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Epidemiological and Clinical Aspects of Ischemic Heart Disease in HIV/AIDS Immunodepression in Infectious Diseases Department of the Chu Point "G"

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Abstract

The cardiovascular prognosis of patients infected with the human immunodeficiency virus will become an increasingly important concern for physicians treating this infection in the coming years. Ischemic heart disease results from insufficient oxygenation of the myocardium due to narrowing or occlusion of one or more coronary arteries. **Objective:** This study aimed to describe the epidemiological and clinical aspects of ischemic heart disease in immunocompromised HIV patients hospitalized in a Infectious and Tropical Diseases Department of the Point "G" University Hospital, Bamako, Mali. **Materials and Methods:** This was a descriptive, cross-sectional study conducted from January 2019 to September 2019 on the records of HIV/AIDS patients with ischemic heart disease. Ischemic heart disease was diagnosed clinically, electrically, and by echocardiography. **Result:** The study involved 13 cases of ischemic heart disease in 331 hospitalized patients, representing a hospital prevalence of 3.9%. The sex ratio was 0.86%. The most affected age group was [50 - 59 years]. HIV1 infection represented 84.5% of cases. Cardiovascular risk factors found outside of HIV infection were dominated by hypertension 69.2% followed by dyslipidemia and smoking with 58.9% and 38.5% respectively. The left ventricular ejection fraction was less than 50% in the majority of cases. Complications were mainly dominated by ischemic stroke and anemia with the same percentage, *i.e.* 46.12%. We recorded 5 deaths with a case fatality rate

of 38.5%. The outcome was favorable in 30.8% of patients with stable heart failure, an intermediate ejection fraction and sequelae such as hemiplegia or dysarthria. **Conclusion**: Ischemic heart disease in HIV-infected individuals is multifactorial in origin and carries a poor prognosis.

Keywords

Myocardial Ischemia, HIV/AIDS, Bamako

1. Introduction

The HIV epidemic is a global public health problem that requires continuous efforts to control. Prevention, testing, and treatment measures are essential to reduce the number of new infections and save lives. According to WHO global statistics, 38.9 million people were living with HIV in 2024. West and Central Africa accounts for approximately 5.1 million of this population [1]. In Mali, the prevalence is 1.1% [2]. The advent of triple antiretroviral therapy has significantly increased the quality and experience of life of human immunodeficiency virus control program. Studies indicate that many people on ART will have a near-normal life expectancy. As they age, these people become vulnerable to all age-related complications, including cardiovascular diseases [3]. In Western countries, there has been a change in the causes of death of HIV-infected patients, with a significant increase in cardiovascular diseases and tumors not related to acquired immunodeficiency syndrome (AIDS) such as lung, gastrointestinal and liver cancers [4] [5]. This phenomenon is sometimes explained by the demographic profile, comorbidities (smoking), coinfections (hepatitis C or B virus) or the toxicity of antiretroviral treatment [6]. Regarding cardiovascular diseases, the incidence of myocardial infarction in the HIV-infected population is twice as high compared to that of the general population. These represent the fourth cause of mortality among human immunodeficiency virus control program after opportunistic infections, cancers and blood diseases [7]. This would be due to certain factors: a high proportion of smokers and drug addicts among human immunodeficiency virus control program, infection by the virus itself with activation of the immune system and the side effects of ARV treatments [3]. Ischemic heart disease results from insufficient oxygenation of the myocardium secondary to narrowing or occlusion of one or more coronary arteries. It manifests itself as acute coronary syndrome with or without ST segment elevation and chronic coronary syndrome [8]. Coronary disease, like other metabolic diseases, can remain asymptomatic for a long time and be discovered incidentally, but it can also result in a picture of heart failure, most often global, especially in patients living with human immunodeficiency virus [9]. In recent years, the frequency of cardiovascular disease has been increasing, while very few studies have been devoted to ischemic heart disease in patients living with human immuno-

deficiency virus [6]. In Mali, few studies exist on cardiovascular disease in patients living with human immunodeficiency virus.

2. Objective

The objective of this work was to describe the epidemiological and clinical aspects of ischemic heart disease in immunocompromised HIV patients hospitalized in the infectious and tropical diseases department of the Point "G" University Hospital, Bamako, Mali.

3. Materials and Methods

This was a 9-month descriptive cross-sectional study from January 2019 to September 2019. It covered all patients hospitalized in the infectious and tropical diseases department for HIV/AIDS infection.

We included HIV-positive adult patients with ischemic heart disease during the study period who consented to participate in the study.

The diagnosis of ischemic heart disease was based on:

- Clinical symptoms (chest pain, dyspnea, palpitations, cough, syncope)
- Electrical features (repolarization disorder, necrosis wave)
- Disturbances in segmental kinetics and left ventricular systolic ejection fraction.
- Troponin was not performed
- Coronary angiography was not performed

Exclusion criteria: Patients who did not undergo paraclinical examinations, non-HIV-infected patients with cardiovascular disease.

Operational definition

- Hypertension is a permanent increase in SBP ≥ 140 mm Hg and/or DBP ≥ 90 mm Hg.
- Ischemic heart disease results from insufficient oxygenation of the myocardium due to narrowing or occlusion of one or more coronary arteries with manifestations of acute or chronic coronary syndrome.
- Subepicardial ischemia was defined by the presence of concordant negative T waves in a coronary territory.
- Subendocardial lesion was defined by a significant ST-segment depression (>1.5 mm) concordant in a coronary territory.
- Necrotic sequelae was defined by concordant R-wave abrasion in a coronary territory.
- Left ventricular hypertrophy was defined by a Sokolov-Lyon index ≥ 35 mm. On echocardiography, LVH was classified as: preserved ejection fraction if >50%, moderate or intermediate between 40% and 50% and impaired <40%.
- A biological assessment, including lipid assessment with LDL, HDL, total cholesterol, and triglyceride measurements to look for dyslipidemia.
- Blood count and formula, blood electrolytes, and serum creatinine measurement.

Data collection: Data were collected from individual patient interviews based on a pre-established questionnaire and medical records. All patients were informed of the study's objectives and confidentiality, as well as their right and ability to refuse to participate. The variables studied were:

- Sociodemographics (age, gender, socio-professional categories).

- Cardiovascular history and risk factors (BP, diabetes, dyslipidemia, sickle cell disease, asthma, obesity, smoking, alcoholism, ARV treatment).

- Clinical signs (chest pain, dyspnea, palpitations, cough, syncope) and paraclinical findings, including laboratory tests, biochemistry, immunology, electrocardiogram, echocardiography, and chest X-ray.

- Antiretroviral and cardiovascular treatment, and the patient's condition at the end of the survey. Data analysis was done using SPSS 20 software. The static test used was ki2 with a significance level of 5%. Statistically significant variables were retained.

4. Result

In total, we surveyed 331 patients living with HIV during the study period, including 13 cases of myocardial ischemia representing a hospital prevalence of 3.9%. The predominance was female (7/13), sex ratio of 0.86% (Table 1). The most affected age group was [50 - 59 years] or 38.5% (Table 1). HIV1 infection represented 84.6% of cases, the majority of our patients were classified as stage C according to the center for disease control and prevention classification system for HIV infection (76.9%) and 91.0% of patients had a CD4 count below 350 cells/mm^3 (Table 2). The widely used antiretroviral regimen was TDF + 3TC + EFV in 84.6% of cases. Cardiovascular risk factors found outside of HIV infection were dominated by hypertension 69.2% followed by dyslipidemia and smoking with 58.9% and 38.5% respectively (Table 3). Cardiovascular presenting symptoms were dominated by chest pain (65.2%), dyspnea (53.8%), and lower limb edema (42%) (Table 4). The electrocardiogram showed sinus tachycardia and subepicardial ischemia in 84.6% and 53.8% of cases, respectively (Table 5). Left ventricular ejection fraction was frequently used for prognostic assessment and monitoring of cardiovascular disease, and provides a widely validated assessment of morbidity and mortality risks. This value was less than 50% in the majority of cases. Global hypokinesia (52%) and anterior wall akinesia (33%) were the most common segmental abnormalities. Treatment was medical, including antiplatelet agents, diuretics, ACE inhibitors, beta-blockers, statins, and antiretroviral therapy. Coronary angiography was not performed for financial reasons. The course was marked by multiple re-hospitalizations. Complications were mainly dominated by anemia and ischemic stroke with 53.8% and 46.2% respectively and cardiac decompensations (Table 6). We recorded 5 deaths with a case fatality rate of 38.5%. The outcome was said to be favorable in 30.8% of patients with stable heart failure, an intermediate ejection fraction and sequelae such as hemiplegia or dysarthria.

Table 1. Distribution of patients according to gender and age.

Gender/Age groups	Numbers	Percentage
Female	7	53.8
Male	6	46.1
Age groups		
Under 50 years old	4	30
50 - 59 years old	5	38.5
60 - 69 years old	2	15.4
Over 69 years old	2	15.4

The most affected age group was [50 - 59 years] with extremes of 41 and 75 years.

Table 2. Distribution of patients according to HIV type and clinical category.

Type of VIH/ Clinical category		Numbers	Percentage
Type of VIH	VIH 1	11	84.6
	VIH 2	1	7.7
	VIH 1 + 2	1	7.7
CD4 rate (cell/mm^3)	<350	10	91.0
	≥350	1	9.0
WHO CDC stage	B	10	77
	C	3	23

Table 3. Distribution of patients according to functional signs.

Functional signs	Numbers	Percentage
Chest pain	8	61.5
Dyspnea	7	53.8
Cough	6	46.2
Palpitations	3	23.1

Table 4. Distribution of patients according to cardiovascular risk factors.

Cardiovascular risk factors	Numbers	Percentage
High blood pressure	9	69.2
Dyslipidemia	7	53.8
Smoking	5	38.5
Diabetes	3	23.1

High blood pressure was the most represented risk factor.

Table 5. Distribution of patients according to electrical abnormalities.

Electrical abnormalities	Numbers	Percentage
Sinus tachycardia	11	84.6
Subepicardial ischemia	7	53.8
Q wave necrosis	4	30.8
Micro voltage	**3**	**23.1**

Table 6. Distribution of patients according to associated complications.

Associated complications	Numbers	Percentage
Anemia	7	53.8
Ischemic Stroke	6	46.2
Renal Failure	5	38.5
Congestive Heart Failure	5	38.5
Pneumonia	**4**	**30.7**

Ischemic stroke and anemia were the major complications associated with it.

5. Comment and Discussion

We identified 13 cases of ischemic heart disease out of a total of 331 hospitalized patients, representing a prevalence of 3.9%. A Niakara and A Traoré found 4.25% and 2.53% respectively [10] [11]. The sex ratio was 0.86 distributed between 7 women and 6 men. A similar study conducted in France in 2013 found a frequency of 23.5%, Higher than that of our study and this could be explained on the one hand by the presence of a cardiology department at the Point G University Hospital where cardiac patients are referred for better care and on the other by the availability of appropriate technical platforms in France by a larger sample size [12] (brocoa). The most represented age group was that of 50 to 59 years, *i.e.* 38.5% of cases and this confirms the frequency of HIV/AIDS infection in the active age group in our country [2]. Antiretroviral treatment has significantly increased the life experience of HIV patients and the possibility of developing cardiovascular pathologies, particularly ischemic heart disease. HIV-1 was 84.6% of cases, in accordance with the literature. The predominance of arterial hypertension with cardiovascular risk factors was classic with 69.2% in our series. O TRAORE *et al.* had found these same factors at the Gabriel TOURE University Hospital [11]. Dyslipidemia (58.9%) represents a major cardiovascular risk factor, especially since it is associated with smoking (38.5%), diabetes (20.1%) or high blood pressure. Its crucial role is described in the genesis of parietal abnormalities and increased parietal stress. They interact in a complex way to damage the arteries and reduce blood supply to the heart, leading to angina pectoris or myocardial infarction. to which is added chronic inflammation linked to HIV infection, a focus of atherosclerosis responsible for myocardial ischemia [6]. General signs were dominated by alteration of general condition in 84.6% of cases and conjunctival pallor in 61.5% of cases, indicating diagnostic delay and non-compliance with ARV treatment as found by Ndirahisha *et al.* [12]. In addition to being the main symptom of anemia, fatigue is also the most common symptom of HIV infection, and it is associated with impaired physical functioning and poor quality of life. Several factors play a role in the development of anemia in HIV-infected patients, including chronicity of the disease, opportunistic infections and certain nutritional deficiencies and this anemia was 46.2% of cases. Other authors had found it during their studies [12] [13]. It is common in HIV-infected people and associ-

ated with a poor prognosis. Cardiovascular symptoms were chest pain with 65.2%, dyspnea with 53.8% and right signs. These signs should encourage clinicians to pay more attention to the search for heart failure in immunocompromised HIV/AIDS patients, especially with high blood pressure and smoking. The majority of our patients were classified as stage C according to the CDC classification and most had a CD4 count below 350 cells/mm^3, *i.e.* 91% of patients were due to diagnostic delay, non-compliance therapeutic and the occurrence of complications. Low CD4 count and CDC stage are found as predisposing factors for cardiac damage in HIV patients [14]. Left ventricular ejection fraction was frequently used for prognostic assessment, monitoring of cardiovascular diseases and allows a widely validated assessment of morbidity and mortality risks. This value was less than 50% in the majority of cases. Global hypokinesia 52% and anterior wall akinesia 33% were the majority of the segmental abnormality signs described by Toguma and Milogo [9]-[13]. Ischemic stroke, pneumonitis and congestive heart failure were long-term prognostic factors. Factors associated with the occurrence of stroke were the clinical stage of HIV/AIDS, CD4 count and cardiovascular risk factors in accordance with the literature [6] [14] [15]. Indeed, the coexistence of cardiovascular risk factors such as high blood pressure, dyslipidemia, diabetes and especially smoking, increases the frequency of nephropathies. Thus, the recognition of an increased risk of renal damage in the HIV-infected population has led to the Infectious Disease.

Society of America (IDSA) to formulate recommendations for the systematic screening of chronic kidney disease at diagnosis by looking for proteinuria on a urine dipstick and estimating the glomerular filtration rate [16]. Treatment was medical, with 5 deaths recorded, representing a case fatality rate of 38.5%. This high mortality rate in our study could be explained by the delay in admission of our patients and the indigence of our patients to bear the medical costs.

6. Conclusion

Ischemic heart disease in HIV-infected individuals is multifactorial in origin and has a poor prognosis. It results from a more marked representation of cardiovascular risk factors, ARV treatment through its metabolic toxicity, and the toxicity of the virus itself. However, screening for these cardiovascular risk factors must be systematic.

Study Limitations

Our study has limitations, including:

Small sample size;

Lack of a cardiac catheterization unit at the time of the study;

Lack of financial resources to perform coronary angioplasty outside Mali.

Conflicts of Interest

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

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