

Clinical Presentations and Outcome of Cardiovascular Emergencies in Yaounde: A Cross-Sectional Study

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Abstract

Background: Cardiovascular emergencies have become a public health problem with a high burden in low-income settings. This is due to the high rates of cardiovascular risk factors that are fast reaching epidemic proportions. There is paucity of data on cardiovascular emergencies to guide repost strategies in our setting. Our aim was to determine the clinical presentation and outcome of cardiovascular emergencies at Yaounde Emergency Center. **Methods:** We carried out this cross-sectional study between June 2015 and May 2017. We included all patients with confirmed cardiovascular emergency. We consecutively collected data on socio-demography, symptoms on admission, past history, clinical findings, and final diagnosis at discharge or in the event of death. **Results:** Of the 8285 patients admitted for medical emergencies, 388 (4.7%) were cardiovascular emergencies. Their mean age was 59.5 ± 13.8 years, and 59% were males. The Medical Emergency Aid Service was the means of transporting 4% of patients. The median time of arrival at the hospital was 48 hours. Symptoms on admission were mainly weakness of a limb (43.8%), and altered consciousness (33.5%). The most common cardiovascular emergencies were ischemic stroke (30.9%), hypertensive emergency (21.4%), and hemorrhagic stroke (16.5%). The most common comorbidity was diabetes (21.9%). The death rate in the 24 - 72 hours was 14.4%. The causes of death were hypertensive emergency (35.7%), and hemorrhagic stroke (30.3%). **Conclusion:** Stroke and hypertensive emergency were the most frequent cardiovascular emergencies. The early mortality was high. Hemorrhagic stroke and hypertensive emergencies accounted for most cases of death.

Keywords

Cardiovascular Emergencies, Ischemic Stroke, Hemorrhagic Stroke, Cameroon

1. Introduction

Cardiovascular diseases (CVD) are a major public health problem in the world, with the greatest burden in low-income settings. They are the leading cause of death due to non-communicable diseases (NCD) worldwide [1] [2] [3]. Cardiovascular emergencies are life threatening, and are the frequent mode of expression of CVD [4]. CVD are estimated to account for about 17.3 million death yearly, and this is expected to reach 23.6 million by 2030 [5]. The cost of management was estimated at 100 billion Euros, and this is expected to reach 122.6 billion by 2020. CVD accounted for about 1 billion deaths in sub-Saharan Africa (SSA) in 2013 [6]. This high burden of CVD is associated with high rates of classical risk factors [7] [8]. Cardiovascular emergencies are mode of expression in most patients, due to the high rate of unawareness and under-treatment [6] [9]. Cardiovascular emergencies accounted for about 12% to 46% of all medical emergencies, with an early mortality of up to 21% [10] [11] [12] [13]. The pattern of cardiovascular emergencies varied with the setting, with higher rates of stroke in SSA, and acute coronary syndrome in high income settings.

An efficient strategy to control CVD and reduce death due to cardiovascular emergencies requires data oriented decision-making. There is a paucity of data on cardiovascular emergencies in our setting. The aim of this cross-sectional study was to report on the spectrum and outcome of cardiovascular emergencies in Cameroon.

2. Methods

2.1. Study Design and Setting

This was a cross-sectional study carried out at the Yaounde Emergency Center (YEC). We prospectively recruited patients between June 2015 and May 2017. The YEC is located at the center of Yaounde, with the aim of managing and coordinating emergencies in the center region and beyond. It went operational in June 2015. The center is well equipped with state of the art equipments, and staffed with 256 personnel including two dedicated Cardiologists. Cardiovascular emergency is a situation involving vital prognosis of an individual as a result of heart and/or vessels damage which imposes immediate care.

2.2. Participants

These were all consenting patients of both sex admitted for a cardiovascular emergency during the study period. Those with incomplete records were excluded.

2.3. Variables and Measurements

Patients were consecutively recruited on admission, and data were collected with

standardized medical records for all patients. We collected data on socio-demography (age, sex, profession, level of education, marital status), means of transportation, origin, presenting complaints, cardiovascular risk factors and comorbidities, family history of cardiovascular disease, findings on physical examination, and findings after an oriented complementary examination. The diagnosis retained for this study was that made by the attending Cardiologist on discharge or after death.

2.4. Sample Size and Statistical Analysis

A consecutive sample of all eligible patients was considered. We analyzed the data using the software IBM SPSS version 23. We have presented discrete variables as counts and percentages, and continuous variables as means \pm standard deviation. In univariate analysis, we calculated the odds (95% confidence interval) of a poor outcome (Death) for each cardiovascular emergency diagnosed. A *p* value < 0.05 was considered statistically significant for the observed associations.

2.5. Ethical Considerations

This study was approved by the Institutional Review Board of the Faculty of Medicine and Biomedical Sciences of the University of Yaounde 1. We carried out this study in accordance with the declarations of Helsinki [14]. We have reported this work following the STROBE checklist [15].

3. Results

3.1. Participants

A total of 8285 patients were admitted, of which 388 (4.7%) were cardiovascular emergencies. There were 229 (59%) males and 159 (41%) females. Their mean age was 59.5 ± 13.8 years, and ranged from 14 to 95 years.

3.2. Descriptive Data

The age range 60 to 69 years were the most represented (30.4%), and Housewives were the most frequent (33.8%). Most of the patients attained secondary school (72.4%), came from home (86.1%), and were transported non-medically (95.9%) (Table 1). Most patients arrived the hospital between the 24th and 48th hour (51%), and 0.5% arrived less than 6 hours to hospital.

3.3. Main Results

Headache was the most frequent symptom on admission (52.8%), and paralysis/Paresia was the most frequent physical finding (43.8%). Excessive alcohol consumption (56.4%), and obesity (42.3%) were the most frequent cardiovascular risk factors. A history of stroke was reported by 92.2% of patients (Table 2). Ischemic stroke was the most frequent cardiovascular emergency (30.9%), followed by hypertensive emergency (20.9%) (Table 3). Death occurred in 56

Table 1. Socio-demographic characteristics of the study population.

Variable	Frequency (n)	Percentage (%)
Age range (Years)		
<40	30	7.7
40 - 49	60	15.5
50 - 59	93	24
60 - 69	118	30.4
70 - 79	52	13.4
>79	35	9
Profession		
Student	5	1.3
House wife	131	33.8
Retired	126	32.5
Civil servant	121	31.2
Others	5	1.3
Level of education		
Primary	36	9.3
Secondary	281	72.4
Higher	71	18.3
Origin		
Home	334	86.1
Referred	50	12.9
Public place	4	1
Mode of transportation		
Ambulance	16	4.1
Others	372	95.9

(14.4%) patients, and this was mainly due to hypertensive emergency (35.7%), hemorrhagic stroke (30.3%), and acute pulmonary edema (12.5%). Acute pulmonary edema was associated with the highest odds of death (OR: 15.7, $p < 0.001$), while those with ischemic stroke were less likely to die (OR: 0.1, $p < 0.001$) (**Table 4**). A history of hypertensive emergency was not associated with poor outcome (OR: 1.85, [95% CI: 0.8 - 4.2], $p = 0.17$). Of those alive in hospital ($n = 332$), 252 (75.9%) were discharged home, while 80 (24.1%) were transferred to specialized centers. Most of the patients were hospitalized for ≤ 5 days (96.4%).

4. Discussion

The aim of this study was to assess the clinical presentation and outcome of cardiovascular emergencies admitted at the Yaounde Emergency Centre (YEC).

Table 2. Symptoms on admission, risk factors, past medical history, and physical findings.

Variable	Frequency (n)	Percentage (%)
Symptoms on admission		
Headache	205	52.8
Vertigo	64	16.5
Blurred vision	39	10.1
Dyspnea	32	8.3
Asthenia	19	4.9
Chest pain	16	4.1
Cough	4	1
Abdominal pains	4	1
Nausea/Vomiting	4	1
Classical cardiovascular risk factors		
Hypertension	118	30.5
Diabetes	85	21.9
Tobacco use	110	28.4
Sedentarity	151	38.9
Dyslipidemia	153	39.4
Obesity	164	42.3
Alcoholism	219	56.4
Past medical history		
Stroke	358	92.2
Hypertensive Emergency	54	14
Acute Coronary Syndrome	37	9.5
Acute Heart Failure	6	1.6
Co-morbidities		
HIV infection	49	12.6
Chronic Kidney Disease (failure)	18	4.6
Pneumonia	85	21.9
Clinical findings on admission		
Systolic BP > 140 mmHg	356	91.8
Diastolic BP >90 mmHg	364	93.8
Tachycardia	385	99.2
Polypnea	388	100
Dysarthria	7	1.7
Fever	12	3
Seizures	23	6
Altered consciousness	130	33.5
Paralysis/Paresia	170	43.8

Table 3. Cardiovascular emergencies.

Variable	Frequency (n)	Percentage (%)
Ischemic Stroke	120	30.9
Hemorrhagic Stroke	64	16.5
Hypertensive Emergency	81	20.9
Acute Coronary Syndrome	47	12.1
Acute Heart Failure	40	10.3
Pulmonary Embolism	23	5.9
Acute Pulmonary Edema	10	2.5
Ventricular Tachycardia	1	0.2
Aortic Dissection	1	0.2
Cardiac Tamponade	1	0.2

Table 4. Causes of death and the determinants.

Variable	Frequency (n)	% of all deaths	% of admitted cases	OR (95% CI)	p value
Ischemic Stroke	3	5.3	2.5	0.1 (0.03 - 0.3)	<0.001
Hemorrhagic Stroke	17	30.3	26.6	2.6 (1.4 - 5.1)	0.001
Acute Heart Failure	3	5.3	7.4	0.5 (0.1 - 1.5)	0.188
Pulmonary Embolism	5	8.9	21.7	2.8 (1.1 - 7.2)	0.024
Acute Coronary Syndrome	0	0	0	NA	NA
Aortic Dissection	0	0	0	NA	NA
Ventricular Tachycardia	0	0	0	NA	NA
Cardiac Tamponade	1	1.7	100	NA	NA
Hypertensive Emergency	20	35.7	24.7	2.5 (1.3 - 4.6)	0.003
Acute Pulmonary Edema	7	12.5	70	15.7 (3.9 - 62.6)	<0.001

OR: Odds Ratio; CI: Confidence Interval; NA: Not Applicable.

Cardiovascular Emergencies accounted for 4.7% of all admissions. These were mainly due to stroke and hypertensive emergencies. The early mortality was about 21%, and mainly due to hemorrhagic stroke and hypertensive emergency.

Few studies in SSA have addressed cardiovascular emergencies (CE). The prevalence of CE was comparable to the 7% reported by Gombet *et al.* [16] in 2007. Patients with cardiovascular diseases were younger, compared to high income settings [17] [18]. This has economic consequences as the active population necessary for economic growth is affected. Male predominance has also been reported [17] [19]. It is not certain if this is true predominance, or it is due to selective presentation at the emergency. Hospital based studies are inappropriate to provide answers on the sex distribution of CVD. Hypertension has been shown to be the main CVD risk factor in SSA [11] [16] [20]. It affects one in three adult in our setting, where most patients go undiagnosed, under investi-

gated, and under treated [9] [21]. Access to diagnostic tests and essential medicines remain very low [22]. This low rate of awareness and undertreatment will often translate as a cardiovascular emergency. The clinical presentation was dominated by stroke. This was similarly reported by other authors [1] [18]. Myocardial infarction has been reported to be relatively less frequent in SSA [23]. It is not known if Africans in SSA are predisposed to stroke than myocardial infarction, or those with myocardial infarction die before reaching hospital and are thus not accounted for. Cases of acute coronary syndrome could be misdiagnosed and treated as peptic ulcer disease in our setting [24]. The setting of the study could significantly modify the statistics of CV emergencies. Specialized centres will attract more cases of the specialty. Kane *et al.* [13] reported up to 28% of acute coronary syndrome in a cardiology clinic in Dakar. Acute aortic syndromes and venous thrombo-embolic diseases were relatively low. Autopsy studies to investigate sudden deaths are often not performed, thus creating uncertainties in the distribution of cases of CV emergencies. Life threatening arrhythmia such as ventricular tachycardia was also less frequent, as few patients might make it to the emergency for timely and effective treatment [25]. Few patients were transported medically to the emergency unit. This has not improved in our setting [11]. Medicalized transportation and pre-hospital treatment are crucial in reducing mortality. Patients often arrived very late to the emergency, thus a substantial delay in receiving lifesaving treatment [11] [13]. This further worsens the outcome, with a high rate of mortality compared to high income settings [20]. There is clearly the need for educating the population and primary health personnel in the early detection and referral of cases of CV emergencies. Efficient transportation system with pre-hospital management should be put in place. Access to emergency CVD healthcare should be improved, as affordability has been shown to be low [1] [22]. Dedicated emergency centres such as stroke units should be put in place, as stroke accounted for most cases of death.

5. Limitations and Strengths

This study should be interpreted in the light of some limitations. This was a hospital based study, with the risk of presentation bias at the emergency department. The prevalence of CVD emergency reported might not truly reflect CVD in the community. This stresses the need for a community survey to give a clearer picture of the burden of each CVD. We could not provide a trend in the rate of CV emergencies due to the short study period of about two years. Observations are still underway. Despite these limitations, this study provides baseline data for an informed decision making, and the basis for further research.

6. Conclusion

Stroke and hypertensive emergency were the most frequent cardiovascular emergencies. The early mortality was high. Hemorrhagic stroke and hypertensive emergencies accounted for most cases of death. Community studies are

needed to assess the true burden of CV emergencies in our setting. Education of the community and health workers in remote areas is needed. This will allow the screening and treating of CVD risk factors, and the early detection and treatment of CV emergencies. Availability, accessibility, and affordability of emergency care should be improved.

Authors' Contributions

Conception: BH, SK. Design: BH, SK. Data collection: BH, YTK, AMJ, SNA. Data analysis and interpretation: BH, YTK, AMJ, SNA, SK. Drafting of the manuscript: BH, YTK, AMJ, SK. All the authors read and approved of the final draft for publication.

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