Epidemiology of Decompensated Heart Failure in the City of Niterói - EPICA - Niterói Project

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Objective - *To compare the epidemiological and socioeconomic profiles, clinical features, etiology, length of hospitalization, and mortality of patients with decompensated heart failure admitted to public and private hospitals in the city of Niterói.*

Methods - *We carried out a prospective, multicenter study (from July to September 2001) comprising all patients older than 18 years with the primary diagnosis of heart failure and admitted to hospitals in the city of Niterói, whose scores according to the Boston criteria were 8 or above. Proportions were compared using the chi-square and Fisher exact tests.*

Results - *The sample comprised 203 patients as follows: 1) 98 patients from public hospitals: 50% were men, their mean age was 61.1±11.3 years, 65% were black, 57% had an income of 1 minimum wage or less, 56% were illiterate, 66% had ischemic heart disease, their mean length of hospitalization was 12.6 days, and the mortality rate adjusted for age was 5.23; 2) 105 patients from private hospitals: 49% were men, their mean age was 72±12.7 years, 20% were black, 58% had an income greater than 6 minimum wages, 11% were illiterate, 62% had ischemic heart disease, their mean length of hospitalization was 8 days, and the mortality rate adjusted for age was 2.94. The distribution of comorbidities and risk factors was similar among the patients of the 2 hospital systems, except for the smoking habit, which was more frequent among patients from public hospitals.*

Conclusion - *In addition to the socioeconomic asymmetries, the hospitalization length and the mortality rate adjusted for age were greater in patients in the public health system.*

Key words: heart failure, epidemiology, Niterói

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The World Health Organization has defined heart failure as one of the priorities among the chronic illnesses requiring attention from health sectors worldwide. Despite medical progress, the prevalence of the disease has increased in the past 5 decades, and currently, the mortality rate may exceed 50% in 5 years from the time the disease is diagnosed[1,2].

It is estimated that the United States has 4.7 million patients with heart failure, and that 550,000 new cases appear annually, causing 280,000 deaths/year [3]. This mortality is equivalent to that due to cancer and exceeds that due to AIDS. The North American expenditures for the treatment of heart failure already exceed US$ 20 billion/year.

According to the data of the Unified Health System in Brazil (SUS), approximately 398,000 hospitalizations and 26,000 deaths occurred due to heart failure in the year 2000. Heart failure accounts for more than 30% of the total of hospitalizations and for 33% of the expenditures with diseases of the circulatory system, and is the first cause of hospitalization of patients > 65 years in the SUS [4]. It is estimated that in 2025, Brazil will have the sixth greatest elderly population in the world, approximately 30 million people, or 15% of its entire population, and that heart failure will be the first cause of death due to cardiovascular disease in the world.

The better control of rheumatic disease, which, in the beginning of last century, was 1 of the major causes of disease, in addition to the efficient protocols to treat systemic arterial hypertension and acute coronary syndromes, allowed these patients to become chronic, delaying death due to these diseases and allowing the patients to evolve in the final stages to heart failure [5].

Heart failure is characterized by a chronic phase in which the patient is stable and another phase of acute decompensation marked by frequent rehospitalizations, another characteristic with a significant socioeconomic impact. Some studies have shown that almost all patients hospitalized due to heart failure are hospitalized again within 1 year[6]. Considering that we are dealing with an elderly population with comorbidities, in need of a vast medicamentous armamentarium to control diseases, and that, in addition, ends up with frequent rehospitalizations, we can better understand the complexity and high cost of the situation. Even in

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the United States, the socioeconomic factor is considered crucial to the evolution of this disease, the low familial income being a predictor of rehospitalization[7]. The costs of hospitalization account for 70% of the resources expended during heart failure management.

The city of Niterói has 458,465 inhabitants and is considered the third city in the country regarding the quality of life according to the Index of Municipal Human Development of the United Nations Program for Development; however, the epidemiological and clinical profiles of the population are not known [8]. These data are fundamental for the elaboration of public polices aiming at improving health care in heart failure. This study assessed and compared the demographic and socioeconomic profiles, in addition to the clinical characteristics, of patients admitted to public and private hospitals in the city of Niterói due to decompensated heart failure.

Methods

This is a prospective cross-sectional study that assesses the epidemiological, socioeconomic, and clinical profiles of patients hospitalized due to decompensated heart failure in the city of Niterói between July and September 2001. We developed a questionnaire appropriate for data collection using written informed consent signed by the patients. The study was approved by the committee on ethics in research of the medical school of the Universidade Federal Fluminense.

The study sample comprised all patients older than 18 years sequentially admitted to the participating hospitals with the primary diagnosis of decompensated heart failure, with no randomization.

The organizing committee determined as a population sample for the public health system 10% of the patients hospitalized due to decompensated heart failure in the city of Niterói in 1 year, which was 105 patients. The parameter used was the DATA-SUS 2000, which recorded 1052 hospitalizations. An equal number of patients was collected in the private hospital system, because no data exist in the literature about the number of patients admitted to private hospitals per year in the city of Niterói.

Data were collected by a team that interviewed the patients, recording demographic data and consulting the medical records to complement information. The diagnosis of heart failure was confirmed by the Boston criteria, and the patients whose score was 8 or above underwent statistical treatment: 98 patients in the public health system and 105 patients in the private health system.

Statistical analysis was performed with the chi-square and Fisher exact tests for comparing proportions. For comparing the means between the 2 independent groups, the Student *t* test and the Mann-Whitney nonparametric test were used in the absence of normal distribution or with a small number of events. The Pearson correlation coefficient was used to assess the degree of association between 2 numerical variables. In-hospital mortality was adjusted for age using the indirect method. The mortalities expected for ages between 61 and 72 years were collected from the mortality table of the Brazilian Institute of Geography and Statistics (IBGE) 2000.

The significance level adopted was 5%. The statistical analysis was performed with SAS® System statistical software.

Results

This study analyzed data from 203 patients, 98 admitted to public hospitals and 105 to private hospitals. The results are shown in table I.

Comparatively, no difference was observed in the distribution by sex. The mean age was extremely different, with 1 decade of difference between the patients from the public and private health systems. In the public hospitals, more illiterate individuals and those whose familial income did not exceed 1 minimum wage were found.

In regard to risk factors and comorbidities, a similar distribution was observed with no statistically significant difference, except for smoking, which prevailed among patients from the public health service (P=0.001). The distribution of the risk factors and comorbidities are shown in figure 1.

Most patients were hospitalized in functional classes III and IV, no difference being observed between the public and private health services. No difference was also found in regard to the etiology of the heart failure, because 2/3 of the patients in both health services had the ischemic etiology of the disease. Treatment suspension was the major cause of decompensation in the public health service.

Despite the longer length of hospitalization in the group of patients from the public health service and the already reported socioeconomic differences, initially no difference was observed in mortality between the groups. After adjusting mortality to age, because a difference o f 1 decade existed between the mean ages of the services, a lower mortality adjusted for age was observed in the private health service.

Table I - Results of the EPICA-Niterói study: Private vs Public Hospitals

	Private	N	Public	N	P Value
Men (%)	49%	51	50%	49	NS
Mean age (years)	72±12.7 years		61.1±11.3 years		P<0.0001
Blacks (%)	20%	21	65%	64	P<0.0001
Familial income ≤ 1 minimum wage	9.5%	10	57%	56	P<0.0001
Illiterate individuals (%)	11%	11	56%	55	P<0.0001
Medication abandonment (%)	17%	18	51%	50	P<0.01
FC III (NYHA)	43%	45	50%	49	NS
FC IV (NYHA)	55%	58	42%	41	NS
Ischemic etiology (%)	62%	65	66%	65	NS
Length of hospitalization (days)	8 days		12.6 days		P=0.0001
In-hospital mortality	13%	14	9%	9	NS
Mortality rate adjusted for age	2.94		5.23		

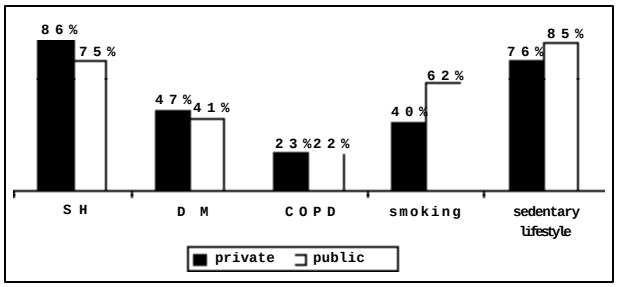

Fig. 1 - Risk factors and comorbidities of patients with heart failure.

Discussion

This pioneering study portrays Brazilian-based medicine showing the asymmetries in the epidemiological profile and the socioeconomic conditions in the public and private health sectors in the city of Niterói.

Heart failure is one of the most important causes of hospital admission in the SUS [4]. Its social and economic impact forces us to develop an in-depth understanding of this issue, so as to allow for organization of health care structures, optimization of costs, and mainly improvement in the quality of life and in the patients' survival, using medication that reduces morbidity and mortality.

Few epidemiological studies have assessed hospitalized patients. Table II shows studies that assess hospitalized patients with decompensated heart failure and their characteristics. Only Villacorta et al [6] and Barretto et al [9] in Brazil have reported a series of patients admitted with decompensated heart failure in tertiary centers.

The socioeconomic characteristics of our patients reflect the great inequalities of our society, which are either overlooked or denied in hope of improvement. These inequalities, however, are highlighted by the objectivity of numerical figures.

The difference of 1 decade between the mean age of patients of the public and private health services (61±11.3 vs 72±12.7 years) is noteworthy. The mean age of the patients of the public health service was lower than 65 years, which, in the Framingham Study, was reported as the age predisposing persons to the appearance of the disease [2].

The similar distribution observed between men and women with heart failure in the EPICA-Niterói project is a finding that deserves better explanation, as no scientific evidence exists supporting such a great difference between the population suffering from the disease in our city and that in other countries, men corresponding to the greatest proportion of individuals affected by heart failure. This fact was evidenced in the Framingham Study [2] and confirmed by Villacorta et al [6] and Barretto et al [9], who studied elderly patients hospitalized due to the disease in our country.

The socioeconomic differences observed correspond to the social heritage in our country, with a predominance of blacks in the public health system (65%) and a predominance of nonblacks in the private health system (80%).

The lower access to health care and economic difficulties may cause the patients of the public health system to be affected earlier by cardiovascular diseases or to have a lower adherence to treatment, or both, resulting in earlier deaths. The low degree of instruction and the low income had already been identified by Philbin et al 7 as risk or worsening factors, or both, for the development of heart failure or for hospital readmission. Our study, which pioneered in assessing the socioeconomic conditions in our country, found a low educational level (56% of illiteracy) and a low income (57% earns up to 1 minimum wage) in the population assisted by the public health system. The illiteracy rate among the patients assisted by the private health system is not also insignificant, reaching 11% of the patients; the income, however, is much higher, with 58% of the patients in the private health system earning more than 6 minimum wages.

In both systems, the patients have been correctly hospitalized with decompensated heart failure in functional classes III (public health system, 50%; private health system, 43%) or IV (public health system, 42%; and private health system, 55%). In his study, Villacorta [6] highlighted a higher mortality rate in the first year for patients arriving at the emergency unit in functional class IV.

The ischemic etiology prevailed in both systems, exceeding 60% of the patients. No correlation was found between the etiology of heart failure and the patient's prognosis. Bart et al [11] reported that the ischemic cause is an independent predictor of mortality; Cohn et al [12] and Parameshwar et al [13], however, reported no relation between ischemic heart failure and worse prognosis.

Analyzing the length of hospitalization of our patients (8 days in the private health system and 12.6 days in the public health system), no great difference exists compared with that in the international studies and data from SUS. A Swedish study [14] reported a mean length of hospitalization for patients with heart failure in 1996 of 10.7 days. Nevertheless, our mean length of hospitalization both in the public and private health systems was longer than that reported by DATA-SUS in 2000 [4]. Table III compares data from SUS in Brazil and in the city of Niterói.

The mortality rate in the public health system after ad-

Table II - Studies on patients hospitalized due to heart failure

Study	n	Mean age	Female	In-hospital mortality
Villacorta et al 1998 [7]	57	69	32%	14%
Croft JB et al 1999 [10]	154	78	58%	16%
EPICA-Niterói (Public)	98	61.1	50%	9%
EPICA-Niterói (Private)	105	72.5	51%	13%

Table III - Data on heart failure in Brazil and in the city of Niterói in 2000

	Niterói	Brazil
Inhabitants	458,465	169,544,443
Hospitalizations	1,052	398,489
Hospitalizations/1000 inhab	2.29	2.35
Mortality rate	6.18	6.62
Length of hospitalization	5.5	5.8
Hospitalization costs	R$ 459.37	R$ 513.57

justing for age was greater than that in the private health system. Our in-hospital mortality rate was greater than that reported by DATA-SUS 2000, which was 6.6% for Brazil and 6.2% in the city of Niterói; however, it was still lower than that reported by Villacorta [6], Barretto [9], and Croft [10]. These data indicate the need for continuous policing concerning the quality of cardiovascular care.

The reason for the greater mortality rate found in the public health system requires further studies assessing this difference: whether it is due to access to specialized resources (intensive care beds, inotropic support, and cardiovascular monitoring) or to access to treatment in accordance with the guidelines of the Brazilian Society of Cardiology, or whether a relation with the qualification of the professional responsible exists. Maybe it is a mixture of all these variables.

The professional of the 21st century should not only be engaged in the search for new knowledge but also for the application of therapeutic advances in his region (states of effectiveness – fundamental for the construction of a health system having quality and social commitment). In the future, the performance indicators of the health services will guide patients at the time of choice and in claiming the appropriate management of the resources from the government and the health management organizations.

References

1. Anderson B, Waagstein F. Spectrum and outcome of congestive heart failure in a hospitalized population. Am Heart J 1993; 126: 632-40.
2. Ho KKL, Pinsky JL, Kannel WB, Levy D. The epidemiology of heart failure: the Framingham study. J Am Coll Cardiol 1993; 22: Suppl A: 6A-13A.
3. 2001 Heart and Stroke Statistical Update da American Heart Association
4. DATASUS 2000 (www.datasus.gov.br).
5. McKee PA, Castelli WP, McNamara PM, Kannerl WB. The natural history of congestive heart failure: the Framingham study. N Engl J Med 1971; 285: 1141-6.
6. Villacorta H, Rocha N, Cardoso R. Evolução intra-hospitalar e seguimento pós-alta de pacientes com insuficiência cardíaca congestiva na unidade de emergência. Arq Bras Cardiol 1998; 70: 167-71.
7. Philbin FE, Dec GW, Jenkins PL, DiSalvo TG. Socioeconomic status as an independent risk factor for hospital readmission for heart failure. Am J Cardiol 2001; 87: 1367-71.
8. Instituto Brasileiro de Geografia e Estatística (www.ibge.gov.br)
9. Barreto ACP, Nobre MRC, Wajngarten M, Canesin MF, Ballas D, Serro-Azul JB. Insuficiência cardíaca em um grande hospital terciário de São Paulo. Arq. Bras. Cardiol. 1998; 71: 15-20.
10. Croft JB, Giles WH, Pollard RA, Keenan NL, Carper ML, Anda RF. Heart failure survival among older adults in the United States: a poor prognosis for an emerging epidemic in the Medicare population. Arch Intern Med 1999; 159: 505-10.
11. Bart BA, Shaw LK, McCants CB, Fortin DF, Lee KL, Calif RM, O'Connor CM. Clinical determinants of mortality in patients with angiographically diagnosed ischaemic or non ischaemic cardiomiopathy. J Am Coll Cardiol 1997; 30: 1002-8.
12. Cohn JN, Tognoni G, Glazer RD. Spormann D, Hester A. Rationale and design of Valsartan Heart Failure Trial: large multinational trial to assess the effects of valsartan on morbidity and mortality in chronic congestive heart failure. J Card Fail 1999; 5: 155-60.
13. Parameshwar J, Keegan J, Sparrow J, Sutton G, Poole-Wilson PA. Predictors of prognosis in severe chronic heart failure. Am Heart J 1992; 123: 421-6.
14. Maghert M, Persson H, Edner M, Kahan T. Epidemiology of heart failure in Sweeden - a national survey. Eur Heart J 2001; 3: 97-103.