

# Post-operative complications in elderly patients undergoing hip fracture surgery: An observational study



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## ABSTRACT

**Background:** Hip fractures in elderly patients are a significant health-care concern due to their high morbidity and mortality rates. **Aims and Objectives:** This study aims to analyze post-operative complications in this demographic to improve care strategies. **Materials and Methods:** This observational study included 100 patients aged between 65 and 90 years, undergoing hip fracture surgery. The cohort comprised 40% males and 60% females. Patients underwent either total hip replacement (30%) or internal fixation (70%). We tracked post-operative complications within the first 30 days, mortality and reoperation rates, and recovery and rehabilitation outcomes over 6 months. **Results:** Post-operative complications were reported in several categories: Infection (10%), cardiovascular (15%), respiratory (12%), renal (5%), neurological (8%), and gastrointestinal (6%). The most common infections were superficial wound infections (6%) and deep infections (4%). Cardiovascular complications included arrhythmias (8%), myocardial infarction (4%), and venous thromboembolism (3%). Pneumonia (7%), acute respiratory distress syndrome (3%), and pulmonary embolism (2%) were the primary respiratory complications. The study also recorded a 4% 30-day mortality rate and a 7% reoperation rate. The average hospital stay was 7 days, with 60% of patients requiring post-discharge rehabilitation. At 6-month post-surgery, 70% of patients had achieved complete recovery. **Conclusion:** The study highlights a significant incidence of post-operative complications among elderly patients undergoing hip fracture surgery. The findings underscore the need for comprehensive perioperative care and vigilant monitoring to mitigate these risks. The data also stress the importance of post-discharge rehabilitation in enhancing recovery outcomes.

**Key words:** Elderly patients; Hip fracture surgery; Post-operative complications; Rehabilitation; Recovery

## INTRODUCTION

Hip fractures in the elderly represent a major public health challenge, characterized by high morbidity and mortality rates, and significant health-care costs.<sup>1</sup> These fractures commonly result from low-energy trauma in patients with pre-existing comorbidities and osteoporosis, leading to a cascade of health-care needs and complications.<sup>2</sup> With the aging population, the incidence of hip fractures is anticipated to rise, further amplifying their impact on both individuals and health-care systems.<sup>3</sup>

The complexity of managing hip fractures in the elderly stems not only from the surgical intervention required but also from the myriad of medical, social, and psychological issues that accompany this patient demographic.<sup>4</sup> Elderly patients often present with a range of comorbid conditions, such as cardiovascular and respiratory diseases, diabetes, and cognitive impairments, which can complicate both the surgical procedure and the post-operative recovery process.<sup>5</sup> Furthermore, the recovery from hip fracture surgery involves not only just physical healing but also rehabilitation to restore mobility and independence, aspects that are crucial for the quality of life in the elderly.

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The surgery for hip fractures varies based on the type and location of the fracture and the patient's overall health status.<sup>6</sup> The two primary surgical interventions are total hip replacement and internal fixation. Total hip replacement is often reserved for more severe fractures, whereas internal fixation is typically employed for less complicated breaks.<sup>6</sup> However, each surgical approach carries its own risks and potential complications, which can include infections, venous thromboembolism, cardiovascular events, and prolonged recovery times.

Post-operative complications are a significant concern in this patient population. These complications can range from acute events, such as infections and cardiovascular incidents, to longer-term challenges such as reduced mobility and decreased independence. The risk of complications is exacerbated by the patient's advanced age and the presence of comorbid conditions. These complications not only affect the immediate recovery and survival of patients but also have long-term implications for their functional status and quality of life.

In the context of these challenges, the role of a multidisciplinary approach in managing elderly patients with hip fractures becomes paramount. This approach encompasses not only surgical treatment but also pre-operative assessment, post-operative care, pain management, and rehabilitation. It involves a team of health-care professionals including surgeons, anesthesiologists, geriatricians, nurses, physiotherapists, and social workers. The goal is to provide comprehensive care that addresses all aspects of the patient's health and well-being.

Given the significant impact of hip fractures on the elderly, there is a pressing need for research that elucidates the various facets of post-operative complications and recovery. Such research is crucial for informing clinical practices and health-care policies aimed at improving outcomes for this vulnerable population.

### Aim and objectives

The aim of this study is to comprehensively analyze the post-operative complications experienced by elderly patients undergoing hip fracture surgery and to evaluate their recovery and rehabilitation outcomes. This research seeks to contribute valuable insights into the risks and challenges faced by this patient group, thereby informing strategies for optimized care.

The specific objectives of the study are as follows:

- To categorize and quantify the different types of post-operative complications occurring within 30 days of hip fracture surgery
- To assess the rates of mortality and reoperation within this patient cohort

- To evaluate the length of hospital stay and the proportion of patients requiring post-discharge rehabilitation facilities
- To determine the rate of complete recovery at 6-month post-surgery, thus providing a comprehensive picture of the short and long-term outcomes following hip fracture surgery in the elderly.

## MATERIALS AND METHODS

### Study setting and design

This observational study was conducted at Government Medical College, Srikakulam, Andhra Pradesh, India, spanning a period from June 2022 to May 2023. The study was designed to observe and analyze post-operative complications, recovery, and rehabilitation outcomes in elderly patients undergoing hip fracture surgery.

### Participants

The study included a cohort of 100 patients, selected based on the following criteria:

- Age: 65–90 years
- Diagnosis: Sustained hip fracture requiring surgical intervention.

### Exclusion criteria

Patients with multiple traumatic injuries, pre-existing chronic infections, or who had undergone previous hip surgeries were excluded from the study.

### Data collection

Data were collected through patient medical records, which included demographic information, medical history, details of the surgical procedure, and post-operative care. The type of surgery (total hip replacement or internal fixation) was noted, along with any intraoperative complications.

### Follow-up and outcome measures

Patients were followed for 6-month post-surgery. The primary outcome measures were as follows:

#### *Post-operative complications*

These complications were divided into several categories including infection, cardiovascular issues, respiratory problems, renal concerns, neurological disturbances, and gastrointestinal issues. Each of these complications was documented and classified according to its intensity and the extent to which it affected the patient's recuperation process. Patients identified as high-risk before surgery are subjected to thorough cardiac assessments, enhancement of respiratory capabilities, rigorous observation of kidney function, adjustments in medication, prevention of blood clots, careful planning of anesthesia, attentive post-surgery

**Table 1: Study sample characteristics**

Characteristic	Details
Total patients	100
Age range	65–90 years
Gender distribution	40% male (40 patients), 60% female (60 patients)

**Table 2: Types of surgical procedures**

Procedure	Percentage of patients	Number of patients
Total hip replacement	30	30
Internal fixation	70	70

**Table 3: Post-operative complications (within 30 days of surgery)**

Complication category	Total cases (%)	Specific complications and percentage
Infection	10	Superficial wound infections: 6, deep infections: 4
Cardiovascular	15	arrhythmias: 8, myocardial infarction: 4, venous thromboembolism: 3
Respiratory	12	Pneumonia: 7, ARDS: 3, Pulmonary embolism: 2
Renal	5	Acute kidney injury: 5
Neurological	8	Stroke: 3, delirium: 5
Gastrointestinal	6	Gastrointestinal bleed: 4, Ileus: 2

**Table 4: Mortality and reoperation rates**

Outcome	Percentage
30-day mortality rate	4
Reoperation rate	7

**Table 5: Recovery and rehabilitation**

Metric	Value
Average hospital stay	7 days
Patients requiring rehabilitation facility post-discharge	60%
Complete recovery at 6-month post-surgery	70%

monitoring, and encouraged to start moving as soon as possible. To minimize potential risks, a team of health-care professionals from various disciplines works together to provide individualized care.

### Mortality and reoperation rates

The occurrence of death and the need for any reoperation within 30-day post-surgery were documented.

### Recovery and rehabilitation

The length of hospital stay, the requirement for rehabilitation post-discharge, and the rate of complete recovery at 6 months were assessed.

### Data analysis

Data were analyzed using appropriate statistical methods. Categorical data were expressed as percentages, whereas continuous data were expressed as mean±standard deviation. The incidence of various post-operative complications and other outcome measures were calculated and presented in a comprehensive manner.

### Ethical considerations

Ethical approval was obtained from the Institutional Ethics Committee of Government Medical College, Srikakulam, Andhra Pradesh, India. All participants gave written informed consent, aligning with the Declaration of Helsinki's ethical guidelines.

## RESULTS

This observational study included a cohort of 100 patients aged between 65 and 90 years. The cohort comprised 40 males (40%) and 60 females (60%), reflecting the demographic distribution of patients typically presenting with hip fractures (Table 1).

### Surgical interventions

Participants underwent one of two surgical procedures. Thirty patients (30%) received total hip replacements, a procedure commonly indicated for severe hip fractures or degenerative changes. The remaining seventy patients (70%) underwent internal fixation, a standard treatment for stabilizing fractured bones (Table 2).

### Post-operative complications within 30 days of surgery

#### Infection-related complications

This was observed in 10% of patients, with superficial wound infections constituting 6% and more severe deep infections comprising 4%. This highlights the importance of stringent sterile techniques and post-operative wound care.

#### Cardiovascular complications

These were reported in 15% of the patient population. The breakdown includes arrhythmias (8%), myocardial infarction (4%), and venous thromboembolism (3%). The data suggest a need for careful cardiovascular monitoring post-surgery, especially considering the age and potential comorbidities of the patient population.

#### Respiratory complications

Respiratory issues were noted in 12% of cases, with pneumonia being the most common (7%). Acute respiratory distress syndrome (ARDS) and pulmonary embolism were also noted, accounting for 3% and 2% of complications, respectively. These findings underscore

the necessity for vigilant respiratory care and monitoring during the post-operative period.

#### **Renal complications**

Acute kidney injury was identified in 5% of patients, emphasizing the need for careful medication management and monitoring of renal function.

#### **Neurological complications**

Neurological issues were observed in 8% of the cohort, including stroke (3%) and delirium (5%). This indicates the need for comprehensive neurological assessments and interventions to mitigate these risks.

#### **Gastrointestinal complications**

Complications in this category were present in 6% of patients, with gastrointestinal bleeding (4%) and ileus (2%) being the primary concerns. These complications necessitate prompt recognition and treatment to prevent further morbidity (Table 3).

#### **Mortality and reoperation rates**

The 30-day mortality rate was 4%, reflecting the serious nature of hip fractures in elderly populations. In addition, a 7% reoperation rate suggests a significant need for surgical revision or intervention post-initial surgery (Table 4).

#### **Recovery and rehabilitation**

The average hospital stay was 7 days, indicative of the acute care phase post-surgery. A significant proportion of patients (60%) required transfer to a rehabilitation facility, highlighting the need for extended care and therapy post-discharge. At the 6-month follow-up, 70% of patients had achieved complete recovery, demonstrating a generally favorable outcome for most patients' post-surgery (Table 5).

## **DISCUSSION**

### **Contextualizing post-operative complications in elderly hip fracture patients**

Our study's findings regarding the high incidence of post-operative complications, including infections, cardiovascular, and respiratory issues, resonate with the complexities highlighted in existing research. As Ruths et al.,<sup>7</sup> and Huette et al.,<sup>8</sup> emphasize, our observation of a 10% infection rate, primarily consisting of superficial wounds and deep infections, underscores the critical need for stringent infection control measures in post-operative care. This is particularly pertinent given the vulnerable nature of the elderly patient population, who are more susceptible to complications due to age-related physiological changes and comorbid conditions.

### **Cardiovascular and respiratory considerations**

The cardiovascular complications observed in our study, such as arrhythmias, myocardial infarction, and venous

thromboembolism in 15% of patients, underscore the necessity of thorough cardiovascular assessment and management, supporting the recommendations by Simunovic et al.<sup>9</sup> This highlights the importance of a comprehensive approach to patient care, which includes pre-operative evaluation of cardiovascular risk factors, intraoperative management, and vigilant post-operative monitoring. Similarly, the 12% incidence of respiratory complications, including pneumonia, ARDS, and pulmonary embolism, reinforces the need for proactive respiratory care, especially considering the decreased mobility and potentially prolonged bed rest associated with hip fracture surgery.

### **The role of multidisciplinary care**

The study's findings on renal and neurological complications illustrate the importance of a multidisciplinary approach in the care of hip fracture patients. The involvement of nephrologists and neurologists, as suggested by Liu et al.,<sup>10</sup> and Mazzola,<sup>11</sup> is crucial for addressing these complex issues that extend beyond the scope of orthopedic surgery. This approach ensures comprehensive patient care, addressing all aspects of the patient's health and facilitating a more holistic recovery process.

### **Mortality and reoperation rates:**

Indicators of severity and complexity of our observed 30-day mortality rate of 4% and a 7% reoperation rate are notable indicators of the severity and complexity of managing hip fractures in the elderly. These statistics align with the findings of Raspopović et al.,<sup>12</sup> and Alexiou et al.,<sup>13</sup> emphasizing the necessity of comprehensive pre-operative assessments and diligent post-operative care. Such measures are essential to minimize the risk of mortality and the need for subsequent surgical interventions.

### **Recovery and rehabilitation: Pathways to improved outcomes**

The study's observation of an average 7-day hospital stay and the requirement of 60% of patients for post-discharge rehabilitation align with the current understanding of recovery processes following hip fracture surgery. The findings support the assertions by Moerman et al.,<sup>14,15</sup> regarding the significance of rehabilitation in not only just physical recovery but also in improving health-related quality of life and aiding patients in returning to their pre-fracture levels of daily activities. Our data show that 70% of patients achieved complete recovery at 6-month post-surgery further underscore the effectiveness of structured rehabilitation programs in ensuring successful long-term outcomes.

### **Limitations of the study**

While providing valuable insights, the study's findings are limited by its observational nature and single-center design. Future multicenter studies with larger sample sizes and longer follow-up durations are needed to validate these findings and explore the long-term outcomes of these patients.



## CONCLUSION

Our study highlights the significant post-operative complications faced by elderly patients undergoing hip fracture surgery. The observed complications, including infection, cardiovascular, respiratory, and neurological issues, emphasize the need for comprehensive and multidisciplinary care. The study's insights into mortality, reoperation rates, and the effectiveness of post-discharge rehabilitation are crucial for developing improved care strategies to enhance patient outcomes and quality of life in this high-risk population.

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**SKK**- Concept and design of the study, results interpretation, review of the literature, and preparing the first draft of the manuscript. Statistical analysis and interpretation, revision of the manuscript; **KRK**- Concept and design of the study, results interpretation, review of the literature and preparing the first draft of the manuscript, revision of the manuscript; **LPK**- Review of literature and preparing the first draft of the manuscript. Statistical analysis and interpretation; **NNB**- Concept and design of the study, results interpretation, review of the literature, and preparing the first draft of the manuscript. Statistical analysis and interpretation, revision of the manuscript.

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