and ANOVA (analysis of variance)s test analysis.

**RESULTS**

In our study we have included 50 patients but only 38 patients were available for follow-up. Remaining 12 patients could not present to follow-up thereafter. In 38 patients who presented for follow-up, one (female) expired during the procedure, three (one male and 2

female) patients expired at various stages of study (patients expired 4 months after procedure, where one (male) due to CVA, other two (females) due to post-operative complications). Average age of patients was 68 years. There were 20 female and 18 male patients in all. There were 16 fracture neck of femurs, 20 Intertrochanteric fractures and 2 subtrochanteric fractures in all.

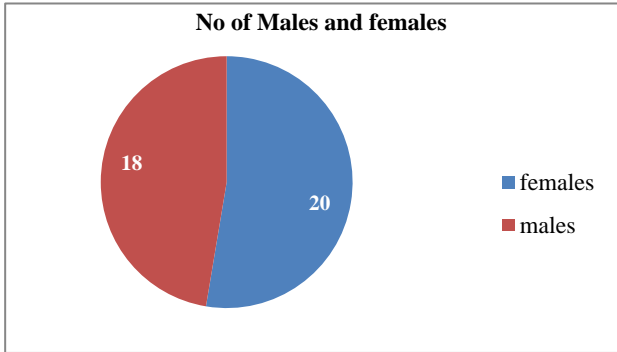


Figure 1: Pie chart distribution showing no of males and females in the study.

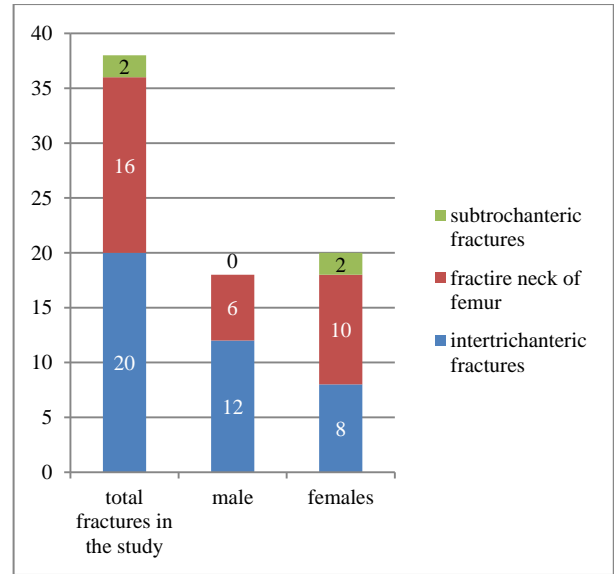


Figure 2: Stacked columns showing various types of fractures in male, female and total number of patients in the study.

Table 3: Showing difference between pre-operative mobility before fracture and postoperative mobility after surgery.

No of patients (%)	Preoperative mobility score	Postoperative mobility score (6 months-1 year)	No of patients (%)	
<b>25 (65.7)</b>	Able to go shopping without difficulty (25/38 patients)	Able to go shopping without difficulty (8/25patients)	8 (32)	
		Able to go shopping with help of aid (7/25 patients)	7 (28)	
		Able to go out of house with help of aid (3/25 patients)	3 (12)	
		Able to go about house with help of aid (5/25 patients)	5 (20)	
		Able to go about house with help of another person (1/25 patients)	1 (4)	
		Could not be mobilized after the procedure (1/25 patients)	1 (4)	
<b>1 (2.6)</b>	Able to get out of House without difficulty (1/38 patients)	Able to go about house with help of aid (1/1 patients)	1 (100)	
<b>12 (31.7)</b>	Without difficulty (2)	Able to go about of home with help of aid (2/12 patients)	2 (16.7)	
		With an aid (2)	Able to go about of home with help of aid (2/12 patients)	2 (16.7)
	Able to get about house (12/38 patients)	Able to go shopping without difficulty (1/12 patients)	1 (8.3)	
		Able to go out of house with help of aid (1/12 patients)	1 (8.3)	
		Able to go about of house without difficulty (2/12 patients)	2 (16.7)	
		With help of another person (8)	Able to go about of house with help of aid (2/12 patients)	2 (16.7)
		Could not be mobilized after the procedure (1/12 patients)	1 (8.3)	
		Died during the procedure (1/12 patients)	1 (8.3)	

(Values in brackets represent number of patients); Percentages in first column left indicate share in total study; Percentage values last column (highlighted) represents share in that group only.

**Table 4: Showing the relation between the abbreviated mental score test, no of patients and pre and postoperative mobility status.**

Abbreviated mental score range	Number of patients	Preoperative mobility	Postoperative mobility
<b>4-6</b>	11	7	5.45
<b>7-8</b>	16	6.5	4.375
<b>9-10</b>	11	6.18	5.36
<b>7.55 overall average</b>	38 (total)	6.55 overall average	4.97 overall average

{ANOVA (analysis of variance)  $F=7.6$  } ( $p<0.001$ )

Preoperative mobility of patients is mobility status before the attainment of fracture. Abbreviate mental score test was measured after the patient was admitted into hospital and before the surgery. Average pre-op mobility score was 6.55 before the fall, came down to 4.97 post-operatively. The reason for the fall of postoperative mobility also includes osteoporosis, age, fracture pattern and surgery, postoperative rehabilitation and control of co morbidities. Average mental score was 7.55 (S.D $\pm$ 1.76) during preoperative evaluation with least value 4 (in two patients) and maximum value 10 (in 8 patients). As per our assumption (null hypothesis) there must be no relation between these variables (pre and postoperative mobility and abbreviated mental test score) of patient, but statistically significant correlation exists between. It is a positive correlation i.e., those patients with good preoperative mobility before fracture and good abbreviated mental test score will have predicted good postoperative mobility. Hence null hypothesis stands rejected.

## DISCUSSION

Post-operative mobility of proximal femur fractures in elderly patients is dependent upon age, physical state (preoperative mobility status before fracture, osteoporosis, fracture pattern, surgery, co-morbidities and early post-operative rehabilitation) and cognitive state of the individual.<sup>5,6</sup> 97% of patients treated surgically will have higher survival rate (82-91%) than those treated non-surgically (55%). Major cause of death is due to deterioration of co-morbidities, 67% (non-surgical) on comparison with 19% (surgical) treated patients.<sup>7</sup> In my study mortality rate is 10.5%

38 patients were included in our study where mortality is 10.5% (4 out of 38 patients), which is comparable with 19% in Daichi et.al (2012) study, but high when compared with 1.46% (17 out 1165 patients) in Sunil N et.al (2016) study.<sup>7,8</sup> Out of 4 patient reported, one expired during procedure, other three expired 4 months after the procedure, one due CVA, other two due to post-operative complications. The shortcomings of our study include low sample size. The treatable causes affecting the mental health are electrolyte disturbances, endocrine abnormalities diabetes, thyroid function, appropriate management of head injury and metabolic causes. These causes need to be identified and treated for good mobilization post operatively.

We started our study with a null hypothesis saying that there is statistically no significant co-relation between mobility status of patient (i.e. preoperative mobility status before fracture and postoperative mobility) and preoperative mental status of patient. During the statistical evaluation (ANOVAs test) we found that there is significant correlation between these variables. At the same time the type of correlation is positive. This infers that those patients with good pre-operative mobility before fracture and with good preoperative mental score test tend to have good and predicted post-operative mobility and early return to daily activities of living, than those with low mobility and low mental scores. Hence null hypothesis remains rejected.

Similar findings were found in study by Parker et al, study. Their study shows 80% chance of one year survival in patients with mobility score 7 and mental test score 8, on comparison to 42% one year survival in patients with mobility score 3 and mental score test 1. Here authors infer that in older patients admitted into hospitals, pre-operative mobility status before fracture is a better assessment factor than mental test score, as they are already in acute confused state.<sup>9</sup>

## CONCLUSION

We conclude that there is significant co-relation between mobility status before the injury and after the surgical fixation, and preoperative mental test score of patient. These can cause an effect on the postoperative mobility of patient and return to daily activities of living after the surgery. We propose prospective studies; with larger sample size is required, so that there is possibility of improving mobility of the patients by supporting the mental health in pre and postoperative period, during stay in the hospital. Identifying and managing the treatable causes affecting mental health can improve postoperative mobility. We emphasize importance multidisciplinary team approach in the better management of proximal femur fractures patients.

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