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Clinical, Electrocardiographic and Echocardiographic Profiles of Elderly Hypertensive Patients in Gabon

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Abstract **Original Research Article**

Introduction*:** Hypertension in the elderly is an independent risk factor for cardiovascular disease. Our objectives were to describe the clinical, electrocardiographic, and echocardiographic features of hypertension in elderly patients. ***Methods: We conducted a descriptive and cross-sectional study from January to September 2023. Elderly hypertensive patients aged 60 years and older, who were followed in the outpatient cardiology service at HIAOBO Hospital in Libreville, Gabon, were included. Statistical data were analyzed using Epi Info 7 software, and a p-value of < 0.05 was considered statistically significant. ***Results***: A total of 210 patients were included. The average age was 60 years with a female predominance (sex ratio of 0.85). The average blood pressure was 162/90 mmHg. Hypertension was controlled in 13% of cases. Electrocardiogram results showed rhythm disturbances (17.78%), left atrial enlargement (45.19%), left ventricular hypertrophy (28.85%), and two cases of complete atrioventricular block. The Holter ECG revealed four cases of non-sustained ventricular tachycardia (Lown stage IVb), six cases of paroxysmal atrial fibrillation, and one case of paroxysmal atrial flutter. Echocardiography, performed in 140 patients, revealed left ventricular hypertrophy (LVH), predominantly concentric, in 25 patients, more frequent in males ($p = 0.04$), and left atrial dilation in 56.42% of cases, more common in older patients ($p = 0.01$). ***Conclusion*:** Electrocardiographic and echocardiographic features in the elderly hypertensive population are characterized by left ventricular hypertrophy, particularly concentric hypertrophy, and the frequent occurrence of arrhythmias, sometimes detected by long-term electrocardiographic monitoring.

Keywords: Hypertension in Elderly, Cardiovascular Disease, Electrocardiographic Features, Echocardiographic Features, Left Ventricular Hypertrophy.

INTRODUCTION

Hypertension in the elderly is an independent factor for cardiovascular disease. It is also a strong independent indicator significantly associated with an increased morbidity and mortality through conditions such as myocardial infarction, heart failure, kidney failure, and cerebrovascular damage [1]. Its prevalence increases with age. According to the MONA LISA study, the prevalence of hypertension in France is 80% in men and 71% in women, in the 65-74 age group [2]. In Sub-Saharan Africa, the prevalence of hypertension in the 60-69 age group is 57.4% in men and 61.5% in women [3]. The number of hypertensive individuals will continue to rise, reaching an estimated 150 million cases by 2025, according to the WHO [3]. These projections are partly due to the progressive aging of the African population [3]. This study was conducted to determine the clinical, electrocardiographic, and echocardiographic characteristics of hypertensive patients aged 60 and above.

METHODS

We conducted a descriptive, cross-sectional study over a nine-month period from January to September 2023. The study included hypertensive patients aged 60 years and above, attending outpatient care in the cardiology department of HIAOBO Hospital in Gabon. The aim was to gather functional symptoms and physical examination data, systematically record a surface electrocardiogram (ECG) to detect left ventricular hypertrophy (LVH), arrhythmias, conduction disturbances, and signs of coronary insufficiency. Echocardiography was performed when indicated to measure cardiac chamber sizes, determine left ventricular mass (indexed to body surface area), and assess left ventricular systolic and diastolic functions. A Holter ECG was performed if needed, to detect paroxysmal arrhythmias or conduction disturbances. LVH was defined on ECG by a Sokolow-Lyon index (SV1 + RV5 or RV6) > 35 mm and/or a Cornell index (SV3 + RavL) > 28 mm in men and > 20 mm in women.

On echocardiography, LVH was defined by a left ventricular mass (LVM) index > 115 g/m² in men and > 95 g/m² in women [4]. The mitral profile was also studied and classified into three types according to the criteria of the American Society of Echocardiography (ASE) [5]. Data were recorded on a pre-established form and entered into an Excel database. Statistical analysis and tests were performed using Epi Info 7 software. The analysis aimed to study the variables and their distribution, as well as compare means and proportions. A p-value < 0.05 was considered statistically significant.

RESULTS

We included 210 patients out of a total of 1080 patients seen during the study period. The prevalence of hypertension in the elderly was 19.26%. The average age was 60 ± 7.6 years [60-91 years], with the most represented age group being 60 to 70 years (60%). There was a female predominance, with a sex ratio of 0.85. Systolic-diastolic hypertension was predominant (74.4%). One hundred seventy-three (83.17%) patients were already under treatment for hypertension. The mean duration of hypertension was 9.6 ± 8.26 years [1 month - 42 years]. Regarding clinical data, among the symptoms of hypertension, headaches were the most frequent (25.5%), followed by tinnitus (17.3%), dizziness (15.4%), and blurred vision (7.5%). Additionally, we observed dyspnea, palpitations, and chest pain in 19.7%, 12.5%, and 5.3% of cases, respectively. The mean systolic blood pressure was 162 mmHg [100-220 mmHg], and the mean diastolic blood pressure was 90 mmHg [70-150 mmHg]. Hypertension was controlled in 13% of patients. Cardiovascular abnormalities are listed in Table 1. Regarding electrocardiographic data, sinus rhythm was noted in 96.8% of cases. The abnormalities found on ECG are presented in Table 2. A Holter ECG was performed in 42 patients. The different abnormalities noted are grouped in Table 3. Doppler echocardiography was performed in 140 patients (67.3% of our population). The mean left ventricular mass index (LVMi) was 86.33 ± 4.27 g/m² [3.5-181.1 g/m²]. LVH was found in 25 patients (17.85%), with a predominance of concentric LVH (92%) compared to eccentric LVH (8%). Men had significantly more LVH than women (p = 0.04). The average left atrial surface area was 20.7 ± 6.9 cm². Left atrial dilation was observed in 56.42% of patients and was significantly more frequent in older patients (p = 0.01). Arrhythmias were significantly more frequent in patients with left atrial dilation (p = 0.02). The mean left ventricular ejection fraction was 67.09 ± 12.47%. Left ventricular dysfunction was noted in 5.7%, and segmental wall motion abnormalities were observed in four cases. Mitral profiles of type I, II, and III were found in 88.57%, 9.28%, and 2.14% of cases, respectively. Echocardiographic Doppler findings are summarized in Table 4.

Table 1: Distribution of Cardiovascular Abnormalities Among Elderly Hypertensive Patients

Cardiovascular Abnormalities	Frequency	Percentage (%)
Rhythm Irregularity	20	9.8
Left Bundle Branch Block (LBBB)	13	6.2
Systolic Murmurs		
- Aortic	11	5.2
- Mitral	11	5.2
Diastolic Aortic Murmur	1	0.4

Table 2: Abnormalities Found in Electrocardiograms of Elderly Hypertensive Patients

Abnormalities	Frequency	Percentage (%)
Rhythm Disturbances	37	17.7
Ventricular Extrasystoles	18	8.6
Atrial Extrasystoles	15	7.2
Atrial Flutter	2	0.8
Atrial Fibrillation	1	0.4
Left Atrial Hypertrophy	94	45.2
Left Ventricular Hypertrophy (LVH)	60	28.8
Systolic LVH	32	15.3
Diastolic LVH	28	13.3
Repolarization Disorders	64	30
Conduction Disorders	54	25.9
Isolated Anterior Hemiblock	30	14.4
Complete left bundle branch block	4	19.4
Repolarization disturbances: subepicardial ischemia, necrosis on the electrocardiogram.		

Table 3: Abnormalities Observed in Holter ECG of Elderly Hypertensive Patients

Abnormalities	Frequency
Ventricular Hyperexcitability	18
Lown Class II	6
Lown Class III	4
Lown Class IVa	4
Lown Class IVb	4
Atrial Hyperexcitability	15
Paroxysmal Atrial Fibrillation	6
Paroxysmal Atrial Flutter	1
Multiple Polymorphic Atrial Extrasystoles	8
Episodes of Significant Bradycardia (HR <40/min)	2

Table 4: Echocardiographic Abnormalities Found in Elderly Hypertensive Patients

Echocardiographic Findings	Frequency (n=140)	Percentage (%)
Left Ventricular Hypertrophy (LVH)	25	17.8
Left Atrial Dilation	79	56.4
Segmental Contractility Disorders of the Left Ventricle	4	2.8
Left Ventricular Dysfunction	8	5.7
Diastolic Dysfunction		
- Type 1	124	88.5
- Type 2	13	9.2
- Type 3	3	2.1
Non-obstructive Sub-aortic Septal Lip	45	32.1
Aortic Valve Calcification	18	12.8
Pulmonary Hypertension (PH)	7	5
Atrial Septal Aneurysm	6	4.2
Calcification of Both Valves (Aortic and Mitral)	4	2.8
Severe Aortic Stenosis	3	2.1
Right Atrial Dilation	2	1.4
Isolated Mitral Valve Calcification	1	0.7
Rheumatic Sequelae of Aortic and Mitral Valves	1	0.7

DISCUSSION

Elderly hypertensive patients represent a significant proportion of the total patient population in our practice. This is partly explained by the high prevalence of hypertension in the Gabonese population (35-40%) [6] and the greater incidence of hypertension in the elderly, which can reach 60-80% [7]. Clinical examination is a crucial step in the assessment of hypertensive patients, focusing on identifying secondary hypertension, complications, or associated cardiovascular risk factors [4]. The electrocardiogram is a simple, accessible, low-cost test that can detect hypertension complications and provide prognostic information. Echocardiography is more accurate for detecting and quantifying LVH, offering a better approach to overall cardiovascular risk and sometimes guiding treatment [4]. In our study, we found 28.85% of patients with electrical LVH and 17.85% with echocardiographic LVH, predominantly concentric. These results are lower than those in the MONALISA study (41% echocardiographic LVH) [2] and the 53.3% prevalence of LVH in hypertensive black African individuals reported by Niakara [8]. In a population with an average age of 55 years, Jaleta reported a prevalence of LVH of 52% in Ethiopia [9].

LVH in hypertensive patients, diagnosed by both electrocardiographic [10] and echocardiographic criteria, is a major predictive factor for increased incidence of coronary artery disease, myocardial infarction, stroke, heart failure, ventricular arrhythmias, and sudden death [11], independent of blood pressure level and other risk factors [12]. Monfared highlighted the close link between LVH and microalbuminuria in a population of hypertensive patients [13]. However, we did not find any statistically significant relationship between LVH and these parameters. Gender appeared to be a more determinant factor, despite considering gender in the definition of LVH.

Arrhythmias on baseline ECG were found in 17.78% of cases, predominantly extrasystoles, especially ventricular ones. We did not find any statistically significant relationship between LVH and arrhythmias. A similar finding was reported by Pose-Reino, who compared hypertensive and non-hypertensive groups [14]. Only left atrial dilation ($p = 0.02$) was significantly associated with the presence of arrhythmias. Our study demonstrated the value of Holter ECG, especially in hypertensive patients, as a useful complementary examination to detect paroxysmal arrhythmias [15]. It

helped identify potentially serious arrhythmias, such as six cases of paroxysmal atrial fibrillation not present on baseline ECG. Hypertension and age are the main risk factors for atrial fibrillation. The presence of atrial fibrillation itself increases the risk of stroke and, through this, raises overall cardiovascular risk [14]. We also observed severe ventricular arrhythmias (ventricular tachycardia), indicating an increased risk of sudden death in hypertensive patients [14]. The value of Holter ECG also lies in studying heart rate variability, which is altered in hypertension and reflects autonomic nervous system dysfunction [14], as well as detecting worsening pre-existing conduction disturbances. Conduction disturbances were reported in a quarter of our population (25.96%), with a predominance of anterior hemiblock and right bundle branch block, although this may be simply related to age.

The impact of hypertension on the left atrium is a key feature of hypertensive heart disease. In our study, left atrial dilation was found in one-third of the entire population. Its occurrence was significantly associated with age (p = 0.01).

CONCLUSION

Hypertension is a prevalent condition in the elderly population. The electrocardiographic and echocardiographic findings are characterized by left ventricular hypertrophy, the frequency of arrhythmias on baseline ECG, especially during prolonged electrocardiographic monitoring, and left ventricular hypertrophy on echocardiography.

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