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Osteoporosis - Does it impact Post Operative Mobility, in Peritrochanteric Fracture Patients?

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Abstract- Background: Osteoporotic fractures are common and occur in aging and elderly population. Of these proximal femur fractures are the most disabling and can result in increased morbidity and mortality. Osteoporosis, determines the type of fracture but also affect reduction of fracture during surgery and post-operative mobility of the individual.

Aim: To evaluate the correlation between Osteoporosis, and post-operative mobility in patients, with proximal femur fractures.

Null Hypothesis: There is no significant correlation between the Osteoporosis, and post-operative mobility of the patients in a proximal femur fracture.

Keywords: osteoporosis, peritrochanteric fractures, pre and post-operative mobility, daily activities of living.

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Abstract- Background: Osteoporotic fractures are common and occur in aging and elderly population. Of these proximal femur fractures are the most disabling and can result in increased morbidity and mortality. Osteoporosis, determines the type of fracture but also affect reduction of fracture during surgery and post-operative mobility of the individual.

Aim: To evaluate the correlation between Osteoporosis, and post-operative mobility in patients, with proximal femur fractures.

Null Hypothesis: There is no significant correlation between the Osteoporosis, and post-operative mobility of the patients in a proximal femur fracture.

Method: A retrospective study was carried out during the period March 2017 to March 2018 in BIRRD (T) Hospital. Patients, who underwent proximal femur fracture surgeries after fulfilling the inclusion and exclusion criteria, were included in the study. Patients evaluated for Osteoporosis with Singh's Index, fracture type, Pre and Post-Operative mobility patterns.

Results: The study included 50 patients, but complete data was available for 40 patients. Remaining ten patients could not present for follow-up and were excluded from the study. Four patients included in the study, expired during the study.

Conclusion: Null hypothesis remains rejected.

Keywords: osteoporosis, peritrochanteric fractures, pre and post-operative mobility, daily activities of living.

I. INTRODUCTION

Proximal femur fractures include fracture neck of femur, inter and Subtrochanteric fractures. These result in mortality and morbidity in the elderly population aged above 50 years. 14-36% of patients expire within one year of proximal femur fractures.¹ This increases to 50% in nonoperative patients. The incidence of these fractures is increasing in India with the aging population, which can soon or later become an epidemic in orthopedic surgery. These fractures have added stress to limitedly available health resources of country.² Patients who sustain second hip fracture is about 10-13%, which further adds to decreased mobility status and increased social dependence.²

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70% of women (>80 years) have osteoporosis, with 60% experience one or other fractures (hip fractures, vertebral compression fractures, distal end radius fractures, shoulder fractures, pelvic fractures mainly pubic rami fractures).³ Minimal trauma and domestic falls can result in these fractures. Many factors influence post-operative mobility in patients with proximal femur fractures, such as osteoporosis, age of patient, time of presentation to hospital after injury or fall, presence of co-morbidities, surgery (surgeon, reduction, surgery time), post-surgery mobilization, social help for recovery, mental status of patients before the surgery.⁴

Osteoporosis (senile, secondary) causes of proximal femur fractures in the elderly. We do want to find, whether there exists a correlation between osteoporosis and post-operative mobility of the patient, time required for returning to daily activities of living. Hence we propose a Null Hypothesis that there exists no correlation between these variables in proximal femur fracture patients.

II. MATERIALS AND METHODS

A retrospective study conducted from 1st March 2017 to 1st March 2018. All proximal femur fracture admitted into BIRRD (T) hospital and those underwent surgery, included in the study after satisfying inclusion and exclusion criteria. Post-operative follow-up limited to an year. Patient admitted into our hospital are mostly from a rural background, with farming as occupation. Observing X-Ray, osteoporosis grading done with Singh's Index. Patients grouped into fracture neck of femur, Intertrochanteric, and Subtrochanteric fractures. Their pre-operative (mobility status before fracture), and post-operative mobility recorded. Abbreviated mental score test before surgery recorded.^{4,9} Mobility assessed with New Mobility Score by M J Parker, 1995.

Table 1: Shows Assessment of New Mobility Score before Fracture.⁵ Score is total 0-9

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

a) Inclusion Criteria

1. Patients with age >50 years with Hip fractures (Peritrochanteric fractures)
2. Unilateral fractures

b) Exclusion Criteria

1. Patients with age < 50 years
2. Childhood illness like polio, cerebral palsy, neuromuscular disorders
3. Non-co-operative patients

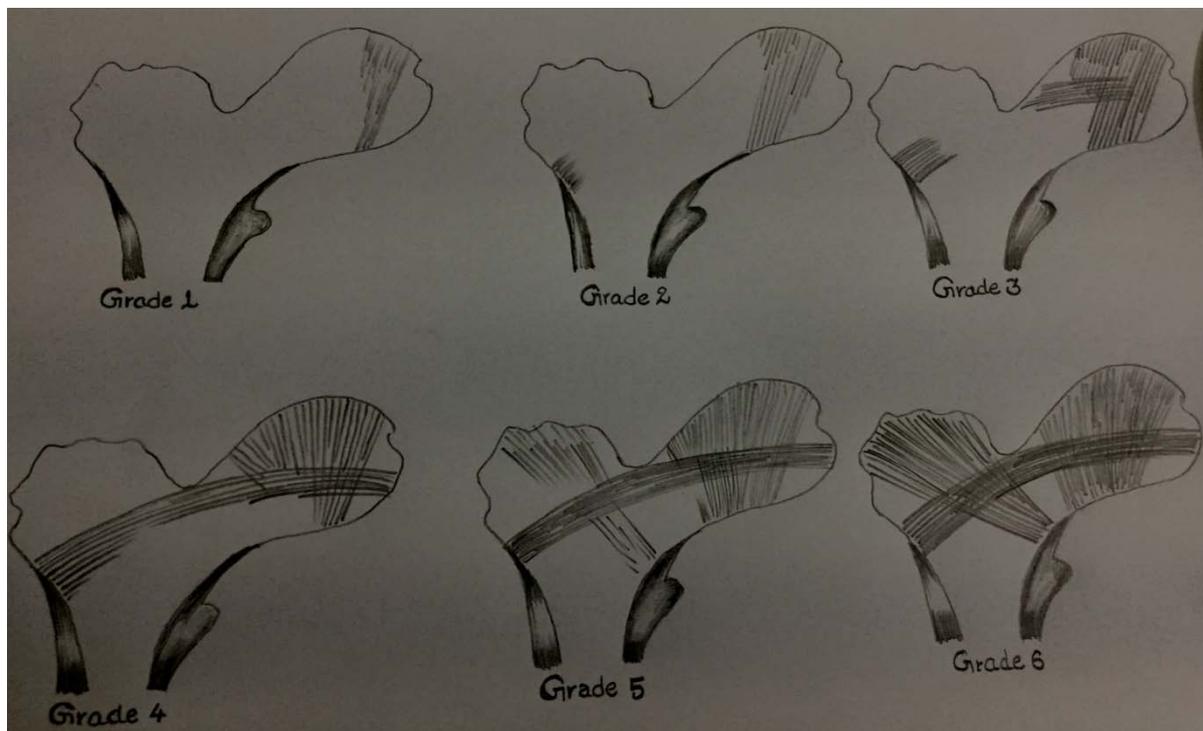
4. Psychiatric illness patients

5. Patients with native and conservative treatment of fractures

6. Pathological fractures other than osteoporosis

7. Patients with any other fractures other than hip fractures

8. Patients rejected for surgery by Anesthetists



Picture 1: Drawn picture showing various grades of osteoporosis as per Singh's Index.⁶

c) Statistical analysis

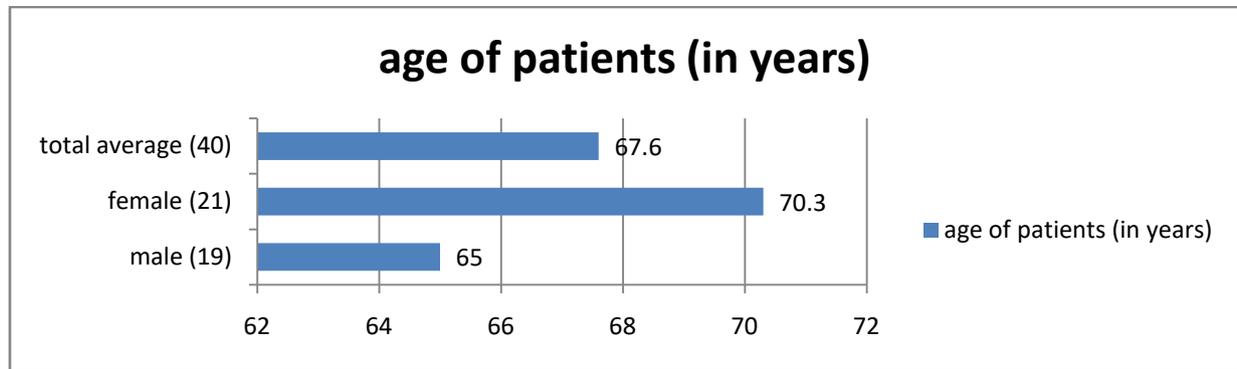
Through Pearson correlation analysis, simple average calculations.

III. OBSERVATION AND RESULTS

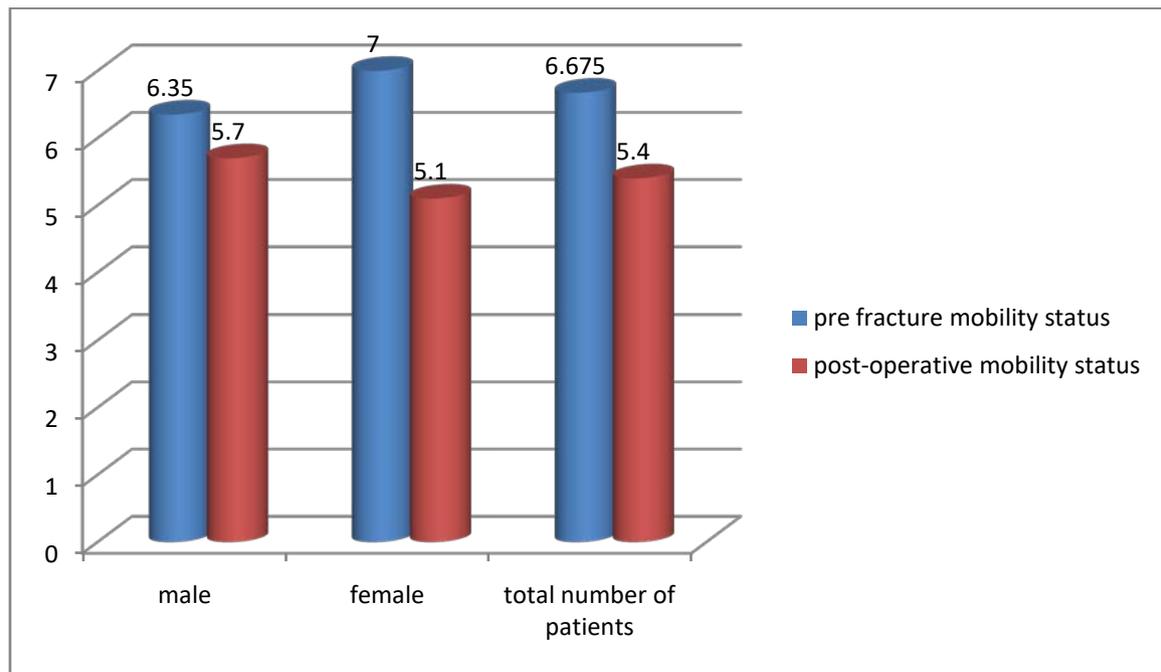
The retrospective study included 50 patients treated in our hospital for proximal femur fractures, but ten people could not present for follow-up. We had complete data of 40 patients. One patient expired, during the procedure on the fracture table, during fixation. Other three patients expired during various periods of study, i.e. ; one expired due to stroke in the

local hospital four months later, the other two patients expired due to post-operative complications.

In all, 20 female and 20 male patients, with an average age of 67.6 years (male-65 years and female-70.3 years). There are 22 Intertrochanteric fractures, 3 Subtrochanteric fractures and 15 fracture neck of femur.



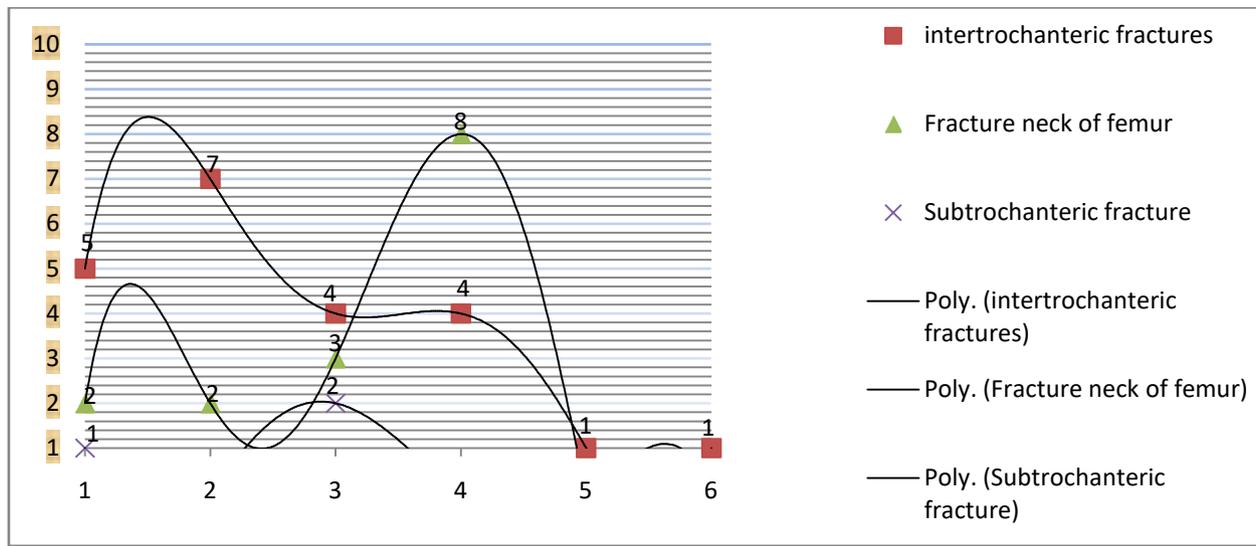
Picture 2: Bar chart, showing the average age of the male, female, and total no of patients in the study



Picture 3: Graph showing the difference between pre and post-operative mobility in Male, Female and total number of patients

Average pre-operative mobility (mobility before the fracture) was 6.67 and came down to 5.4. Abbreviated mental score test was 7.85.





Picture 4: Scatter Plot is showing osteoporosis grade (Singh's Index), fracture type and trends between

We in our study intend to find out whether there exists any correlation between osteoporosis and pre and post-operative mobility through correlation test (Pearson test). We proposed a *Null Hypothesis* that there is no co-relation between these variables. On

analysis, we found that these variables were related to each other. There is a positive correlation between the variables, but the intensity of the relationship between them varies as shown in table.2

Table 2: Shows the intensity of the relationship between these variables

Intensity of co-relationship	Variables
Stronger	• Pre-operative Versus Post-operative mobility status
Moderate	• Osteoporosis Versus Time taken to return to daily activities of living
Weak	• Osteoporosis Versus Post-operative mobility • Osteoporosis Versus Pre operative mobility

Hence the *null hypothesis* remains rejected.

IV. DISCUSSION

Osteoporosis, a condition which can cause disability and present a burden to already constrained health budget in developing countries, through fractures. Forget about the disability in old age due to constant osteoporotic pain; it can influence the type, and comminution of fracture, reduction and fixation during surgery, the healing time and mobilization of patients' post-operatively.⁷

In the study we intend to find out whether there exists a correlation between the osteoporosis and pre-fracture mobility and post-operative fracture mobility of patients. We used Singh's index in the grading of osteoporosis. We used the new mobility score to determine the mobility status of patients before the fracture and post-operatively. We found there exists the correlation between these variables which is positive i.e.; those patients with good bone strength will have a better pre-operative mobility, post-operative mobility, and early return to daily activities of living.

The reasons we project or infer towards this positive co-relation are:

1. Osteoporosis will impact the fracture type (the more the osteoporotic it will be Intertrochanteric).
2. Osteoporosis will result in more comminution of fracture (more comminution of fracture fragment will result in difficulty in reduction, increase surgery time, these fragments devoid of blood supply can influence union process at a later date)
3. Osteoporosis will influence the post op mobility (comminution increases post-operative recovery, time for mobilization)
4. Fracture neck of femur operated with bipolar and THR will have good post-operative mobility than Intertrochanteric fractures.
5. Intertrochanteric fractures operated with Proximal Femur nailing have good post-operative mobility than operated with DHS.

There is positive correlation between these variables, but intensity varies. There appears a strong relation between the pre-fracture mobility and post-operative fracture mobility followed by osteoporosis and its influence in return to daily activities of living. Per se we know the constraints of the study, a small sample size. Perhaps, an increase in the sample size can reveal the correlation in a better way. Osteoporosis influences

the healing of fracture which in turn affects the post-operative mobility and early return to daily activities of living.

Table 3: Shows correlation co-efficient between variables

Variables	Total no: of fractures	Intertrochanteric fractures	Fracture neck of fractures
Osteoporosis versus pre-operative mobility status	0.0423	0.1330	0.0839
Osteoporosis versus post- operative mobility status	0.1083	0.0193	0.2855
Pre operative and post-operative mobility status	0.5107	0.5914	0.4472
Osteoporosis versus time taken for return to activities of daily living	0.3399	0.4315	0.0238

(P<0.05)

One year mortality rate in hip fractures is about 10%-25% in various studies.^{1,8} In the study we have 10% mortality i.e. ;one patient expired during the surgery and remaining three due to post-operative complications (four out of 40 patients). In our study Picture, No.4 shows that the stronger the bone, the less number of fractures can be expected i.e. ; As osteoporosis decreases the fractures also decreases.

V. CONCLUSION

We infer that there exists a positive correlation between the osteoporosis and post-operative mobility of patients in proximal femur fractures, but also it influences the early return of daily activities of living after the surgery. Hence prevention of osteoporosis in the aging population decreases the incidence of proximal femur fractures, economic burden and disability in that particular population.

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