Scientific Research Publishing

Surgical Science, 2026, 17(5), 167-177
https://www.scirp.org/journal/ss
ISSN Online: 2157-9415
ISSN Print: 2157-9407

Post-Operative Complications in Gastrointestinal Surgery at Kamenge University Teaching Hospital

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How to cite this paper: Mbonicura, J.C., Nkurunziza, S., Iturimbere, A., Kamatari, D. and Nduwimana, F. (2026) Post-Operative Complications in Gastrointestinal Surgery at Kamenge University Teaching Hospital. *Surgical Science*, **17**, 167-177.
https://doi.org/10.4236/ss.2026.175018

Received: April 15, 2026
Accepted: May 8, 2026
Published: May 11, 2026

Abstract

Background: Postoperative complications in gastrointestinal surgery remain a major public health concern, particularly in low-resource settings, where they significantly affect morbidity, mortality, and healthcare costs. This study aimed to assess the epidemiological, clinical, and therapeutic characteristics of postoperative complications at Kamenge University Teaching Hospital. **Methods:** We conducted a prospective descriptive study over a 12-month period (October 2024 to September 2025) in the Department of Visceral and Digestive Surgery. All patients who developed at least one postoperative complication following gastrointestinal surgery were included. Data were collected using a standardized form and analyzed using SPSS version 26. **Results:** Among 416 operated patients, 71 developed postoperative complications, yielding a prevalence of 17.06%. The mean age was 28.2 ± 23.9 years, with a male predominance (59.15%). Emergency surgery accounted for 83.09% of cases. Infectious complications were the most common, particularly surgical site infections (38.88%), followed by postoperative peritonitis (27.77%) and septic shock (20.37%). Non-infectious complications included malnutrition (27.5%) and anastomotic leakage (20%). *Escherichia coli* was the predominant pathogen (75%). Severe complications (Clavien-Dindo grade IIIb and V) were frequent, and the mortality rate reached 30.98%. The mean hospital stay was 41.18 days. **Conclusion:** Postoperative complications are frequent and severe at Kamenge University Teaching Hospital, with a predominance of infectious

complications and high mortality. Emergency surgery and suboptimal perioperative practices appear to be major contributing factors. Strengthening perioperative care and adherence to evidence-based protocols are essential to improve surgical outcomes.

Keywords

Postoperative Complications, Digestive Surgery, Surgical Site Infection, Emergency Surgery, Clavien-Dindo Classification

1. Introduction

Post-operative complications (POC) in gastrointestinal surgery represent a major public health issue, with a significant impact on patients' short- and long-term prognosis, as well as on the costs associated with hospital care [1] [2]. Despite advances in surgical techniques and post-operative care, complications remain common and can seriously affect patients recovery [3]. These complications can range from infections and bleeding to organ failure, and have an impact on patients' quality of life and the use of hospital resources [4]. At our university hospital, the most recent similar study, which dates back to 2009, whilst valuable, did not take into account significant developments in surgical and medical practices, nor demographic and epidemiological changes among patients [5]. Indeed, surgical techniques, diagnostic and therapeutic approaches, and the management of risk factors have seen significant advances since that study [6] [7]. Furthermore, the characteristics of the patient population undergoing surgery have changed, with an increased prevalence of certain comorbidities such as diabetes, obesity and cardiovascular disease, which could have an impact on the occurrence of post-operative complications [8] [9]. A one-year prospective study is therefore necessary not only to update the epidemiological data on these complications, but also to assess the impact of new therapeutic approaches and identify the risk factors specific to this population. It is essential to update information regarding the most common types of complications, their management and their progression. These data will provide a better understanding of current trends in post-operative complications in digestive surgery at our University Hospital, whilst identifying areas requiring improvements in post-operative care [10]. Post-operative complications have a significant impact not only on patients' clinical outcomes but also on the costs of hospital care [11] [12]. Indeed, these complications often lead to prolonged hospital stays, frequent readmissions and more complex patient management, thereby increasing costs for healthcare facilities [13]. A better understanding of these complications could enable the implementation of more targeted prevention strategies, thereby reducing length of stay, the number of readmissions and, consequently, hospital costs. It is also a matter of improving patients' quality of life by reducing the risk of long-term sequelae, such as disabilities or persistent morbidity [12]. Furthermore, although recent studies have been conducted in

other settings, particularly in West Africa, there remains a lack of local literature on the specific characteristics of post-operative complications at our hospital. Indeed, the characteristics of our patient population and the specific surgical techniques used at our university hospital warrant in-depth analysis in order to better adapt care to local circumstances [14]. The aim of this study is to assess the epidemiological, diagnostic, therapeutic and clinical characteristics of post-operative complications in gastrointestinal surgery at the Kamenge University Teaching Hospital and to analyse the findings in the light of the literature.

2. Materials and Methods

This is a prospective descriptive study conducted in the Department of Visceral and Digestive Surgery at the Kamenge University Teaching Hospital (KUTH) over a 12-month period from 1 October 2024 to 30 September 2025. The study population comprised all patients of any age who were admitted to and underwent digestive surgery at the Kamenge University Teaching Hospital during the study period. We included all patients of any age who developed a post-operative complication following digestive surgery at the KUTH during the study period. Excluded from our study were any patients who did not consent to participate in the study or whose records were incomplete for any reason. Not included were any patients who developed a post-operative complication following digestive surgery at the KUTH outside the study period, and any patients admitted for the management of a post-operative complication following digestive surgery performed elsewhere.

The data for our study were collected from the medical records of patients who had undergone surgery and been hospitalised, which included the patients' sociodemographic details, diagnosis on admission, treatment, clinical course, post-operative complications, and length of stay, as well as from the records of major surgical procedures. Perioperative antibiotic prophylaxis was defined as antibiotics administered within 60 minutes before incision and discontinued within 24 hours postoperatively. Antibiotics administered beyond this period were considered therapeutic. Microbiological analyses were performed at the National Reference Laboratory of Kamenge University Teaching Hospital. Standard bacteriological techniques were used for pathogen identification, including culture and biochemical testing. When available, antimicrobial susceptibility testing was conducted in accordance with established laboratory protocols. A pre-designed data collection form was used. Data collection was facilitated by the use of the KoboCollect app, downloaded to a smartphone via the Play Store. The data was collected and analysed using the Kobotoolbox server, which enabled the data to be exported to Microsoft Excel for further analysis.

Data analysis was carried out using SPSS Version 26. The tables were created in Microsoft Excel 2016. The text was written using Microsoft Word 2016 and the references were managed using Zotero.

3. Results

A total of 416 patients underwent gastrointestinal surgery during the study period,

among whom 71 developed at least one postoperative complication, yielding a prevalence of 17.06%. The mean age was 28.2 ± 23.9 years (range: 3 days to 89 years). Pediatric patients (≤14 years) accounted for 35.21% of cases, while adults represented 64.79%. The most represented age group was 25 - 34 years (21.12%). Males predominated, representing 59.15% of patients (sex ratio: 1.44). Most patients (78.87%) resided in rural areas. Regarding educational level, primary education was most frequent (43.63%), followed by secondary education (30.90%) and illiteracy (20%). Farmers constituted the largest occupational group (53.48%), while 39.43% of patients were unemployed (Table 1).

Table 1. Sociodemographic characteristics of patients.

Variables		Number of cases (n)	Percentage
Age (mean ± SD)		28.2 ± 23.9	
Gender	Male	42	59.15
	Female	29	40.85
Residence	Rural	56	78.87
	Urban	15	21.13
Education level	Primary	24	43.63
	Secondary	17	30.9
	Illiterate	11	20.00
Occupation	Farmers	28	53.48
	Unemployed	23	39.43

The vast majority of our patients, namely 87.32%, did not smoke. Just under half of our patients, 46.47%, consumed alcohol. Only 7 patients had a specific underlying condition, representing 9.85%. Hypertension and HIV were the most common, each accounting for 42.85%. ASA class III was the most common, accounting for 57.74%, followed by ASA class IV, accounting for 26.76%. The vast majority of our patients had no significant medical history. 88.73% of our patients had no medical history.

As for surgical and gynaecological-obstetric history, 94.36% and 90.14% respectively had no history, and 98.59% of our patients had no family history. Emergency surgery accounted for the majority of cases (83.09%) among patients who developed postoperative complications. The initial procedure was performed by a senior surgeon in 67.60% of cases. The most common type of gastrointestinal surgery was lower gastrointestinal tract (LGIT) surgery, accounting for 80.28%. Altémeier class IV (clean surgery) was the most common, accounting for 45.07% of all procedures. This was followed by Class III (contaminated surgery) and Class II (clean-contaminated surgery), accounting for 26.76% and 23.94% of procedures respectively.

Perioperative antibiotic prophylaxis was frequently prolonged beyond recom-

mended guidelines. The most commonly used regimen was a combination of third-generation cephalosporins and imidazoles (52.11%), followed by quinolones and imidazoles (14.08%). In 38.02% of cases, antibiotics were administered for more than 7 days. It is important to note that antibiotic administration exceeding 7 days corresponded to therapeutic treatment of established postoperative infections rather than true prophylaxis. However, this distinction was not always clearly documented, suggesting potential inconsistencies in perioperative antibiotic stewardship.

The duration of the procedure was 120 to 180 minutes in 49.29% of cases, followed by 60 to 120 minutes in 40.84% of cases. The time to onset of postoperative complications was between 1 and 6 days in 50.70% of cases, followed by 7 to 14 days in 21.12% of cases (Table 2).

Table 2. Timing, clinical signs and microbiology of post-operative complications.

Variables		Number of cases (n)	Percentage
Time to complication	<1 day	10	14.08
	1 - 6 days	36	50.70
	7 - 14 days	15	21.12
Time to diagnosis	1 - 6 days	51	71.83
	>7 days	4	5.63
Clinical signs	Tachycardia	41	75.92
	Fever	30	55.55
	Hypotension	18	33.33
Main pathogen	*E. coli*	5	75.00

Among the 71 patients with postoperative complications, 43.66% experienced infectious complications alone, while 56.33% had both infectious and non-infectious complications. Surgical site infection was the most frequent infectious complication (38.88%), followed by postoperative peritonitis (27.77%) and septic shock (20.37%). Pulmonary infections occurred in 7.40% of cases. Escherichia coli was the most commonly isolated pathogen (75%), consistent with gastrointestinal endogenous flora. Among non-infectious complications, malnutrition was the most frequent (27.5%), followed by anastomotic leakage (20%) and multiorgan failure (17.5%). Gastrointestinal fistula, renal failure, and intestinal obstruction were less frequent. Out of a total of 71 cases, 31 of our patients did not experience any non-infectious complications, representing 43.66% (Table 3).

The mean time to diagnosis of postoperative complications was 3.7 days. Most cases (71.83%) were diagnosed between 1 and 6 postoperative days, while 14.08% were diagnosed within the first 24 hours. Delayed diagnosis (>7 days) occurred in 5.63% of patients. Diagnosis was primarily clinical, based on signs such as tachycardia (75.92%), fever (55.55%), and hypotension (33.33%).

Table 3. Distribution of postoperative complications.

Complications		Number of cases (n)	Percentage
Infectious	Surgical site infection	28	38.88
	Postoperative peritonitis	20	27.77
	Septic shock	14	20.37
	Pulmonary infection	5	7.40
Non-infectious	Malnutrition	11	27.50
	Anastomotic leakage	8	20.00
	Multi-organ failure	7	17.50
	Gastrointestinal fistula	5	12.50
	Renal failure	4	10.00

Microbiological cultures were performed in 7 out of 71 patients with postoperative complications. Specimens were obtained primarily from surgical site infections, peritoneal fluid, and blood cultures. Whenever possible, samples were collected prior to the initiation of antibiotic therapy. Among the isolates, *Escherichia coli* was the most frequently identified pathogen.

According to the Clavien-Dindo classification, the most common complications were grade IIIb, accounting for 33.80% of cases, followed by grade V complications at 30.98%. Medical treatment was initiated in 76.05% of cases and surgical treatment in 61.97% of cases. A combination of medical and surgical treatment was carried out in 38.02% of cases, whilst 61.97% of cases received only surgical or medical treatment. The average length of hospital stay was approximately 41.18 days, with a standard deviation of 49.8 days. The outcome was unfavourable in 57.74% of cases.

4. Discussion

Postoperative complications in gastrointestinal surgery remain a major concern, particularly in low-resource settings. The overall prevalence of postoperative complications (17.06%) in this study is consistent with reports from similar low-resource settings, where rates range between 10% and 30% [15] [16]. However, the mortality rate observed in our series (30.98%) is considerably higher than that reported in high-income countries, where it generally remains below 5% [17] [18].

The predominance of emergency surgery (83.09%) likely represents a key contributing factor to poor outcomes. Emergency procedures are frequently associated with delayed presentation, inadequate preoperative optimization, and advanced disease stages, all of which significantly increase postoperative risk [19] [20]. This difference reflects the demographic profile of African populations and the high burden of emergency surgical conditions in younger individuals. The male predominance observed in our study is also consistent with previous African reports [16] [21].

A key finding is the high proportion of emergency surgeries (83.09%), which is a well-established risk factor for postoperative complications [19]. Emergency procedures are often associated with delayed presentation, advanced disease, and limited preoperative optimization, all of which significantly increase morbidity and mortality [22]. This likely contributed to the high proportion of severe complications observed in our series.

Infectious complications, particularly surgical site infections, were the most common. This finding is consistent with global literature, which identifies surgical site infection as the leading postoperative complication in gastrointestinal surgery, especially in low- and middle-income countries [23] [24]. The predominance of Escherichia coli is expected given its origin from the intestinal microbiota [25] [26]. The low rate of microbiological sampling observed in our study likely reflects limited access to routine bacteriological investigations in our setting, which may have led to an underestimation of the true microbiological profile of postoperative infections.

The prolonged duration of antibiotic prophylaxis observed in this study is concerning, as it deviates from international guidelines recommending discontinuation within 24 hours postoperatively in most cases [27] [28]. Such practices may contribute to antimicrobial resistance and increased healthcare costs without proven benefit [29].

Prolonged antibiotic use has not been shown to reduce infection rates and may instead promote antimicrobial resistance, increase costs, and expose patients to unnecessary adverse effects [29].

Emergency surgery was highly prevalent among patients with postoperative complications in this cohort. This likely reflects delayed presentation and limited preoperative optimization, which are common challenges in low-resource settings. Similarly, prolonged antibiotic exposure was observed among patients with complications. However, this finding should be interpreted cautiously, as prolonged antibiotic use may reflect the severity of postoperative infections rather than a causal relationship. Overall, these findings highlight associations rather than causal relationships, given the descriptive design of the study.

Non-infectious complications such as malnutrition, anastomotic leakage, and multi-organ failure were also frequent. Malnutrition, in particular, is a well-recognized risk factor for poor surgical outcomes and is highly prevalent in low-resource settings [30]. Anastomotic leakage remains one of the most feared complications in digestive surgery, associated with high morbidity and mortality [31].

Most complications were diagnosed within the first postoperative week, with an average delay of 3.7 days, highlighting the importance of early postoperative monitoring. As in other low-resource settings, diagnosis in our study was primarily clinical, relying on signs such as tachycardia, fever, and hypotension [32]-[34].

According to the Clavien-Dindo classification, a high proportion of complications were severe (grade IIIb and V). The mortality rate (30.98%) is particularly high compared to reports from high-income countries, where postoperative mortality is generally below 5% [17] [18] [25]. This discrepancy may be explained by

delayed presentation, the high rate of emergency surgeries, limited access to intensive care, and challenges in timely management of complications [20] [22].

The prolonged hospital stays (mean 41 days) observed in our study reflect the severity of complications and has important implications for healthcare costs and resource utilization. Similar findings have been reported in other African studies, where complications significantly increase hospital stay and economic burden [16] [35] [36].

Despite advances in surgical techniques, our findings suggest that postoperative complications remain a major challenge in our setting. There is a need to strengthen perioperative care through improved preoperative optimization, adherence to evidence-based antibiotic protocols, enhanced infection prevention measures, and early detection of complications.

This study has some limitations. As a single-center study, its findings may not be generalizable. Additionally, some variables such as intraoperative technical details and long-term outcomes were not assessed. Nevertheless, this prospective study provides updated and valuable data on postoperative complications in gastrointestinal surgery in our context.

5. Conclusion

Postoperative complications remain frequent, severe, and associated with high mortality in gastrointestinal surgery at Kamenge University Teaching Hospital. Infectious complications, particularly surgical site infections, predominate and are strongly associated with emergency surgery and suboptimal perioperative practices. These findings highlight the urgent need to strengthen perioperative care, improve adherence to evidence-based antibiotic protocols, enhance infection prevention strategies, and reinforce early detection and management of complications. Implementation of standardized surgical care pathways could significantly improve outcomes in this setting. Further multicenter studies are recommended to better understand the determinants of postoperative complications and guide national surgical quality improvement strategies.

Authors' Contributions

JCM conceptualized, designed and supervised the study. SN contributed to data analysis and manuscript drafting. AI participated in data collection and interpretation. DK and FN critically revised the manuscript for important intellectual content. All authors read and approved the final manuscript.

Data Availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethical Considerations

Ethical approval was obtained from the relevant institutional authorities of Ka-

menge University Teaching Hospital. Informed consent was obtained from all participants or their legal guardians prior to inclusion in the study. Confidentiality and anonymity were strictly maintained throughout the research process in accordance with ethical standards.

Acknowledgements

The authors would like to thank the staff of the Department of Visceral and Digestive Surgery at Kamenge University Teaching Hospital for their collaboration and support in data collection. We are also grateful to all patients who participated in this study.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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