e-ISSN: 0975-5160, p-ISSN: 2820-2651

Available online on www.ijtpr.com

International Journal of Toxicological and Pharmacological Research 2024; 14(2); 91-94

Original Research Article

Evaluation of Postoperative Complication Rates and Associated Factors in Surgical Patients

Jayashri Ingole[1], Miss. Ankita Agrawal[2], Virupaksha B. Kachewar[3]

[1]Assistant Professor Dept. of Surgery Dr. Rajendra Gode Medical College, Amravati.
[2]Demonstrator Dept. of Microbiology Dr. Rajendra Gode Medical College, Amravati.
[3]Assistant Professor Dept. of Orthopaedics Dr. Rajendra Gode Medical College, Amravati.

Received: 03-01-2024 / Revised: 29-01-2024 / Accepted: 14-02-2024
Corresponding Author: Dr. Jayashri Ingole
Conflict of interest: Nil

Abstract

Background: Postoperative complications are a significant concern in surgical practice, impacting patient outcomes and healthcare resource utilization. Comprehensive evaluations of complication rates and associated factors are essential for improving surgical care.

Methods: This cross-sectional study conducted at a tertiary care center aimed to assess postoperative complication rates and associated factors among surgical patients. Data were extracted from electronic medical records, including demographics, preoperative comorbidities, surgical characteristics, and postoperative outcomes. Descriptive statistics and multivariable regression analysis were used to analyze the data.

Results: A total of 1,200 surgical patients were included in the analysis. The mean age was 56 years, with 55% being male. Surgical site infections (10%) were the most common complication, followed by pulmonary complications (6.7%) and wound dehiscence (5%). Multivariable regression analysis identified age, presence of comorbidities, and intraoperative complications as independent predictors of postoperative complications.

Conclusion: This study highlights the significant burden of postoperative complications among surgical patients at a tertiary care center. Identification of specific risk factors provides insights for targeted interventions to improve patient outcomes.

Keywords: Postoperative complications, surgical patients, tertiary care center, risk factors, cross-sectional study.

Introduction

Postoperative complications represent a significant challenge in surgical practice, contributing to increased morbidity, mortality, and healthcare costs. Understanding the rates of these complications and identifying associated factors is crucial for optimizing patient outcomes and resource utilization. Over the past decades, numerous studies have investigated postoperative complication rates and their determinants across various surgical specialties and settings. However, there remains a need for comprehensive evaluations, particularly in tertiary care centers, to identify common trends and modifiable risk factors.

The seminal work of Weiser et al. (2008) provided an estimation of the global volume of surgery, highlighting the scale of surgical procedures worldwide and underscoring the importance of addressing postoperative complications on a global scale [1]. Furthermore, studies by Khuri et al. (2005) and Bennett-Guerrero et al. (1999) emphasized the impact of postoperative complications on long-term survival and healthcare utilization, respectively, underscoring the need for effective strategies to mitigate these adverse outcomes [2, 3].

In recent years, initiatives such as the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) have focused on improving surgical outcomes through data-driven quality improvement efforts [4]. These programs have contributed valuable insights into risk factors for postoperative complications and have facilitated benchmarking and performance improvement initiatives in surgical practice [5, 6].

Despite these advancements, there remains variability in postoperative complication rates and outcomes across different surgical specialties and healthcare settings. Therefore, this study aims to fill this gap by conducting a comprehensive evaluation of postoperative complication rates and associated factors among surgical patients at a tertiary care center. By identifying common risk factors and areas for improvement, this study seeks to inform targeted interventions to enhance patient care and outcomes in surgical practice.

Methodology:

This cross-sectional study was conducted at a tertiary care center from January 2018 to December 2020 to evaluate postoperative complication rates and associated factors in surgical patients across various specialties. The study population consisted of adult patients aged 18 years and above who underwent elective or emergency surgical procedures at the tertiary care center.

Patient data were extracted from electronic medical records, including demographics, preoperative comorbidities, surgical characteristics, and postoperative outcomes. Preoperative comorbidities such as hypertension, diabetes mellitus, coronary artery disease, chronic obstructive pulmonary disease (COPD), and obesity were documented. Surgical characteristics encompassed the type of surgery, surgical approach (laparoscopic or open), duration of surgery, and intraoperative complications.

Postoperative complications were defined based on established criteria, including surgical site infections (SSI), wound dehiscence, pulmonary complications (e.g., pneumonia, atelectasis), urinary tract infections (UTI), thromboembolic events, myocardial infarction (MI), stroke, and other medical complications requiring intervention.

Descriptive statistics were used to summarize patient demographics, preoperative comorbidities, surgical characteristics, and postoperative outcomes. Frequencies and percentages were reported for categorical variables, while continuous variables were described using means with standard deviations (SD) or medians with interquartile ranges (IQR), as appropriate.

Bivariate analyses, including chi-square tests for categorical variables and t-tests or Mann-Whitney U tests for continuous variables, were conducted to assess associations between patient characteristics, surgical factors, and postoperative complications.

Multivariable regression analysis was performed to identify independent predictors of postoperative complications, adjusting for potential confounders such as age, comorbidities, surgical characteristics, and intraoperative complications.

Ethical approval was obtained from the institutional review board (IRB) of the tertiary care center prior to data collection to ensure compliance with ethical guidelines and patient confidentiality.

Results:

A total of 1,200 surgical patients were included in the analysis, with a mean age of 56 years (SD = 12.3), and 55% were male. The most common surgical specialties were general surgery (35%), orthopedic surgery (28%), and gynecological surgery (20%). Among the study population, 420 patients (35%) had at least one preoperative comorbidity, with hypertension being the most prevalent (n = 220, 18.3%), followed by diabetes mellitus (n = 180, 15%).

Table 1: Patient Demographics and Preoperative Characteristics

Characteristic	Value
Mean Age (years)	56 ± 12.3
Gender (Male)	55%
Surgical Specialties	
- General Surgery	35%
- Orthopedic Surgery	28%
- Gynecological Surgery	20%
Preoperative Comorbidities	
- Hypertension	220 (18.3%)
- Diabetes Mellitus	180 (15.0%)
- Other	

Regarding surgical characteristics, laparoscopic surgery was the most common approach (60%), followed by open surgery (40%). The mean duration of surgery was 2.5 hours (SD = 1.1). Intraoperative complications occurred in 10% of cases, with bleeding being the most frequent (n = 60, 5%).

Table 2: Surgical Characteristics and Intraoperative Complications

Characteristic	Value
Surgical Approach	
- Laparoscopic	60%
- Open	40%
Mean Duration of Surgery (hours)	2.5 ± 1.1
Intraoperative Complications	
- Bleeding	60 (5%)
- Other	

Postoperatively, 280 patients (23.3%) experienced complications. The most common complications were surgical site infections (n = 120, 10%), followed by pulmonary complications (n = 80,

6.7%) and wound dehiscence (n = 60, 5%). Bivariate analyses revealed significant associations between postoperative complications and older age ($p < 0.001$), higher BMI ($p = 0.023$), presence of comorbidities ($p = 0.001$), longer duration of surgery ($p = 0.004$), and intraoperative complications ($p < 0.001$).

Table 3: Postoperative Complications and Associated Factors

Complication	Number (%)
Surgical Site Infections	120 (10.0%)
Pulmonary Complications	80 (6.7%)
Wound Dehiscence	60 (5.0%)
Other	

Bivariate analyses revealed significant associations between postoperative complications and older age ($p < 0.001$), higher BMI ($p = 0.023$), presence of comorbidities ($p = 0.001$), longer duration of surgery ($p = 0.004$), and intraoperative complications ($p < 0.001$).

Multivariable regression analysis identified age (odds ratio [OR] = 1.08, 95% confidence interval [CI] 1.04-1.12), presence of comorbidities (OR = 2.30, 95% CI 1.65-3.20), and intraoperative complications (OR = 3.50, 95% CI 2.10-5.80) as independent predictors of postoperative complications, after adjusting for other variables.

Discussion

The findings of this study conducted at a tertiary care center provide valuable insights into the prevalence of postoperative complications and associated factors among surgical patients. Our analysis revealed that 23.3% of patients experienced postoperative complications, consistent with previous studies indicating a substantial burden of adverse events following surgery [1, 2]. Among the identified complications, surgical site infections (SSIs) were the most prevalent, followed by pulmonary complications and wound dehiscence, highlighting the importance of targeted interventions to mitigate these risks [3, 7].

Consistent with existing literature, our study identified several patient-related and surgical factors associated with an increased risk of postoperative complications. Older age, presence of preoperative comorbidities, higher body mass index (BMI), longer duration of surgery, and intraoperative complications were significantly associated with adverse outcomes [8-10]. These findings underscore the importance of preoperative optimization and comprehensive risk assessment in identifying high-risk patients and implementing appropriate perioperative management strategies to reduce complications [5,6].

Multivariable regression analysis confirmed age, presence of comorbidities, and intraoperative complications as independent predictors of postoperative complications, consistent with previous studies highlighting the impact of these factors on surgical outcomes [11, 12]. Addressing modifiable risk factors such as optimizing comorbid conditions, minimizing intraoperative complications, and adhering to evidence-based surgical practices may help mitigate the risk of adverse events and improve patient outcomes [13, 14].

Our study has several strengths, including a large sample size, comprehensive data collection, and rigorous statistical analysis. However, it is not without limitations. The retrospective nature of the study and reliance on electronic medical records may have introduced inherent biases and limitations in data completeness and accuracy. Additionally, the study was conducted at a single tertiary care center, limiting the generalizability of findings to other healthcare settings.

Conclusion

In conclusion, this study adds to the growing body of evidence on postoperative complication rates and associated factors among surgical patients. By identifying specific risk factors and highlighting opportunities for targeted interventions, our findings contribute to enhancing perioperative care practices and optimizing patient outcomes. Future research should focus on prospective studies and multi-center collaborations to validate these findings and implement evidence-based strategies to reduce postoperative complications in surgical patients.

References

1. Weiser TG, Regenbogen SE, Thompson KD, et al. An estimation of the global volume of surgery: a modelling strategy based on available data. Lancet. 2008;372(9633):139-144.
2. Khuri SF, Henderson WG, DePalma RG, Mosca C, Healey NA, Kumbhani DJ; Participants in the VA National Surgical Quality Improvement Program. Determinants of long-term survival after major surgery and the adverse effect of postoperative complications. Ann Surg. 200 5;242(3):326-341.
3. Bennett-Guerrero E, Welsby I, Dunn TJ, et al. The use of a postoperative morbidity survey to evaluate patients with prolonged hospitalization after routine, moderate-risk, elective surgery. Anesth Analg. 1999;89(2):514-519.

4. American College of Surgeons. National Surgical Quality Improvement Program. https:// www.facs.org/quality-programs/acs-nsqip. Accessed January 10, 2024.
5. Bilimoria KY, Cohen ME, Ingraham AM, et al. Effect of postdischarge morbidity and mortality on comparisons of hospital surgical quality. Ann Surg. 2010;252(1):183-190.
6. Birkmeyer JD, Shahian DM, Dimick JB, et al. Blueprint for a new American College of Surgeons: National Surgical Quality Improvement Program. J Am Coll Surg. 2008;207(5):777-78 2.
7. Silber JH, Rosenbaum PR, Trudeau ME, et al. Multivariate matching and bias reduction in the surgical outcomes study. Med Care. 2001; 39(10):1048-1064.
8. Hawn MT, Itani KM, Gray SH, et al. Association of timely administration of prophylactic antibiotics for major surgical procedures and surgical site infection. J Am Coll Surg. 2008; 206(5):814-819.
9. Sobh E, Nakahira S, Thakur S, et al. Risk factors for postoperative complications and readmission in percutaneous nephrolithotomy. J Urol. 2019;202(2):262-267.
10. Kao LS, Ghaferi AA, Ko CY, Dimick JB. Reliability of superficial surgical site infections as a hospital quality measure. J Am Coll Surg. 2011;213(2):231-235.
11. Dimick JB, Weeks WB, Karia RJ, Das S, Campbell DA Jr. Who pays for poor surgical quality? Building a business case for quality improvement. J Am Coll Surg. 2006;202(6): 933-937.
12. Shiloach M, Frencher SK Jr, Steeger JE, et al. Toward robust information: data quality and inter-rater reliability in the American College of Surgeons National Surgical Quality Improvement Program. J Am Coll Surg. 2010; 210(1):6-16.
13. Lee J, Kalfas I, Strickland T, Mangano DT. Perioperative glucose control and morbidity in the surgical patient: a systematic review and meta-analysis. Clin Nutr ESPEN. 2020;40:72-84.
14. Ricciardi R, Roberts PL, Read TE, Hall JF, Marcello PW, Schoetz DJ. Which adverse events are associated with mortality and prolonged length of stay following colorectal surgery? J Gastrointest Surg. 2013;17(7):1485-14 93.