

# Hypertensive Emergencies in the Department of Cardiology at the Teaching University Hospital of Brazzaville (Republic of the Congo): Preliminary Study

Solange Flore Mongo Ngamami<sup>1,2</sup>, Bertrand Fikahem Ellenga Mbolla<sup>1,2\*</sup>, Guénoel Barthel Ebinda<sup>2</sup>, Christian Michel Kouala Landa<sup>1</sup>, Louis I. Ondze Kafata<sup>1,2</sup>, Méo S. Ikama<sup>1,2</sup>, Thierry Raoul Gombet<sup>2</sup>, Suzy-Gisèle Kimbally Kaky<sup>1,2</sup>

<sup>1</sup>Department of Cardiology, Teaching University Hospital, Brazzaville, Republic of the Congo

<sup>2</sup>Department of Doctoral Studies, Faculty of Health Sciences, Marien Ngouabi University, Brazzaville, Republic of the Congo

Email: \*ellenga\_bertrand@hotmail.com

**How to cite this paper:** Ngamami, S.F.M., Mbolla, B.F.E., Ebinda, G.B., Landa, C.M.K., Kafata, L.I.O., Ikama, M.S., Gombet, T.R. and Kaky, S.-G.K. (2019) Hypertensive Emergencies in the Department of Cardiology at the Teaching University Hospital of Brazzaville (Republic of the Congo): Preliminary Study. *World Journal of Cardiovascular Diseases*, 9, 1-8.

<https://doi.org/10.4236/wjcd.2019.91001>

**Received:** November 23, 2018

**Accepted:** January 8, 2019

**Published:** January 11, 2019

Copyright © 2019 by author(s) and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

**Background:** Hypertensive emergencies are still a common mode of finding hypertension. **Objective:** to determine the epidemiological, clinical and paraclinical characteristics of the hypertensive emergency, and to evaluate the factors associated with poor blood pressure control. **Patients and method:** cross-sectional and analytical study, conducted from July 2010 to June 2014 (4 years), in the cardiology department of the Brazzaville University Hospital. **Included,** patients admitted were those systolic blood pressure (BP)  $\geq$  180 mm Hg, and diastolic BP  $\geq$  110 mm Hg, with target organ involvement. **A minimum biological assessment,** an ECG, a chest X-ray, a brain CT-scan and a cardiac ultrasound were required. **Results:** Fifty patients were included, including 31 women (62%). The mean age was  $53.8 \pm 13.7$  years old, age  $<$  60 years ( $n = 34$ ; 68%), low income population ( $n = 23$ ; 46%). Hypertension was often known ( $n = 49$ ; 98%), and poor compliance ( $n = 33$ ; 67.4%). Associated risk factors were: obesity ( $n = 13$ ), and diabetes ( $n = 7$ ). The average consultation time was  $4.1 \pm 3.7$  days. The reasons for hospitalization were: dyspnea ( $n = 24$ ; 48%), neuro-sensory signs ( $n = 24$ ; 48%), and functional limb impotence ( $n = 15$ ; 30%). The major laboratory abnormalities were hyperuricemia ( $n = 16$ ; 32%) and hyperglycemia ( $n = 16$ ). Left ventricular hypertrophy was noted at the ECG ( $n = 29$ ; 58%). Cardiac ultrasound showed a LVEF  $<$  40% ( $n = 8$ ). The main hypertensive emergencies were: heart failure ( $n = 23$ ; 46%), stroke ( $n = 23$ ; 46%), severe renal failure ( $n = 10$ ; 20%), and malignant hypertension ( $n = 23$ ; 46%). The average hospital stay was  $11.4 \pm 5.5$  days,

and 1 death was recorded. BP was uncontrolled in 38 cases (76%). Factors associated with uncontrolled blood pressure were: female sex (OR 3; 95% CI 0.8 - 11.5) and low-income patient (OR 1.26; 95% CI 0.34 - 4.68). Conclusion: organs affected during hypertensive emergencies are most often the heart, the brain and the kidney in our context. Early management of hypertension will reduce these complications.

## Keywords

Emergencies, High Blood Pressure, Stroke, Heart Failure, Black African

---

## 1. Introduction

Hypertension (HT) is a global public health problem, with its prevalence estimated at 34.9%, and its impact on mortality of more than 10.5 million per year [1]. In Africa, its prevalence is higher (46%), and the disease is revealed at an early age, by complications [2]. In Brazzaville, Congo's largest city, its prevalence was 32.5% in 2004 [3]. HT is the leading cause of hospitalization in Congo's cardiology department [4]. Hypertensive urgency is defined by a significant rise in blood pressure, associated with target organ damage, the most prominent of which are stroke, heart failure (HF) and renal failure [4] [5] [6].

Hypertensive emergencies are a common mode of HT discovery in blacks. Indeed, Maweni reported that 46% of hypertensive emergencies revealed hypertension in black patients [6]. Hypertensive urgency is a serious disease, because of its high mortality with a decline at one year, estimated at 26.8% according to Shao [7]. In Brazzaville, hypertension is often revealed by complications, due to the delay of diagnosis and poor care, and hypertensive emergencies are dominated by stroke [4] [8] [9].

The purpose of this study was to determine the epidemiological, clinical and paraclinical characteristics of hypertensive urgency, and to evaluate the factors associated with poor blood pressure control.

## 2. Patients and Methods

*Type of study, period, setting:* This was a cross-sectional study, conducted from July 2010 to June 2014 (4 years) in the cardiology and internal medicine department of the Brazzaville University Hospital. Inclusion: Patients admitted for hypertension with systolic 180 mm Hg and/or diastolic 110 mm Hg and target organ involvement, were selected. Chosen files had the WHO minimum assessment of HT, an electrocardiogram (EKG), a chest X-ray, a cardiac ultrasound and the brain CT-scan or fundus examination depending on the case. Patients with incomplete records were excluded. Anonymity was required according to the Helsinki Protocol of 1975.

Items: The analyzed parameters were epidemiological, clinical, paraclinical,

therapeutic and prognostic.

*Definitions:*

- Consultation delay: average time between onset of symptoms and date of hospitalization.
- Patient with low income: based on the average income below the minimum required by the country and the profession according to the family survey carried out by the ministry of plan (republic of the Congo) [10].
- Poor treatment compliance: hypertensive patient who has abandoned the treatment and does not respect the hygiene measures.
- Obesity: body mass index  $\geq 30$ .
- Diabetes: patient treated for diabetes or having a fasting blood sugar  $\geq 1.26$  g/L away from the admission.
- Hyperuricemia: uricemia 60 mg/L in women and 70 mg/L in men [11].
- Hypokalemia: serum potassium  $< 3.5$  mEq/L.
- Anemia: hemoglobin rate less than 2 units compared to usual values, or  $< 11$  g/dL in women and  $< 12$  g/dL in men.
- Severe renal failure: glomerular filtration rate (GFR) calculated according to the Crocroft and Gault formula  $< 30$  ml/min.
- Cardiomegaly on chest X-ray: cardio-thoracic index greater than 0.55.
- Left ventricular hypertrophy (LVH) on EKG: Sokolow-Lyon index  $> 35$  mm, or Cornell index [12].
- Left ventricular ejection fraction (LVEF) lowered: ejection fraction  $< 30\%$  calculated according to the Simpson method with a Toshiba® ultrasound system.
- Alteration of glomerular filtration rate: glomerular filtration rate calculated by the Crocroft and Gault formula  $< 30$  ml/min.
- No control of blood pressure: systolic 140 mm Hg and/or diastolic 90 mm Hg.

Statistical analysis: the data was entered into Microsoft Excel and processed by Epi Info (CDC Atlanta, USA). The qualitative variables were represented in terms of numbers (n) and percentage (%). Quantitative variables were represented in mean standard deviation and extremes. The comparison of the averages used Student's t-tests. A calculation of Odds Ratio (OR) and 95% confidence interval (CI) was performed to determine associated factors. The threshold of significance for comparisons was  $< 5\%$ .

### 3. Results

Fifty patients were included, 31 women (62%). The frequency of hypertensive emergencies was 7% in cardiology. The mean age was  $53.8 \pm 13.7$  years (range: 30 to 90 years). Age was  $< 60$  years in 34 cases (68%). The low income patient was found in 23 cases (46%). Patients were referred in 9 cases (18%). The average consultation delay was  $4.1 \pm 3.7$  days (range: 1 and 15 days). This delay was  $4.2 \pm 3.7$  days for men vs.  $4.1 \pm 3.8$  days for women ( $p > 0.05$ ). HT was often

known (n = 49; 98%), and patients were poor observers (n = 33; 67.4%). Known cardiovascular risk factors were: obesity (n = 13; 26%), diabetes (n = 7; 14%), dyslipidemia (n = 7; 14%), family history of early cardiovascular disease (n = 7; 14%), excessive alcohol consumption (n = 1).

The reasons for hospitalization were represented by: exercise dyspnea (n = 24; 48%) including orthopnea (n = 17), neuro-sensory signs (n = 24, 48%), functional impotence limb (n = 15; 30%), disturbances of consciousness (n = 5), dysarthria (n = 1), epistaxis (n = 1).

The examination has shown an average systolic BP of  $221.2 \pm 26.2$  mm Hg (range: 181 to 282), and a diastolic BP of  $129.8 \pm 21$  mm Hg (range 111 to 152). Congestive HF was found (n = 23; 46%) including acute pulmonary edema (n = 18). Hemiplegia was reported (n = 24; 48%).

Biological, EKG, radiological, and echocardiographic parameters are reported in **Table 1**. Biological abnormalities were: hyperuricemia (n = 23), hyperglycemia (n = 16), anemia (n = 6), and hypokalemia (n = 5). Fundus examination (n = 25) revealed hypertensive retinopathy in 4 cases. The nosology types of hypertensive emergencies were: heart failure (n = 23; 46%), stroke (n = 23; 46%), severe renal failure (n = 10; 20%), and malignant HT (n = 4; 8%). Treatment at the admission and discharge are shown in **Figure 1**. The average hospital stay was  $11.4 \pm 5.5$  days (range: 4 and 31 days). One death was recorded and 7 cases (14%) of sequelae hemiplegia.

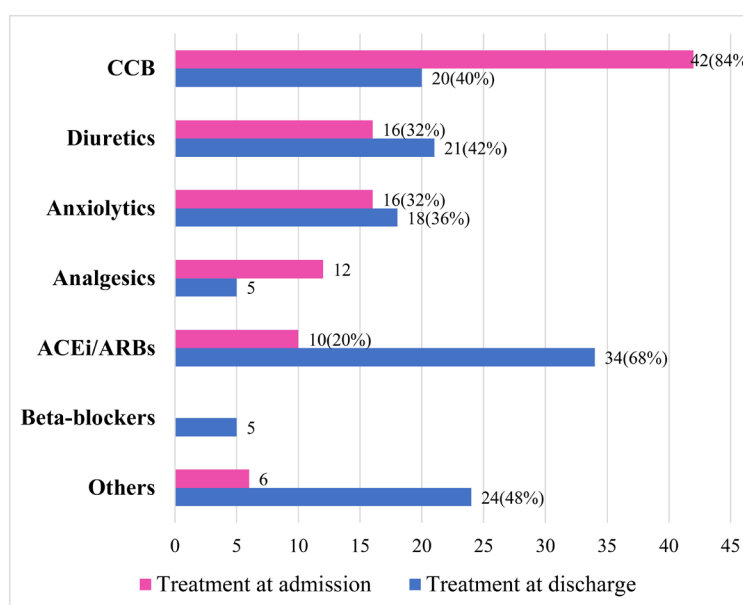
Blood pressure was normalized at discharge in 12 cases (24%). Factors associated with non-control of blood pressure (n = 38; 76%) at discharge are reported in **Table 2**.

**Table 1.** Distribution of biological, EKG, radiological and ultrasound parameters.

	Mean $\pm$ e.t or n (%)
<b>Serum analysis</b>	
Creatinin (mg/L)	18.7 $\pm$ 15.1
Hemoglobin (g/dL)	12.9 $\pm$ 2
Hematocrit (%)	42.6 $\pm$ 5.9
Kaliemia (mEq/L)	4 $\pm$ 0.6
Uricemia (mg/L)	63.4 $\pm$ 24.3
Glycemia (g/L)	1.4 $\pm$ 0.7
<b>EKG</b>	
LVH	29 (58)
Repolarization disorders	13 (26)
Complete cardiac block	2 (4)
<b>Cardiac ultrasonography</b>	
LVEF (%)	66.4 $\pm$ 9.6
Concentric LVH	12 (24)
LVEF < 30%	8 (16)

**Table 2.** Associated factors of uncontrolled blood pressure in output.

	n (%)	Odds ratio	95% CI	p-value
Male sex	12 (31.5)	0.33	0.09 - 1.26	0.103
Female sex	26 (68.5)	3.03	0.8 - 11.5	0.103
Patient with low income	18 (47.3)	1.26	0.34 - 4.68	0.73
Obesity	6 (15.8)	0.13	0.03 - 0.55	<0.01
Hyperuricemia	12 (31.5)	0.32	0.08 - 1.25	0.103
Heart failure	15 (39.5)	0.33	0.08 - 1.29	0.107
Stroke	20 (52.6)	0.79	0.21 - 2.94	0.73
Severe renal failure	6 (15.8)	0.38	0.09 - 1.68	0.19

**Figure 1.** Antihypertensive treatment in admission and in output. CCB: calcium channel blocker; ACEi/ARBs: angiotensin converting enzyme inhibitor/angiotensin II receptor blockers.

#### 4. Discussion

The limits of the study: The study was a documentary review. Records of all patients with hypertensive urgency were retained. The size of sample is reduced because rejected files without blood chemistry and morphological examinations by the authors. Nevertheless, this is a preliminary study and the compilation of the files will continue.

Hypertensive emergencies represent clinical situations requiring treatment in an intensive care unit [5] [6] [7]. Indeed, because of its high mortality at one year 26.8% to 79%, adequate care in intensive care unit is required [7] [13]. Their frequency during hypertensive crises varies from region to another, 25.2% according to Peacock in USA [5], and 68% according to Shao in Tanzania [7].

In our series, female sex predominated, but Maweni reported a similar preva-

lence in both sexes [6]. The HT in blacks is considered severe and often discovered by complications [8]. This fact is linked to ignorance of the disease, illiteracy, prejudice, religion belief and the low-income [8]. Hypertensive urgency allowed the discovery of hypertension in 46% of cases according to Maweni [6]. Neuro-sensory signs are those that often bring patients to the hospital, but also more specific signs such as chest pain or functional impotence [6].

The associated biological abnormality that prevailed was hyperuricemia. It is a common cardiovascular risk factor and is an independent factor in stroke mortality [11]. During the hypertensive emergency, the glomerular filtration rate decreases and the LVEF decreases [5]. We reported 16% cases of HF with low LVEF. Anemia has been described as a factor of poor prognosis during hypertensive emergencies. In fact, hemolytic anemias are very poor prognosis [14].

The most common clinical features were HF and stroke. This situation was described in Brazzaville in emergencies [4]. Stroke care remains difficult in Congo, due to a lack of equipments and drugs [9]. The treatment used in emergency, is a continuous IV infusion of calcium channel blockers or beta-blockers as indicated [13]. A very fast decrease of the blood pressure is associated with a poor prognosis [5]. The subsequent treatment of hypertension is most often represented by angiotensin converting enzyme inhibitors and calcium channel blockers, as recommended by the African black subject [2].

Mortality at one year remains high, 26.8% for Shao and 79% for Aronow [7] [13]. These deaths are attributed to the failure of the target organs, namely the heart, brain and kidney during hypertensive crises. Factors associated with non-control of blood pressure were female gender and low socioeconomic status. Thus, public awareness and early detection of hypertension are essential for the prevention of major complications [1]. Similarly, the fight against poverty must be considered by the public authorities, in order to cope with this endemic cardiovascular disease [1] [2] [10].

## 5. Conclusion

Organs damaged during hypertensive emergencies are most often the heart, brain and kidney in our context. The control of the blood pressure remains difficult. Primary prevention and early management of hypertension will limit these complications.

## Conflicts of Interest

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

## References

- [1] Beaney, T., Schutte, A.E., Tomaszewski, M., Ariti, C., Burrell, L.M., Castillo, R.R., Damasceno, A., Kruger, R., lackland, D., Nilsson, P.M., Prabhakaran, D., Ramirez, A.J., Schlaich, M.P, Wang, J., Weber, M.A. and Poulter, N.R. (2018) On Behalf of the MMM Investigators. May Measurement Month 2017: An Analysis of Blood

- Pressure Screening Results Worldwide. *The Lancet Global Health*, **6**, e736-e743. [https://doi.org/10.1016/S2214-109X\(18\)30259-6](https://doi.org/10.1016/S2214-109X(18)30259-6)
- [2] Dzudie, A., Rayner, B., Ojji, D., Schutte, A., Twagirumukiza, M., Damasceno, A., Ba, S.A., Kane, A., Kramoh, E., Anzouan Kacou, J.B., Onwubere, B., Cornick, R., Sliwa, K., Anisuba, B., Mocumbi, A.O., Ogola, E., et al. (2017) PASCAR Roadmap on Hypertension. Roadmap to Achieve 25% Hypertension Control in Africa by 2025. *Cardiovascular Journal of Africa*, **28**, 262-273. <https://doi.org/10.5830/CVJA-2017-040>
- [3] Kimbally-Kaky, G., Gombet, T., Bolanda, J.D., Voumbo, Y., Okili, B., Ellenga Mbolla, B., Gokaba, Ch., Loumouamou, D., Bitsindou, P., Nzoutani, L., Ekoba, J., Nkoua, J.L. and Bouramoué, C. (2006) Prevalence Ofarterial Hypertension at Brazzaville. *Cardiologie Tropicale*, **32**, 97-98.
- [4] Ellenga Mbolla, B.F., Gombet, T.R., Mahoungou, G.K., Otiobanda, G.F., Ossou Nguet, P., Ikama, M.S., Kimbally Kaky, G. and Etitie, F. (2011) Hypertensive Emergencies at the University Hospital Center of Brazzaville, Congo. *Médecine tropicale. Revue du Corps de santé colonial*, **71**, 97-98.
- [5] Peacock, F., Amin, A., Granger, C.B., Pollack Jr., C.V., Levy, P., Nowak, R., Kleinschmidt, K., Varon, J., Wyman, A. and Gore, J.M. (2011) Hypertensive Heart Failure: Patients Characteristics, Treatment, and Outcomes. *American Journal of Emergency Medicine*, **29**, 855-862. <https://doi.org/10.1016/j.ajem.2010.03.022>
- [6] Maweni, R.M., Sunderland, N., Rahim, Z., Odih, E., Kallampallil, J., Saunders, T. and Akunuri, S. (2018) Clinical Characteristics of Black Patients with Hypertensive Urgency. *Irish Journal of Medical Science*, **187**, 1089-1096. <https://doi.org/10.1007/s11845-018-1787-0>
- [7] Shao, P.J., Sawe, H.R., Murray, B.L., Mfinanga, J.A., Mwafongo, V. and Runyon, M.S. (2018) Profile of Patients with Hypertensive Urgency and Emergency Presenting to an Urban Emergency Department of a Tertiary Referral Hospital in Tanzania. *BMC Cardiovascular Disorders*, **18**, 158. <https://doi.org/10.1186/s12872-018-0895-0>
- [8] Gombet, T.R., Ellenga Mbolla, B.F., Ikama, M.S., Ekoba, J. and Kimbally-Kaky, G. (2009) Cost of Emergencies Cardiovascular Care at the University Hospital Center in Brazzaville, Congo. *Médecine tropicale. Revue du Corps de santé colonial*, **69**, 45-47.
- [9] Ossou Nguet, P.M., Otiobanda, G.F., Ellenga Mbolla, B.F., Ikama, M.S., Ondze Kafata, I. and Bandzouzi Damba, B. (2013) First Thrombolysis in Acute Stroke with Tenecteplase in Congo. *International Journal of Stroke*, **8**, E47. <https://doi.org/10.1111/ijss.12079>
- [10] National Center for Statistics and Economic Studies (CNSE) (2012) Demographic and Health Surveys ESDC-II 2011-2012, Preliminary Report. Brazzaville, April 2012. <https://dhsprogram.com/pubs/pdf/PR19/PR19.pdf>
- [11] Mapoure, Y.N., Ayeah, C.M., Doualla, M.S., Ba, H., Mbatchou Ngahane, H.B., Mbahe, S. and Luma, H.N. (2017) Serum Uric Acid Is Associated with Poor Outcome in Black Africans in the Acute Phase of Stroke. *Stroke Research and Treatment*, **2017**, Article ID: 1935136.
- [12] Tanaka, K., Tanaka, F., Onoda, T., Tanno, K., Ohsawa, M., Sakata, K., Omama, S., et al. (2018) Prognostic Value of Electrocardiographic Left Ventricular Hypertrophy on Cardiovascular Risk in a Non-Hypertensive Community-Based Population. *American Journal of Hypertension*, **31**, 895-901. <https://doi.org/10.1093/ajh/hpy055>
- [13] Aronow, W.S. (2017) Treatment of Hypertensive Emergencies. *Annals of Transla-*

*tional Medicine*, **5**, S5. <https://doi.org/10.21037/atm.2017.03.34>

- [14] Abdalla, H., Alfishawy, M., Babigumira, M. and Bashir, T. (2015) Malignant Hypertension and Thrombotic Thrombocytopenic Purpura: False Friends. *American Journal of Case Reports*, **16**, 374-376. <https://doi.org/10.12659/AJCR.892787>