

## Original Research Article

# Risk Factors for Postoperative Complications after Emergency Digestive Surgery: A Five-Year Multicenter Study from Sub-Saharan Africa

Fred Dikongue<sup>1</sup>, Valery Onana Mvondo<sup>2</sup>, Basile Essola<sup>2</sup>, Franck Borel Kouam<sup>2</sup>, Achille Many Essomba<sup>3</sup>, Jean Paul Engbang<sup>2,4\*</sup>

<sup>1</sup>Faculty of Medicine and Pharmaceutical Sciences, University of Douala, Douala, Cameroon

<sup>2</sup>Faculty of Medicine and Biomedical Sciences, University of Yaoundé I, Yaoundé, Cameroon

<sup>3</sup>Faculty of Medicine and Pharmaceutical Sciences, University of Ebolowa, Sangmelima, Cameroon

<sup>4</sup>Laquintinie Hospital of Douala, Douala, Cameroon

**Article History**

Received: 07.05.2026

Accepted: 15.06.2026

Published: 19.06.2026

**Journal homepage:**<https://www.easpublisher.com>**Quick Response Code**

**Abstract: Background:** Postoperative complications remain a major cause of morbidity and mortality following emergency digestive surgery, particularly in low- and middle-income countries where delayed presentation and limited healthcare resources are common. Evidence regarding predictors of postoperative complications in sub-Saharan Africa remains scarce. This study aimed to determine the incidence, pattern, severity, and predictors of postoperative complications following emergency digestive surgery in three tertiary hospitals in Cameroon. **Methods:** We conducted a multicenter retrospective analytical study in three referral hospitals in Douala, Cameroon, including the Douala General Hospital, Douala Laquintinie Hospital, and Deido District Hospital. Adult patients undergoing emergency digestive surgery between January 2018 and December 2023 were included. Demographic, clinical, operative, and postoperative data were collected. Complications were graded according to the Clavien–Dindo classification. Univariate and multivariate logistic regression analyses were performed to identify independent predictors of postoperative complications. **Results:** We analyzed 1,102 patients undergoing emergency digestive surgery, among whom 361 developed postoperative complications (32.8%). Surgical site infection was the most frequent complication (32.6%). Most complications were classified as minor (73%) according to Clavien–Dindo grading. The overall mortality rate was 7.2%. Multivariate analysis identified age between 50 and 60 years, ASA III status, and Altemeier class III as independent predictors of postoperative complications. **Conclusion:** Approximately one-third of patients undergoing emergency digestive surgery developed postoperative complications. Advanced age, poor preoperative physical status, and contaminated surgical wounds significantly increased the risk of adverse postoperative outcomes. Early identification of high-risk patients may improve perioperative management and reduce postoperative morbidity.

**Keywords:** Emergency Surgery, Postoperative Complications, Digestive Surgery, Surgical Site Infection, Risk Factors, Cameroon.

**Copyright © 2026 The Author(s):** This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

## INTRODUCTION

Emergency digestive surgery remains one of the most demanding fields of general surgery worldwide. Conditions such as acute appendicitis, generalized peritonitis, intestinal obstruction, strangulated hernia, and abdominal trauma frequently require urgent operative management to prevent severe morbidity and death. Despite substantial advances in perioperative care, postoperative complications continue to represent a major challenge, particularly following emergency

procedures where patients often present with physiological derangement, sepsis, delayed consultation, or advanced disease stages [1, 2].

Globally, postoperative complications affect approximately 20–40% of patients undergoing emergency abdominal surgery and account for a significant proportion of postoperative mortality and prolonged hospitalization [3, 4]. According to the GlobalSurg Collaborative, patients undergoing emergency gastrointestinal surgery in low- and middle-

\*Corresponding Author: Jean Paul Engbang

Faculty of Medicine and Biomedical Sciences, University of Yaoundé I, Yaoundé, Cameroon

income countries (LMICs) experience substantially higher rates of postoperative morbidity and mortality compared with those treated in high-income countries, reflecting disparities in healthcare resources, perioperative monitoring, intensive care capacity, and timely access to surgical services [5, 6].

Among postoperative adverse events, surgical site infections (SSI), intra-abdominal abscesses, anastomotic leakage, pulmonary complications, sepsis, and thromboembolic events remain the most frequently reported. These complications not only increase mortality but also lead to longer hospital stays, higher healthcare costs, reduced quality of life, and increased burden on healthcare systems [7, 8]. Surgical site infection alone is estimated to account for nearly one-third of postoperative complications after emergency gastrointestinal surgery and remains the most common healthcare-associated infection in surgical patients worldwide [9].

Several patient-related and procedure-related factors have been associated with postoperative complications. Advanced age, pre-existing comorbidities, poor nutritional status, delayed presentation, sepsis at admission, elevated American Society of Anesthesiologists (ASA) score, contaminated or dirty surgical wounds, prolonged operative time, and emergency surgical indications have consistently been identified as predictors of adverse postoperative outcomes [10–12]. The accurate identification of these risk factors is essential for perioperative risk stratification, optimization of patient management, and implementation of preventive strategies.

In sub-Saharan Africa, emergency digestive surgery constitutes a substantial proportion of the surgical workload. However, healthcare systems frequently face major constraints, including delayed patient presentation, limited diagnostic resources, shortages of trained personnel, and restricted access to intensive care facilities [13, 14]. Consequently, postoperative complications remain common and are often associated with poor outcomes. Nevertheless, robust multicenter data evaluating the epidemiology and determinants of postoperative complications in the region remain scarce.

In Cameroon, available evidence regarding postoperative complications after digestive surgical emergencies is limited. Most published studies have been conducted in single institutions with relatively small sample sizes, thereby limiting the generalizability of their findings [15]. Furthermore, little is known about the independent predictors of postoperative complications in the context of emergency digestive surgery across multiple referral hospitals.

Therefore, this multicenter study aimed to determine the incidence, pattern, severity, and

independent predictors of postoperative complications following emergency digestive surgery in three major hospitals in Douala, Cameroon. Identifying high-risk patients may contribute to improving perioperative management strategies and reducing postoperative morbidity and mortality in resource-limited settings.

## METHODS

### Study Design and Setting

We conducted a multicenter retrospective analytical study in three major public hospitals in Douala, Cameroon: the Douala General Hospital (DGH), the Douala Laquintinie Hospital (DLH), and the Deido District Hospital (DDH). These hospitals serve as referral centers for emergency digestive surgery and receive patients from Douala and neighboring regions.

The study covered a six-year period from January 1, 2018, to December 31, 2023.

### Study Population

The study included all adult patients who underwent emergency digestive surgery during the study period.

### Inclusion Criteria

Patients were eligible if they:

- were aged 20 years or older;
- underwent emergency surgery for a digestive surgical condition;
- Had complete medical records available for review.

The digestive emergencies considered included:

- acute appendicitis;
- generalized peritonitis;
- intestinal obstruction;
- strangulated abdominal wall hernia;
- abdominal trauma requiring laparotomy.

### Exclusion Criteria

Patients were excluded if they:

- underwent elective digestive surgery;
- had incomplete medical records preventing adequate assessment of postoperative outcomes;
- died before surgical intervention.

### Data Collection

Data were collected retrospectively from hospital medical records, operative reports, anesthesia charts, nursing records, and discharge summaries using a standardized data collection form.

The following variables were extracted:

### Sociodemographic Variables

- age;
- sex;

- level of education.

#### Clinical Variables

- comorbidities;
- previous abdominal surgery;
- delay between symptom onset and hospital consultation;
- American Society of Anesthesiologists (ASA) score;
- Level of consciousness at admission.

#### Operative Variables

- diagnosis;
- type of surgical procedure;
- wound contamination class according to the Altemeier classification;
- delay between admission and surgery;
- duration of surgery;
- use of abdominal drains;
- use of nasogastric tubes.

#### Outcome Variables

The primary outcome was the occurrence of at least one postoperative complication during hospitalization.

Postoperative complications included:

- surgical site infection;
- wound dehiscence;
- intra-abdominal abscess;
- postoperative sepsis;
- pulmonary complications;
- digestive fistula;
- thromboembolic complications;
- postoperative death.

Complications were classified according to the Clavien–Dindo classification system.

#### Definitions

A postoperative complication was defined as any deviation from the normal postoperative course occurring during hospitalization and requiring medical, surgical, or intensive care management.

Surgical site infection was defined according to the Centers for Disease Control and Prevention (CDC) criteria.

Postoperative mortality was defined as any death occurring during the same hospital admission following surgery.

#### Statistical Analysis

Data were entered and analyzed using IBM SPSS Statistics version 27.0 (IBM Corp., Armonk, NY, USA).

Continuous variables were summarized as means  $\pm$  standard deviations (SD) or medians with interquartile ranges (IQR), depending on data distribution.

Categorical variables were expressed as frequencies and percentages.

Comparisons between patients with and without postoperative complications were performed using:

- Pearson's Chi-square test or Fisher's exact test for categorical variables;
- Student's t-test or Mann–Whitney U test for continuous variables.

Variables with a p-value  $< 0.20$  in univariate analysis were entered into a multivariable logistic regression model. Adjusted odds ratios (aORs) and adjusted p-values were calculated. Statistical significance was set at  $p < 0.05$ .

#### Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee of the Faculty of Medicine and Pharmaceutical Sciences of the University of Douala.

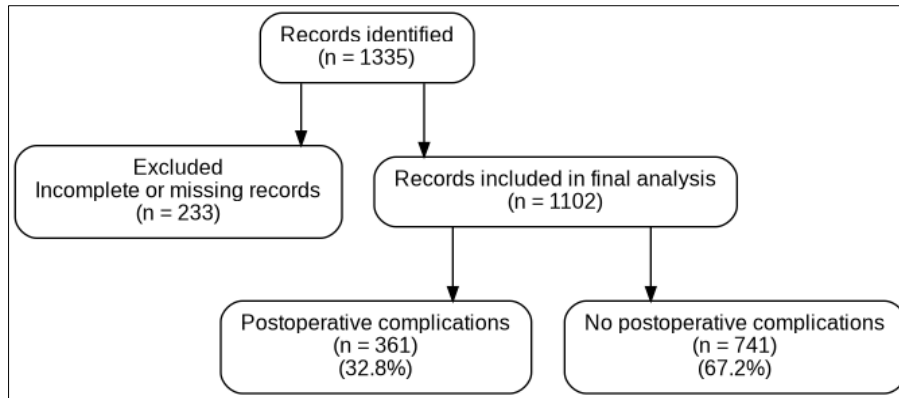
Administrative authorizations were obtained from the directors of the Douala General Hospital, Douala Laquintinie Hospital, and Deido District Hospital before data collection.

Patient confidentiality was maintained throughout the study by anonymizing all collected data. As this was a retrospective study based on medical records, informed consent was waived by the ethics committee.

## RESULTS

#### Patient Selection and Baseline Characteristics

During the study period, a total of 1,102 patients were included in the final analysis. A total of 1,335 records were identified. After excluding 233 incomplete or missing records, 1,102 patients were included in the final analysis (Figure 1).



**Figure 1: Flowchart of patient selection.**

The mean age of patients who developed postoperative complications was  $38.0 \pm 16.2$  years. Male patients predominated. Most patients were classified as

ASA I, while a smaller proportion presented with severe preoperative conditions corresponding to ASA III and ASA IV classes (Table 1).

**Table 1: Baseline Characteristics of the Study Population**

Variable	Postoperative Complications (n=361)	No Postoperative Complications (n=741)
<b>Age group (years)</b>		
20–29	67 (18.0)	172 (23.2)
30–39	153 (42.3)	296 (39.9)
40–49	51 (14.1)	122 (16.4)
50–59	47 (13.7)	97 (13.0)
≥60	43 (11.9)	54 (7.2)
<b>Sex</b>		
Male	245 (67.8)	436 (58.8)
Female	116 (32.2)	305 (41.2)
<b>Educational level</b>		
Primary	34 (9.9)	75 (10.1)
Secondary	68 (18.8)	102 (13.7)
Higher education	259 (71.2)	564 (76.1)

Regarding educational level, secondary education was the most represented category. The majority of patients had no significant medical comorbidity. Previous abdominal surgery was r.

exceeding 24 hours. At admission, the majority were conscious and hemodynamically stable.

**Clinical and Operative Characteristics**

Most patients consulted after a prolonged symptom duration, with consultation delays frequently

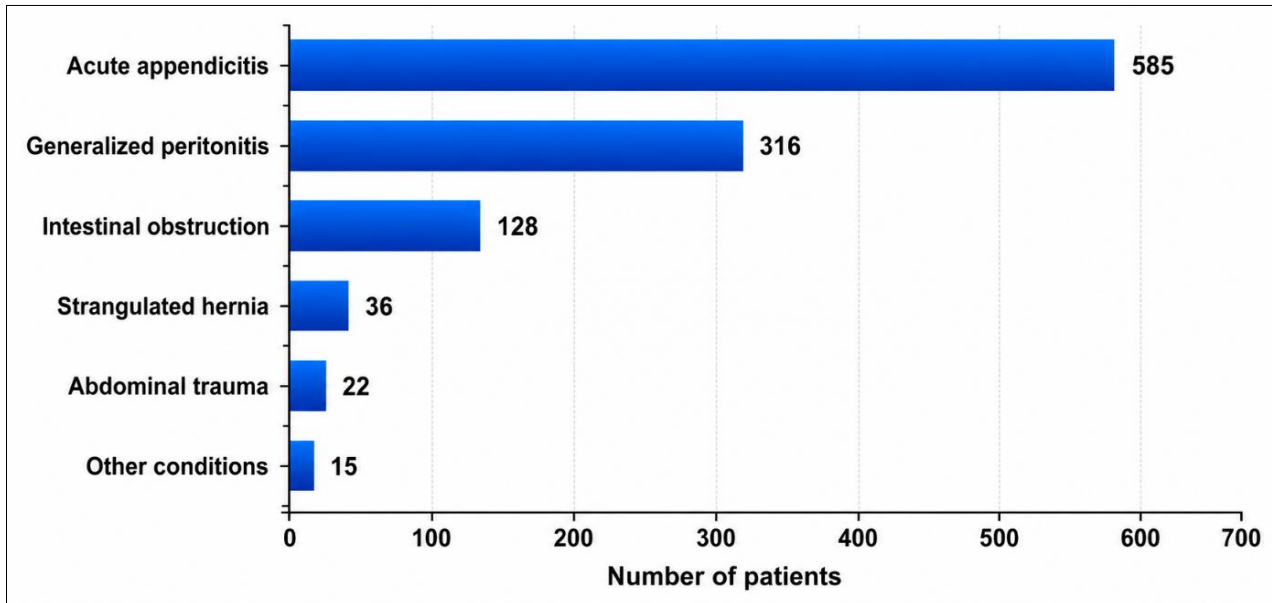
According to the ASA classification, most patients belonged to classes I and II. Regarding surgical wound contamination, Altmeier class II predominated, followed by classes III and IV (Table 2).

**Table 2 : Clinical and Operative Characteristics**

Variable	Postoperative Complications (n=361)	No Postoperative Complications (n=741)
<b>Consultation delay (days)</b>		
0.5–1	112 (31.0)	245 (33.0)
2–3	145 (40.1)	198 (26.7)
4–7	104 (28.8)	298 (40.2)
<b>ASA Classification</b>		
ASA I	147 (40.7)	468 (63.1)
ASA II	118 (32.6)	257 (34.6)
ASA III	60 (16.6)	10 (1.3)
ASA IV	36 (10.0)	6 (0.8)
<b>Altmeier Classification</b>		
Clean (ALT I)	103 (28.7)	513 (69.2)
Clean-contaminated (ALT II)	135 (37.4)	207 (27.9)
Contaminated (ALT III)	95 (26.5)	15 (2.0)
Dirty (ALT IV)	28 (7.7)	6 (0.8)

The most frequent surgical emergencies were acute appendicitis, generalized peritonitis, intestinal obstruction, strangulated hernia, and abdominal trauma.

The distribution of emergency digestive conditions is presented in Figure 2.



**Figure 2: Distribution of emergency digestive surgical conditions.**

Most patients underwent surgery within the first 24 hours after admission. The duration of surgery was less than two hours in the majority of cases. Abdominal drainage and nasogastric decompression were frequently performed according to intraoperative findings (Table 2).

**Incidence and Pattern of Postoperative Complications**

Among the 1,102 included patients, 361 developed at least one postoperative complication, corresponding to an overall incidence of 32.8%.

The spectrum of postoperative complications is summarized in Table 3 and illustrated in Figure 3.

**Table 3: Spectrum of Postoperative Complications**

Complication	Frequency (%)
Surgical site infection	32.6
Urinary tract infection	8.5
Respiratory infection	7.1
Hypovolemia	4.0
Adhesive bowel obstruction	3.0
Dyspnea	3.0
Other complications	41.8

Surgical site infection (SSI) was the most frequent complication, accounting for 32.6% of all postoperative adverse events. Other common complications included urinary tract infections, respiratory infections, postoperative hypovolemia, adhesive bowel obstruction, and pulmonary complications.

Most patients presented with local inflammatory signs, fever, wound discharge, abdominal pain, or digestive symptoms depending on the nature of the complication (Table 3).

The median time to occurrence of complications was within the first postoperative week.

The clinical presentation of postoperative complications was dominated by abdominal pain, fever, wound discharge, abdominal tenderness, and abdominal distension (Table 4).

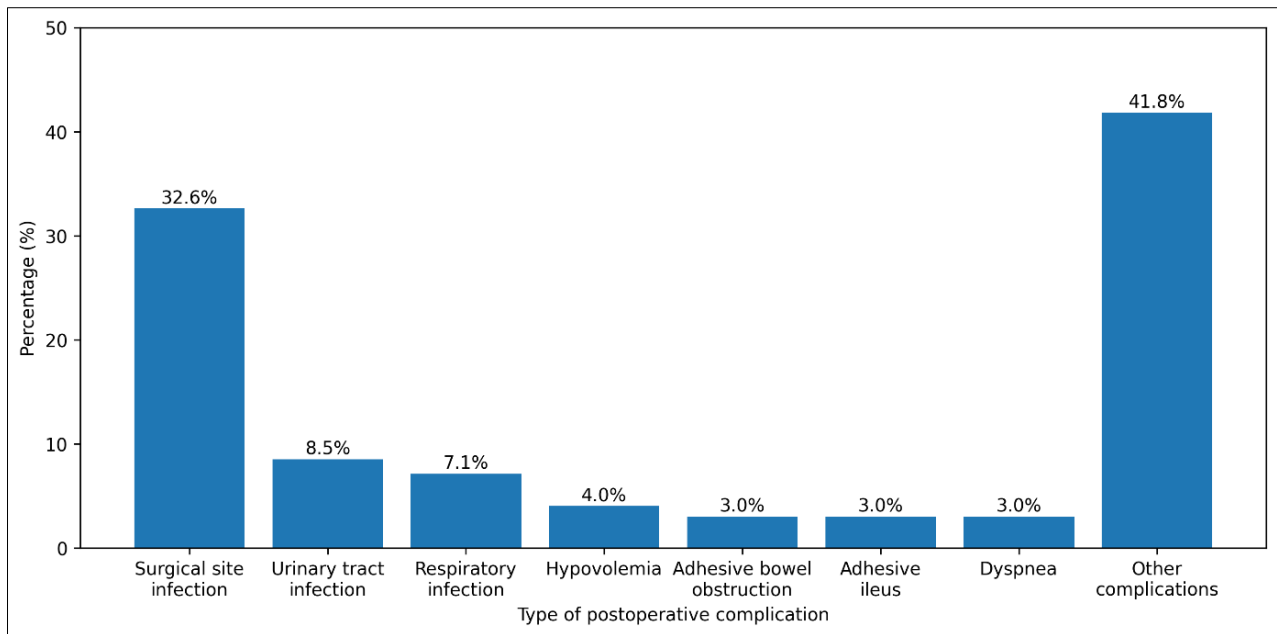


Figure 3: Distribution of postoperative complications among patients who developed postoperative complications (n = 361)

Table 4: Clinical Presentation of Postoperative Complications

Category	Clinical Findings
Functional symptoms	Abdominal pain, vomiting, bowel obstruction symptoms
General signs	Fever, deterioration of general condition
Physical signs	Surgical wound discharge, abdominal tenderness, abdominal distension

**Management and Outcomes of Postoperative Complications**

Treatment strategies varied according to the type and severity of complications. Conservative medical management, including antibiotic therapy, fluid

resuscitation, and supportive care, was sufficient in most patients. However, a subset required invasive procedures, including surgical drainage, reoperation, or intensive care management (Table 5).

Table 5: Management and Outcomes of Postoperative Complications

Variable	Value
Conservative medical treatment	Predominant
Reoperation	Performed when indicated
Intensive care admission	According to severity
Favorable outcome	Majority of patients
Postoperative mortality	7.2%

The majority of patients recovered favorably following treatment. Nevertheless, postoperative complications were associated with prolonged hospital stay and increased healthcare utilization.

Overall postoperative mortality was 7.2% (Table 5).

**Severity of Postoperative Complications**

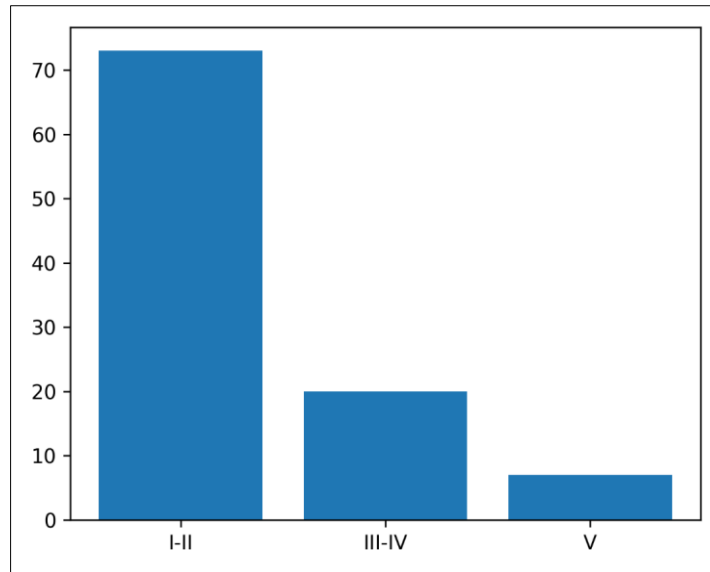
According to the Clavien–Dindo classification, minor complications (Grades I and II) represented

approximately 73% of all postoperative adverse events, whereas major complications (Grades III and IV) accounted for the remaining severe morbidity burden.

Grade V complications corresponded to postoperative deaths. The distribution of complications according to Clavien–Dindo grades is presented in Table 6 and Figure 4.

Table 6: Severity of Postoperative Complications According to the Clavien–Dindo Classification

Clavien–Dindo Grade	Frequency (%)
Grade I–II	73.0
Grade III–IV	20.0
Grade V (death)	7.2



**Figure 4: Distribution of postoperative complications according to the Clavien-Dindo classification**

**Factors Associated with Postoperative Complications**

Univariate analysis identified several variables significantly associated with postoperative complications, including older age, delayed consultation,

higher ASA score, contaminated surgical wounds, prolonged operative duration, and severe intra-abdominal pathology (Table 7).

**Table 7: Univariate Analysis of Factors Associated with Postoperative Complications**

Variable	Crude OR	95% CI	p-value
Age 50–59 years	1.308	1.029–6.315	<0.001
Secondary education	0.400	0.045–0.727	0.009
Altemeier III	1.891	1.021–4.660	0.001
ASA III	1.333	1.204–1.708	0.034

*OR = Odds Ratio; CI = Confidence Interval.*

Multivariable logistic regression analysis identified three independent predictors of postoperative complications. Adjusted odds ratios and adjusted p-values are presented in Table 8.

After adjustment for potential confounders, three independent predictors of postoperative complications remained statistically significant (Table 8):

- age between 50 and 60 years (adjusted OR, p = 0.001);
- Altemeier class III wound contamination (adjusted OR, p = 0.024);
- ASA III physical status classification (adjusted OR, p = 0.020).

**Table 8: Multivariable Logistic Regression Analysis of Independent Predictors of Postoperative Complications**

Variable	Adjusted OR	Adjusted p-value
Age 50–59 years	1.051	0.001
Altemeier III	0.967	0.024
ASA III	1.113	0.020

**Footnote:** Adjusted confidence intervals could not be reliably extracted from the original regression output and were therefore not reported.

Because adjusted confidence intervals could not be reliably retrieved from the original regression output, no forest plot was generated for the multivariable model.

Patients presenting these characteristics had a significantly higher risk of developing postoperative complications compared with their respective reference groups.

**DISCUSSION**

This multicenter study evaluated postoperative complications following emergency digestive surgery in three referral hospitals in Douala, Cameroon. We found an overall postoperative complication rate of 32.8%, with surgical site infection (SSI) being the most common complication. Most complications were classified as

minor according to the Clavien–Dindo classification, while age between 50 and 59 years, ASA III status, and Altemeier III wound contamination emerged as independent predictors of postoperative complications.

The incidence of postoperative complications observed in the present study (32.8%) is consistent with reports from other low- and middle-income countries and falls within the range reported for emergency abdominal surgery worldwide. A recent systematic review and meta-analysis from sub-Saharan Africa reported a pooled postoperative complication rate of approximately 20%, although substantial heterogeneity existed among studies because of differences in patient populations, healthcare resources, and perioperative management strategies [16]. The slightly higher incidence observed in our study may be explained by delayed presentation, advanced disease stages, and the predominance of contaminated abdominal emergencies frequently encountered in our setting.

Surgical site infection was the leading postoperative complication in our series, accounting for 32.6% of all complications. This finding is consistent with the international literature, which identifies SSI as the most frequent complication following emergency gastrointestinal surgery [17]. In the GlobalSurg study involving patients from more than 60 countries, SSI rates were significantly higher in low- and middle-income countries than in high-income settings despite similar surgical procedures [17]. Similar observations have been reported in several African studies, where SSI rates ranged from 15% to more than 30% following emergency abdominal surgery [18, 19].

The predominance of infectious complications in our cohort may be explained by the nature of emergency digestive surgery itself. Peritonitis, bowel perforation, strangulated bowel obstruction, and abdominal sepsis are frequently associated with contaminated or dirty operative fields. Delayed presentation remains another major challenge in sub-Saharan Africa and often leads to advanced intra-abdominal contamination before surgical intervention [18, 19]. Consequently, the risk of postoperative infectious complications remains substantially elevated compared with elective procedures.

The overall postoperative mortality rate in our study was 7.2%. Although lower than mortality rates reported in some African emergency laparotomy series, it remains considerably higher than those observed in high-income countries [5-17]. Previous multinational studies have demonstrated that mortality after emergency abdominal surgery is strongly influenced by access to intensive care facilities, perioperative monitoring, availability of trained personnel, and timely surgical intervention [5-17].

According to the Clavien–Dindo classification, most complications in our series were minor (Grades I–II), accounting for approximately 73% of all postoperative adverse events. Similar findings have been reported in contemporary studies evaluating emergency abdominal surgery outcomes, where minor complications predominate but severe complications remain responsible for most postoperative deaths and resource utilization [16-20].

One of the most important findings of this study was the identification of age between 50 and 59 years as an independent predictor of postoperative complications. The relationship between advancing age and adverse postoperative outcomes has been consistently demonstrated in the surgical literature [21]. Older patients often present with diminished physiological reserve, impaired immune response, and a higher prevalence of chronic diseases, all of which contribute to increased susceptibility to postoperative complications.

ASA III status was also independently associated with postoperative complications. This result corroborates findings from previous studies demonstrating that the ASA classification remains one of the strongest predictors of postoperative morbidity and mortality after abdominal surgery [4-22]. Patients classified as ASA III typically present with severe systemic disease and reduced physiological reserve, increasing their vulnerability to postoperative infections, organ dysfunction, and delayed recovery.

Another major finding of our study was the independent association between Altemeier III wound contamination and postoperative complications. Contaminated wounds are known to carry a substantially higher bacterial burden and have consistently been associated with increased rates of surgical site infection, intra-abdominal sepsis, and postoperative morbidity [19-23]. Our results reinforce the importance of strict adherence to perioperative antibiotic protocols, meticulous surgical technique, and enhanced postoperative surveillance in contaminated abdominal procedures.

From a clinical perspective, the predictors identified in this study may facilitate perioperative risk stratification and targeted preventive interventions. Patients aged over 50 years, those with ASA III status, and those undergoing surgery in contaminated operative fields should be considered high-risk individuals. Enhanced postoperative monitoring, optimized antimicrobial stewardship, early mobilization, and prompt recognition of complications may contribute to improved outcomes in these patients.

The strengths of this study include its multicenter design, large sample size, and inclusion of a broad spectrum of emergency digestive surgical conditions. The participation of three referral hospitals

increases the external validity of the findings and improves their applicability to similar resource-limited settings across sub-Saharan Africa.

Nevertheless, several limitations should be acknowledged. First, the retrospective nature of the study may have introduced information bias due to incomplete medical records. Second, some potentially important prognostic variables, such as nutritional status, serum albumin levels, smoking history, and detailed microbiological findings, were not consistently available. Finally, long-term outcomes beyond hospital discharge could not be assessed.

Despite these limitations, the present study provides valuable multicenter evidence regarding the burden, pattern, and determinants of postoperative complications following emergency digestive surgery in Cameroon and contributes to the limited body of literature available from sub-Saharan Africa.

## CONCLUSION

Postoperative complications remain a major challenge following emergency digestive surgery in resource-limited settings. In this multicenter study conducted in three referral hospitals in Douala, approximately one-third of patients developed at least one postoperative complication, with surgical site infection representing the most frequent adverse event. Although most complications were classified as minor according to the Clavien–Dindo classification, postoperative mortality remained substantial.

Age between 50 and 59 years, ASA III physical status, and Altemeier III wound contamination were identified as independent predictors of postoperative complications. These findings highlight the critical importance of perioperative risk stratification, early recognition of high-risk patients, strict infection prevention measures, and optimization of perioperative management.

Strengthening emergency surgical care pathways, promoting earlier patient presentation, improving perioperative monitoring, and implementing targeted preventive strategies for high-risk patients may contribute substantially to reducing postoperative morbidity and mortality in sub-Saharan Africa.

Future prospective multicenter studies are warranted to validate these findings and to develop context-specific predictive models for postoperative complications following emergency digestive surgery in low-resource settings.

## REFERENCES

1. Weiser TG, Haynes AB, Molina G, et al. Size and distribution of the global volume of surgery in 2012. *Bull World Health Organ*. 2016;94(3):201–209.

2. Bhangu A, Nepogodiev D, Futaba K, et al. Systematic review and meta-analysis of the incidence of surgical site infection in emergency abdominal surgery. *Br J Surg*. 2014;101(1):e91–e100.
3. Havens JM, Peetz AB, Do WS, et al. The excess morbidity and mortality of emergency general surgery. *J Trauma Acute Care Surg*. 2015;78(2):306–311.
4. Mullen MG, Michaels AD, Mehaffey JH, et al. Risk associated with complications after urgent surgery. *JAMA Surg*. 2017;152(6):e170504.
5. GlobalSurg Collaborative. Mortality of emergency abdominal surgery in high-, middle- and low-income countries. *Br J Surg*. 2016;103(8):971–988.
6. NIHR Global Health Research Unit on Global Surgery. Global variation in postoperative mortality and complications after cancer surgery. *Lancet*. 2021;397:387–397.
7. Tevis SE, Kennedy GD. Postoperative complications and implications on patient-centered outcomes. *J Surg Res*. 2013;181(1):106–113.
8. Nepogodiev D, Martin J, Biccard B, et al. Global burden of postoperative death. *Br J Anaesth*. 2019;123(2):229–238.
9. Allegranzi B, Bagheri Nejad S, Combescure C, et al. Burden of endemic healthcare-associated infection in developing countries. *Lancet*. 2011;377(9761):228–241.
10. Ingraham AM, Cohen ME, Bilimoria KY, et al. Comparison of outcomes after emergency general surgery procedures. *Surgery*. 2010;148(4):784–792.
11. Dharap SB, Athavale VS, Siddiqui AA, et al. Risk factors for postoperative complications in emergency abdominal surgery. *Indian J Surg*. 2021;83:1147–1154.
12. Fagbamigbe AF, Umezurike CC, Adisa AO, et al. Predictors of postoperative complications following abdominal surgery in low-resource settings. *World J Surg*. 2022;46(7):1560–1568.
13. Chichom-Mefire A, Fon T, Ngowe-Ngowe M. Emergency surgery in Cameroon: challenges and perspectives. *Pan Afr Med J*. 2020;35:112.
14. Biccard BM, Madiba TE, Kluyts HL, et al. Perioperative patient outcomes in the African Surgical Outcomes Study. *Lancet*. 2018;391(10130):1589–1598.
15. Tonye R, Ndzié E, Ndzié M, et al. Postoperative complications in district hospitals of Yaoundé, Cameroon. *Health Sci Dis*. 2015;16(3):1–6.
16. Yadeta DA, Bulto GA, Kassa BG, et al. Incidence and predictors of postoperative complications in sub-Saharan Africa: a systematic review and meta-analysis. *Front Health Serv*. 2024;4:1353788.
17. GlobalSurg Collaborative. Surgical site infection after gastrointestinal surgery in high-income, middle-income, and low-income countries: a prospective international multicentre cohort study. *Lancet Infect Dis*. 2018;18(5):516–525.

18. Ojewuyi OO, Ojewuyi AR, Fasanu AO, et al. Surgical site infections following abdominal surgery: incidence, risk factors and outcomes. *Afr Health Sci*. 2024;24(4):91–98.
19. HEAL Africa Surgical Collaborative. Risk factors for surgical site infection after abdominal surgery in a tertiary African hospital. *East Cent Afr J Surg*. 2025;30(1):45–53.
20. Clavien PA, Barkun J, de Oliveira ML, Vauthey JN, Dindo D, Schulick RD, de Santibañes E, et al. The Clavien-Dindo classification of surgical complications: five-year experience. *Ann Surg*. 2009;250(2):187–196. doi: 10.1097/SLA.0b013e3181b13ca2.
21. Park JS, Lee KG, Kim MK. Trends and outcomes of emergency general surgery in elderly and highly elderly population in a single regional emergency center. *Ann Surg Treat Res*. 2023;104(6):325-331.
22. Protopapa KL, Simpson JC, Smith NCE, Moonasinghe SR. Development and validation of the Surgical Outcome Risk Tool (SORT). *Br J Surg*. 2014;101:1774–1783.
23. Ban KA, Minei JP, Laronga C, et al. American College of Surgeons and Surgical Infection Society guidelines for surgical site infection prevention. *J Am Coll Surg*. 2017;224(1):59–74.

---

**Cite This Article:** Fred Dikongue, Valery Onana Mvondo, Basile Essola, Franck Borel Kouam, Achille Many Essomba, Jean Paul Engbang (2026). Risk Factors for Postoperative Complications after Emergency Digestive Surgery: A Five-Year Multicenter Study from Sub-Saharan Africa. *East African Scholars J Med Surg*, 8(6), 289-298.

---