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RESEARCH ARTICLE

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Morbidity and Mortality of Surgical Patients Admitted to an Intensive Care Unit in Kinshasa, Democratic Republic of Congo

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ABSTRACT

Introduction: Postoperative morbidity and mortality in intensive care units is a major challenge within the healthcare systems of resource-limited countries. In Kinshasa, the Provincial General Referral Hospital manages a considerable number of patients requiring intensive care following surgery. This study aims to evaluate the postoperative mortality rate and identify associated risk factors.

Methods: A retrospective correlational study was conducted on 75 patients who underwent surgery and were admitted to the intensive care unit between January and June 2019. Data were extracted from medical records and analyzed using SPSS software. The chi-square test was used to examine the associations between surgical variables and patient clinical outcomes, with a significance level set at 5%.

Results: The overall mortality rate was 70.6%. The predominant complications included acute renal failure (24%), cardiorespiratory arrest (21.3%), and septic shock (16%). A statistically significant association was observed between the clinical outcome and several variables: surgical indication ($p = 0.000$), surgical modality ($p = 0.009$), type of anesthesia ($p = 0.001$), and type of surgery ($p = 0.002$). In contrast, the ASA score did not show a significant correlation with mortality ($p = 0.119$).

Conclusion: These results highlight the crucial influence of operative and anesthetic conditions on patient survival in intensive care. It is therefore imperative to improve perioperative management to reduce postoperative morbidity and mortality in this setting.

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Postoperative complications, Intensive care units, Hospital Mortality, Democratic Republic of the Congo.

Abbreviations

WHO: World Health Organization, ASA: American Society of Anesthesiologists, DRC: Democratic Republic of the Congo, AG: General Anesthesia, ALR: Regional Anesthesia, CHU: University Hospital Center, HPGRK: Kinshasa Provincial General Referral Hospital.

Introduction

Post-operative morbidity and mortality represent a major public health challenge worldwide, particularly in resource-limited countries where hospital infrastructure, medical staff, and technical equipment are frequently inadequate. According to the World Health Organization (WHO), more than 234 million surgical procedures are performed annually worldwide, with an overall mortality rate ranging from 0.4% to 0.8% in developed countries, while it can exceed 5% in developing countries [1]. Nearly half of these deaths are considered preventable.

The postoperative period, particularly the first 48 hours following surgery, is recognized as a critical phase during which patients are exposed to major risks of complications such as organ failure, hemodynamic instability, nosocomial infections, or residual sequelae related to anesthesia. In this context, intensive care units play a crucial role in the early detection and rapid, effective management of these adverse events.

In African contexts, numerous studies have documented high postoperative mortality rates. For example, Anzoua et al. [2] reported a mortality rate of 63.6% in the surgical intensive care unit at the University Hospital of Ouagadougou. Furthermore, M'biandoun [3], in Mali, observed a mortality rate of 34% in emergency surgery, characterized by a marked predominance of early postoperative complications (92%).

In the Democratic Republic of Congo (DRC), data on morbidity and mortality among surgical patients admitted to intensive care remain scarce and poorly documented. Most hospitals lack reliable registries that would allow for rigorous monitoring of the quality of postoperative care or a precise assessment of risk factors associated with adverse outcomes.

In this context, the present study was conducted at the Kinshasa Provincial General Referral Hospital (HPGRK), one of the major hospital centers in the DRC, to address this lack of local data. It

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aims to analyze the morbidity and mortality of surgical patients admitted to intensive care and to identify the main surgical and anesthetic factors influencing their prognosis.

Materials and Methods

Study framework

This study was conducted at the Kinshasa Provincial General Referral Hospital (HPGRK), the main public hospital in Kinshasa, the capital of the Democratic Republic of Congo. The hospital has an intensive care unit that admits post-operative patients, particularly those from surgical emergencies.

Type of study

This is a quantitative, retrospective, descriptive and correlational study. It was carried out over a six-month period, from January 1 to June 30, 2019, based on the analysis of the medical records of surgical patients admitted to intensive care.

Population and sampling

The target population included all patients who underwent surgery and were subsequently transferred to intensive care during the study period. A sample of 75 patients was selected using non-probability convenience sampling.

The inclusion criteria were:

- to be a patient who underwent surgery and was admitted to intensive care at HPGRK during the study period;
- to have a complete and usable medical file.

or missing files were excluded from the analysis.

Variables studied

The dependent variable was the patient's outcome in the intensive care unit (recovery or death).

The independent variables included:

- The ASA score (American Society of Anesthesiologists)
- The surgical indication
- The surgical procedure (emergency or scheduled)
- The type of surgery
- The type of anesthesia

Data collection

The data were collected using a document analysis method with a standardized information extraction grid. This grid contained the clinical, surgical, and anesthetic information necessary for the statistical analysis.

Data analysis

The data were coded and then analyzed using SPSS version 21. Descriptive analysis allowed for the presentation of frequencies and percentages. For the analysis of the relationships between independent variables and patient outcomes, the Chi-square test was used with a significance threshold set at $p \leq 0.05$.

Ethical considerations

This study complied with fundamental ethical principles in biomedical research.

- Permission to consult the medical records was obtained from the officials of HPGRK.
- The data was processed anonymously and confidentially.
- The results of the study are intended solely to improve the quality of care, without any commercial or discriminatory intent.

Results

Table 1: Distribution of subjects according to age group.

Age range (in years)	Number (n)	Percentage (%)
≤ 15	11	14.7%
16-30	21	28.0%
31 – 45	13	17.3%
46 – 60	6	8.0%
≥ 61	24	32.0%
Total	**75**	**100.0%**

The majority of patients were aged 61 and over, which may indicate an increased vulnerability of this population to adverse postoperative outcomes.

Table 2: Distribution by sex.

Sex	Number (n)	Percentage (%)
Male	42	56.0%
Female	33	44.0%
Total	**75**	**100.0%**

A male predominance is observed, possibly linked to the nature of the pathologies operated on (e.g., prostate).

Table 3: Outcome of surgical patients admitted to intensive care.

Issue	Number (n)	Percentage (%)
Healing	22	29.3%
Death	53	70.6%
Total	**75**	**100.0%**

The high mortality rate (70.6%) highlights the severity of the cases and the need for improved quality of care in post-operative intensive care.

Table 4: Observed post-operative complications.

Complication	Number (n)	Percentage (%)
Acute kidney injury (AKI)	18	24.0%
Cardiopulmonary arrest	16	21.3%
Septic shock	12	16.0%
Hypovolemic shock	10	13.3%
Electrolyte imbalances	8	10.7%
Diabetic coma	4	5.3%
OAP (acute pulmonary edema)	3	4.0%
Pulmonary embolism	3	4.0%
stroke	2	2.7%
Encephalopathy	2	2.7%
Cardiogenic shock	2	2.7%

Acute renal failure, cardiorespiratory arrest and septic shock are the main post-operative complications identified, justifying the need for rigorous hemodynamic and metabolic monitoring in intensive care.

Table 5: Distribution according to type of anesthesia.

Type of anesthesia	Number (n)	Percentage (%)
AG + orotracheal intubation	57	76.0%
ALR (loco-regional anesthesia)	16	21.3%
General Assembly in the open air	2	2.7%
Total	**75**	**100.0%**

The majority of patients underwent surgery under general anesthesia with intubation, often in an emergency setting.

Table 6: Associations between operative factors and patient outcomes.

Factors	Total operated	Death	%	p-value
ASA risk				
ASA I	10	2	20.0	0.119
ASA II	22	18	81.8	
ASA III	43	33	76.7	
Surgical indication				
Acute abdomen	48	37	77.1	< 0.001***
Cancer	3	3	100.0	
Gynecology and Obstetrics	3	2	66.7	
Urological and nephrological	21	11	52.4	
Operating procedure				
Emergency	46	34	73.9	0.009**
Scheduled	29	19	65.5	
Type of anesthesia				
AG+IOT	57	48	84.2	0.001**
AG open air	2	0	0.0	
ALR	16	5	31.3	
Type of surgery				
Laparotomy	49	43	87.8	0.002**
Prostate lymph node dissection	16	7	43.8	
Cesarean section and fistula repair	4	2	50.0	
Others	6	1	16.7	

** p < 0,01; *** p<0,001

The results show that the surgical indication, the surgical modality, the type of surgery, and the type of anesthesia significantly influence patient outcomes. However, the ASA score does not predict ICU outcomes in this context.

Discussion

This study aimed to analyze the morbidity and mortality of surgical patients admitted to the intensive care unit at the Kinshasa Provincial General Referral Hospital, as well as to identify the major risk factors influencing their prognosis. The results revealed an alarming mortality rate of 70.6%, significantly higher than data reported in industrialized countries, where this rate is between 0.4% and 0.8% according to the World Health Organization [1]. This high rate is, however, comparable to observations made in other African contexts: 63.6% in Burkina Faso [2], 34% in Mali [3] and 49% in Togo [4].

This excess mortality can be explained by several key factors: the predominance of surgical emergencies, significant delays in medical care, a lack of technical resources adapted to resuscitation, and often inadequate hospital infrastructure. Numerous African studies have also highlighted that prolonged delays before referral and the severity of pathologies are major aggravating factors in postoperative morbidity and mortality [5,6].

Furthermore, advanced age (> 60 years) appears as a particularly vulnerable category, confirming the work of Proske [7] and Dutton, which highlights increased fragility in older subjects linked to the frequent presence of co-morbidities such as heart disease, kidney failure or diabetes.

It is important to emphasize that age, as an isolated variable, is not a direct predictor of mortality, but rather an indicator of cumulative physiological frailty [8]. The observed male predominance (56%) could be attributed to the nature of the pathologies treated surgically, particularly prostate conditions.

This trend is corroborated by other African studies, such as the one conducted by Ahouannou [9] in Mali, which reports a male-to-female ratio of 1.9. The most frequently encountered complications include acute renal failure (24%), cardiorespiratory arrest (21.3%), and septic shock (16%). These clinical manifestations are characteristic of multiple organ dysfunction syndrome, frequently observed in postoperative intensive care, particularly in contexts where treatment is delayed [10,11].

Furthermore, the type of anesthesia and the surgical modality (emergency versus elective) were significantly correlated with an adverse outcome, confirming the findings of Chang et al. [12] and Kasall et al. [13]. General anesthesia with orotracheal intubation (GA + OTI), the most frequently used technique in this study (76%), is often reserved for emergency situations, thus increasing the risk of respiratory and hemodynamic complications.

In contrast, the ASA score, intended to reflect preoperative anesthetic risk, did not demonstrate significant predictive value for mortality. This observation corroborates the findings of Ahouannou [9], who emphasizes that risk assessment based solely on the ASA score is insufficient in resource-limited settings, where other systemic factors such as delays in care, nosocomial infections, and access to healthcare play a predominant role.

Furthermore, the type of surgery is also a determining prognostic factor: emergency digestive interventions, particularly laparotomies, are associated with increased mortality. These results are consistent with those reported by Rasamoelina et al. [14] and Pougam [15], who identified emergency digestive surgery as particularly morbid in Africa.

Ultimately, this study confirms that postoperative morbidity and mortality in intensive care units in Kinshasa remain high and multifactorial. Advanced patient age, the urgent nature of surgical procedures, the early onset of complications, and the type of anesthesia administered are major contributing factors. These findings call for rigorous strengthening of perioperative monitoring, a substantial improvement in the capacity of intensive care units, and the implementation of stricter triage

and pre-anesthetic preparation strategies.

Conclusion

This study, conducted at the Kinshasa Provincial General Referral Hospital, revealed a concerning rate of postoperative morbidity and mortality among patients admitted to the intensive care unit, with a mortality rate of 70.6%. The factors most significantly correlated with an adverse outcome included the surgical indication, the urgency of the procedure, the type of anesthesia used, and the surgical category performed. Conversely, although the ASA score is commonly used as an indicator of preoperative risk, it did not demonstrate statistically significant predictive value in this specific context.

The major complications identified, such as acute renal failure, cardiorespiratory arrest and septic shock, illustrate the vulnerability of patients operated on in an intensive care setting frequently limited by technical and human constraints.

Faced with this critical situation, it is imperative to implement measures aimed at strengthening anesthesia and intensive care capacities, encouraging better anticipation of perioperative risks, and optimizing the management of surgical emergencies. Furthermore, improving hospital infrastructure, providing continuing education for healthcare staff, and developing and implementing protocols adapted to the local context are essential levers for mitigating postoperative morbidity and mortality and improving the overall quality of care provided in hospitals in the Democratic Republic of Congo.

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