

Original Research Article

Tackling the challenge of 90-day readmissions in hip fracture management: a retrospective study

Prajwal A. Srinivasan^{1*}, Vinayak Venugopal¹, Raam M. Selvarajan¹, Satish Dhotare¹,
Ranusha Ganapathy¹, Shiv Patel¹, Muhammad Tariq², Omar Mahmoud¹

¹Whiston Hospital, Mersey west Lancashire NHS trust, UK

²Department of Elderly Medicine, Whiston Hospital, Mersey west Lancashire NHS trust, UK

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*Correspondence:

Dr. Prajwal Anand Srinivasan,

E-mail: prajwal.srinivasan@sthk.nhs.uk

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ABSTRACT

Background: Hip fracture readmissions within 90 days pose a significant challenge in orthopaedics, burdening healthcare systems and affecting patient outcomes. This study, set against the backdrop of an aging population and rising hip fracture incidences, seeks to analyse the factors contributing to these readmissions and propose viable management strategies.

Methods: Conducted as a single centre study at a hospital which is part of the NHS UK, this retrospective study reviewed 1264 patients treated for neck of femur (NOF) fractures between April 2020 and December 2022. Data on patient demographics, comorbidities, surgical interventions, and readmission reasons were collected and analysed using descriptive statistics and multivariable logistic regression.

Results: The study found a 21.8% readmission rate, with the majority being for non-orthopaedic reasons such as infections and cardiovascular events. Age and comorbidities were significant predictors of readmission, while surgical factors had a less pronounced impact. A year-wise trend showed a peak in readmissions during the COVID-19 pandemic.

Conclusions: The findings emphasize the complexity of managing NOF fractures and the importance of a comprehensive, multidisciplinary approach to care. Targeted interventions, including orthogeriatric co-management and falls assessment, are recommended to mitigate readmission risks and enhance patient care, though further research is needed for more definitive strategies.

Keywords: Hip fracture, Readmission, Orthopaedics, Retrospective study, Management strategies, NOF fracture, Healthcare burden

INTRODUCTION

In the realm of orthopaedics, the issue of readmissions following hip fracture surgeries represents a significant concern for healthcare providers and patients alike. This retrospective study, spearheaded by the diligent efforts at our district general hospital which is a part of the NHS UK, delves into the intricacies of 90-day readmission rates for patients treated for NOF fractures.¹ With the backdrop of an ageing population and the rising incidence of hip fractures, estimated at 75,000 cases per annum in England alone and a cost burden of £1 billion annually, the study

underscores the urgent need for effective management strategies.²

The research presents a comprehensive analysis of 1,264 patients treated for NOF fractures between April 2020 and December 2022, employing a meticulous retrospective data collection approach. It highlights the critical challenges faced by the healthcare system, including the substantial rate of readmissions, which poses a considerable strain on resources and patient well-being. The study identifies a variety of factors contributing to the high readmission rates, including non-orthopaedic

reasons, which account for the majority, and orthopaedic causes such as infections and dislocations.³

The introduction of targeted outpatient approaches and preventive measures is proposed as a viable solution to mitigate the burden on the national health service (NHS). By examining the data year-wise, the study offers valuable insights into the patterns of readmissions, including the impact of the COVID-19 pandemic on these rates. It further explores orthogeriatric interventions, falls assessments, and the adoption of laminar air flow systems in surgery as part of a comprehensive strategy to reduce readmissions.⁴

This article aims to not only shed light on the pressing issue of 90-day readmissions following hip fracture surgeries but also to advocate for the adoption of evidence-based practices that can enhance patient outcomes and alleviate the pressure on healthcare facilities. Through a detailed exploration of the causes, implications, and potential solutions, this study contributes significantly to the ongoing discourse on improving hip fracture management and patient care in the orthopaedic domain.⁵

METHODS

This retrospective study was conducted at a district general hospital affiliated with the NHS, focusing on patients admitted with NOF fractures. The study period spanned from April 2020 to December 2022, aiming to evaluate 90-day readmission rates and identify potential factors contributing to these readmissions.

Study population

The study included a total of 1,264 patients treated for NOF fractures within the specified period. Eligibility criteria encompassed all patients aged 60 years and above, admitted with a confirmed diagnosis of NOF fracture, and who underwent surgical intervention. Exclusion criteria were patients who did not undergo surgery, those with pathological fractures due to malignancies, and patients who were readmitted for unrelated conditions.

Data collection

Data were retrospectively collected from the hospital's electronic health records (EHR) system, encompassing patient demographics (age, sex), comorbidities, type of surgical intervention, length of hospital stay, and readmission details within 90 days post-discharge. The primary outcome measured was the rate of readmission within 90 days of discharge, categorized into orthopaedic and non-orthopaedic reasons.

Statistical analysis

Descriptive statistics were used to summarize patient characteristics, including means and standard deviations for continuous variables and frequencies and percentages

for categorical variables. The chi-square test was utilized for categorical comparisons, and the t-test was employed for continuous variables. Multivariable logistic regression analysis was conducted to identify independent predictors of 90-day readmission, adjusting for potential confounders such as age, sex, comorbidities, and type of surgical procedure. Statistical significance was set at $p < 0.05$.

Ethical considerations

The study protocol was reviewed and approved by the local institutional review board (IRB) of the district general hospital. Given the retrospective nature of the study and the use of anonymized patient data, informed consent was waived. All procedures were conducted in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or the comparable ethical standards.

RESULTS

The analysis of 1,264 patients treated for NOF fractures at this single centre from April 2020 to December 2022 yielded significant insights into the patterns of readmission and the factors influencing these outcomes. The patient cohort had a mean age of 79 years, with a predominance of female patients (72%). Most fractures were treated with surgical intervention within 36 hours of admission, aligning with national guidelines for NOF fracture management. A mortality rate of 7.35% was noted on index admission.

Readmission rates

Of the 1,264 patients, 276 (21.8%) were readmitted within 90 days post-discharge. The readmission reasons were predominantly non-orthopaedic (86.9%), including issues such as infections, cardiovascular events, and respiratory complications. Orthopaedic reasons accounted for 13.1% of readmissions, with the primary causes being surgical site infections, prosthetic complications, and issues related to the initial fracture fixation.

Year-wise trends

A year-wise analysis revealed a fluctuating trend in readmission rates, with a noticeable increase in 2021, which coincided with the peak periods of the COVID-19 pandemic. The readmission rate was 22.2% in 2020, peaked at 24.12% in 2021, and slightly decreased to 19.07% in 2022. This variation highlighted the potential impact of pandemic-related healthcare strains on post-operative care and readmission rates.

Factors associated with readmission

Multivariable logistic regression analysis identified several independent predictors of 90-day readmission. Age was a significant factor, with patients older than 85 years

having a 1.5 times higher risk of readmission compared to younger patients. The presence of comorbidities, particularly diabetes and cardiovascular diseases, was also associated with an increased risk of readmission. Surgical factors, including the type of surgical procedure, did not significantly predict readmission, suggesting that patient intrinsic factors played a more crucial role in determining readmission risks.

Interventions and outcomes

The study also evaluated the impact of orthogeriatric co-management and pre-discharge falls assessment interventions introduced during the study period. Preliminary analyses suggested a positive trend towards reducing readmission rates, although these findings were not statistically significant within the study's timeframe.

Table 1: Demographic data.

Variables	Description
Total patients	1,264
Age (in years)	Mean: 79, range: 60-102
Gender	Female: 72%, male: 28%
Comorbidities	Common: cardiovascular diseases, diabetes, respiratory disorders
Surgery type	Internal fixation, hemiarthroplasty, total hip replacement
Hospital stays	Mean: 12 days, range: 5-40 days
Readmission rate	21.8% within 90 days
Readmission causes	Orthopaedic: 13.1%, non-orthopaedic: 86.9%

Table 2: Year-wise trend of 90-day readmission rates.

Years	Total patients	Readmitted patients	Readmission rate (%)
2020	428	95	22.2
2021	427	103	24.12
2022	409	78	19.07

Table 3: Causes for readmission.

Causes	Quantification
Medical (AKI/ T2RF/ abdominal pain/ generally unwell)	197 (15.5%)
Frailty + recurrent falls	38 (3%)
Orthopaedic	
Infection-implant	13 (1%)
Dislocation	9 (0.7%)
Implant failure	5 (0.3%)
Recurrent hip trauma	5 (0.3%)
Infection-superficial SSI	2 (0.16%)
Hematoma	2 (0.16%)
DVT	5 (0.3%)

DISCUSSION

The findings from this retrospective study highlight the complexities surrounding the management of NOF fractures and the subsequent challenge of minimizing 90-day readmission rates. Notably, the study revealed a significant readmission rate of 21.8%, with a notable distinction between orthopaedic and non-orthopaedic reasons for these readmissions.⁶ This bifurcation underscores the multifactorial nature of post-operative complications, emphasizing the need for a holistic approach to patient care that extends beyond the immediate surgical intervention.⁷

The predominance of non-orthopaedic reasons for readmission, such as infections, cardiovascular events, and respiratory complications, illuminates the critical importance of comprehensive pre-operative assessment and post-operative care. These findings suggest that while surgical technique and timing are crucial, the overall management of the patient's health plays a pivotal role in reducing readmissions. This is particularly relevant in the context of an aging population, where comorbidities are prevalent and can significantly impact patient outcomes.⁸

The year-wise analysis of readmission rates, which indicated a peak during the COVID-19 pandemic, further exemplifies the external factors that can influence post-operative care and readmission rates. The stress placed on healthcare systems during such periods can divert resources and attention from elective surgeries and post-operative care, potentially leading to increased complications and readmissions.⁹

Moreover, the identification of age and comorbidities, specifically diabetes and cardiovascular diseases, as independent predictors of readmission, highlights the necessity for targeted interventions. These interventions could include enhanced pre-operative optimization, closer post-discharge monitoring, and tailored rehabilitation programs to address the specific needs of high-risk patient groups.¹⁰

The slight positive trend observed with the introduction of orthogeriatric co-management and pre-discharge falls assessment interventions suggests that multidisciplinary approaches could be beneficial in addressing the complex needs of NOF fracture patients. Patients need to be evaluated for associated medical co-morbidities to identify high risk individuals and ensure stringent follow-up is provided for them. However, the lack of statistical significance indicates that further research and more robust implementation strategies may be required to fully realize the potential of these interventions.¹¹

Limitations

The findings of this study are subject to several limitations that should be considered when interpreting the results. First, the retrospective nature of the study may introduce

biases related to data collection and accuracy, as the reliance on electronic health records could lead to inconsistencies or omissions in patient data. Furthermore, the study was conducted in a single NHS center, which may limit the generalizability of the results to other settings or populations with different healthcare systems. Additionally, the study period coincided with the COVID-19 pandemic, which could have uniquely affected readmission rates due to variations in hospital protocols and patient behavior during the pandemic. Although adjustments were made for known confounders such as age and comorbidities, there may be other unmeasured variables that could influence the readmission outcomes. Finally, while the study suggests potential interventions to reduce readmission rates, these findings are based on observational data, and randomized controlled trials are needed to establish causality and efficacy of these interventions.

CONCLUSION

This study underscores the multifaceted challenges in managing NOF fractures and the critical factors contributing to 90-day readmission rates. The insights gained point towards the necessity of integrating comprehensive medical care, multidisciplinary approaches, and targeted interventions to mitigate readmission risks and improve patient outcomes in this vulnerable population. Further research is essential to develop and refine strategies that address the complex needs of patients undergoing NOF fracture surgeries.

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