

Postoperative Intensive Care Unit Admissions in Cameroon: Indications, Outcomes, and Predictors of Mortality at Douala General Hospital

Yannick Mahamat Ekani Boukar¹, Divine Martins Mokake¹, Mbele Richard II², Achille Tajouego¹, Ousmana Oumarou³, Savom Eric Patrick², Nana Theophile Chunteng¹, Ngwane Ntongwetape¹, Junette Metogo⁴, Guy Aristide Bang², Chichom Alain¹, Arthur Essomba²

¹Faculty of Health Sciences, University of Buea, Buea, Cameroon

²Faculty of Medicine and Biomedical Sciences, University of Yaoundé I, Yaoundé, Cameroon

³Faculty of Medicine and Biomedical Sciences, University of Garoua, Garoua, Cameroon

⁴Faculty of Medicine and Pharmaceutical Sciences, University of Douala, Douala, Cameroon

Email: boukaryoussouf@gmail.com

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Abstract

Background: Postoperative complications are a major cause of morbidity and mortality worldwide, particularly in low-resource settings. Admission to intensive care units (ICUs) after surgery plays a critical role in preventing and managing life-threatening complications. However, data from sub-Saharan Africa remain scarce. **Objective:** To determine the indications, outcomes, and predictors of mortality among postoperative patients admitted to the ICU of Douala General Hospital, Cameroon. **Methods:** We conducted a retrospective cross-sectional study of all patients admitted to the ICU after surgery between January 2018 and December 2022. Sociodemographic, clinical, surgical, and outcome variables were extracted from medical records. Data were analyzed using SPSS v25. Logistic regression identified predictors of mortality, with significance set at $p < 0.05$. **Results:** A total of 352 patients were included. The mean age was 46.3 ± 18.4 years, with a male predominance (56.2%). Emergency surgeries accounted for 61.6% of admissions. The most common indications for ICU admission were hemodynamic instability (27.6%), severe sepsis/septic shock (21.3%), and respiratory failure (19.2%). The mean length of ICU stay was 6.8 ± 4.2 days. Postoperative complications included sepsis (29.5%), acute respiratory distress syndrome (15.6%), and acute kidney injury (10.2%). The overall mortality rate was 28.4%. Independent predictors of mortality were septic shock (OR: 3.2, 95% CI: 1.8 - 5.7), need for mechanical ventilation (OR:

2.9, 95% CI: 1.6 - 5.1), and emergency surgery (OR: 2.4, 95% CI: 1.3 - 4.2).

Conclusion: Postoperative ICU admissions at Douala General Hospital are frequent and associated with high mortality, primarily driven by sepsis and respiratory failure. Strengthening perioperative care, infection prevention, and timely ICU referral are critical to improving surgical outcomes in Cameroon.

Keywords

Intensive Care Unit, Postoperative Complications, Surgery, Mortality Predictors, Cameroon

1. Introduction

Surgery is an essential component of modern healthcare, but it is also associated with significant risks of morbidity and mortality, particularly in low- and middle-income countries (LMICs). Globally, more than 313 million surgical procedures are performed annually, with postoperative complications accounting for 4.2 million deaths each year [1]. The burden is disproportionately higher in LMICs, where perioperative care is often limited by resource constraints, late presentation, and inadequate monitoring [2] [3].

Intensive care units (ICUs) play a crucial role in the management of postoperative patients at risk of severe complications, such as sepsis, respiratory failure, and hemodynamic instability [4]. In high-income countries, postoperative ICU admissions are frequently guided by standardized scoring systems and evidence-based protocols [5]. By contrast, in sub-Saharan Africa, ICU resources are scarce, patient selection is inconsistent, and outcomes remain poorly documented [6] [7].

In Cameroon, access to ICU care is limited and the criteria are not clearly defined, and there is a paucity of published data on postoperative ICU outcomes. Douala General Hospital (DGH), one of the country's leading tertiary centers, provides a unique opportunity to study these outcomes in a resource-constrained setting.

This study aimed to describe the indications, outcomes, and predictors of mortality among postoperative patients admitted to the ICU of Douala General Hospital between 2018 and 2022.

2. Methods

This was a retrospective cross-sectional study conducted at the ICU of Douala General Hospital, a tertiary referral center in Cameroon. The ICU is a 12-bed multidisciplinary unit equipped for mechanical ventilation, vasopressor therapy, and hemodynamic monitoring

We included all adult patients (≥ 18 years) admitted to the ICU after surgery between January 1, 2018, and December 31, 2022. Exclusion criteria were incomplete medical records and patients admitted for nonsurgical reasons. Data were

extracted from ICU admission registers and patient files. Variables included:

- **Sociodemographic:** age, sex.
- **Comorbidities:** hypertension, diabetes, renal disease, cardiac disease, others.
- **Clinical:** comorbidities, type of surgery (elective or emergency).
- **Indications for ICU admission:** hemodynamic instability, sepsis/septic shock, respiratory failure, neurological impairment.
- **Interventions:** mechanical ventilation, vasopressor support, renal replacement therapy.
- **Post operative complications:** sepsis, ARDS, acute kidney injury.
- **Outcomes:** length of stay, complications, and mortality.

Patients were classified according to explicit clinical criteria:

- **Hemodynamic instability:**

Defined as systolic blood pressure < 90 mmHg, mean arterial pressure (MAP) < 65 mmHg, or a persistent drop in blood pressure requiring > 30 mL/kg fluid resuscitation and/or vasopressor support. The presence of new-onset arrhythmias requiring intervention or signs of peripheral hypoperfusion (confusion, cold extremities, prolonged capillary refill) was also considered.

- **Severe sepsis/Septic shock:**

Severe sepsis was defined as suspected or confirmed infection associated with organ dysfunction (e.g., acute kidney injury, altered mental status, respiratory compromise).

Septic shock was defined as sepsis with persistent hypotension requiring vasopressors to maintain MAP $\geq$ 65 mmHg despite adequate fluid resuscitation.

- **Respiratory failure:**

Defined as the need for mechanical ventilation, or oxygen saturation (SpO₂) < 90% despite supplemental oxygen $\geq$ 10 L/min. Clinical signs (tachypnea, use of accessory muscles, inability to maintain airway) were also considered

Data were entered into SPSS v25. Continuous variables were expressed as means $\pm$ SD, categorical variables as frequencies and percentages. Variables with $p < 0.2$ in univariate analysis were included in a multivariate, logistic regression was used to identify independent predictors of mortality. Statistical significance was set at $p < 0.05$. Ethical approval was obtained from the Institutional Review Board of the Faculty of Medicine and Biomedical Sciences, University of Yaoundé I. Authorization to access medical records was granted by the administration of Douala General Hospital.

3. Results

A total of 352 patients were analyzed. The mean age was 46.3 ± 18.4 years, ranging from 18 to 84 years. Males represented 56.2% of the cohort, giving a male-to-female ratio of approximately 1.3:1. The majority of patients were between 41 and 60 years old (42%), followed by 31.8% in the 18 - 40 year's age group (**Table 1**).

Of the 352 participants, 195 (55.4%) had no comorbidity, while 94 (26.7%) and 63 (17.9%) had respectively one and at least two comorbidities. Hypertension was

the most represented comorbidity (23.0%), followed by renal disease (17.9%) and diabetes mellitus (12.8%) in that order (**Table 2**).

Table 1. Sociodemographic characteristics of postoperative ICU patients (N = 352).

Variable	Frequency	Percentage (%)
Male	198	56.2
Female	154	43.8
Mean age (years)	46.3 ± 18.4	-
Age 18 - 40	112	31.8
Age 41 - 60	148	42.0
Age >60	92	26.2

Table 2. Comorbidities.

		Frequency	Proportion (%)
Comorbidities	Hypertension	81	23.0
	Renal disease	63	17.9
	Diabetes mellitus	45	12.8
	Liver disease	11	3.1
	Heart disease	10	2.8
	HIV	9	2.6
	Lung disease	8	2.3
	Morbid obesity	2	0.6
	Sickle-cell disease	1	0.3
Number of comorbidities	None	195	55.4
	1 comorbidity	94	26.7
	> 2 comorbidities	63	17.9

The most frequent indications for postoperative ICU admission were hemodynamic instability (27.6%), severe sepsis or septic shock (21.3%), and respiratory failure (19.2%). Neurological impairment accounted for 15.3% of admissions, while other causes, including renal failure, represented 16.6% (**Table 3**).

Regarding postoperative complications, sepsis was the most common (29.5%), followed by acute respiratory distress syndrome (15.6%) and acute kidney injury (10.2%). Concerning interventions, over one-third of patients required mechanical ventilation (34.7%), nearly one-quarter required vasopressor support (24.7%), and a smaller proportion underwent renal replacement therapy (4.0%) (**Table 4**).

The mean ICU length of stay was 6.8 ± 4.2 days. At discharge, 71.6% of patients survived, while the overall mortality rate was 28.4% (**Table 5**).

Multivariate logistic regression identified three independent predictors of mortality: admission for septic shock (adjusted OR: 3.2, 95% CI: 1.8 - 5.7, $p = 0.001$), requirement of mechanical ventilation (adjusted OR: 2.9, 95% CI: 1.6 - 5.1, $p = 0.003$), and undergoing emergency surgery (adjusted OR: 2.4, 95% CI: 1.3 - 4.2, $p = 0.008$) (**Table 6**).

Table 3. Indications for postoperative ICU admission.

Indication	Frequency	Percentage
Hemodynamic instability	97	27.6%
Severe sepsis/septic shock	75	21.3%
Respiratory failure	68	19.2%
Neurological impairment	54	15.3%
Renal/metabolic disorders	58	16.6%

Table 4. Postoperative complications and interventions.

Variable	Frequency	Percentage (%)
Sepsis	104	29.5
ARDS	55	15.6
Acute kidney injury	36	10.2
Mechanical ventilation required	122	34.7
Vasopressor support	87	24.7
Renal replacement therapy	14	4.0

Table 5. Outcomes of postoperative ICU patients.

Variable	Frequency	Percentage (%)
Mean length of stay	6.8 ± 4.2 days	-
Survival	252	71.6
Mortality	100	28.4

Table 6. Logistic regression—predictors of mortality.

Predictor	Adjusted OR	95% CI	p-value
Septic shock	3.2	1.8 - 5.7	0.001
Mechanical ventilation	2.9	1.6 - 5.1	0.003
Emergency surgery	2.4	1.3 - 4.2	0.008
Comorbidities	1.2	0.8 - 2.1	0.210

4. Discussion

This study demonstrates that postoperative ICU admissions at Douala General Hospital are frequent, with high mortality (28.4%). These results are higher than in high-income countries, where postoperative ICU mortality is usually below 10% [4] [5], but consistent with findings from other sub-Saharan African ICUs (20% - 40%) [6]-[8]. Comorbidities were prevalent (44.6%), they did not independently predict mortality. However, their presence suggests a need for more rigorous preoperative medical evaluation.

The leading indications for ICU admission were hemodynamic instability, sepsis, and respiratory failure. This is consistent with African and global literature, which identifies sepsis and cardiovascular instability as major postoperative threats [9] [10].

Sepsis was the most common complication and an independent predictor of mortality. This reflects both late presentation and limited infection control resources. This finding is consistent with reports from African ICUs indicating that sepsis is a leading cause of preventable postoperative death [10]. The high proportion of patients requiring mechanical ventilation also underscores the severity of postoperative respiratory complications, which significantly increase mortality risk [11].

Emergency surgery was strongly associated with poor outcomes, in line with studies demonstrating worse prognosis compared to elective surgery [12]. This suggests that improving perioperative optimization and timely surgical referral could improve survival.

5. Strengths and Limitations

This is one of the few studies in Cameroon providing data on postoperative ICU outcomes. However, as a retrospective single-center study, it is limited by potential documentation bias and lack of long-term follow-up.

6. Conclusion

Postoperative ICU admissions at Douala General Hospital are associated with high morbidity and mortality, mainly due to sepsis, respiratory failure, and emergency surgical interventions. Although comorbidities were common, they were not independent predictors of mortality. To improve outcomes in resource-limited settings like Cameroon:

6.1. Strengthening Perioperative Optimization

- Implement standardized preoperative assessment tools targeting comorbidities.
- Introduce early-warning scoring systems for timely ICU referral.

6.2. Improving Infection Prevention and Sepsis Control

- Reinforce perioperative antibiotic prophylaxis protocols.
- Introduce low-cost infection-control measures (hand hygiene audits, sterilization

monitoring).

- Implement simplified sepsis bundles suitable for LMICs.

6.3. Multidisciplinary ICU Management

Such interventions are feasible and could substantially reduce postoperative mortality. Further prospective multicenter studies are needed to guide national perioperative and critical care policies.

Conflicts of Interest

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

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