

Clinical aspects of heart failure in young adults

Aspectos clínicos de la insuficiencia cardiaca en adultos jóvenes

Aspectos clínicos da insuficiência cardíaca em adultos jovens

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ABSTRACT

Introduction: recent studies indicate that the incidence of heart failure among the young population has increased. The etiological causes of this disease vary and differ substantially from those of older adults, and their mortality is higher, compared to the latter. **Objective:** to describe clinical aspects of young patients with heart failure at the Hospital General Docente “Dr. Agostinho Neto” in Guantánamo, Cuba, in the period 2022-2023. **Method:** descriptive and cross-sectional study carried out at said institution, with a universe made up of 65 young patients discharged with a diagnosis of heart failure (N = 65). The variables studied were: age group, sex, risk factors and comorbidities, left ventricular ejection fraction, etiology and status at discharge. **Results:** males predominated with 72.4%, age groups 45-50 years (21.54%) and

51-55 years (35.38%) were the predominant ones. Among the risk factors and comorbidities, the most frequent was arterial hypertension in 63.07%, 61.54% of the patients had heart failure with reduced left ventricular ejection fraction. The main etiological cause was ischemic with 53.81%. Deaths constituted 32.39%. **Conclusions:** males and older age groups predominate. The burden of risk factors and comorbidities is high. Patients with reduced left ventricular ejection fraction predominate and mortality is high.

Keywords: heart failure; young adults; mortality



RESUMEN

Introducción: recientes estudios indican que la incidencia de insuficiencia cardíaca entre la población joven se ha incrementado. Las causas etiológicas de esta enfermedad son variadas y difieren sustancialmente de los adultos mayores, así como su mortalidad es superior comparada con estos últimos. **Objetivo:** describir aspectos clínicos de los pacientes jóvenes con insuficiencia cardíaca en el Hospital General Docente “Dr. Agostinho Neto” de Guantánamo, Cuba, en el periodo 2022 – 2023. **Método:** estudio descriptivo y transversal realizado en dicha institución, con un universo conformado por los 65 pacientes jóvenes egresados con diagnóstico de insuficiencia cardíaca (N = 65). Las variables estudiadas fueron: grupo etario, sexo, factores de riesgo y comorbilidades, fracción eyección ventrículo izquierdo, etiología y estado al egreso. **Resultados:** predominó el sexo masculino con un 72,4 %, los grupos etarios de 45-50 años (21,54 %) y de 51-55 años (35,38 %) fueron los predominantes. Entre los factores de riesgo y comorbilidades, el más frecuente fue la hipertensión arterial en el 63,07 %. El 61,54 % de los pacientes tenía una insuficiencia cardíaca con fracción de eyección del ventrículo izquierdo reducida. La principal causa etiológica fue la isquémica con el 53,81 %. Los fallecidos constituyeron el 32,39 %. **Conclusiones:** predominan el sexo masculino y los grupos etarios de mayor edad. La carga de factores de riesgo y comorbilidades es elevada. Predominan los pacientes con fracción de eyección del ventrículo izquierdo reducida y la mortalidad es alta.

Palabras clave: insuficiencia cardíaca; adultos jóvenes; mortalidad

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RESUMO

Introdução: estudos recentes indicam que a incidência de insuficiência cardíaca na população jovem tem aumentado. As causas etiológicas desta doença são variadas e diferem substancialmente daquelas dos idosos, bem como a sua mortalidade é superior em relação a estes últimos. **Objetivo:** descrever aspectos clínicos de pacientes jovens com insuficiência cardíaca atendidos no Hospital General Docente “Dr. Agostinho Neto” de Guantánamo, Cuba, no período 2022 – 2023. **Método:** estudo descritivo e transversal realizado na referida instituição, com universo composto por 65 pacientes jovens formados com diagnóstico de insuficiência cardíaca (N = 65). As variáveis estudadas foram: faixa etária, sexo, fatores de risco e comorbilidades, fração de ejeção do ventrículo esquerdo, etiologia e situação na alta. **Resultados:** predominou o sexo masculino com 72,4%, predominando as faixas etárias de 45 a 50 anos (21,54%) e 51 a 55 anos (35,38%). Dentre os fatores de risco e comorbilidades, o mais frequente foi a hipertensão arterial em 63,07%. 61,54% dos pacientes apresentaram insuficiência cardíaca com redução da fração de ejeção do ventrículo esquerdo. A principal causa etiológica foi isquêmica com 53,81%. Os falecidos constituíam 32,39%. **Conclusões:** predomina o sexo masculino e faixas etárias mais avançadas. A carga de fatores de risco e comorbilidades é alta. Predominam pacientes com fração de ejeção ventricular esquerda reduzida e a mortalidade é elevada.

Palavras-chave: insuficiência cardíaca; adultos jovens; mortalidade



INTRODUCTION

Heart failure (HF) is a relevant clinical and public health problem affecting approximately 64.3 million people worldwide,⁽¹⁾ associated with high mortality; approximately 30% to 50% at 3 years and 50% to 75% at 5 years.⁽²⁾

Recent studies indicate that the burden of HF among the young population has increased,^(3,4,5,6) with the proportion of patients ≤ 50 years doubling from 3% in 1995 to 6% in 2012 ($P < 0.0001$).⁽⁴⁾ A recent cohort study using French national database showed a trend of decreasing incidence of HF in the general population, while significantly increasing in adults ≤ 50 years of age ($P < 0.01$).⁽⁷⁾

The etiologic causes of HF in young people are varied and differ substantially from older adults; the main causes of HF in young people include cardiomyopathies related to genetic factors, premature myocardial ischemic damage associated with risk factors development of atherosclerotic lesion, response to different cardiotoxic agents, and myocarditis.⁽⁸⁾

HF mortality is higher in younger adults compared to older adults; Swedish researchers through data from the Swedish Heart Failure Register merged with National Patient and Cause of Death Registers from 2003 to 2014, reported a mortality five times higher in those younger than 55 years compared to those equal to or older than 55 years.⁽⁶⁾

There are few investigations that address the epidemiological study of HF in Cuba found in the review conducted by the authors of the study Global burden of heart failure: a comprehensive and updated review of epidemiology of 2022.⁽²⁾

Guantánamo as a province lacks studies that address HF; for this reason, the authors have proposed as an objective: to describe clinical aspects of young patients with heart failure in the General Teaching Hospital "Dr. Agostinho Neto" of Guantánamo in the period 2022 - 2023.

METHOD

A descriptive and transversal study was carried out with the objective of describing clinical aspects in young patients with heart failure in the General Teaching Hospital "Dr. Agostinho Neto" of Guantánamo in the period 2022 - 2023.

The universe was constituted by all 65 young patients with a diagnosis of heart failure ($N = 65$) discharged from the General Teaching Hospital "Dr. Agostinho Neto" of Guantánamo during the study period who met the inclusion criteria designed.

Patients between 18 and 55 years of age were considered young adults.

Inclusion criteria: those patients with clinical diagnosis of heart failure and echocardiogram performed between 18 and 55 years of age



Exclusion criteria: all patients in whom the clinical history was not sufficient to obtain primary information

The variables analyzed were age group, sex, clinical variables (risk factors and comorbidities, etiology and status at discharge).

The variable left ventricular ejection fraction (LVEF) was defined as:

- a) Heart failure with preserved ejection fraction (HFpEF): LVEF \geq 50%
- b) Heart failure with mid-range ejection fraction (HFmrEF): LVEF 41% - 49%
- c) Heart failure with reduced ejection fraction (HFrEF): LVEF \leq 40%

Definitions in the study

HF was defined as a clinical syndrome with symptoms and/or signs evidencing pulmonary or systemic congestion caused by cardiac structural damage and/or functional abnormality. Arterial hypertension (HT) was defined by blood pressure \geq 140/90mmHg and/or antihypertensive treatment.

Diabetes mellitus (DM) was defined by clinical diagnosis (fasting plasma glycemia \geq 7 mmol/L, random plasma glucose \geq 11.1 mmol/L, hemoglobin A1c \geq 6.5%, and/or antidiabetic treatment).

Obesity was defined according to standard body mass index (BMI) limits: underweight (BMI $<$ 18.5 kg/m²), overweight (BMI \geq 25 kg/m²), and obese (BMI \geq 30 kg/m²).

Heavy alcohol consumption was defined as five or more alcoholic drinks for men or four or more alcoholic drinks for women on the same occasion on at least one day per month.

Smoker was defined as a person who smokes or has smoked any number of cigarettes daily during the last month.

HF of ischemic cause was defined by documentation of ischemic heart disease including angiographically verified presence of significant coronary obstruction, history of previous myocardial infarction, previous revascularization, or electrocardiographic or echocardiographic evidence of ischemia.

Hypertensive HF was defined by the presence of symptoms and signs of HF in a patient with a history of hypertension and elevated systolic blood pressure at presentation in the absence of acute coronary syndrome or a history of it, and hemodynamically significant congenital or valvular heart disease.

Dilated cardiomyopathy was defined by the combination and systolic dysfunction of the left ventricle or both ventricles of idiopathic or specific origin.



The source of information used was secondary: medical records. An Excel database with the study variables was created and exported to the SPSS version 26 program, with which all the statistical processing was performed. The results of the univariate analysis for the qualitative variables were expressed in absolute and relative frequencies (%).

The research was approved by the research commission of the scientific council of the General Teaching Hospital "Dr. Agostinho Neto", for its pertinence, respect for ethical regulations and methodological design. The bioethical principles were complied with, complying with the Declaration of Helsinki.

The source for obtaining the information was the clinical history; at no time was there physical contact with the patients, so informed consent was not required; nevertheless, the confidentiality of the data was guaranteed at all times.

RESULTS

Table 1 shows the distribution of patients according to age group and sex, showing a predominance of the male sex: 47 patients, for 72.30 %; while the female sex: 18 patients, representing 27.70 %. The male sex predominated in all age groups. Most of the patients, both male and female, were in the age groups 46-50 years (14; 21.54 %) and 51-55 years (23; 35.38 %).

Table 1: Patients according to age group and sex

Age group	Male		Female		Total	
	No.	%	No.	%	No.	%
18 – 30	3	4,63			3	4,63
31 – 35	5	7,69	1	1,54	6	9,23
36 – 40	8	12,30	2	3,08	10	15,38
41 – 45	7	10,76	2	3,08	9	13,84
46 – 50	10	15,38	4	6,16	14	21,54
51 – 55	14	21,54	9	13,84	23	35,38
Total	47	72,30	18	27,70	65	100,00

Source: medical records

According to risk factors and comorbidities, AHT was the most frequent with 41 patients (63.06 %), followed by smoking with 29 patients (44.61 %). Obesity was present in 24 patients (36.92 %), while 23 patients (35.39 %) were diabetic. Atrial fibrillation (AF) was found in 14 patients representing 21.53 % of the total (Table 2).



Table 2: Patients according to risk factors and comorbidities

Risk factor and comorbidities	No.	%
Arterial hypertension	41	63,07
Diabetes mellitus	23	35,38
Atrial fibrillation	14	21,53
Valvular heart disease	2	3,08
Cancer	7	10,76
Stroke	4	6,16
Obesity	24	36,92
Smoking	29	44,61
Excessive alcohol consumption	7	10,76
Use of anticancer drugs	4	6,16

Source: medical records

Table 3 shows the distribution of patients according to LVEF value. From a total of 40 patients (61.54 %) presented the HFrEF phenotype, followed by the HFpEF phenotype with 14 patients (21.54 %), while only 11 patients represented had the HFmrEF phenotype (16.92 %).

Table 3: Young patients with heart failure according to LVEF

FEVI	No.	%
HFpEF	14	21,54
HFmrEF	11	16,92
HFrEF	40	61,54
Total	65	100,00

Source: medical records

LVEF: left ventricular ejection fraction; HFpEF: heart failure with preserved ejection fraction; HFmrEF: heart failure with mid-range ejection fraction; HFrEF: heart failure with reduced ejection fraction.

In more than half of the patients (35; 53.81 %) the etiology was ischemic. Most of the patients with ischemic HF were in the 46-50 age group, with 7 patients (10.76 %) and the 51-55 age group with 16 patients (24.60 %), representing 35.36 % of all the patients studied.

Hypertensive HF, with 13 patients (20.03 %) was the second most frequent etiology in the investigation. In 11 patients, representing 16.92 % of all patients enrolled in the study, the etiological diagnosis was dilated cardiomyopathy; of the 11 patients with dilated cardiomyopathy, 8 were 40 years of age or younger and 3 were older than 40 years of age. In only 6 patients (9.24%) did HF present another etiological cause (Table 4).



Table 4: Patients according to age group and etiology

Age group	Etiology							
	Ischemic		Dilated cardiomyopathy		Hypertensive HF		Others	
	No.	%	No.	%	No.	%	No.	%
18 – 30	-	-	2	3,08	-	-	1	1,54
31 – 35	-	-	3	4,63	2	3,08	1	1,54
36 – 40	5	7,69	3	4,63	2	3,08	2	3,08
41 – 45	7	10,76	-	-	-	-	-	-
46 – 50	7	10,76	2	3,08	3	4,63	2	3,08
51 – 55	16	24,60	1	1,54	6	9,24	-	-
Total	35	53,81	11	16,92	13	20,03	6	9,24

Source: medical records

Figure 1 shows the distribution of patients according to discharge status. In the study, 44 patients were discharged alive (67.69 %), while 21 patients were discharged deceased, which represented 32.39 %.

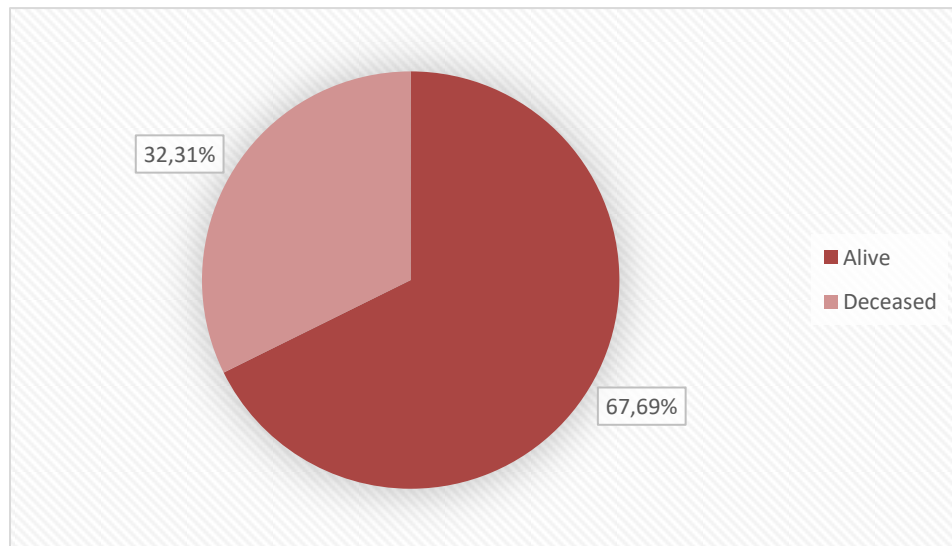


Fig 1: Young patients with heart failure according to discharge status

DISCUSSION

The incidence of HF increases with age from ~0.07% at 18 years of age to 1.31% at 50 years of age, similarly in both sexes, but always higher in male patients than in female patients in all age groups studied, particularly, in men aged 36 to 50 years.⁽⁷⁾ Similarly, the CHARM study⁽⁹⁾ found male predominance in all age groups.

The predominance of the male sex in young adults may be related to the higher incidence of ischemic heart disease in this age range and to the fact that women of childbearing age have estrogenic protection against the development of ischemic heart damage.



In the study by Barasa et al.⁽³⁾ 31% of patients between 18 and 54 years of age were female, and the number of women with HF increased with age, with the highest proportion in the oldest age group,⁽⁹⁾ a result that coincides with that obtained in the present study.

HF patients aged 50 years or younger have more major risk factors for HF than estimated in the young general population in France and have high rates of traditional risk factors for ischemic heart disease, including obesity, smoking, HT, and DM⁽⁷⁾. Rates of risk factors increase with age⁽⁹⁾ and confer a higher relative risk of developing HF in patients <55 years compared with older patients.⁽¹⁰⁾ Comorbidities play a role in the pathogenesis of the HF syndrome, or act as a perpetuating factor; they are associated with increased severity of HF symptoms, impaired quality of life, and worse prognosis.⁽¹¹⁾

Arterial hypertension is one of the most significant risk factors related to the development of HF; it is associated with a 3.2-fold increase in the future risk of heart failure in young people, (95 % already 1.81; P=0.003).⁽¹⁰⁾ The percentage of hypertensive patients in the study is higher (63.06%) than that reported by Jainet al.⁽⁵⁾ 49.1 % and Basic, et al.⁽⁶⁾: 31.6 %.

Smoking showed a behavior similar to that obtained by Basic et al.⁽⁶⁾ and slightly lower than that shown by Jainet al.⁽⁵⁾. The result obtained in relation to the presence of obesity in the study is similar to that reported by Jainet al.⁽⁵⁾ Lecoeuret al.⁽⁷⁾, found between the years 2013-2018 a significant increase in smoking and obesity in patients aged 18 to 50 years with HF.

The relationship between HF and diabetes is reciprocal, patients with HF have a higher risk of diabetes and vice versa, diabetes is a higher risk factor for new-onset HF.⁽¹²⁾ The percentage of diabetic patients in the investigation (35.39 %) is higher than reported by Barasa et al.⁽³⁾: 14 % and Basic et al.⁽⁶⁾: 16.7 %. AF showed a behavior similar to that reported by other investigators.⁽⁶⁾

Similar to that reported by different authors, the investigation showed a high percentage of risk factors and comorbidities, including obesity, smoking, hypertension and DM⁽⁷⁾, which increase with age.⁽⁹⁾

The analysis of LVEF behavior in the study was similar to that obtained by Swedish researchers⁽⁶⁾ with data from the Swedish Heart Failure, National Patient, Cause of Death and Population Registers, which showed a predominance of patients with HF_rEF (67.9%), while patients with HF_pEF represented only 9.5%, similar to that obtained by Tromp⁽¹⁰⁾, 66% of patients classified as HF_rEF and 32% as HF_pEF (P<0.001).

The ischemic etiology was significantly higher than that reported by Lecoeuret al.⁽⁷⁾: 20 %, Barasa et al.⁽³⁾: 21 % and Basic et al.⁽⁶⁾: 25.9 %. Similarly, Domengé et al.⁽⁸⁾ and Lecoeuret al.⁽⁷⁾ reported a predominance of ischemic etiology in older age groups. The proportion of patients with ischemic heart disease increases with age.⁽⁹⁾ Young people (≤55 years) with HF of ischemic cause often have high rates of classical atherosclerotic damage risk factors: HT, DM, smoking or obesity.⁽⁸⁾ The high number of patients with HF of ischemic cause referred in the study could be related to the high numbers of patients with HT, DM, smoking and obesity.



Hypertensive heart disease is currently the second leading cause of HF.⁽¹³⁾ Hypertension affects the structure and function of the left ventricle, and its long-term pathophysiological repercussions produce ventricular hypertrophy, fibrosis, and structural alterations in large and small arteries that lead to diastolic and systolic dysfunction, and finally to clinically manifest heart failure.⁽¹⁴⁾ In an investigation of the causes of HF in the period from 1990 to 2017 in 195 countries and territories, hypertensive HF constituted the second cause of HF, with 26.2% of cases.⁽¹³⁾ In this study hypertensive HF was the second etiological cause, however, it represented a lower percentage.

The proportion of patients with HF caused by dilated cardiomyopathy in the study was lower than the 27.2% reported by Basic et al.⁽⁶⁾ The majority of patients with dilated cardiomyopathy were aged 40 years or younger, consistent with Domengé et al.⁽⁸⁾ The proportion of patients with dilated cardiomyopathy declines with age.⁽⁹⁾ Estimates of HF mortality vary considerably depending on the study design, baseline risk of the study population, heart failure criteria, and LVEF cutoff values.⁽¹¹⁾

Estimates of HF mortality vary considerably depending on the study design, the baseline risk of the study population, the criteria for heart failure and the LVEF cutoff values.⁽¹¹⁾ When comparing the result obtained with the results of recent investigations, the proportion of deaths is high. Canadian investigators found that 10 % of young adult patients die within one year after their first admission for HF.⁽⁹⁾ The study by Lecoeuret al.⁽⁷⁾ showed a hospital mortality related to heart failure in young patients (≤ 50 years) approximately 10 %. The hospital mortality in young adults reported by Jainet al.⁽⁵⁾ in their investigation was 1.3 %.

The limitation of this study is that it is a descriptive study and, therefore, it does not allow us to establish a causal relationship; it is also single-center and retrospective, so it is recommended that prospective, multicenter research designed to demonstrate causal relationships be carried out.

CONCLUSIONS

Male sex predominated in all age groups, with the highest number of patients in older age groups, the burden of risk factors and comorbidities is high, patients with HFrEF predominate and mortality is high.

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Conflicts of interest:

The authors declare that there are no conflicts of interest.

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