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Postoperative Complications in the Intensive Care Unit of Gabriel Toure University Hospital in Bamako: Epidemiological, Clinical and Prognostic Aspects

Koita S A[1*], Mangané M[2], Almeimoune A[2], Diop Th M[2], Konaté M[3], Sanogo D[2], Soumaré A[2], Gamby A[2], Coulibaly A[2], Coulibaly M[1], Kassogué A[2], Sangaré H[2], DIANGO DM[2]

[1]Department of Anesthesiology, Intensive Care and Emergency Medicine, Mother and Child University Hospital "Luxembourg"
[2]Department of Anesthesiology, Intensive Care and Emergency Medicine, Gabriel Touré University Hospital
[3]Department of General Surgery, Gabriel Touré University Hospital, Bamako

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***Corresponding author:** Siriman A Koita
Department of Anesthesiology, Intensive Care and Emergency Medicine, Mother and Child University Hospital "Luxembourg"

Abstract **Original Research Article**

Objective: The objective was to study postoperative complications in the Intensive Care Unit (ICU) of Gabriel Touré University Hospital. ***Methodology****:* This was a descriptive, analytical study with prospective data collection covering a 12-month period from April 1, 2023, to March 31, 2024. Patients admitted to the ICU who developed a postoperative complication were included in the study. Data were analyzed using SPSS software version 20.0. The analysis was performed in Microsoft Office Excel 2020, and the document was created in Microsoft Office Word 2020. The Chi-square test was used, with a significance level set at $P<0.05$. ***Results****:* Out of 602 patients admitted to the ICU, 297 underwent surgical interventions, among whom 123 experienced postoperative complications, representing a frequency of 41.4%. The male-to-female sex ratio was 1.08. The most represented age group was 21 to 40 years, with an average age of 28.8 ± 14.9 years. The most frequent comorbidities were arterial hypertension (17.07%) and duodenal ulcers (5.6%). Peritonitis was the most common indication for surgery, with a frequency of 17.88%, followed by hemoperitoneum (13%). Hemodynamic instability was the most frequent reason for ICU admission, representing 25.2% of cases. Digestive surgery accounted for 44.7% of patients. At least one adverse perioperative event occurred in 47.2% of patients, with hypotension being the most frequent (65% of cases). General anesthesia was the most commonly used type (97.3% of cases). Renal complications were the most frequently observed, found in 43.9% of patients. Additionally, 39% of patients were classified as Grade I according to the Clavien-Dindo classification. Age, ASA classification (ASA3 and 4), and the Altemeier classification (Altemeier IV) were identified as risk factors. The prognosis of the patients was linked to the Altemeier classification as well as the nature and severity of the complications encountered. Although the overall outcome was favorable for 75.5% of operated patients, the mortality rate remained high at 24,4%. ***Conclusion:*** Postoperative complications remain a major concern in the management of surgical patients. This study highlights the importance of thorough preoperative risk assessment and tailored care to reduce the incidence and severity of postoperative complications.

Keywords: Postoperative complications, Intensive Care, Gabriel Touré University Hospital.

INTRODUCTION

Postoperative complications (POCs) are defined as any deviation from the expected normal postoperative course, whether symptomatic or asymptomatic [1]. They are generally classified into two main types: early complications occurring within thirty (30) days after surgery and late complications occurring beyond thirty days. These complications may or may not be related to the underlying disease for which surgery was performed and may or may not be a direct consequence of surgery and/or anesthesia [2].

Despite significant advances in surgical techniques, sterilization equipment, surgical instruments and draping materials, as well as strict adherence to universal aseptic principles in operating theaters, postoperative complications remain frequent. Most of

these complications can be effectively managed in a surgical setting. However, ICU admission of patients with POCs reflects the variable severity and complexity of their clinical condition, which may be life-threatening in the short term. Intensive care management allows optimization of the postoperative period in high-risk patients through the use of dedicated resources. These considerations underline the major challenge that postoperative complications represent in modern surgical care, emphasizing the importance of this study.

METHODOLOGY

This was a descriptive and analytical study with prospective data collection conducted over a 12-month period from April 1, 2023, to March 31, 2024. All patients admitted to the ICU for postoperative complications were included.

The variables studied included socio-demographic characteristics, medical history, reason for admission, surgical indication, operative technique, type of surgery, ASA and Altemeier classifications, type of anesthesia, anesthetic agents used, intraoperative adverse events, pre-anesthetic consultation data, type of complication, Clavien-Dindo classification, time to onset of complications, length of hospital stay, and patient outcomes.

Data analysis was performed using SPSS version 20.0. Tables were created using Microsoft Office Excel 2020, and text processing was performed using Microsoft Office Word 2020. The Chi-square test was used with a significance threshold set at $P<0.05$.

The study was conducted with the consent of patients and/or their relatives, and all collected data were kept confidential.

RESULTS

Among the 602 patients admitted to the ICU during the study period, 297 underwent surgical procedures, of whom 123 developed postoperative complications, representing 20.43% of all ICU admissions and 41.4% of postoperative admissions.

The male-to-female ratio was 1.08. The most represented age group was 21–40 years, with a mean age of 28.8 ± 14.9 years. The most frequent comorbidities were arterial hypertension (17.7%) and peptic ulcer disease (5.6%).

Peritonitis was the most frequent surgical indication (17.88%), followed by hemoperitoneum (13%). Hemodynamic instability, particularly hypotension, was the leading reason for ICU admission (25.2%). Digestive surgery was the most represented (44.7%).

At least one intraoperative adverse event was observed in 47.2% of patients, mainly hypotension (65%). General anesthesia was the most commonly used anesthetic technique (97.3%).

Renal complications were the most frequently observed (43.9%). Furthermore, 39% of patients were classified as Grade I according to the Clavien-Dindo classification.

Identified risk factors included age, ASA classification (ASA 3U and 4U), and Altemeier class IV. Prognosis was associated with the Altemeier classification and the severity of complications.

Although outcomes were favorable in 75.7% of patients, the mortality rate remained high at 24.4%. Among patients who developed complications, 42.3% died.

Table 1: Surgical Indications

Specialty	Surgical Indications	(n=123)	(%)
Digestive Surgery (n=55)	Hémopéritoine	14	25,4
	Peritonitis	20	36,3
	Intestinal obstruction	13	23,6
	Gastric tumor	4	7,27
	Pancreatic tumor	1	1,8
	Hiatal hernia	1	1,8
	Umbilical hernia	2	3,6
Neurosurgery (n=19)	Subdural hematoma	3	15,7
	Epidural hematoma	5	26,3
	Intraparenchymal hematoma	3	15,7
	Depressed skull fracture	2	10,5
	Spinal cord injury	2	10,5
	Intracranial tumor	2	10,5
	Hemorrhagic stroke	2	10,5
Gynéco-obstétrique (n=33)	Eclampsia	9	27,2
	Ovarian tumor	3	9
	Uterine rupture	6	18,1

Specialty	Surgical Indications	(n=123)	(%)
	Retroplacental hematoma	15	45,4
Traumatology (n=5)	Lower limb trauma	5	100
Pediatric Surgery (n=9)	Intestinal intussusception	3	33,3
	Ureteropelvic junction obstruction	1	11,1
	Hernie hiatale	1	11,1
	Péritonitis	2	22,2
	Hemoperitoneum	2	22,2
Urology (n=1)	Renal trauma	1	100
ORL (n=1)	Cervical trauma	1	100

Table 2: Intraoperative Adverse Events

Type of Event	Number (n=58)	(%)
Hypotension	38	65,5
Cardiorespiratory arrest	10	17,2
Difficult intubation	5	8,6
Hypertension	2	3,4
Mendelson syndrome	2	3,4
Hemorrhage	1	1,7

Tableau 3: Postoperative Complications According

Clavien–Dindo Classification	Number	(%)
GRADE I	48	39,0
GRADE II	34	27,6
GRADE IIIa	3	2,4
GRADE IIIb	17	13,8
GRADE Iva	3	2,4
GRADE IVb	5	4,1
GRADE V	13	10,6
Total	123	100,0

Table 4: Types of Complications

	Complications	Fréquence	Pourcentage (%)
Respiratoiry (n=46)	Pneumonia	21	45,7
	Pleural effusion	17	37,0
	Respiratory distress	11	23,9
	Acute pulmonary edema	5	10,9
	Mendelson syndrome	4	8,7
	Pneumothorax	2	4,3
	Hémothorax	1	2,2
Cardiovascular (n=16)	Shock	8	50
	Resuscitated cardiac arrest	8	50
Infectieuse (n=38)	Péritonitis	16	53,3
	Sepsis	12	40,0
	Surgical site infection	9	30,0
	Urinary tract infection	1	3,3
Rénal (n=54)	Acute kidney injury	54	100,0
Digestive (n=15)	Vomiting	7	46,6
	Constipation	5	33,3
	Diarrhea	2	13,3
	Evisceration	1	6,6
	Digestive fistula	2	13,3
Hémorragic (n=7)	Hemoperitoneum	5	71,4
	Gastrointestinal bleeding	2	28,6
Neurological (n=3)	Stroke	3	100,0
Anesthesia-related **(n=15)**	Delayed emergence	15	100,0
Others (n=6)	Pressure ulcers	6	100,0

DISCUSSION

This prospective descriptive study focused on patients admitted to the ICU following surgical procedures, with the primary objective of evaluating postoperative complications comprehensively. Data collection was conducted over a twelve-month period to ensure a complete annual cycle, allowing a representative and in-depth analysis of the incidence and management of postoperative complications.

The most represented age group in our cohort was 21–40 years, with a mean age of 28.8 ± 14.9 years. This finding is consistent with studies by Assouto *et al.,*[3] and Tonye TA *et al.,*[4], who reported mean ages of 30 and 38 years, respectively. However, this average age is lower than that reported by Proske [5], which may be explained by differences in study populations and a high prevalence of obstetric conditions in our cohort, mainly affecting young women.

The sex ratio of 1.08 is similar to that reported by Assouto *et al.,* and Ouro-Bang'na Maman *et al.,*[6], reflecting a slight male predominance.

The incidence of postoperative complications (41.4%) is comparable to findings by Massaoulé *et al.,*[7] (35.7%), Mpoy Emy Monkessa *et al.,*[8] (36.4%), and Otiobanda *et al.,*[9] (33.7%), but remains higher than rates reported in European settings, such as France (28%) by Gillon [10] and Germany (29.5%) by Markus [11]. These differences may be attributed to variability in definitions, methodologies, and study populations.

Hemodynamic instability, particularly hypotension (25.2%), was the leading cause of ICU admission, followed by delayed awakening (6.5%). These findings are comparable to those reported by Mpoy Emy Monkessa et al.

Emergency surgery accounted for 88.6% of cases, consistent with findings by Tonye TA *et al.,*(91%), highlighting the increased risk of complications due to inadequate preoperative preparation. Peritonitis was the leading surgical indication, likely reflecting delayed diagnosis and management.

Postoperative complications were predominantly renal (43.9%), followed by respiratory complications (39.02%). These findings differ from those of Ouangré *et al.,*[13], who reported a predominance of infectious complications. This discrepancy may be explained by differences in patient profiles and surgical indications.

The high rate of renal complications may be related to inadequate preoperative optimization and the high proportion of emergency surgeries, as well as the prevalence of obstetric conditions such as placental abruption and eclampsia.

Respiratory complications were associated with emergency digestive surgery, general anesthesia, and mechanical ventilation, which was required in 58.6% of patients.

Although overall outcomes were favorable in 57.7% of cases, mortality among patients with complications was high (42.3%), consistent with African literature. Contributing factors include limited resources, insufficient technical facilities, and delays in management.

Mortality was significantly associated with the type and severity of complications according to the Clavien-Dindo classification. Infectious, respiratory, and renal complications were the leading causes of death.

Age, ASA classification (ASA 3 and 4), and Altemeier class IV were identified as predictive risk factors, in agreement with existing literature.

CONCLUSION

Postoperative complications remain a major concern in the management of surgical patients. Particular attention should be given to patients with identified risk factors in order to improve clinical outcomes and reduce.

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