

Secondary Hypertension in Sub-Saharan African Populations: A Retrospective Study between 2011 and 2016 at Regional Hospital of Saint-Louis, Senegal

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Abstract

Introduction: High blood pressure (HBP) is a worldwide health issue responsible of high cardiovascular morbidity and mortality. Even though essential HBP is far the most frequently reported in patients, secondary causes must be known because of their severity and the possibility of aetiological treatment. No recent epidemiological data are available about secondary causes of HBP in black African populations. The aim of this study was to describe aetiological patterns of secondary HBP in patients followed at Saint-Louis Hospital. **Patients and Method:** We conducted a retrospective and descriptive study in regional hospital of Saint-Louis. All patients aged ≥ 15 years old admitted from January 1st 2011 to January 31st 2015 in internal medicine, nephrology, emergency and cardiology departments were included. Clinical, para-clinical data and patients outcomes were collected from medical records. Hypertension was defined according to JNC8 criteria. Secondary HBP was considered if explorations identified a clear aetiology to hypertension. Statistical analysis was done with Excel 2010 and STATA 12.0. **Results:** We included 9253 patients with mean age of 35 ± 12 years (15 - 83 years) and sex-ratio of 1.6. Overall 67.5% of patients had hypertension and secondary causes were found in 10.5% of them. The majority of patients presented clinical symptoms suggesting a secondary cause of HBP and first-line laboratory explorations were normal in half of cases. Renal diseases were responsible for 79.1% of secondary HBP cases mainly dominated by glomerulonephritis (22.6%), vascular nephropathies (18.7%) and autosomal dominant poly-

cystic kidney disease (5.8%). They were followed by preeclampsia (13.6%) and endocrinal aetiologies such as hyperthyroidism (5.8%), hypercorticism (0.5%), pheochromocytoma (0.5%), primary hyperparathyroidism (0.4%) and Conn's adenoma (0.1%). Combination of ≥ 3 antihypertensive drugs was necessary in 71.5% of cases and surgical treatment was performed in three patients. Blood pressure was normalized in only 27.7% of patients. **Conclusion:** Secondary causes are frequent in our young patients with HBP. In the majority of patients complete clinical examination and minimal laboratory investigations recommended by World Health Organisation can give an aetiological orientation that needs further radiological and hormonal explorations.

Keywords

Secondary High Blood Pressure, Internal Medicine, Black Africans

1. Introduction

High blood pressure (HBP) is a global public health issue associated with an important cardiovascular morbidity and mortality [1] [2]. In Africa, either in urban or in rural populations, recently reported statistics show a clear increasing burden of chronic diseases like HBP and a dramatically low level of diseases awareness and BP control [3] [4]. Essential hypertension is the most reported form but secondary causes must also be known because they are often severe but reversible under etiological treatment [4]. Data about secondary causes of HBP in black African populations are scarce and the leading curable HBP etiologies are not well identified. In this study, we aimed to describe the clinical and etiological patterns of secondary hypertension in Saint-Louis (northern Senegal).

2. Patients and Methods

We performed a prospective descriptive study including patients followed between January 1st 2011 and January 31st 2015 at regional reference hospital of Saint-Louis. All patients aged ≥ 18 years and with blood pressure $\geq 140/90$ mm Hg were included. Clinical, biological and radiological findings were collected from medical records as well as evolution after treatment. Secondary HBP was considered in patients where explorations identified a specific cause. Hypertensive patients without etiological explorations were excluded from the study. Data were analyzed using Epi Info 7.

3. Results

A total of 9779 were admitted in internal medicine and cardiology department during the study period but 526 of them were excluded from the study because of incomplete data. Finally, 9253 patients were included in the analysis with mean age of 35 ± 12 years (15 - 83 years) and sex-ratio of 1.6. Among these 6245 presented HBP (4103 men and 2142 women) (total HBP prevalence of 67.5%). Secondary causes of HBP were found in

968 cases (prevalence of 10.5%) in contrast with 89.5% of patients suffering from essential hypertension.

Adolescents and young adults aged ≤ 35 years were most affected, while patients aged ≥ 65 years represented only 22% of secondary HBP. The majority of patients presented clinical symptoms suggesting a secondary cause of HBP and first-line laboratory explorations (WHO recommendations) were normal in half of patients (51.5%). Renal diseases were responsible for 766 cases (79.1%) of secondary HBP mainly dominated by glomerulonephritis (22.6%), vascular nephropathies (18.7%) and autosomal dominant polycystic kidney disease (5.8%). They were followed by preeclampsia (13.6%) and endocrinal aetiologies such as hyperthyroidism (5.8%), hypercorticism (0.5%), pheochromocytoma (0.5%), primary hyperparathyroidism (0.4%) and Conn's adenoma (0.1%).

Clinical examination suggested a diagnosis in 54.2% of patients with secondary HBP. Hypertension was severe (stage 2 of JNC 8 classification) in 735 patients (76%) and 212 patients (21.8%) had malignant hypertension. Visceral complications were found in patients with secondary HBP. Hypertensive retinopathy 406 cases (41.9%), acute left cardiac failure 86 cases (8.9%), malignant nephrosclerosis 186 cases (19.2%), hypertensive encephalopathy 151 cases (15.6%) and stroke 58 cases (0.6%). Electrocardiogram reported left ventricular hypertrophy in 62.5% of patients. Renal failure was found in 65.3% of patients presented electrolytes disorders such as hyponatremia (60.3% of patients), hyperkalemia (27.9% of patients) and hypokalemia (2.6%) and hyperuricemia (24.5%) Eleven percent of patients had elevated fasting blood glucose and dyslipidemia was present in 49.6% of patients.

The most commonly used antihypertensive classes were loop diuretics, dihydropyridine calcium channel blockers (CCB), Angiotensin Conversion Enzyme inhibitors (ACEI), alpha-blockers and beta-blockers. These drugs were used alone (in 28.5% of cases) or as combination therapy (in 71.5% of patients, including 48.9% of fixed-dose combination). Drugs therapy allowed an efficient control of blood pressure in only 27.9% of patients. Surgical treatment was performed in 13 patients (07 cases of hyperthyroidism, 03 cases of parathyroid adenoma, 02 cases of pheochromocytoma, 01 cases of renal vascular compression).

4. Discussion

This study shows that hypertension is a common internal medicine intake pattern and two out of five have a secondary cause. This prevalence is very high compared to those reported in the literature vary between 6 and 10.5% depending on the mode of recruitment [3] [4]. In a series of 1,020 hypertensive patients in Japan, Omura *et al.* found 9.1% of secondary causes outside the kidney [5]. Strong nephrology component of our study population was probably a selection bias involved in increase the proportion of secondary hypertension causes kidney.

The examination and clinical examination occupy a central place in the etiological research. Indeed, they already provide diagnostic guidance in the majority of cases [6]

although they can sometimes be poor [5]. In the absence of clinical signs directing them to a specific HTA etiology, to find arguments to a secondary cause are young age less than 50 years, the severity of hypertension with visceral immediately at the time of discovery [6], resistance to treatment [7] [8]. These data are also supported by the clinical and evolutionary characteristics found in our patients who are mostly young people with severe hypertension responding little treatment.

As in most series [3] [9] [10], nephropathy is also the first secondary hypertension because in our series. Followed endocrine disorders dominated by pheochromocytoma contrary to the results of Omura *et al.* who report primary aldosteronism as the most common hypertension of endocrine origin [5] [11]. Other authors report renovascular hypertension as the second most common cause of secondary hypertension [4] especially in the elderly [12].

Search endocrine etiologies, the determination of plasma renin activity and aldosterone and renal angiography sensitized the captopril test are diagnostic tests with a high sensitivity (100%) and good specificity (70% - 80%) [5] even if they have not been made in all patients. Nevertheless, the majority of them have benefited from an abdominal ultrasound, the dosage of cortisol and blood and urinary catecholamines remain with abdominal CT scan, less sensitive but very specific examinations (100%) for the diagnosis of secondary hypertension [5]. Some authors propose the plasma aldosterone/plasma renin activity is more sensitive in the detection of primary aldosteronism as well in black patients than Caucasians [9].

Undetermined etiologies were essentially made of probable chronic glomerulonephritis whose belated discovery did not allow etiological research thrust. No cause of iatrogenic hypertension was found in our series.

Despite use of drugs association in 71.5% of cases, blood pressure normalized for only 27.9% of patients. The high frequency of resistant hypertension in our patients could also be explained by the important prevalence of chronic kidney disease which is a classical cause of resistance to antihypertensive drugs [8]. Studies report a satisfactory blood pressure control in only 5.6 to 15% of patients with secondary hypertension despite the introduction of HAART [5] [8] [13].

5. Conclusion

Secondary hypertension in our series mainly concerns young people. They are happy to severe and resistant to monotherapy. Thorough clinical examination and a minimum balance WHO can often be an etiological orientation which must be confirmed by imaging studies and endocrine explorations. Etiologies are dominated by renal and endocrine causes should be sought systematically to enable early and appropriate care taken.

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