

Epidemiology and Management of Heart Failure in the Medicine Department of Tombouctou Hospital

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Abstract

Introduction: Heart failure is a complex syndrome and very frequently observed and secondary to the outcome of many advanced heart diseases. It is made up of a set of symptoms that reflect the tissue and visceral consequences of heart failure. **The objective** was to determine the hospital prevalence and to describe the management of heart failure in the medical department of Tombouctou hospital in Mali. **Methods:** This is a descriptive cross-sectional study with retrospective data collection, carried out over 24 months and involving the analysis of 266 records of patients hospitalized for heart failure. **Results:** The frequency of heart failure was 17.6% with a female predominance. The average age was 48 years with extremes of 16 and 90 years. Cardiovascular risk factors were dominated by high blood pressure with 38%. Global heart failure was the mode of discovery in 72.2% of cases. The etiologies were dominated by hypertensive dilated cardiomyopathy in 36.8% and peripartum cardiomyopathy in 32% of cases. The majority of our patients benefited from diuretic treatment, *i.e.* 95.9% frequency; with a favorable evolution in 96.2% of cases. We recorded 10 deaths, *i.e.* a lethality of 3.7%. We report some difficulties encountered during our security study because Tombouctou is a war zone and the lack of a technical platform for biology such as (BNP or NT-proBNP). **Conclusion:** Heart failure is a real public health problem. Its prevalence is increasing due to the aging of the population and especially the poor management of arterial hypertension in our context.

Keywords

Heart Failure, Epidemiology, Etiology, Treatment, Tombouctou Hospital

1. Introduction

Heart failure (HF) is a frequent and serious pathology. The European Society of Cardiology (ESC) in its 2021 recommendations, classifies heart failure into three phenotypes: heart failure with reduced ejection fraction (LVEF \leq 40%), heart failure with slightly reduced ejection fraction (LVEF included between 41% and 49%) and heart failure with preserved ejection fraction (LVEF \geq 50%) [1]. Worldwide, it affects approximately 15 million people, including approximately 5 million in the United States of America [2]. In Europe, it affects 1% to 2% of people between 50 and 59 years old and around 5% to 10% of people aged between 80 and 89 years old [3]. The incidence of this syndrome is only increasing and the number of heart failure patients is expected to double by 2040 [4]. As for Africa, it varies from one country to another, so it is 15% in Morocco [5], 37.7% in Senegal, 41.3% [6] in Mali [7]. Its epidemiology is little known in our country despite its considerable economic impact on the health system. Its prevalence continues to increase in our developing countries due, in particular, to arterial hypertension and coronary disease. In Tombouctou, no study was done on heart failure, hence the interest of our study. The objectives of this study were to determine the hospital prevalence and to describe the management of heart failure in the medical department of Tombouctou hospital in Mali.

2. Material and Method

This was a cross-sectional, descriptive study with a retrospective collection of data from January 2020 to December 2021 at the level of the medicine department of Tombouctou hospital, during which we included 266 patients with heart failure. The volunteers were patients hospitalized for heart failure. After obtaining informed consent, they were included in the study.

2.1. Collection of Data

Data collection was done from hospital records.

The data collected were socio-demographic, clinical (functional signs, physical signs), cardiovascular and para-clinical risk factors (trans-thoracic echocardiography, electrocardiogram and radiology).

2.2. Judging Criteria

Clinical: patients aged 16 and over who have presented symptoms suggestive of heart failure and who have been hospitalized in the department.

The positive diagnosis of heart failure was based on:

- A clinical syndrome of heart failure;

- An increase in left ventricular filling pressures with or without left ventricular dysfunction.

2.3. Operational Definitions

Heart failure (HF) is therefore defined by the inability of the heart muscle to provide normal systemic blood flow with a normal filling pressure regime.

Signs of heart failure (HF) were dyspnea (according to NYHA), crackles, left canter sound for left IC and hepatalgia, right canter sound, hepatomegaly, edema of the lower limbs, turgidity of the jugular veins for the right IC.

2.4. Variables

Data were collected using the medical observation record and recorded in a questionnaire. This questionnaire was written by the scientific manager and the principal investigator and included:

The statistical population studied was patients with clinical and echocardiographic heart failure.

The variables studied were:

- Quantitative included the age of patients, the seniority of hypertension and diabetes, the number of days of hospitalization and death.
- Qualitative included sex of patients, symptoms, description of echocardiographic doppler, electrocardiographic and biology abnormalities.

The questionnaire was subjected to a follow-up test on the recruitment procedure and data analysis.

Excel 2016 software was used for data entry and then analyzed by SPSS 24 software. The demographic, clinical and paraclinical characteristics of the patients were described. The qualitative data were presented by their proportion, expressed as a percentage, and the quantitative data by their median or their mean (plus or minus standard deviation).

2.5. Ethics

Informed consent was obtained with strict confidentiality.

3. Results

The general characteristics of the population studied:

Out of 1513 hospitalized patients, 266 had heart failure. The hospital prevalence was 17.6%. The average age was 48 years with extremes of 16 and 90 years (**Table 1**) the majority of our patients lived in the city of Tombouctou and surrounding (78.9%) with a low income level (80.4%). Chronic heart failure was the most common medical history (15.4%). Cardiovascular risk factors were dominated by arterial hypertension with 38% and tobacco with 13% (**Table 2**). The mode of discovery was the table of global heart failure (72.2%). The clinical symptomatology was dominated by dyspnea (89%), cough (73.6%) and edema of the lower limbs (46.6%). On chest X-ray, cardiomegaly was present in 17.7% of cases with vascular redistribution at the top in 12.7% of cases. On biology, anemia

(22.2%), moderate to severe renal insufficiency 29.7% and hypokalemia 12.8% were noted. Regular sinus tachycardia was the dominant abnormality on the electrocardiogram (46.6%) followed by left ventricular hypertrophy (33.8%), ischemia (22.2%) and complete arrhythmia by fibrillation atrial (16.5%). Transthoracic Doppler echocardiography found dilatation of the left ventricle in 70.3% of cases, with an average end-diastolic diameter of 60 mm associated with a drop in the systolic fraction of the left ventricle in 77.8% of cases, with a fraction of mean ejection in 39.9% and kinetic abnormalities in 16.2% of cases (Table 3).

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

Age	Sex			
	Male		Female	
	Effectives	%	Effectives	%
16 - 45 years	20	7.5	101	37.9
46 - 60 years	32	12	29	10.9
Age > 60 years	60	22.5	24	9
Total	112	42.1	154	57.9

Table 2. Distribution of patients according to cardiovascular risk factors.

Risk factors	Effectives	Percentage
Arterial hypertension	101	38%
Age \geq 60	50	19%
Tobacco	34	13%
Sedentary lifestyle	23	8.6%
Diabetes	16	6%
Obesity	2	0.7%

Table 3. Distribution of patients according to the results of cardiac Doppler ultrasound.

FEVG	Effectives	Percentage
Reduced	145	54.5%
Moderately reduced	62	23.3%
Preserved	59	22.2%
Total	266	100
Total	266	100

3.1. Etiological Factors of Heart Failure

Etiologies of heart failure were dominated by hypertensive dilated cardiomyopathy (36.8%), peripartum cardiomyopathy 32%, ischemic heart disease (16.2%),

restrictive heart disease (5.6%), hypertrophic heart disease (4.5%) and Chronic heart pulmonale (2.6%) (**Table 4**).

Table 4. Distribution of patients according to etiology of heart failure.

Etiology	Effectives	Percentage
Dilated cardiomyopathy	98	36.8%
Peripartum cardiomyopathy	85	32%
Ischemic heart disease	43	16.2%
Restrictive heart disease	15	5.6%
Hypertrophic heart disease	12	4.5%
Chronic heart pulmonale	7	2.6%
Mitral stenosis	3	1.1%
Others	3	1.1%

3.2. The Treatment

On admission, our patients received medical treatment as follows: diuretics (95.9%), beta-blockers (93.6%), ACE inhibitors (87.2%), heparins (69.2%), vitamin K antagonists (AVK) (22.6%), iron (12%), antirhythmics (8.3%), angiotensin II receptor antagonists (ARA II) (4.1), nitrate derivatives (1.1%), unfortunately none of our patients benefited from coronary angiography or resynchronization due to lack of technical facilities. The discharge treatment consisted of: loop diuretics (92.1%), beta-blockers (90.9%), ACE inhibitors (87.2%), anti-aldosterone (41.7%) and AVK (22.6 %).

3.3. Hospital Evolution

The average hospital stay was 5.7 days. The evolution was favorable in the majority of cases (96.2%). Complications included 15.4% complete arrhythmia due to atrial fibrillation, 7.1% intracavitary thrombus and 1.5% stroke and two cases of refractor heart failure. The rate of recurrence of hospitalization for decompensation was 12.8%.

We recorded 10 deaths, *i.e.* a lethality of 3.7% (**Table 5**).

Table 5. Distribution of patients according to evolution under treatment and length of hospital stay.

Duration of hospitalization	Evolution under treatment			Total
	Favorable without complication	Favorable with complication	Death	
1 - 7 days	163 (61.3%)	38 (14.3%)	8 (3%)	209 (78.6)
8 days - 1 month	28 (10.5%)	27 (10.1%)	2 (0.7%)	57 (21.4%)
Total	191 (71.8%)	65 (24.4%)	10 (3.7%)	266 (100%)

4. Discussion

Heart failure is an increasingly common condition in our context.

The prevalence of heart failure in our series is about 17.6% higher than that found in Morocco 15% [5]; but remains lower than those reported in other sub-Saharan African countries, in particular 25.6% from Togo [8], 37.7% from Dakar [6], 41.3% from Bamako [7], 45.9% of Congo Brazzaville [9] this difference can be explained by the financial and security difficulties preventing patients not residing in the city of Tombouctou from consulting.

The average age was 48 years, relatively young, lower than many studies carried out in Africa on heart failure (52.5) by Pio [8], (59) by Nana [10], (56.2) from Doulgou [11]. This average age is also lower than that found in France (79 years) by the RS2002-2 survey [12] and in the United States (72.4 years) by ADHERE [13]. The young age of the Malian population and the high frequency of peripartum heart disease could explain the young average age of our study unlike in Europe and the United States where the population is aging [4].

The female gender was noted in 57.9% of cases. This proportion was also found by Maiga AK [14], Traoré [15] in Mali and ADHERE in the United States [13], unlike Djamaal and Karima who noted a predominance of the male sex [16] [17]. Arterial hypertension was the most described risk factor 38% in line with most African but also African-American studies on heart failure [6] [13] [18] [19]. The most found mode of discovery was the table of congestive heart failure, *i.e.* 72.2% frequency in accordance with the rest of the literature [13] [19] [20] explaining the severity of the disease and due in part to the delay of support.

The origin of heart failure is mainly hypertensive in our series and that of Ikama [9], it constitutes a real public health problem. Unlike European, American and Thai studies, it is of ischemic origin [13]. This difference could be explained by the more efficient diagnostic means, but perhaps also by the change in lifestyle and urbanization.

Our patients did not benefit from biology such as BNP or NT-proBNP due to the lack of a technical platform. 29.7% of our patients had moderate to severe renal insufficiency, 22.2% had anemia, and 12.8% had hypokalaemia, in agreement with Jamal [16].

On chest radiography, cardiomegaly was present in 17.7% of cases, with signs of pulmonary overload in 12.7% of cases; lower than the 94.6% of Ouédraogo [21] and 86% of Jamal [16] due to the fact that all of our patients did not benefit from chest X-ray.

Left ventricular hypertrophy (33%) was the dominant anomaly on the electrocardiogram followed by complete arrhythmia by atrial fibrillation (16.5%) comparable to that of Ouédraogo [21] and Kambiré [22] in Burkina. It was higher than those of the SAFETY [23] and Jamal [16] studies. This ventricular hypertrophy is an adaptation mechanism of the heart at the onset of heart failure.

Cardiac Doppler ultrasound was performed in all our patients, because it is a key examination in the management of heart failure, whether at the time of diagnosis of the disease or during follow-up. The mean LVEF in our study was

39.9% similar to those reported by Tougouma (32%) [24], Jamal (36%) [16] and Maggioni (38%) [25]. Severely impaired LVEF and the presence of other abnormalities testify to the advanced stage of heart failure in our context.

The clinical benefit of diuretic administration in AHF is universally accepted, loop diuretics are the first choice in AHF [23] [24]. The frequency of use of diuretics in our study is consistent with that reported in the literature where diuretics were the first molecules prescribed in AHF (89.7% to 90%) in the literature [13] [26] [27]. This is due to the clinical stage of the disease with water and sodium retention.

We recorded a low case fatality rate of 3.7% compared to most of the literature due to the small sample size [27].

The rate of recurrence of hospitalization recorded in this series was 12.8% lower than that of the literature of 22% to 30% [13] [20] [28] [29].

5. The Limits of Our Study

The small size of our sample and the results obtained could therefore not be extrapolated to the general population; Non-production of BNP or NT-proBNP due to the lack of a technical platform; financial difficulties and the security situation linked to the rebellion in the area prevented patients from being consulted at the hospital.

6. Conclusion

Heart failure is a real public health problem. Its prevalence is increasing due to the aging of the population and especially the poor management of arterial hypertension in our country. The etiology of heart failure in our series is dominated by hypertensive heart disease and peripartum cardiomyopathy. Early diagnosis and management of hypertension will reduce the prevalence of heart failure.

7. Recommendations

We focus on sensitizing the population and health workers on the regular and correct monitoring of arterial hypertension; prenatal consultation.

At the level of political decision-makers: Reinforce accessibility to care.

Research: We believe further research is needed nationally and in order to identify the characteristics of this disease.

Conflicts of Interest

The authors declare no conflict of interest.

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