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Survival of geriatric patients (>65 yrs of age) operated for proximal femoral fracture and causes of mortality after 90 day follow up period

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Abstract

Background: Proximal femur fractures are common in the elderly and there is always an urgency to operate them. In northern India the hip fracture crude incidence for patients above the age of 50 years has been reported as 129 per 1,00,000 with no definite incidence of mortality of patients>65yrs found in literature.

Methods: The present study was a prospective observational study and was registered prospectively in the *clinical trials* registry- *India* (CTRI) with registration number of CTRI/2018/03/012853. Duration of study was from August 2017 to November 2018.

Results: Incidence of 30 day survival was 86.37% (n=95), incidence of 60 day survival was 78.19% (n=86) and incidence of 90 day survival was 74.55% (n=82).

Conclusion: To conclude in a resource limited country as ours the incidence of 30 day survival at a tertiary level institute is 86.37% which is comparable to the incidence reported in western literature.

Keywords: Survival, Neck, Femur.

Introduction

Perioperative management of the elderly with proximal femur fractures is a challenge for the anaesthesiologist.[1] The reported one year post-operative mortality is 20-35% for patients aged >65 years.[2] Disabilities and comorbidities are common in this age group and the ability to recover from damage is decreased. A multidisciplinary approach for pre and postoperative optimization of patient's has been reinforced by National Institute for care and health excellence (NICE).[3] Elderly patients are a heterogenous population; some may be robust while others are frail. A lot of disparity exists between the chronological and biological age and thus it is advised to focus on the

biological age when planning the perioperative management.

Proximal femur fractures are common in the elderly and there is always an urgency to operate them. In northern India the hip fracture crude incidence for patients above the age of 50 years has been reported as 129 per 1,00,000 with no definite incidence of mortality of patients>65yrs found in literature.[4] Patients operated within 48 hours have a better outcome than those with delayed surgical intervention.[5] Thus, in medically unstable patients we need to balance the risk of operating an unfit patient against the risk of delaying surgery because previous studies have reported that an early surgery on an unstable patients does not result in a statistically significant difference in mortality.[6,7]

Visit by an anesthesiologist for a pre-operative assessment is the first opportunity to recognize the issues and challenges anticipated for the surgery. A comprehensive geriatric assessment(CGA) is thus advocated to ensure that nothing is missed out.[8] It is time consuming but a pre-operative recognition of patients at high risk for adverse outcome enables appropriate informed consent, decision regarding the timing of surgery, preparation for the anesthetic management of the case , access and availability for higher level of care. It is advocated that the pre-operative assessment should alsofocus on geriatric – specific markers namely frailty, disability and co-morbidity.[9]

In an attempt to decrease the mortality of elderly with proximal femur fractures research has been conducted to identify the preoperative markers related to six month mortality. Thomas et al[10] identified impaired cognition, recent falls, lower albumin, anemia, functional dependence, and increased comorbidities as the significant factors influencing six month mortality.[10] They concluded that the perioperative presence of ≥4 geriatric specific markers has high sensitivity(81%) and specificity (86%) for six month mortality.

Material and Methods

The present study was a prospective observational study and was registered prospectively in the *clinical trials* registry- *India* (CTRI) with registration number of CTRI/2018/03/012853. Duration of study was from August 2017 to November 2018. We recruited patients till month of August in year 2018 and the three month follow up period ended in November 2018. Study was started after approval of the protocol by the Institute Ethics Committee (NK/3836/MD/499). Written informed consent of the patients was taken prior to recruitment. A minimum sample size of 80 patients (approved by the Institute Ethics Committee) was chosen based on the monthly audit reports which recorded a median number of cases of proximal femur fractures in elderly (>65years) to be 9/month.

Inclusion Criteria

Patients aged more than 65 years of age with proximal femoral fracture following trivial trauma, admitted in the Advanced Trauma Center and orthopedic ward of PGIMER for operative intervention were evaluated for inclusion.

Exclusion Criteria

1) Patients with poly-trauma.

2) Patients with pathological fracture.

3) Refusal to give consent.

Statistical Analysis

Statistical analysis was carried out using IBM SPSS (Statistical Package for Social Sciences) statistical version 2.0. The analysis included frequency table, association of variables based on Chi-square test.

Normality of data was checked by Kolmogorov–Smirnov tests of normality.

All quantitative variables assessing the 30, 60 and 90 day adverse outcome were estimated using measures of central tendency (mean and median) and measures of dispersion (standard deviation). All statistical tests were seen at two-tailed level of significance ($p \leq 0.05$). Statistical significance between the survivor and non-survivor group was tested using 2 sample independent t test (for normal variables) and Mann Whitney test (for non-normal variables).

To find factors that affect the outcome of elderly patients undergoing orthopedic interventions we used multivariate logistic regression analysis. Variable for multivariate analysis were chosen from significant variables via univariate analysis. All variables were made dichotomous by using dummy variables as 0 and 1. As a first step univariate models of 30, 60, 90 day mortality were evaluated to see the predictive capacity of all collected individual variable thought by the investigators to have a predictive effect on mortality $P \leq 0.05$ was statistically significant.

Results

Incidence of 30 day survival was 86.37% (n=95), incidence of 60 day survival was 78.19% (n=86) and incidence of 90 day survival was 74.55% (n=82).

Death at 30 days: Out of the 15 mortalities that took place in the first 30 days fourteen were in the hospital and one was after discharge at home. Out of the 14 mortalities 5 were in ICU, 5 in HDU and remaining 4 were in ward.

Table 1: 30 day mortality; incidence and immediate cause of death

Cause of death	Postoperative day of death	Number of patients
Cardiac	2*,3,4,4,5,15	6
PTE	2,4	2
Sepsis	21**,7,18	3
BCIS	2*	1
ARF	5,7	2
Exacerbation of COPD	7	1

*2 died on day 1;**Died at home

PTE-Pulmonary thromboembolism; BCIS- Bone cement implantation syndrome; ARF-Acute renal failure; COPD-Chronic obstructive pulmonary disease.

Death at 60 days. Out of the 9 mortalities that took place in the 30-60 days 3 were in the hospital and 6 were after discharge at home. Out of 3 deaths in , one was in ICU, two were in HDU(High dependency unit).

Table 2: 60 day mortality; incidence and immediate cause of death

Cause of death	Postoperative day of death	Number of patients
PTE	40,33	2
Sepsis	57**,57	2
RF	52**	1
#Failure to thrive	44**,46**,54**	3
Aspiration of food	40**	1

**Died at home; RF-Renal failure; #Failure to thrive is a combination of immobility, appetite loss with poor feeding leading to increased morbidity and death, PTE-Pulmonary thrombo embolism.

Death at 90 days: Out of the 4 mortalities that took place in the 60-90 days all were after discharge at home

Table 3: 90 day mortality; incidence and immediate cause of death

Cause of death	Postoperative day of death	Number of patients
PTE (saddle thrombus)	71	1
Unknown	89	1
#Failure to thrive	61	1
Pneumonia	83	1

PTE-Pulmonary thromboembolism;#Failure to thrive is a combination of immobility, appetite loss with poor feeding leading to increased morbidity and death

Discussion

This prospective, single center observational study assessed mortality after proximal femoral fractures in patient aged more than 65 years following trivial trauma. In our study the incidence of mortality at 30 days was 13.63% and is higher than the incidence reported in western countries which reports it as 5.36%.[11] This can be explained by the delay in surgical fixation of the fracture in our subset of patients. The median (IQ) delay was reported to be 12(8-18) days. Delay in surgical fixation of proximal femoral fracture is known to affect early (30 day) and late mortality.[12]A delay of more than 48 hours increase odds of 30 day mortality by 41% and one year mortality by 32%.[13]

Incidence of mortality at 60 days and 90 days in our study was 21.82% and 25.45% respectively. The incidence of 90 day mortality reported by Mohamed et al[14] in NOF fractures (in patient) with a mean waiting time for surgery of 26.6 hours was 22.6% and is comparable with ours. The reason attributed to delay in surgery in their study was delay in review by orthogeriatrician. In their study main cause of acute death was acute myocardial infarction and sepsis of unknown origin. Main cause of acute death in our study was cardiac (infarction) 40%, sepsis 20%. The main cause of death at 30-60 day interval in our study was failure to thrive (33.33%) sepsis/PTE (16.66% each). In 60-90 day interval PTE, failure to thrive, pneumonia (25% each) were the causes of mortality.

Conclusion

To conclude in a resource limited country as ours the incidence of 30 day survival at a tertiary level institute is 86.37% which is comparable to the incidence reported in western literature.

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