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Comparative Analysis of the Epidemiological and Evolutionary Profile of Patients with Dilated Cardiomyopathy and Other Causes of Heart Failure

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Abstract

Introduction*: Dilated cardiomyopathy (DCM) is a major cause of heart failure, characterized by left ventricular dilation and reduced systolic function. It is a frequent cause of heart transplantation. This study aims to assess the epidemiological, clinical, and evolutionary profile of patients with DCM at Ibn Rochd University Hospital, Casablanca, and compare them to those with other causes of heart failure.*

Objective : *The objective of this study is to compare the clinical and evolutionary characteristics of patients with DCM to those with ischemic, hypertensive, or valvular heart failure in order to evaluate differences in termes of comorbidities, decompensation events, and mortality.*

Methodology: *This retrospective study included 1,230 patients treated for heart failure between 2020 and 2023, of whom 483 (39%) had DCM. Patients were over 18 years old and had a left ventricular ejection fraction (LVEF) below 40%. Comparative statistical analysis was performed between DCM patients and those with other etiologies using Student's t-tests and chi-square tests, with significance set at $p < 0.05$.*

Results: *DCM patients had an average age of 63 years, and 58% were male. The mean LVEF was 20.8%, with 75% of DCM patients having an LVEF below 30%. Regarding symptoms, 50% of DCM patients were in NYHA Class II. The cardiac decompensation rate was 25% among DCM patients, with a hospitalization rate of 30% and a five-year mortality rate of 12%.*

Discussion: *DCM represents a significant proportion of heart failure cases at Ibn Rochd University Hospital and is associated with an increased risk of decompensation and hospitalization. Despite the widespread use of modern treatments, DCM remains a severe disease requiring optimized management to improve patient prognosis.*

Conclusion: *This study highlights the severity of DCM compared to other forms of heart failure, emphasizing the need for early, multidisciplinary management to reduce the risks of decompensation and improve survival rates among DCM patients.*

Keywords: Epidemiological, Heart Failure, Cardiomyopathy

Introduction

Dilated cardiomyopathy (DCM) is a disease of the heart muscle characterized by dilation of the heart chambers, particularly the left ventricle, and impaired systolic function. It is the most common form of non-ischemic cardiomyopathy, accounting for approximately 60% of non-ischemic cardiomyopathies (1). The condition leads to a progressive reduction in the heart's contractile capacity, resulting in decreased left ventricular ejection fraction (LVEF) and the development of heart failure [1]. DCM is a major cause of heart failure worldwide, with an estimated incidence of 5 to 8 cases per 100,000 people per year, and is one of the leading indications for heart transplantation [2].

The causes of DCM are diverse and include idiopathic, familial, toxic (e.g., alcohol, chemotherapy), infectious (e.g., viral myocarditis), and autoimmune forms. Approximately 30% to 40% of DCM cases are familial, suggesting a genetic component [2]. Clinically, DCM manifests with heart failure symptoms such as dyspnea, edema, and fatigue, and can lead to serious complications like ventricular arrhythmias, thromboembolism, or sudden death [3].

In terms of prognosis, DCM remains a serious disease. The five-year mortality rate for patients with severe DCM ranges from 20% to 50%, depending on the severity of cardiac dysfunction

and associated comorbidities. However, the introduction of modern treatments such as beta-blockers, angiotensin-converting enzyme inhibitors (ACE inhibitors), angiotensin receptor blockers (ARBs), and implantable devices (defibrillators) has significantly improved the prognosis [3].

In Morocco, data on the epidemiology and evolution of DCM patients are scarce. This study aims to fill this gap by providing a detailed assessment of the epidemiological, clinical, and evolutionary profile of DCM patients followed at Ibn Rochd University Hospital in Casablanca [4]. It focuses on associated comorbidities, rates of heart failure decompensation, hospitalizations, and medium-term mortality to better understand the characteristics of this population and improve management.

Objective of the Study

This retrospective study aims to evaluate the epidemiological, clinical, and evolutionary profile of patients with dilated cardiomyopathy (DCM) at Ibn Rochd University Hospital in Casablanca and compare them with all patients treated for heart failure. The main objective is to determine the specific characteristics of DCM patients and analyze their evolution compared to other forms of heart failure, considering comorbidities, complications, and hospitalizations.

Methodology

Study Population

The study included 1,230 heart failure patients followed at Ibn Rochd University Hospital between January 2020 and December 2023. Of these, 483 were diagnosed with dilated cardiomyopathy (DCM), representing about 39% of all heart failure patients. The other causes of heart failure included ischemic, valvular, and hypertensive etiologies.

Inclusion Criteria

- Patients aged 18 years and older.
- Confirmed diagnosis of dilated cardiomyopathy based on clinical and echocardiographic criteria, including left ventricular ejection fraction (LVEF) below 40% and left ventricular dilation.
- Medical follow-up at Ibn Rochd University Hospital for at least six months.
- Heart Failure patients with ischemic, hypertensive, or valvular etiology were included for comparison.

Exclusion Criteria

- Patients with acute heart failure due to a reversible cause (e.g., acute myocardial infarction, acute myocarditis) not related to chronic disease.
- Patients with documented coronary artery disease on coronary angiography or imaging, indicating an ischemic etiology of heart failure.
- Patients with severe valvular disease requiring immediate surgical correction.
- Patients with medical follow-up less than six months or lost to follow-up before the end of the study period.

Statistical Analysais

The Data Analysis Was Conducted in Two Stages

1.Descriptive analysis of demographic (age, sex), clinical (comorbidities, ejection fraction, NYHA classification), and evolutionary variables (decompensation, hospitalizations, mortality). Results are presented as means, percentages, and standard deviations.

2.Statistical comparison between patients with DCM and those with other etiologies of heart failure. Student's t-tests were used for continuous variables (age, LVEF), and chi-square tests were used for qualitative variables (comorbidities, NYHA, decompensation). A significance threshold of $p < 0.05$ was applied for all analyses.

Results

The study included a total of 1,230 patients with heart failure, of which 483 (39%) had dilated cardiomyopathy (DCM). The other heart failure etiologies included ischemic causes (42%), hypertensive causes (12%), and valvular causes (7%). Among DCM patients, the mean age was 63 years, with 279 males (58%) and 204 females (42%). Regarding comorbidities, 33% of patients had hypertension (HTN), 24% had diabetes, and 12% had dyslipidemia. Additionally, 23% of patients were smokers, and 14% had a history of alcoholism. Chronic kidney disease was present in 20% of patients.

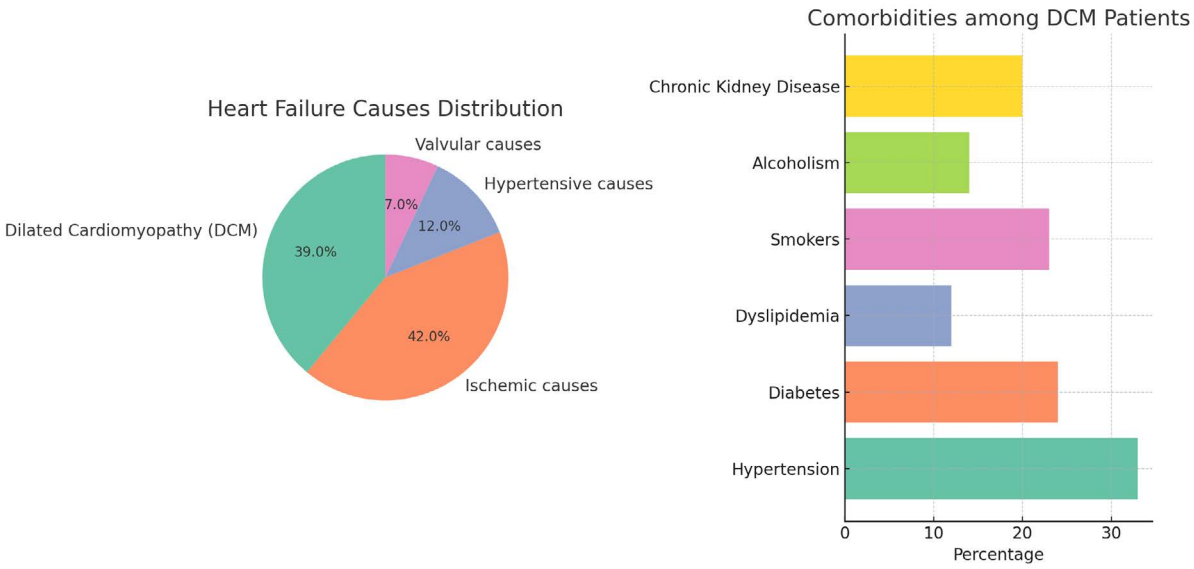

Figure 1

The mean left ventricular ejection fraction (LVEF) among DCM patients was 20.8%, with 75% of patients having an LVEF below 30%. Clinically, most DCM patients were in NYHA Class II (50%), followed by NYHA Class III (35%) and NYHA Class IV (15%). The most frequently reported signs of heart failure were lower limb edema (44% of patients), exertional dyspnea (76%), and orthopnea episodes (32%). The most common type of cardiac decompensation in DCM patients was global decompensation (45%), followed by right-sided (35%) and left-sided (20%) decompensation.

Category	Percentage/Mean
Mean Left Ventricular Ejection Fraction (LVEF)	20.8%
Percentage of patients with LVEF below 30%	75%
NYHA Class II	50%
NYHA Class III	35%
NYHA Class IV	15%
Lower limb edema	44%
Exertional dyspnea	76%
Orthopnea episodes	32%
Global cardiac decompensation	45%
Right-sided cardiac decompensation	35%
Left-sided cardiac decompensation	20%

Figure 2

Regarding treatment, 85% of DCM patients were on beta-blockers, 78% were receiving ACE inhibitors or angiotensin receptor blockers (ARBs), and 65% were on aldosterone antagonists. Diuretics were prescribed to 70% of patients. Compared to DCM patients, those with ischemic heart failure ($n = 517$) were generally older (mean age 69 years, $p < 0.001$) and had a higher prevalence of comorbidities, such as hypertension (45%, $p = 0.02$) and diabetes (36%, $p = 0.01$). The mean LVEF in the ischemic group was higher at 35% ($p < 0.001$). Patients with hypertensive heart failure ($n = 147$) had a mean age similar to DCM patients (63 years, $p = 0.56$) but had a higher mean LVEF of 38% ($p < 0.001$).

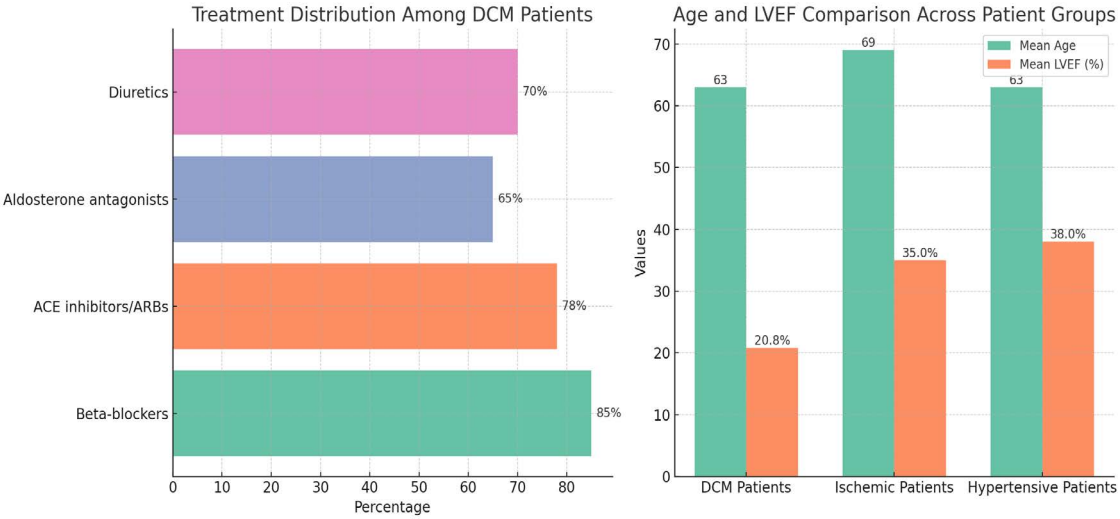

Figure 3

In terms of clinical outcomes, 25% of DCM patients experienced at least one episode of heart failure decompensation, compared to 20% of ischemic patients ($p = 0.03$) and 15% of hypertensive patients ($p = 0.001$). The hospitalization rate for heart failure was 30% in DCM patients, compared to 25% in ischemic patients ($p = 0.04$) and 18% in hypertensive patients ($p = 0.01$). The five-year mortality rate for DCM patients was 12%, compared to 15% for ischemic patients ($p = 0.08$) and 10% for hypertensive patients ($p > 0.05$).

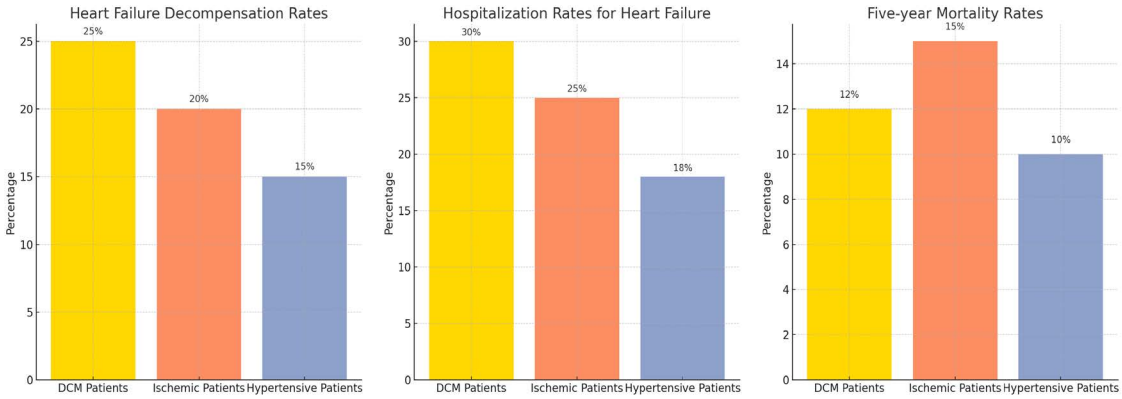

Figure 4

Discussion

The results of this study reveal that dilated cardiomyopathy (DCM) accounts for a significant proportion of heart failure cases at Ibn Rochd University Hospital, representing 39% of all patients treated. This proportion aligns with international estimates, where DCM accounts for between 30% and 60% of non-ischemic heart failure cases [1]. DCM is defined by left ventricular dilation and reduced systolic function in the absence of significant coronary, valvular, or hypertensive causes. It is one of the leading causes of heart failure globally, with an incidence estimated at 5 to 8 cases per 100,000 inhabitants per year, and is a frequent indication for heart transplantation in severe forms [2, 3].

The mean age of DCM patients in this study was 63 years, consistent with international data, where the average age typically falls between 55 and 65 years [4]. Studies also report a male predominance in DCM, which is confirmed by our findings, with 58% of patients being male, a typical gender distribution for this condition [4]. This male predominance may be due to a higher susceptibility to idiopathic and toxic forms of DCM in men [4].

Regarding comorbidities, 33% of DCM patients had hypertension, and 24% had diabetes, slightly lower rates than those observed in ischemic heart failure. These findings align with the literature, where ischemic heart failure is generally more associated with classic cardiovascular risk factors such as hypertension and diabetes [6]. Chronic kidney disease was present in 20% of DCM patients in our cohort, a factor known to worsen morbidity and increase long-term mortality risk. Studies have shown that chronic kidney disease is common in DCM, with a prevalence of up to 30% depending on the severity of cardiac dysfunction [7].

The mean left ventricular ejection fraction (LVEF) among DCM patients in this study was 20.8%, indicating severe systolic dysfunction. This result is consistent with other studies, where the LVEF in DCM patients is frequently below 30%, highlighting a significant inability of the left ventricle to maintain adequate cardiac output [5, 6]. In contrast, ischemic heart failure patients had a higher mean LVEF (35%), typical of cases where systol-

ic dysfunction is less pronounced but exacerbated by recurrent ischemic events [7].

Clinically, the majority of DCM patients were in NYHA Class II (50%) and Class III (35%), indicating moderate to severe functional limitations. These results are consistent with international studies, which report that DCM patients are often classified in advanced functional stages at diagnosis due to the insidious nature of the disease [7,8]. International guidelines, particularly those from the European Society of Cardiology (ESC), emphasize the importance of early DCM management to prevent progression to NYHA Class III and IV, where morbidity and mortality significantly increase [8].

The clinical course of DCM patients in this study shows a high rate of heart failure decompensation (25%), higher than that observed in ischemic (20%) and hypertensive (15%) heart failure patients. This result aligns with international reports, where decompensation rates in DCM patients range from 20% to 30%, reflecting the severity of left ventricular dysfunction and the clinical fragility of these patients [3]. Global decompensation was the most common type in DCM patients (45%), followed by right- and left-sided decompensation. These episodes are often related to systemic and pulmonary congestion and frequently require hospitalization.

The hospitalization rate for heart failure in DCM patients in this study was 30%, a figure comparable to international registries, where hospitalization rates can reach 35% in severe DCM patients [9]. In contrast, hypertensive and ischemic patients had lower hospitalization rates, confirming that DCM is often associated with more frequent hospitalizations due to the severity of systolic dysfunction [10]. According to ESC and ACC/AHA guidelines, repeated hospitalizations for heart failure are a marker of poor prognosis and require aggressive treatment optimization to reduce recurrence risks [3].

The five-year mortality rate for DCM patients was 12%, relatively low compared to historical studies reporting mortality rates ranging from 20% to 50% in severe DCM forms (1, 5). This lower rate may be explained by the widespread use of beta-blockers (85% of DCM patients), ACE inhibitors/ARBs (78%), and aldosterone antagonists (65%), in line with modern therapeutic recommendations [6]. These treatments have demonstrated their ability to improve ventricular function, reduce hospitalizations, and lower mortality [8]. In DCM, implantable devices, such as implantable cardioverter defibrillators (ICDs) and pacemakers, also play a key role in preventing death from ventricular arrhythmias, although their use was not specifically evaluated in this study [10].

Conclusion

This retrospective study has provided an analysis of the epidemiological, clinical, and evolutionary profile of patients with dilated cardiomyopathy (DCM) at Ibn Rochd University Hospital in Casablanca, comparing them to other causes of heart failure. The results indicate that DCM represents a significant proportion of heart failure cases, with younger patients, more severe systolic dysfunction, and a higher risk of decompensation and hospitalization. These findings align with international data, highlighting the severity of DCM compared to ischemic and hypertensive forms of heart failure.

Despite therapeutic advances, particularly with the use of beta-blockers, ACE inhibitors/ARBs, and aldosterone antagonists, DCM remains associated with significant mortality and morbidity, with frequent episodes of heart Failure decompensation [5-7]. However, the lower mortality rate observed in this study compared to historical data reflects the effectiveness of current treatments, though further efforts are needed to optimize patient management.

The main contribution of this study lies in its detailed evaluation of DCM in a Moroccan population, where data remains scarce. These results underscore the importance of proactive, multidisciplinary management in line with international recommendations to improve the prognosis of DCM patients. Further studies are needed to better understand the impact of advanced treatments, such as implantable devices, and explore innovative strategies to further reduce mortality and improve the quality of life for these patients.

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