Epidemiological and assistance care profile of patients with heart failure in a regional reference municipality

Perfil epidemiológico e assistencial de pacientes com insuficiência cardíaca em município de referência regional

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ABSTRACT

Introduction: heart failure is a crippling disease that reduces the quality of life; therefore, it is a serious public health problem. **Objectives:** to analyze the epidemiological and assistance care profile of heart failure patients admitted to a regional reference hospital. Statistically correlate clinical signs to diagnostic criteria and admissions to primary care services. To verify consistency between the treatment used and heart failure guidelines. **Patients and methods:** this was a prevalence, cross-sectional, and an exploratory study conducted through the reading of medical charts from a regional reference hospital from patients whose cause for hospitalization was heart failure in 2010. The data were analyzed in the Epi-Info 3.5 software. Frequency analysis and Odds Ratio (OR) with 95% confidence interval were calculated taking into account the P-value calculated through the Fisher's exact test. The project was approved by the University Ethics Committee (Protocol 159/2011). **Results:** 54 medical records were analyzed; 81% of patients had access to a primary care unit in the area of their residence. Dyslipidemia was associated with the highest number of hospitalizations (OR = 16/P = 0.034). The primary etiology of heart failure was systemic hypertensive heart disease (72.2%). The main risk factors found were hypertension (66.7%), smoking (48.1%), diabetes mellitus (44.4%), and dyslipidemia (40.7%). Out of the heart failure diagnoses, 68.52% could have been made from the Framingham criteria. **Conclusions:** permanent education programs are needed for addressing heart failure risk factors, evaluation and adherence to treatment, and active search for cases in the primary care as well as diagnosis of heart failure and its proper management.

Key words: Heart Failure; Heart Failure/epidemiology; Heart Failure/prevention & control; Health Care (Public Health).

RESUMO

Introdução: insuficiência cardíaca é doença incapacitante que reduz a qualidade de vida, portanto, grave problema de saúde pública. Objetivos: traçar perfil epidemiológico e assistencial de pacientes com insuficiência cardíaca internados em hospital de referência regional. Correlacionar estatisticamente sinais clínicos a critérios diagnósticos e internações a serviços de atenção primária. Verificar concordância do tratamento utilizado com as diretrizes para insuficiência cardíaca. Pacientes e Métodos: estudo de prevalência do tipo transversal exploratório, realizado por meio da leitura de prontuários, em hospital de referência regional, em 2010, cuja causa de internação era a insuficiência cardíaca. Os dados foram analisados no Epi-Info 3.5. Procedeu-se à análise de frequência e cálculo da Odds Ratio (OR), com intervalo de confiança de 95%, tomando-se em conta o teste exato de Fisher para cálculo do P-valor. O projeto foi aprovado pelo Comitê de Ética da Universidade (Protocolo 159/2011). Resultados: foram analisados 54 prontuários; 81% dos pacientes possuíam unidade de atenção primária na área de

sua residência. Dislipidemia esteve associada a maior número de internações (OR=16/P=0,034). A principal etiologia da insuficiência cardíaca foi a cardiopatia hipertensiva sistêmica (72,2%). Os principais fatores de risco encontrados foram hipertensão arterial sistêmica (66,7%), tabagismo (48,1%), diabetes mellitus (44,4%) e dislipidemia (40,7%). Dos diagnósticos de IC, 68,52% poderiam ter sido feitos a partir dos critérios de Framingham. Conclusões: são necessários programas de educação permanente voltados para a abordagem dos fatores de risco para insuficiência cardíaca, avaliação de adesão ao tratamento e busca ativa de casos na atenção primária, bem como do diagnóstico de insuficiência cardíaca e seu manejo adequado.

Palavras-chave: Insuficiência Cardíaca; Insuficiência Cardíaca/epidemiologia; Insuficiência Cardíaca/prevenção & control; Atenção à Saúde.

INTRODUCTION

Heart failure (HF) can be defined as the heart disability to maintain adequate cardiac output to meet the tissue demands or doing it only when using high ventricular filling pressure.[1] Most heart diseases present HF as the outcome, being the third leading cause of hospitalizations in the SUS and the first cause of cardiovascular disease, consuming 3% of all resources for hospitalizations.[2]

Currently, there is an increasing incidence and prevalence of HF. This is due to therapeutic advances in diseases that were previously fatal such as ischemic heart disease, increasing patient survival and leading them to become chronic.[3] Another important factor is the population aging.[4]

Approximately 240,000 new cases of HF are diagnosed every year in Brazil, with about two million patients having this disease.[5] The main risk factors for the development of HF are family history, diabetes mellitus (DM), systemic hypertension (HA), alcoholism, smoking, and dyslipidemia.[2]

Because HF is the outcome of other chronic conditions, it is sensitive to primary care actions. It is estimated that the effective treatment of HA could reduce its incidence by 60% in women and 50% of men.[6] Despite the expansion of primary care in the country, the SUS data show increasing numbers of hospitalizations and mortality rates by HF. This unfavorable development occurs due to the lack of continuous monitoring in clinics and health centers, difficulty of obtaining proper medical guidance and establishing a proper therapy, and organized access to medicines.[7] Although there is awareness about the importance of HF, there are few studies that aim to survey epidemiological, clinical, and therapeutic data, making the elaboration of proposals for prevention in public health difficult.[5]

Thus, the aim of this study was to trace the epidemiological and care profile of HF patients hospitalized in a regional reference hospital in southern Minas Gerais, correlating clinical signs and diagnostic criteria, coverage of primary care and hospitalization, verifying if the treatment used followed the standards established in the guidelines for HF management in Brazil.

MATERIAL AND METHOD

Type of study and research site

This was a prevalence, cross-sectional, descriptive, observational, exploratory study using secondary data obtained in the medical records of a university hospital in southern Minas Gerais. The study period was from January to December of 2010.

The hospital is accredited by the Unified Health System (SUS) and is a regional reference assisting patients from 16 surrounding municipalities belonging to micro-regional health in which the municipality is headquarters and city-pole. Because the location is also a macro-regional pole, the hospital assists patients of high complexity from 153 municipalities belonging to the southern macro-region of Minas Gerais.

Inclusion criteria

The selected sample consisted of medical records of patients older than 18 years old, whose hospitalization reason was the HF on that year, considering the International Code of Diseases (ICD-10).

Procedures and data collection

The records were requested at the Medical Files Service (SAME); data were collected and registered in an appropriate script consisting of open and closed questions that allowed describing the epidemiological and caring profiles of HF. The studied variables were: a) socio-demographic characteristics (age, gen-

der, ethnicity, place of birth, residence, and origin); b) previous disease; c) medications used during hospitalization; d) length of hospitalization; e) frequency of recorded hospitalizations throughout the disease development history.

Statistical analysis

Data were entered into the Microsoft Excel 2010 program and analyzed using the Epi-Info version 3.5.2 with a descriptive analysis of frequencies and associations between variables by calculating the Odds Ratio (OR). The correlation between addresses and Family Health Strategy (FHS) in the area of the patient´s residence was also analyzed. A significance level of 5% was adopted considering the Fisher exact test for the comparisons of proportions and correlation between variables.

Ethical aspects

The project was approved by the Research Ethics Committee of the University, protocol number 159/2011. In accordance with the criteria adopted by the National Council of Ethics in Research (CONEP) at the research execution time, the free and informed consent form was provided by the clinical direction of the hospital where data were being analyzed.

RESULTS

From the analysis of 54 medical records of patients hospitalized in 2010 at a regional reference hospital, the average age of patients at the time of the last hospitalization was 68.85 years old, median of 70 years old; the youngest patient was 33 years old, and the oldest was 94 years old. In 68.5% of records, there was no information on ethnicity and among those records with this information, 93.96% were Caucasian and the others were dark-skin. The sample contained 46.3% women and 53.7% men. In 50% of the records, there was no information about the place of birth; 9.3% showed records of natives of the headquarter municipality. Most patients resided in the university headquarter municipality (75.9%). In 88.9% of the records, there was no information on the patients' origin.

Another important aspect is that the etiology of HF was not explicit in the medical records of patients. Thus, it was necessary to deduce it from other information in the medical records. Therefore, after observing 72.2% of cases with HA, ischemic heart disease in 27.8%, and Chagas disease in 3.7%, it was possible to infer that hypertensive heart disease was the main etiology of HF in this group of patients. It is worth mentioning the valvular cardiomyopathy was identified in 22.2% of records without proper data exploration.

The main risk factors found were anemia (68.5%), HA (66.7%), smoking (48.1%), DM (44.4%), dyslipidemia (40.7%), and coronary heart disease (27.8%). Patients generally presented two or more risk factors.

It was difficult to determine the association between dyslipidemia and HF because in 57.4% of cases there was no research or confirmation on a dyslipidemia diagnosis recorded in the medical record. However, when considering the use of antilipidemic drugs, it was observed that 40.7% of patients had dyslipidemia. Regarding smoking, 11.1% of records showed this risk factor, however, in 37% of them quitting smoking was recorded. There was no information about smoking in 13% of records. Alcoholism was also frequent and reported in 22.65% of cases; 17% of patients referred having abandoned the addiction. The use of alcohol, despite the absence of information, was detected in 11.3% of the records.

The most frequently reported signs and symptoms were: dyspnea on exertion (88.9%), fine chest rattling (79.6%), edema in extremities (75.9%), cardiomegaly (57.4%), nocturnal cough (53.7%), paroxysmal nocturnal dyspnea (44.4%), distension of neck veins (29.6%), tachycardia (25.9%), hepatomegaly (24.1%), pleural effusion (16.7%), acute pulmonary edema (7.4%), increased venous pressure, tachyarrhythmias, and abdominojugular reflux (1.9%).

An association between dyslipidemia and number of hospitalizations was found (OR=16.00 p=0.003) and between DM and HA (OR=8.41 and p=0.002). The male gender was strongly associated with alcohol consumption (OR=50, p=0.000) and smoking (OR=5.55 and p=0.006).

In 88.9% of records, chest X-ray, and echocardiography requests were found, with or without an electrocardiogram request (ECG). In 11.1% of cases, only ECG was requested. The review of medical records showed that most of the HF diagnosis could have been detected from the use of the Framingham criteria for HF diagnosis (68.52%). Still regarding the diag-

nosis, CID was not registered in 72.2% of records. CID was 150.0 in 3.7% of cases, and 150.9 in 24.1% of cases.

As to the used therapy, the prescription of angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARB) were not present in 9.2% of records. The frequency of prescriptions for digitalics was 31.5%; an association between their use and high risk of tachycardia was observed (OR=7.2 and p=0.002). Conversely, tachycardia was associated with increased chances of death (OR=5.16 and p=0.019).

The therapy used and frequency of indication in each pharmacological group are shown in Table 1.

Table 1 - Medicamentos mais frequentemente utilizados (N=54)

	N	(%)
Spironolactone	41	(75.9%)
Another diuretic	48	(88.9%)
IECA	45	(83.3%)
S-blocker	26	(48.1%)
Digitalics	17	(31.5%)
Calcium channel blockers	14	(25.9%)
Direct vasodilators	10	(18.5%)
BRA	7	(13.0%)
IA of central action	1	(01.9%)
IDR and α-blockers	1	(01.9%)
Antiplatelet or anticoagulant	49	(90.7%)
Antianginal	17	(31.5%)
Antiarrhythmic	15	(27.8%)
Antidiabetic	15	(27.8%)
Antilipidemic	22	(40.7%)
Bronchodilators	32	(59.3%)
Sedation and analgesia	52	(96.3%)

IECA – Angiotensin Converting Enzyme Inhibitor; BRA – Angiotensin Receptor Blockers; IA of central action – Adrenergic of Central Action Inhibitors; IDR – Direct Renin Inhibitor; (*) Some patients were treated with combined procedures.

The average length of hospitalization was 12.02 days, and the average interval between hospitalizations was 16.21 months. The number of hospitalizations was on average 1.85 per patient. In 68.5% of cases, the discharge was based on clinical frame stabilization. However, in 5.6% of records, the reason for discharge was not mentioned; in 22.2% of cases the discharge was due to death and in 1.9% of cases, the discharge was due to transfer or treatment abandonment.

Concerning access to the primary care services, 81% of patients had access to a family health unit in the area of their residence.

DISCUSSION

HF has been a prevalent syndrome generating large expenditures for SUS and growing every year, especially due to population aging. Thus, epidemiological studies become essential to develop strategies for its prevention and control.[5] On the other hand, the difficulty in literature research on this topic in Minas Gerais State is indicative of the lack of epidemiological studies in this state, which reaffirms their importance.

The epidemiological aspects showed that the average age of patients (68 years old) in this study is similar to that reported by Framingham[8], who identified 60 years old as the most likely age for the emergence of HF. The gender frequency was different from the study by Rassi et al.[9] in which female patients were the majority. A possible explanation for this difference is that a significant number of men in the study were alcoholics, which is an important additional risk factor for HF.

The great absence of information on ethnicity in the hospital records indicates negligence about this information. Gaps or lack of health information in over 30% of records is taken by the literature as indicative of precarious quality information[10] that hinders analysis. The lack of data on place of birth and origin also affected the determination of possible HF etiologies because patients who had resided in endemic areas of Chagas disease have increased chance to develop Chagas heart disease.[11]

In line with the study by Framingham,[8] hypertensive heart disease was supposedly the main etiology found. Hypertensive etiology was deduced from the information in the patients´ records with history of HA without other likely causes.[12] However, there is controversy regarding results presented in other studies[9,13-14] in which ischemic heart disease is identified as the main etiology of HF. In this study, ischemic heart disease was the second most frequently recorded causal hypothesis.

Valvular cardiomyopathy is another important possible etiology, however, not properly emphasized because the medical records registering valve diseases did not have additional information indicating it as a causal or consequential factor for HF. Non-treated valvular diseases at the appropriate time can compromise the myocardium leading to HF. However, HF itself can lead to a secondary mitral insufficiency as well. That is, the record of valvulopathy without a proper exploration of the data could compromise its interpretation. Chagas disease appeared as an etiol-

ogy of HF in two patients, as expected because southern Minas Gerais is a non-endemic area.[15]

The main risk factors found as HA, dyslipidemia, DM, smoking, anemia, and coronary heart disease, as previously shown, are in agreement with the study of Nogueira et al.,[5] whose conclusion is that a variety of combinations of risk factors leads to HA and ischemic disease and ends with the development of HF.

The association detected between dyslipidemia and number of hospitalizations was obtained when considering treatment for dyslipidemia as its diagnosis because the prescription of antilipidemic drugs was observed in many records but not in the clinical frame. Thus, our study corroborates dyslipidemia as a risk factor for HF. However, this association may be over-estimated because it is possible that the antilipidemic treatment was used without the patient having a dyslipidemia lipid profile; or under-estimated because the absence of a lipid profile study would not allow the diagnosis of cases, which would be without treatment. In any case, the research result highlights the importance of research and control of dyslipidemia according to the literature, which indicates it as a risk factor for the emergence of HF[2], whose need for control is essential to prevent the increase in the incidence of this disease.[5]

Smoking, another risk factor known to be associated with cardiovascular disease and highly prevalent in this study, indicates the need for qualification in the primary care because it is the appropriate scenario for stimulating quitting smoking, either through a psychosocial approach or drug therapy.[2] Similarly, the DM and HA frequency of cases shows the importance of strengthening primary health actions because appropriate therapy in the early stages of both diseases is as important as the constancy in educational work among the population to ensure changes in lifestyle and increased adherence to drug treatment, essential for therapeutic success. The primary care should be the locus of detection and control of smoking, dyslipidemia, DM, and HA, as well as the appropriate approach to those who are already diagnosed with HF, preventing their clinical frame of decompensation and need for several hospitalizations.

Another relevant aspect to be discussed was the lack of information about the abusive or non-abusive use of alcohol in over 10% of records. In Brazil, alcoholic cardiomyopathy is quite a common cause of HF,[16] whose association may not be clear in this study due to the lack of information once again compromis-

ing the determination of HF etiologies. It is noteworthy that in this region, the culture and consumption of "cachaça" (a sugar cane alcohol beverage) are well spread. Just as smoking, alcohol consumption requires preventive and educational work especially directed at the male population. This is a statement that corroborates the strong association found between male gender and drinking and smoking habits.

Human health has become a central theme in the national scenario, therefore, in 2012 the implementation of the National Policy for Integral Attention to Men's Health began.[17] The main actions proposed in this policy seek to break cultural and organizational obstacles that prevent men from attending health services, particularly primary care services. Among these barriers, are the cultural resistance that men have to admit their weaknesses and the organizational barrier generated by the opening hours of health services, similar to the working hours of most of the population, which together make men choosing for urgent and emergency services when the disease is already at an advanced stage.[17]

It is also noteworthy the relevant data that many patients have anemia at some point during hospitalization; several studies showed the relationship between anemia in patients with HF and worse prognosis, associating it with increased cardiovascular mortality.[12]

The main symptom presented by patients was dyspnea, similar to that in the study of Alti et al.[18]

It was also noted in many records that the diagnosis of decompensated HF would have been achieved from the observation of the Framingham criteria, since patients presented signs and symptoms, that when associated, would allow diagnosing decompensated disease only through good clinical evaluation. According to Montera et al.,[2] the confirmation of HF diagnosis according to the Framingham criteria requires at least two major criteria and/or one major criterion together with two minor criteria (Table 2). It is noteworthy that the minor criteria must be considered only when not assigned to another medical condition, for example, pulmonary hypertension, chronic obstructive pulmonary disease, cirrhosis, ascites, or nephrotic syndrome.

Although the Framingham criteria are classical and important from the clinical point of view, they have been little reported in the literature. The epidemiology textbooks[19-21] mentioned them more often than the medical clinic. However, the focus is on the study methodology as an illustrative example and not to clarify their clinical significance. It is intended here

to demonstrate the importance of knowledge and dissemination of the Framingham criteria for the diagnosis of acute HF because professionals in the primary care would be able to detect signs and symptoms of worsening disease regardless of accessing more complex and expensive complementary exams (for example, echocardiograms). It is believed that if these criteria were widespread among medical students, who once inserted in the primary care network would be able to take appropriate clinical decisions reducing the need for hospitalization and treatment of HF in tertiary care, or even bottle-necking the secondary care. Similarly, its spread in continuing education programs for professionals already working in the public health services is of paramount importance.

Table 2 - Framinghan criteria for the diagnosis of acute HF

Major criteria	Minor criteria
Nocturnal paroxysmal dyspnea	Edema of bilateral ankle
Jugular venous distension	Nighttime cough
Pulmonary crepitation	Dyspnea to common efforts
Cardiomegaly (in chest radiography)	Hepatomegaly
Acute pulmonary edema	Pleural effusion
Third heart sound (gallop)	Capacity functional reduction at 1/3 of the maximum previously registered
Increased central venous pressure (> 16 cm H_2O in the right atrium)	Tachycardia (HR>120 bpm)
Abdominojugular reflux	
Weight loss> 4.5 kg in five days in response to treatment	

For the initial HF diagnosis and screening, tests like chest X-ray and ECG can be used. However, the definite HF diagnosis requires an echocardiogram, which is the gold standard for measuring the ejection fraction.[2] In addition, an echocardiographic reassessment is essential when the clinical frame indicates the need for therapy modification.[22] Because the difficulty of access to this type of examination by less favored social class patients is known, the record of 11.1% of cases with only ECG may be due to failures in the medical records; lack of access to appropriate examination due to equipment unavailability, or lack of accredited qualified professionals or medical knowledge about the importance of examinations. In any case, these are failures in the physical, financial, and human public health sector that need to be considered and seriously discussed.

Also regarding the diagnosis, we highlight the fact that CID was not registered in 72.2% of the records. Be-

cause this is mandatory information, the lack of zeal and commitment to hospital records is perceived here once again. The importance of registration using the international classification of diseases is based on the fact that it allows statistics and promotes comparisons between diseases of all nations and continents.[23] Even when registered, the CID coding quality is often impaired. There are many explanations for this such as bad handwriting of doctors, difficulty to understand what is written, lack of knowledge and training of hospital staff about the CID registration, interpretation of medical records, existence of multiple diagnoses, and more concern about the registration procedure than with the diagnosis because the procedure will imply in refund or non-refund of services provided.[24]

The statements made from this study regarding treatment and management of HF should be interpreted considering the sample size (54 cases) and precariousness of the medical records. Considering that the patients had been hospitalized due to HF decompensation, it was inferred that these patients fit within the II, III, or IV functional classes with symptoms even when performing daily activities. That is, the use of IECA or BRA would obviously be required. The absence of prescriptions for IECA or BRA in 9.2% of cases is discordant to the guidelines for management and treatment of HF because the use of one of these two drugs has evidence level A for all types of heart dysfunction regardless of symptoms.[22]

The indication of beta-blockers, such as carvedilol, also shows level of evidence A for patients with systolic dysfunction.[22] Considering that 60% of HF cases have systolic dysfunction,[2] the number of patients who used beta-blockers (48.1%) can also be considered a problem. However, it is important to point again the failure of medical records registration, which may explain the data obtained. That is, the lack of knowledge about the current guidelines for HF treatment is not the only plausible justification.

The association between the use of digitalics and risk of developing tachycardia, and from this, increased chance of death, also corroborates data in the literature guiding the judicious use of digitalics. Cunha et al.[25] found that in 52.7% of the studied patients, the prescription of digitalics was inadequate. The evaluation of ejection fraction is required as well as the optimization of treatment for the correct prescription of digitalics.[22] However, how to proceed without a secure access to echocardiogram? Conversely, tachycardia is possibly one of the signs re-

lated to digitalics intoxication[2] and suggests the need for better clinical evaluation of patients.

The average length of hospitalization was similar to those reported in other studies.[26] The average interval between hospitalizations showed that HF patients return to the hospital at every 16.21 months, showing lack of integrity and longitudinal care in the primary care services, possible reason for the occurrence of new HF decompensation and readmissions.

The observation of clinical outcomes in the cases analyzed in this study shows a high rate of mortality, in the order of 22.2%, much higher than that reported by Godoy et al., whose study had a rate of 15% deaths among the evaluated cases.[26] In addition to the problems already mentioned related to management of cases, completeness and longitudinal care, there is another possible explanation for this difference in outcome between the two studies, that is, the increase in mortality rate could be explained by the average age of patients in our study, higher than that in Godoy´s study.

Finally, there is the fact that 81% of patients supposedly had access to primary care services because they lived in the area covered by the family health units. Considering that the main HF etiology hypothesis was HA, it is possible to infer that the primary care was inefficient in HS treatment by not preventing the clinical frame of patients living in their area to evolve into worse outcomes, causing them to develop HF decompensation. Similarly, the proper management and control of additional important risk factors for the development of HF, discussed here, would certainly contribute to reducing its incidence.

CONCLUSIONS

The objective of this study was to trace the epidemiological and assistential profile of HF patients hospitalized in a regional reference hospital. Although the frequent absence of essential information in the records has affected the analyzes, particularly on associations, the results found may help the preparation of HF prevention strategies because the data shows that this population is mainly of elderly patients of both genders, with hypertension, diabetes, dyslipidemia, and smoking and drinking habits. The lack of records, especially of socio-cultural data affects the description of epidemiological profiles and corroborates the thesis that the medical education does adopt a biopsychosocial approach model but still maintain emphasis on the biological determinants of health and disease. Regarding the assistential profile, the frequent readmission of patients who for the most part (80%) reside in areas covered by the health family units can be interpreted as a result of the inability of local professionals to deal with HF.

The lack of essential complementary tests such as lipid profiles and echocardiography as well as optimal treatment leads to a question: Is there a lack of resources for adequate cases or unpreparedness of those who deal with the disease?

The discordance between the HF treatment recommended in the guidelines and those adopted in some cases is a failure that can compromise the prognosis and increase mortality in this group of patients. Similarly, the absence of basic complementary tests not only hinders diagnosis but also leads to worsening prognosis compromising the treatment, and hence, the evolution of cases. Regardless of the answer to the question posed in future studies, this research reflects the overall panorama of HF, at least in the state of Minas Gerais. By being a research conducted in a university environment, the results are a warning sign. They reveal, above all, the need and urgency of appropriate programs of continuing education in health, particularly focused on the approach of prevalent medical conditions, evaluation of adherence to treatment, active search for cases, and appropriate management of HF in public health services.

Furthermore, the clinical rescue of the Framingham criteria is suggested, which once used by general practitioners by being essentially clinical, allow overcoming the lack of resources to carry out complementary tests, providing an early detection of possible decompensation, particularly in elderly patients with comorbidities, indicated here as the primary focus of care.

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