



90-Day Mortality Following Hip Fracture in Elderly Patients: A Retrospective Study at a Tertiary Care Centre

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ABSTRACT

Background: Hip fractures in the elderly are associated with substantial morbidity, mortality, and healthcare burden despite advances in surgical management. The first 90 days following hip fracture represent a critical period during which a significant proportion of deaths occur. Data on short-term mortality from Indian tertiary care centres remain limited.

Methods: A retrospective observational study was conducted at a tertiary care centre including 100 patients aged >60 years who underwent surgery for hip fractures. Demographic characteristics, fracture pattern, surgical procedure, and 90-day survival status were obtained from hospital records. The primary outcome was all-cause mortality within 90 days. Descriptive statistics were used to summarize patient characteristics, and associations between mortality and age group or sex were analysed using the Chi-square test.

Results: The mean age was 77.66 ± 8.01 years (range, 61–94 years), with females comprising 59% of patients. Intertrochanteric fractures were the most common fracture type (63%), and long proximal femoral nailing was the most frequently performed procedure (53%). Thirteen patients died within 90 days, resulting in an overall mortality rate of 13% (95% confidence interval: 6.4%–19.6%). Mortality was highest in patients aged ≥ 90 years (25%), but no significant association was found between mortality and age group ($\chi^2 = 1.48$, $p = 0.688$) or sex ($\chi^2 = 0.00$, $p = 1.000$).

Conclusion: The 90-day mortality following hip fracture surgery was 13%, comparable with contemporary literature. Hip fractures continue to be associated with considerable early mortality, underscoring the importance of timely surgery, multidisciplinary perioperative care, and structured rehabilitation to improve short-term outcomes.

Key-words: Hip fracture; Elderly; Ninety-day mortality; Proximal femur fracture; Intertrochanteric fracture; Tertiary care centre

INTRODUCTION

Hip fractures are among the most common and devastating injuries affecting the elderly population, representing a major cause of morbidity, mortality, functional decline, and healthcare expenditure worldwide. [1-3]

As life expectancy continues to increase, the incidence of hip fractures is expected to rise substantially, particularly in developing countries with rapidly ageing populations. Despite advances in surgical techniques, perioperative care, and rehabilitation, hip fractures remain associated with significant short- and long-term mortality, with many survivors experiencing prolonged disability and loss of independence. [1-4]

Early mortality following hip fracture is an important indicator of the quality of patient care and overall clinical outcomes. While one-year mortality has traditionally been reported in the literature, assessment of mortality within the first 90 days provides a more meaningful

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measure of early postoperative outcomes, encompassing the immediate effects of injury, surgical intervention, perioperative complications, and early rehabilitation.^[2,5]

Previous studies have demonstrated that a substantial proportion of deaths following hip fracture occur within the first three months after injury, emphasizing the clinical relevance of evaluating 90-day mortality.^[2,5]

Recent international guidelines advocate prompt surgical management, multidisciplinary orthogeriatric care, early mobilization, and standardized perioperative protocols to improve outcomes following hip fractures in older adults.^[2,3] Although these strategies have contributed to improved patient care, mortality following hip fracture continues to remain high, with reported rates varying considerably across different populations and healthcare systems because of differences in patient demographics, healthcare infrastructure, and perioperative management.^[1,4]

Data regarding short-term mortality following hip fractures from Indian tertiary care centres remain relatively limited. Local epidemiological data are essential for understanding the burden of disease, benchmarking institutional outcomes, and facilitating comparisons with international literature. Evaluation of 90-day mortality may also help assess the effectiveness of existing treatment pathways and identify opportunities for improving patient care. Therefore, the present study was undertaken to determine the 90-day mortality among elderly patients undergoing surgical treatment for hip fractures at a tertiary care centre.

MATERIALS AND METHODS

Study Design and Setting- This retrospective observational study was conducted at the Department of Orthopaedics, Dr B R Ambedkar Medical College and Hospital, a tertiary care centre. Hospital records of elderly patients admitted with hip fractures between Feb 2024 and Jan 2026 were retrospectively reviewed.

Study Population- The study included patients aged 60 years and above who sustained a hip fracture and underwent surgical management during the study period.

Inclusion Criteria

- ❖ Patients aged ≥ 60 years.

- ❖ Radiologically confirmed hip fractures, including intracapsular neck of femur fractures and extracapsular intertrochanteric fractures.
- ❖ Patients who underwent definitive surgical treatment at our institution.
- ❖ Availability of complete hospital records and documented follow-up for 90 days after surgery.

Exclusion Criteria

- ❖ Pathological fractures.
- ❖ Periprosthetic fractures.
- ❖ Polytrauma patients with multiple major injuries.
- ❖ Patients managed conservatively.
- ❖ Patients with incomplete medical records or unavailable 90-day follow-up data.

Data Collection- Patient information was obtained from the institutional electronic medical records and inpatient case files. The following variables were recorded: The collected variables included age, sex, type of hip fracture, date of injury, date and type of surgical procedure, date of discharge, and survival status at 90 days following surgery. Mortality was assessed as all-cause mortality occurring within 90 days after surgery. Survival status was determined from hospital records and, where necessary, verified through telephonic follow-up with patients or their relatives to ensure complete 90-day outcome data. Mortality data were obtained from hospital records and verified through telephonic follow-up where necessary.

Outcome Measure- The primary outcome of the study was 90-day all-cause mortality, defined as death due to any cause occurring within 90 days following surgical treatment of the hip fracture.

Statistical Analysis- Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics version XX (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean $\pm$ standard deviation (SD) or median with interquartile range (IQR), depending on data distribution. Categorical variables were summarized as frequencies and percentages. The 90-day mortality rate was calculated by dividing the number of deaths occurring within 90 days after surgery by the total number of patients included in the study and expressed as a percentage.



Ethical Considerations- The study protocol was approved by the Institutional Ethics Committee of Dr B R Ambedkar Medical College and Hospital. As this was a retrospective study utilising anonymised hospital records, the requirement for informed consent was waived by the ethics committee. Patient confidentiality was maintained throughout the study in accordance with the ethical principles outlined in the Declaration of Helsinki.

RESULTS

A total of 100 elderly patients aged >60 years with hip fractures who underwent surgical management were included. The mean age was 77.66 ± 8.01 years (range, 61–94 years), with a median of 78 years. Most patients were aged 70–79 years (43%), followed by 80–89 years (35%). Patients aged 60–69 years accounted for 18%, while 4% were aged >90 years (Table 1).

Table 1: Age distribution of study participants

Age group (years)	Number of patients (n)	Percentage (%)
60–69	18	18
70–79	43	43
80–89	35	35
≥90	4	4
Total	100	100

Among the 100 patients, 59 (59%) were females and 41 (41%) were males, giving a female-to-male ratio of 1.4:1 (Table 2).

Table 2: Sex distribution

Sex	Number of patients (n)	Percentage (%)
Male	41	41
Female	59	59
Total	100	100

Intertrochanteric fractures were the most common fracture pattern, accounting for 63% of cases, followed

by fractures of the neck of the femur (26%) and subtrochanteric fractures (11%) (Table 3).

Table 3: Distribution of fracture pattern

Fracture type	Number of patients (n)	Percentage (%)
Intertrochanteric fracture	63	63
Neck of femur fracture	26	26
Subtrochanteric fracture	11	11
Total	100	100

The most frequently performed surgical procedure was proximal femoral nailing (Long PFN) in 53% of patients,

followed by arthroplasty (27%), short PFN (11%), and PFN-A2 (9%) (Table 4).

Table 4: Surgical procedures performed

Procedure	Number of patients (n)	Percentage (%)
Arthroplasty	27	27
Long PFN	53	53
Short PFN	11	11
PFN-A2	9	9
Total	100	100

A total of 13 patients died within 90 days following surgery, resulting in an overall 90-day mortality rate of 13%. The estimated 95% confidence interval (CI) for the

mortality rate was 6.4%–19.6% (normal approximation) (Table 5).

Table 5: Overall 90-day mortality

Outcome	Number (n)	Percentage (%)
Alive at 90 days	87	87
Dead within 90 days	13	13
Total	100	100

The highest mortality was observed among patients aged ≥ 90 years (25%), followed by those aged 70–79 years (14%), 80–89 years (14.3%), and 60–69 years (5.6%). Among male patients, 5 of 41 (12.2%) died within 90 days, whereas 8 of 59 (13.6%) female patients died during the same period.

DISCUSSION

Hip fractures remain one of the leading causes of morbidity and mortality among the elderly despite advances in surgical management, anaesthesia, and perioperative care.^[1-4] The present study evaluated the 90-day mortality following surgical management of hip fractures in elderly patients at a tertiary care centre. Among the 100 patients included in the study, the overall 90-day mortality was 13%, with no statistically significant association between mortality and either age group or sex.

The overall 90-day mortality of 13% observed in the present study is comparable with reports from both Indian and international literature. Previous studies have consistently demonstrated that mortality within the first three months after hip fracture ranges between 10% and 20%, despite improvements in surgical and perioperative management.^[2,5,6] A recent retrospective study by Postler *et al.* reported a 90-day mortality of 17.6% among elderly patients with proximal femoral fractures treated surgically.^[6]

Indian literature evaluating short-term mortality after hip fractures remains relatively sparse. Gupta *et al.* reported a one-year mortality of approximately 22% following hip fracture surgery in patients aged 50 years and above, highlighting the significant mortality burden associated with these injuries in the Indian population.^[7] Rajasekaran *et al.* similarly reported excess mortality among elderly Indian patients with hip fractures, with a one-year mortality of 19%.^[8]

Although direct comparisons between 90-day and one-year mortality should be made cautiously, these studies suggest that a substantial proportion of deaths occur during the early post-fracture period, supporting the relevance of 90-day mortality as a clinically meaningful outcome measure. Similarly, data from the Irish Hip Fracture Database demonstrated a 120-day mortality of approximately 15%, while analyses from the United Kingdom National Hip Fracture Database have reported comparable short-term mortality rates.^[9,10] The slightly lower mortality observed in our study may be attributable to differences in patient demographics, perioperative optimization, institutional protocols, and healthcare delivery systems.

The mean age of patients in the present study was 77.66 ± 8.01 years, which is comparable to that reported in contemporary studies involving elderly hip fracture populations.^[6,8,11] Most patients belonged to the seventh and eighth decades of life, reflecting the increasing incidence of fragility fractures with advancing age. Although mortality was highest among patients aged ≥ 90 years (25%) in the present study, the association between age group and mortality did not reach statistical significance. The absence of significance may be explained by the relatively small sample size and the limited number of patients in the oldest age category. Nevertheless, numerous large-scale studies have demonstrated increasing age to be independently associated with mortality following hip fracture.^[6,7,11,12] The Swedish Hip Fracture Register and other national registry studies have consistently shown progressively higher mortality with advancing age, particularly among patients older than 85 years.^[11,12]

Females constituted 59% of the study population, resulting in a female-to-male ratio of approximately 1.4:1. This finding is consistent with established epidemiological patterns and reflects the higher

prevalence of osteoporosis among postmenopausal women.^[1,7,8] Similar female predominance has been reported in national hip fracture registries across Europe and Asia.^[11,13] Although mortality rates were comparable between males (12.2%) and females (13.6%) in our study, several larger population-based investigations have reported significantly higher mortality among male patients after hip fracture.^[12-14] Endo *et al.* in a systematic review and meta-analysis, demonstrated that male sex was associated with increased mortality following hip fracture, potentially owing to a greater burden of comorbid illness and reduced physiological reserve.^[14] The lack of a significant sex-related difference in our cohort may again reflect the limited sample size.

Intertrochanteric fractures accounted for nearly two-thirds (63%) of all fractures in the present study, followed by neck of femur fractures (26%) and subtrochanteric fractures (11%). This distribution is consistent with previous reports demonstrating that intertrochanteric fractures represent the most common osteoporotic hip fracture subtype among elderly individuals.^[3,7,13] Correspondingly, proximal femoral nailing was the most frequently performed procedure (53%), reflecting contemporary surgical preferences for unstable extracapsular fractures. Arthroplasty was predominantly performed for displaced intracapsular fractures, in accordance with current guideline recommendations.^[2,3]

The 95% confidence interval for the observed mortality rate (6.4%–19.6%) suggests that the true 90-day mortality within a similar population is likely to fall within this range. Although the confidence interval is relatively wide because of the modest sample size, the observed mortality remains consistent with findings from recent systematic reviews and registry-based studies.^[5,6,15]

STRENGTHS

The strengths of the present study include complete 90-day follow-up of all patients and evaluation of a contemporary cohort managed at a tertiary care centre using current surgical practices.

LIMITATIONS

The retrospective design may introduce selection and information bias. The relatively small sample size limits statistical power and may have contributed to the

absence of significant associations between mortality and demographic variables. Additionally, potentially important predictors of mortality, including comorbidities, ASA grade, timing of surgery, nutritional status, pre-fracture mobility, postoperative complications, and cause of death, were not assessed. Future prospective multicentre studies with larger sample sizes are needed to provide more robust estimates of 90-day mortality and identify modifiable risk factors in the Indian population.

CONCLUSIONS

Hip fractures in elderly patients remain associated with substantial early mortality despite advances in surgical and perioperative care. In this retrospective study of 100 patients, the 90-day mortality was 13%. Most patients were aged 70–89 years, with female predominance and intertrochanteric fractures. Although mortality was higher among patients aged >90 years, age and sex were not significantly associated with 90-day mortality. These findings highlight the need for timely surgery, multidisciplinary perioperative management, early mobilization, and structured follow-up. Larger prospective multicentre studies are needed to identify modifiable factors associated with short-term mortality after hip fracture surgery in the Indian population.

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