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Idiopathic Dilated Cardiomyopathy in the Sub-Saharan Tropical Environment: Clinical, Paraclinical and Therapeutic Aspects in the Cardiology Department of the Ignace Deen National Hospital

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Abstract

Dilated cardiomyopathy (DCM) is currently defined as the presence of left or bi-ventricular dilation and systolic dysfunction in the absence of abnormal load conditions (hypertension, valve disease) or coronary heart disease sufficient to cause overall systolic failure [1]. The objective of this study was to contribute to the study of knowledge on DCM in the cardiology department of the national hospital Ignace Deen. **Methods:** It was a descriptive retrospective study lasting 12 months conducted in the cardiology department of the CHU Ignace Deen in Conakry. We included all records of inpatients in the cardiology department of the Ignace Deen National Hospital during the study period for a DCM meeting the following criteria: • Absence of history of hypertension, valvular disease, coronary artery disease; • Presence of a left ventricular dilation with LV EDV > 56 mm or EDV of LV > 27 mm/m^2; • Impairment of systolic function with reduced or moderately reduced LVEF; • Absence of segmental kinetic disorders. Our data were: epidemiological; clinical, paraclinical and therapeutic and were collected via a dedicated form. The data collected on a survey form were analyzed by SPSS 20.0 software and entered into Microsoft Word 2016. Confidentiality has been paramount and of rigor. **Results:** Out of 955 patients admitted during the study period, 88 had DCM, corresponding to a hospital prevalence of 9.21%. The majority of patients were men (37.5%) with a sex ratio of H/F of 1.6, and the age groups most affected

were those aged 54 - 65 years (63.63%) and 66 - 77 years (13.63%), with an average age of 52.5 ± 18.5 years. The functional signs were dominated by NYHA class III and IV dyspnea with frequencies of 64.77% and 28.4%, respectively. Regarding the result of the cardiac Doppler ultrasound, the left ventricle was dilated in all our patients (100%) and an alteration of the systolic function of the LV in 51.13%. The medical treatment included a loop diuretic in 97.72% of cases, an IEC/ARB II in 50% of cases, a beta-blocker in 40.90% of cases and 50% for spironolactone. Only 9 patients, 10.22% and 7 (7.95%) benefited from gliflozins and Saccubitril-Valsartan, respectively. **Conclusion:** DCM is a common condition, and represents one of the main causes of heart failure. It affects both sexes, with a male predominance. Under medical treatment, the outcome is most often favorable. However, it is responsible for a significant mortality.

Keywords

DCM Idiopathic, Ignace Deen, Guinea

1. Introduction

DCM is currently defined by the presence of left ventricular or bi-ventricular dilation and systolic dysfunction in the absence of abnormal load conditions (hypertension, valve disease) or coronary artery disease sufficient to cause overall systolic failure [1]. It can be primary (genetic, mixed or mainly familial non-genetic, or acquired) or secondary (inflammatory, autoimmune or thyrotoxic) [2], but in the majority of cases, no precise cause is found, this led to the common terminology of idiopathic dilated cardiomyopathy (CDI) [3]. The prevalence of DCM in the general population remains undetermined and epidemiological data regarding dilated cardiomyopathy are difficult to interpret. This disorder develops at any age, in both sexes and among people of all ethnic origins [4] [5]. Classically, the disease mainly affects young adults, aged 30 to 40 years, three times more often men than women. In fact, it can be observed at any age, apart from genetic forms whose penetration, linked to age, is considered complete around 50 years [6]. In the US, the prevalence of (age-adjusted) DCM is 36 per 100,000 [4]. In Africa, DCM constitutes a health problem due to its morbidity and mortality [7]. In the Congo, DCM represents the second cause of hospitalization for heart failure after arterial hypertension, with a frequency of 32.1% [8]. In Tunisia, its prevalence was estimated at 1.6% in the cardiovascular disease department of the Regional Hospital of Jendouba [9]. In Mali, according to a hospital study conducted at CHU Point G, the prevalence of DCM was estimated at 26.3% [10]. The mortality of DCM is high, typically 50% at 5 years after the diagnosis of the disease, either by refractory heart failure or sudden death most often due to a ventricular rhythm disorder. The evolution can be complicated by a systemic embolism with a cardiac starting point. Thanks to the progress of medical treatment (inhibitors of the renin

angiotensin system and beta-blockers) and due to the earlier discovery of the disease, the prognosis of DCM has improved over the last 20 years [11], The 5-year survival rate can now reach 80% [12]. In Guinea, little work has been devoted to DCM. Thus, the scarcity of previous studies in Guinea, the high frequency of DCM in our hospital structures with the corollary of rhythmic complications, thromboembolisms and hemodynamics responsible for a high lethality with a significant risk of sudden death motivated the present research work. The objective of this study was to contribute to the study of knowledge on dilated cardiomyopathies (DCM) in the cardiology department of the Ignace Deen National Hospital.

2. Methodology

Study framework: The cardiology department of the Ignace Deen National Hospital was the framework for conducting this study.

Period and type of study: It was a descriptive retrospective study lasting 12 months (from December 01, 2023 to November 30, 2024).

Inclusion criteria

We included all records of inpatients in the cardiology department of the Ignace Deen National Hospital during the study period for a DCM meeting the following criteria:

- Absence of history of hypertension, valvular disease, coronary artery disease.
- Presence of a left ventricular dilation with LV EDV > 56 mm or EDV of LV > 27 mm/m^2.
- Impairment of systolic function with reduced or moderately reduced LVEF.
- Absence of segmental kinetic disorders.

Criteria for non-inclusion

We did not include in this study the incomplete files that did not include a cardiac ultrasound.

Data Collection. Our data was: epidemiological; clinical, paraclinical and therapeutic and were collected via a dedicated form.

Data entry and analysis: The data collected on a survey form were analyzed by SPSS 20.0 software and entered into Microsoft Word 2016.

Ethical considerations: Confidentiality has been paramount and of rigor.

Study variable: were quantitative and qualitative.

3. Results

Out of 955 admitted patients, 88 had a DCM, with a hospital frequency of 9.21% (Figure 1). The majority of patients were male (37.5%) with a sex M/F ratio of 1.6 and the age groups most affected were those 54 - 65 years old (63.63%) and 66 - 77 years old (13.63%), with a mean age of 52.5 ± 18.5 years (Table 1).

The functional signs were dominated by dyspnea class III and IV with frequencies of 64.77% and 28.40% respectively (Table 2).

The cardiac physical signs were marked by tachycardia, which represented half of the cases, namely 50%, a left gallop and an aerial systolic breath respectively

2.27% and 10.22% (Table 3).

The peripheral signs were marked by a predominance of lower limb edema with 96.59% of cases, 28.40% of cases of hepatomegaly and 25% of cases of hepatojugular reflux (Table 3).

Cardiomegaly in radiology was present in 92.04% of the cases in our study (Table 4).

The ECG revealed left ventricular hypertrophy in all our patients, or 100%, and atrial fibrillation in 3.5% of cases (Table 5).

Regarding the result of the cardiac Doppler ultrasound, the left ventricle was dilated in all our patients (100%) and LVEF reduced 35 (51.13%) (Table 6).

The medical treatment included a diuretic for the loop in 97.72% of cases, an IEC/ARL in 50% of cases, a beta-blocker in 40.90% of cases.

Only 9 patients, or 10.22% and 7 (7.95%), benefited from gliflozins and Saccubitril-Valsartan, respectively (Table 7).

In our series, the evolution was favorable in 87.5% of cases. We recorded 10.22% of deaths (Table 8).

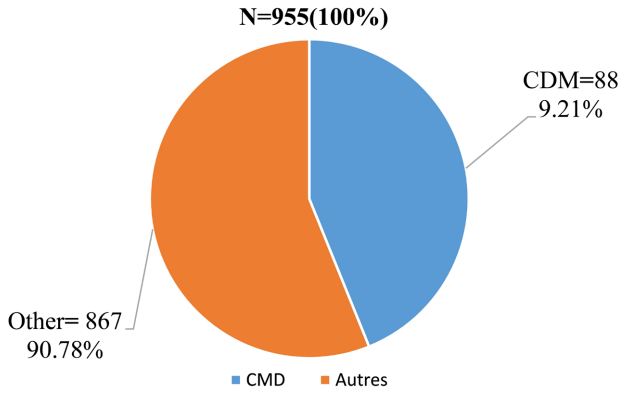

Figure 1. Hospital frequency.

Table 1. Distribution of patients according to socio-demographic characteristics.

characteristics	effective	Percentage
Age (years)		
18 - 29	4	4.54
30 - 41	6	6.81
42 - 53	7	7.95
54 - 65	56	63.63
66 - 77	12	13.61
Average 52.5 ± 18.5 years		
gender		
male	49	55.68
Féminin	39	44.31
sex ratio (M/F)	**1.25**	

Extremes 18 and 77 years.

Table 2. Distribution of patients based on functional signs.

Pattern	n = 88 (%)
dyspnea	88 (100)
stage-III	63 (71.59)
Stage IV	25 (28.40)
cough	30 (30.09)
fast heartbeat	27 (30.68)
chest pain	14 (15.90)

Table 3. Distribution of patients according to the physical signs of heart failure.

Physical signs		n = 88 (%)
Cardiac auscultation	tachycardia	40 (45.45)
	Gallop left	2 (2.27)
	Apexian systolic murmur	9 (10.22)
	Burst of pulmonary B2	8 (9.09)
Pulmonary auscultation	Bilateral crackling rails	79 (89.77)
	Left pleural effusion	13 (14.72)
Peripheral examination	LED	85 (96.59)
	hepatomegaly	25 (28.40)
	Hepatojugular reflux	22 (25)
	ascites	10 (11.36)
	Jugular turgor	8 (9.09)

LED: edema of the lower limbs.

Table 4. Distribution of patients based on radiographic signs.

Radiographic signs	n = 88 (%)
Cardiomegaly	81 (92.04%)
Vascular redistribution	15 (17.04%)
Pleural effusion	14 (15.90%)

Table 5. Distribution of patients according to electrocardiographic signs.

ECG Signs		n = 88 (%)
Conduction abnormality	AVB I	11 (12.5)
	LBBB	4 (11.36)
	LAH	11 (12.25)
	RBBB	9 (10.22)
	Bifascicular block	4 (11.36)
Irregular heartbeat	PAC	4 (11.36)
	PVC	9 (10.22)

Continued

	permanent AF	3 (3.40)
	Flutter	1 (1.13)
Hypertrophie cavitaire	LV	88 (100)
	LA	79 (89.77)
	RV	80 (90.90)

Table 6. Distribution of patients based on ultrasound abnormalities.

Echocardiographic signs		n = 88 (%)
Cavity dilation	LV	88 (100)
	LVEDD ± DS (mm)	65.9 ± 5.6 (57 - 82)
LVEF Alteration	Moderately reduced	21 (23.86)
	reduced	35 (51.13)
PAH		13 (14.72)
LV Intra thrombus		7 (7.95)
LVFP		67 (76.13)
mitral leakage		88 (100%)
pericardial effusion		23 (26.13)

RVEDD: moyenne: 29.6 ± 6.2 mm; extrêmes: 22 - 45 mm; LA: moyenne: 34.7 ± 8.4 cm^2; extrêmes: 20 - 54 cm^2; RA: moyenne: 23.3 ± 8.4 cm^2; extrêmes: 10 - 40 cm^2.

Table 7. Distribution of patients according to treatment.

Treatment	n = 88 (%)
Diuretic	86 (97.72)
ACEi/ARB	44 (50)
Beta-blocker	44 (50)
ACEi/ARB + AMR + Bêtabloquant	44 (50)
Spironolactone	44 (50)
AVK	8 (9.09)
DOA	7 (7.95)
Digitalic	4 (4.54)
Dobutamine	4 (4.54)
Dérivés nitrés	10 (11.36)
Sacubitril-Valsartan	7 (7.95)
Gliflozin	9 (10.22)

Table 8. Distribution of patients based on evolution.

Evolution	n = 88 (%)
Favorable	77 (87.5)
Deaths	9 (10.22)
Exit against medical advice	2 (2.27)

4. Discussion

The main limitation of our study was the lack of BNP and NT-proBNP data.

Indeed, NT-proBNP is a marker whose diagnostic and prognostic utility in heart failure is well documented. As such, its use should be integrated into daily medical practice.

In order to contribute to the study of knowledge on DCM, we conducted this study. The low socio-economic level of our patients, the difficulty in performing coronary angiography, the lack of BNP and NT pro BNP performance, and the under-equipment of the technical platform of the cardiology department were the main difficulties and limitations encountered.

The hospital prevalence of CDM in our series was 9.21%. It is lower than that of Ikama SM *et al.* [8] In the Congo in 2018, who had found a frequency of 32.1% in their study. In sub-Saharan Africa, based mainly on hospital data, DCM is one of the main causes of heart failure (HF), with a hospital frequency varying between 17% and 48% [14].

Men were the most represented in our study, at 55.68%. In the literature, it has been reported that CDM affects men three times more often than women [3].

The age group between 54 and 65 years was dominant with an average age of 52.5 ± 18.5 years (extremes: 18 and 89 years). This result is comparable to that of Ikama SM *et al.* [8] in Congo who found 52.2 17.1 years (extremes: 15 and 86 years). According to the literature, CDM can occur at any age, more frequently in young adults aged 30 - 40 years [3].

Dyspnea was present in all our patients. This result is comparable to that of Akue EG *et al.* [15] in Togo in 2011 who had found a frequency of 98.7% in their study. According to the literature, dyspnea is the most common but least specific clinical sign, often indicative of the disease [16] [17]. It is related to the increase in pulmonary capillary pressure due to left cardiac dysfunction. In our study, this dyspnoea was NYHA class III and IV in respectively 57 patients, or 64.77%, and 25 patients, or 28.40%. These results agree with those of Diallo I [18] in Guinea, in his thesis in 2015, who had found class IV dyspnea in 13 patients, or 52%, and class III in 8 patients, or 32%.

The cardiac physical signs were marked by tachycardia, which represented half of the cases, or 50%, compared to 63% in Coulibaly D [19]. We reported a left gallop and an aerial systolic breath in our patients with respective frequencies of 2.27% and 10.22%. Our result is in agreement with that of Coulibaly D [19].

The pulmonary physical signs were marked by crackles with 89.77%. This sign is related to an increase in pressure in the pulmonary circulation and especially in the pulmonary capillary [15].

The peripheral signs were marked by a predominance of edema of the lower limbs with 96.59% of cases, 28.40% of cases of hepatomegaly and 25% of cases of hepato-jugular reflux. Akue EG *et al.* [15] In Togo, in their study, 75.7% were found for edema of the lower limbs, 71.6% for hepatomegaly and 51.4% for hepatojugular reflux. These signs could be explained by an increase in the pressure in

the systemic venous circulation related to the decrease in venous return, itself secondary to the increase in pressure in the straight cavities [20].

Cardiomegaly in radiology was present in 92.04% of the cases in our study. This result is superposable to that of Ikama SM and coll. [8] who had reported 100% of cases.

The ECG revealed left ventricular hypertrophy in all our patients, *i.e.* 100%,

In our study, permanent atrial fibrillation accounted for 3.5% of cases, this result is different from that of Sana F *et al.* [21] who, in their study, had found 31.7% of cases in patients with idiopathic DCM.

LBBB is frequently associated with congestive heart failure [21]. In our study, we noted an LBB in 11.36% of our patients. This result is comparable to that of Murray-Thomas T [22] who, in his study, had found a LBBB in 19.2% of the patients.

CDM is a disease of the heart muscle characterized by uni or bi ventricular dilation associated with impaired systolic function [23].

Transthoracic echocardiography is the key test for positive diagnosis. She objectified a left ventricular dilation in all our patients with a median left ventricular end-diastolic diameter of 65.9 5.6 mm. This result is superposable with those from Ikama SM *et al.* [8] in the Congo who had an average LVEDD of 65.5 7.0 mm. This is explained by the fact that the main ultrasound manifestation of DCM is left ventricular dilation.

Systolic dysfunction with reduced LVEF was present in 35 (51.13%) of our patients. This result is comparable to that of Ikama SM *et al.* [8] who had found an LVEF at 33.4 6.8% on average. An intracavitary thrombus was found in (7.95%). This result is lower than that of Akue EG *et al.* [15] which, in their study, had found 13.5% of cases of intracavitary thrombus. The presence of this thrombus could be explained by the severity of the alteration in the systolic function of the LV.

The medical treatment included a loop diuretic in 97.72% of cases, an ACEi/ARB in 50% of cases, a beta-blocker in 40.90% of cases. The IMPROVE-HF study published in 2010 had identified 80% of patients under ACEi/ARB, 86% under beta-blockers, and 36% under MRA. Florianne B [24], in her thesis in 2016, had demonstrated that the presence of optimized neurohormonal triple therapy (ACEi/ARb, beta-blocker, MRA) was associated with a significant reduction in serious rhythmic complications and mortality, all causes combined, with a dose-protective effect dependent.

In our study, only 9 patients, or 10.22% and 7 (7.95%), benefited from gliflozins and Saccubitril-Valsartan, respectively. This result could be explained by the high cost and scarcity of these drugs in pharmacies. Indeed, inhibitors of sodium glucose transporter type 2 (dapagliflozin and empagliflozin) and sacubitril-valsartan have shown their ability to improve survival and prevent hospitalizations for heart failure [25].

In our series, 87.5% had a favorable evolution. Our result is comparable to that

of Akue EG *et al.* In Togo, in 2011, reported a favorable evolution in 90.5% of cases and a death rate at 9.5% [15].

5. Conclusions

This study shows that CDM is a common condition, and one of the main causes of heart failure. It affects both sexes, with a high proportion of patients classified as NYHA III/IV.

Under optimal medical treatment, the evolution is most often favorable. However, it is responsible for a non-negligible mortality.

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Authors' Contribution

All authors have read and approved the final and revised version of this article. Barry Ibrahima Sory, Camara Ousmane Mamadama, contributed to the design of the study and the discussion of the results.

Camara Ousmane Mamadama and Keita Fatoumata Binta contributed to the data collection and statistical data analysis of the study.

Conflicts of Interest

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

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