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Cardiovascular Emergencies in the Intensive Care Unit of Owendo University Hospital: A Retrospective Cohort Study (2021-2024)

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Abstract

Introduction: Cardiovascular emergencies represent a major public health challenge in sub-Saharan Africa, with high morbidity and mortality. Their profile in intensive care in Gabon is poorly documented. The objective of this work was to describe the epidemiological, clinical, and evolutionary aspects of cardiovascular emergencies at Owendo University Hospital Center (CHUO). Methods: This was a retrospective cohort study conducted in the intensive care unit of CHUO from January 1, 2021, to December 31, 2024. All adult patients admitted for a cardiovascular emergency were included. Demographic, clinical, diagnostic, and evolutionary data were analyzed. Logistic regression was performed to identify factors associated with mortality. The significance threshold was set at $p < 0.05$. Results: Among 1334 admissions, 311 patients (23.3%) presented with a cardiovascular emergency. The mean age was 34.8 ± 14.2 years. The sex ratio was 0.15. Hypertension (22.5%) and overweight/obesity (27.7%) were the main risk factors observed. Hypertensive emergencies accounted for 76.2% of cases, primarily in obstetric contexts. Other cardiovascular emergencies encountered included strokes (15.4%), acute heart failure (5.4%), pulmonary embolism (1.9%), aortic dissection (0.3%), and pericardial tamponade (0.3%). Hospital mortality was 9%. In univariate analysis, hemorrhagic stroke was strongly associated with mortality (OR = 15.76; 95% CI [6.7 - 37.4]; $p < 0.001$). In multivariate analysis, no variable remained significantly associated, although a trend was observed for hypertension. Conclusion: Cardiovascular emergencies in intensive care at CHUO are dominated by obstetric hypertensive conditions. Hemorrhagic

stroke is the main factor of mortality. Strengthening hypertension prevention and improving technical facilities are necessary.

Keywords

Cardiovascular Emergency, Resuscitation, High Blood Pressure, Gabon

1. Introduction

Cardiovascular diseases (CVDs) represent the leading cause of mortality worldwide, with approximately 19.8 million deaths annually [1]. Long associated with developed countries, they are increasingly prevalent in low- and middle-income countries, where more than three-quarters of cardiovascular deaths occur [1]. This progression is driven by rapid urbanization, sedentary lifestyles, and the rising prevalence of major risk factors such as arterial hypertension (HTN), diabetes, and obesity.

In sub-Saharan Africa, this phenomenon manifests as a high prevalence of admissions for cardiovascular emergencies (CVE). These life-threatening conditions are a frequent reason for hospitalization in emergency and intensive care units. The literature reports particularly high mortality in these settings [2]-[4], often attributable to delayed access to care and structural limitations of specialized technical facilities.

In Gabon, the profile of cardiovascular emergencies has been described in some emergency services in Libreville [5] and in semi-urban settings [6]. Additionally, certain pathologies falling under these emergencies have been studied in isolation [7] [8]. However, the overall profile of CVEs in an intensive care unit has not yet been the subject of a comprehensive study.

The Owendo University Hospital Center (CHUO), initially designed as a trauma center, has a polyvalent intensive care service that receives a growing number of patients with medical emergencies, including cardiovascular ones. The objective of this work was to describe the epidemiological, diagnostic, and evolutionary profile of CVEs in the CHUO intensive care service from 2021 to 2024.

2. Methods

2.1. Type and Setting of the Study

This was a retrospective cohort study conducted in the intensive care unit (ICU) of CHUO. This polyvalent ICU admits both medical and surgical patients, with a significant proportion of female patients from the gynecology-obstetrics department.

2.2. Study Period

The study covered a four-year period, from January 1, 2021, to December 31, 2024.

2.3. Study Population

The target population included all records of patients admitted to the CHUO ICU for a cardiovascular emergency during the study period.

2.3.1. Inclusion Criteria

Medical records meeting the following criteria were selected for the study:

- Age 18 years or older.
- Documented cardiovascular emergency.
- Management within the CHUO intensive care unit.
- Usable medical record (including at least age, sex, length of hospitalization, diagnosis, and evolutionary outcomes).

2.3.2. Non-Inclusion Criteria

- Medical records meeting the following criteria were not selected:
- Non-cardiovascular pathologies;

2.3.3. Exclusion Criteria

Incomplete medical records that did not allow documentation of the main variables or evolutionary outcomes were excluded.

2.4. Data Collection

Data were extracted from medical records using a standardized collection form.

The collected variables included:

- Sociodemographic data: age, sex, obstetric status (pregnancy, postpartum).
- Clinical data: reason for admission, clinical signs, comorbidities.
- Cardiovascular risk factors (hypertension, obesity, diabetes, smoking).
- Paraclinical data: results of biological tests, electrocardiogram and imaging. These examinations, which were not systematic, were carried out when indicated.
- The retained diagnosis

Some diagnoses that could qualify as emergencies in more than one category were classified in only one group.

- Evolutionary data: length of stay in intensive care, outcome, mortality.

2.5. Diagnostic Definitions

The diagnoses retained based on clinical and/or paraclinical data were as follows:

- Coronary emergencies: acute coronary syndrome (ACS).
- Vascular emergencies: ischemic or hemorrhagic stroke (IS/HS), aortic dissection, pulmonary embolism (PE).
- Hypertensive emergencies: hypertensive encephalopathy, pregnancy-related hypertensive disorders (severe preeclampsia, eclampsia, retroplacental hematoma, HELLP syndrome).
- Hemodynamic emergencies: acute heart failure, acute pulmonary edema (APE), pericardial tamponade.

- Rhythmic emergencies: severe rhythm or conduction disorders.

For patients transferred with a previously established diagnosis, this was considered, unless a subsequent change was noted in the file.

2.6. Sample Size

The sample was exhaustive, including all patient records meeting the eligibility criteria during the study period. No prior calculation was performed due to the retrospective nature of the study.

2.7. Statistical Analysis

Data were entered into an Excel file and analyzed using R, SPSS, and Epi Info 7 software*.

Qualitative variables were expressed as frequencies and percentages. Quantitative variables were expressed as means ± standard deviations or medians and ranges, depending on the distribution. Statistical associations were tested using the Chi^2 test or Fisher's exact test for qualitative variables, and Student's t-test or non-parametric tests for quantitative variables.

A univariate analysis was conducted to identify variables associated with mortality. Clinically relevant variables were introduced into a multivariate logistic regression model.

A stratified analysis comparing obstétric and non obstétric cases was performed to explore the influence of the obstetric contexton the profile of cardiovascular emergencies.

A significance threshold of 5% ($p < 0.05$) was adopted.

2.8. Ethical and Regulatory Considerations

The study was conducted in accordance with the principles of the Declaration of Helsinki. Official authorization was obtained from the hospital administration for access to patient records. Data were anonymized prior to analysis, ensuring patient confidentiality.

3. Results

3.1. General Data of the Population

During the study period, 1334 patients were admitted to the CHUO intensive care unit, of whom 311 were for cardiovascular emergencies, representing a hospital frequency of 23.3% (**Figure 1**).

The mean age of the patients was 34.8 ± 14.2 years, with a predominance of the 26 - 45 year age group (56.6%; **Figure 2**).

Women represented 86.8% of the sample (n = 270), resulting in a sex ratio of 0.15. Among the female patients, 16 (5.9%) were pregnant and 205 (75.9%) were in the postpartum period.

In 78.1% of cases, patients came from the Gynecology-Obstetrics services,

emergency reception, and operating room (Table 1).

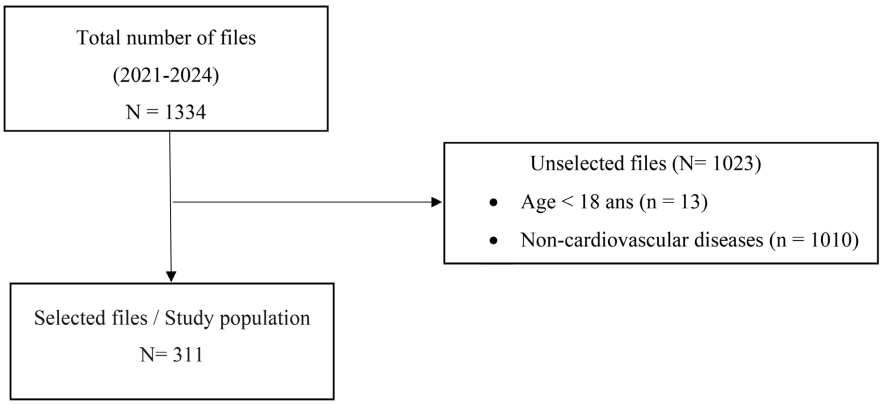

Figure 1. Flowchart of patient file selection for patients presenting with a cardiovascular emergency in the intensive care unit of the CHUO.

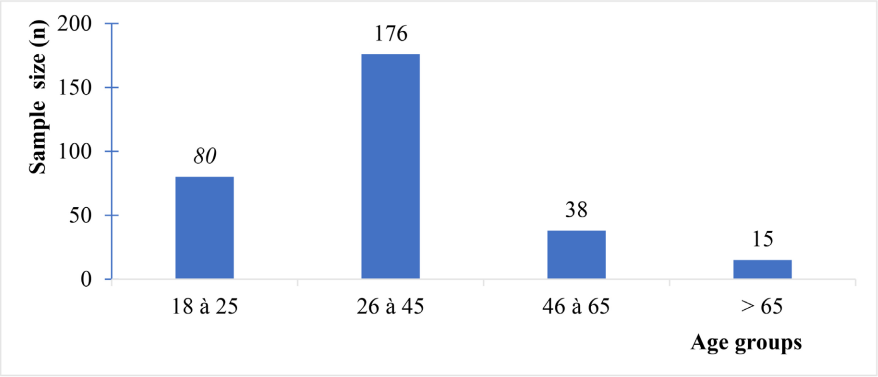

Figure 2. Distribution of cardiovascular emergencies admitted to intensive care according to age group.

Table 1. Distribution of patients according to their origin.

Referring Department	Number	(%)
Gynecology-Obstetrics	89	28.6
Emergency Department	80	25.7
Operating Room	74	23.8
Gynecological Emergencies	37	11.9
Traumatology-Orthopedics	5	1.6
Neurosurgery	4	1.3
Cardiology or Gynecology Outpatient Clinics	7	2.3
Other Hospital Facilities	15	4.8
Total	**311**	**100**

3.2. Reasons for Admission and Risk Factors

The reason for admission was dominated by continuation of care for an already

established diagnosis (87.1%). When specified, dyspnea was the most frequent reason for admission (6.1%) (Table 2).

Table 2. Patient distribution according to reason for admission.

Reason for Admission	Number (n = 311)	(%)
Dyspnea Stage IV	19	6.1
Chest Pain	3	1.0
Dyspnea + Chest Pain	1	0.3
Headaches + Visual Blurring	2	0.6
Seizures	11	3.5
Unilateral Hemiparesis	4	1.3
Continuation of Care for a Diagnosis	271	87.1

The categorry of continued management of diagnosis corresponded mainly to hypertensive disorders of pregnancy in 230 (84.9%) cases, hemorragic (31; 11.4%) or ischemic (6; 2.2%) strokes and hypertensive encephalopathy (4; 1.5%)

The most frequently identified cardiovascular risk factors were overweight and obesity (27.7%), hypertension (22.5%), and alcohol consumption (19.6%). No known cardiovascular risk factors were identified in 48.4% of patients.

3.3. Paraclinical Data

An electrocardiogram was available in the record of 18 patients, showing sinus tachycardia in four patients, a rhythm disorder consistent with atrial fibrillation in one patient, and an S1Q3 pattern in two patients. Doppler echocardiography, found in the record of 22 patients, revealed cardiac chamber dilation with left ventricular systolic dysfunction in 12 patients. It showed a large pericardial effusion with signs of compression in one patient. A mobile intimal flap separating two channels was visible in the ascending aorta, associated with a dilated aorta, moderate aortic regurgitation, and a pericardial effusion with signs of compression in another patient. A thoracic angio-CT, available in six patients, confirmed pulmonary embolism in two patients, signs of right heart failure in two patients, and an aortic dissection involving the ascending aorta in one patient. A cranio-encephalic CT scan, available in 26 patients, revealed lesions suggestive of strokes in 25 patients, including 8 ischemic and 17 hemorrhagic.

3.4. Diagnostic Profile of Cardiovascular Emergencies

Overall, hypertensive emergencies (76.2%; n = 237) were the most frequent CVEs, followed by vascular emergencies (17.7%; n = 55) and hemodynamic emergencies (6.1%; n = 19) (Table 3).

Hypertensive emergencies were dominated by pregnancy-related hypertensive disorders. Strokes accounted for 87.3% of vascular emergencies. Ischemic stroke was due to an embolic rhythm disorder (atrial fibrillation) in one patient (0.3%). Pulmonary embolism occurred in the context of pelvic trauma in one patient and

vertebro-medullary trauma in another. Aortic dissection, revealed by chest pain, occurred in a 38-year-old man with no particular history. It involved the ascending aorta (Stanford type A). Pericardial tamponade occurred in a young woman in the context of immunosuppression due to human immunodeficiency virus. The diagnosis of peripartum cardiomyopathy had been suggested in five patients (1.6%) with heart failure, and hypertensive heart disease in the same proportion.

Table 3. Distribution of patients according to the type of cardiovascular emergency.

Types of Emergencies	Number N = 311	Percentage (%)
Hypertensive Emergencies		
Hypertensive Encephalopathy	6	1.9
Hypertensive Disorder During Pregnancy		
- Severe Preeclampsia	175	56.3
- Eclampsia	55	17.7
- Grade III hypertension at 9 WA	1	0.3
Sub-total	237	76.2
Vascular Emergencies		
Stroke	48	15.4
- Ischemic	10	3.2
- Hemorrhagic	38	12.2
Pulmonary Embolism	6	1.9
Aortic Dissection	1	0.3
Sub-total	55	17.7
Hemodynamic Emergencies		
Stage IV Heart Failure	16	5.1
Cardiogenic Shock	2	0.6
Pericardial Tamponade	1	0.3
Sub-total	19	6.1

WA: weeks of amenorrhea.

3.5. Evolution and Mortality

The median length of stay was three days (interquartile range (2 - 10 days) with extremes of 0 and 262 days).

A favorable outcome was observed in 90% of cases, marked by transfer to a peripheral service within the hospital (gynecology/obstetrics, neurosurgery, traumatology) or to an outpatient cardiology service for continuation of care before returning home. The overall hospital mortality was 9% (n = 28).

3.6. Factors Associated with Mortality

In univariate analysis, several factors were associated with mortality, including age, male sex, and hypertension. Patients with hemorrhagic stroke had a 15.7 times higher risk of death compared to others (OR: 15.7; 95% CI [6.7 - 37.4]; p =

0.001, Table 4).

Table 4. Univariate analysis of factors associated with hospital mortality.

Variable	OR	IC95%	P value
Hemorrhagic Stroke	15.8	[6.7-37.4]	0.001
Age (years)	1.1	[1.01-1.09]	0.01
Male Sex	2.87	[1.15-7.12]	0.02
Hypertension	3.45	[1.45-8.2]	0.005

CI: confidence interval; OR: odds ratio.

3.7. Risk Factors and Mortality

In multivariate analysis, none of the variables in the final model reached the threshold of statistical significance, although a trend toward association was observed for hypertension (Table 5).

Table 5. multivariate analysis of factors associated with mortality.

Variable	OR	IC95%	P value
Age (years)	1.03	[0.99 - 1.07]	0.08
Female Sex	2.05	[0.72 - 5.84]	0.18
Hypertension	3.45	[0.95 - 7.21]	0.06

CI: confidence interval; OR: odds ratio.

3.8. Mortality According to Diagnosis

Mortality varied significantly according to the diagnosis ($p < 0.0001$). Hemorrhagic stroke had the highest mortality in absolute numbers (16 deaths out of 38 cases, or 42.1%), accounting for 57.1% of all deaths. (Table 6)

Table 6. comparative analysis of outcomes according to diagnosis.

Diagnostic	Total (n = 311)	Deaths (n = 28)	Case Fatality Rate (%)	Mortality Rate (%)	Overall P Value
Hypertensive Encephalopathy	6	3	50.0	1.0	$p < 0.0001$
Eclampsia	44	1	2.3	0.3	
Severe Preeclampsia	175	1	0.6	0.3	
Hemorrhagic Stroke	38	16	42.1	5.1	
Ischemic Stroke	10	3	30.0	1.0	
Pulmonary Embolism	6	1	16.7	0.3	
Aortic Dissection	1	0	0.0	0.0	
Acute Heart Failure	16	3	18.8	1.0	
Cardiogenic Shock	2	0	0.0	0.0	
Pericardial Tamponade	1	0	0.0	0.0	

3.9. Stratified Analysis of Diagnostic Profiles

The analysis reveals two distinct profiles within the service:

The obstetric profile, accounting for 71.1% of cases, dominated by pregnancy-related hypertensive disorders, with low mortality.

The medical and vascular profile, 28.9% of cases, with a majority of strokes and heart failure, and rarer pathologies such as aortic dissection and pericardial tamponade, where mortality is higher, particularly with hemorrhagic strokes.

4. Discussion

This study aimed to describe the epidemiological, clinical, and evolutionary profile of cardiovascular emergencies admitted to the intensive care unit at Owendo University Hospital Center (CHUO). The results highlight an atypical profile dominated by obstetric hypertensive emergencies, with a predominantly young and female population, which strongly contrasts with classical data on cardiovascular emergencies in sub-Saharan Africa.

The observed hospital frequency (23.3%) confirms the growing burden of cardiovascular diseases in intensive care units in Africa, consistent with data from Mali (24.8%), the Democratic Republic of Congo (32.5%), and Togo [2] [3] [9]. This trend fits within the context of the epidemiological transition characterized by the increasing prevalence of cardiovascular risk factors in low- and middle-income countries [1]. However, the comparability of these results remains limited due to the heterogeneity of the studied structures. Indeed, the CHUO profile is heavily influenced by its significant obstetric activity, introducing a major recruitment bias that profoundly reshapes the observed epidemiology.

This structural bias explains the atypical demographic characteristics of our cohort, marked by a low mean age (34.8 years) and an extreme female predominance (86.8%). These findings contrast with African series reporting older and predominantly male patients [2] [3] [5] [9]. This divergence underscores that the concept of cardiovascular emergencies is not homogeneous and closely depends on the recruitment context. In our study, it primarily reflects a specific subgroup: cardiovascular complications of pregnancy. Similar observations have been reported in the works of Metogo Ntsama *et al.* and Obame *et al.* [4] [8], confirming the importance of gestational hypertensive pathologies in intensive care units integrated into obstetric pathways.

From a nosological perspective, the strong predominance of hypertensive emergencies (76.2%) constitutes the central result of this study. It far exceeds the proportions usually reported, reflecting the effect of obstetric recruitment [3] [9]. Severe preeclampsia and eclampsia represent various forms of hypertensive emergencies here, associating severe blood pressure elevation with acute target organ damage [10]. This configuration illustrates a dual burden: that of poorly controlled chronic hypertension in the general population, and that of gestational hypertension, whose pathophysiology relies on systemic endothelial dysfunction and altered placental perfusion.

The analysis of vascular emergencies highlights a predominance of hemorrhagic strokes, breaking from international data where ischemic strokes account for about 80% of cases [11]. This reversal of the ratio is well documented in sub-Saharan Africa [12] and is primarily explained by the high prevalence of severe uncontrolled arterial hypertension [13]. From a pathophysiological standpoint, chronic exposure to elevated blood pressure levels induces structural alterations in small cerebral arteries (lipohyalinosis, Charcot-Bouchard microaneurysms), promoting their rupture. This regional specificity assigns a disproportionate role to hemorrhagic strokes in mortality, as observed in our study.

The overall mortality (9%) appears relatively low compared to regional data, but this observation must be interpreted in light of the sample composition bias [2] [3]. The high proportion of obstetric emergencies, associated with low mortality in cases of rapid management, dilutes the overall lethality [8]. In contrast, non-obstetric pathologies, particularly hemorrhagic strokes, account for the majority of deaths, confirming their intrinsic severity [3] [11]. This distinguishes two distinct prognostic profiles: an obstetric profile with low lethality and a vascular profile with high mortality.

5. Strengths and Limitations of the Study

The main strength of this work is that it is based on a relatively large cohort and provides original data on a poorly documented context: cardiovascular emergencies in intensive care within an environment with high obstetric activity. It highlights an epidemiological profile that is rarely described.

However, several limitations must be emphasized. The retrospective nature of the study exposes it to information bias and the presence of missing data. The selection bias related to predominantly obstetric recruitment limits the generalizability of the results to other intensive care services.

This work underscores the need to strengthen strategies for the prevention and screening of arterial hypertension, the primary lever for reducing cardiovascular morbidity and mortality. It highlights the importance of integrating cardiovascular and obstetric care into coordinated care pathways, particularly in centers receiving a high volume of patients in the peripartum period. Finally, it emphasizes the urgency of improving access to diagnostic tools, an essential condition for management aligned with international standards.

6. Conclusion

Cardiovascular emergencies are frequent in the CHUO intensive care unit. They are dominated by obstetric hypertensive emergencies affecting a young population. This particularity must be taken into account in in the interpretation and generalization of the results to other intensive care populations. Hemorrhagic stroke is the main factor associated with hospital mortality. These results highlight the significant burden of hypertension and its major prognostic impact. They underscore the importance of screening and controlling hypertension, as well as strengthening diagnostic and organizational resources to improve patient outcomes.

Conflicts of Interest

None.

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