Use of Diagnostic and Therapeutic Resources in Patients Hospitalized to Heart Failure: Influence of Admission Ward Type (INCARGAL Study)

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Background. Heart failure (HF) is the most rapidly growing cardiac pathology in industrialized countries, and already the primary cause of hospital admissions of elderly people. Outside the field of clinical trials, there have not been many studies in Spain of the influence of the admission department on diagnostic and therapeutic management, whether this affects short-term and long-term prognosis, and the factors that determine the department the patient is admitted to.

Objectives. To analyze whether management and prognosis of patients admitted with heart failure differ depending on the admission ward (cardiology versus internal medicine-geriatrics).

Patients and method. Cross-sectional study of 951 patients (505 men and 446 women) consecutively hospitalized for HF in the cardiology (n = 363) and internal medicine-geriatrics (n = 588) wards of 12 hospitals of Galicia and recruited over a maximum period of 6 months. The main epidemiological and clinical variables were recorded at admission, and the complications, treatments, and clinical status were recorded at release.

Results. HF patients had a mean age of 75.5 ± 12 years (women 78.5 years and men 72.6 years). The average hospitalization time was 11 ± 8 days and 50.8% were first admissions. Total hospital mortality was 6.8%. Fifty-nine percent (58.9%) of patients had arterial hypertension, 31.9% ischemic heart disease, 27.6% cardiac valve disease, 28.5% diabetes mellitus, and 32.5% chronic obstructive pulmonary disease (COPD). The patients admitted to cardiology ward were younger (72.5 ± 13 vs 77.4 ± 11 years; p < 0.005), more frequently men (51.9 vs 43.7%; p < 0.005), more often first hospitalizations (54.8 vs 48.4%; p < 0.005), and acute pulmonary edema was more common (22.8 vs 9.2%; p < 0.005). The odds ratio (and 95% CI) for therapeutic and diagnostic procedures in relation to admission ward (reference group internal medicine-geriatrics), adjusted for age, sex, systolic function, number of hospitalizations, and history of dementia, hypertension, COPD, AMI, valve disease and ischemic heart disease, are: echocardiogram, 3.49 (2.58-4.73); catheterization, 6.42 (3.29-12.55), admission to intensive care, 3.94 (2.15-7.25), revascularization, 2.15 (0.57-8.08), and beta-blocker treatment, 3.39 (1.93-5.97). No differences in hospital mortality (6.6% in cardiology vs 7% in internal medicine-geriatrics) or average hospitalization time were found between departments.

Conclusions. The admission ward was related with a clear difference in HF management, with better adherence to guidelines and more use of resources by cardiologists. This was unrelated with differences in hospital mortality so a longer follow-up of these patients is required to evaluate the impact of these therapeutic measures on the prognosis and evolution of HF, as well as the cost-benefit relation in an elderly patient population.

Key words: *Heart failure. Treatment. Diagnostic procedure. Cardiology. Internal medicine.*

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At the end of the article we report the centers and members that take part in the INCARGAL study.
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Utilización de recursos diagnósticos y terapéuticos en pacientes ingresados por insuficiencia cardíaca: influencia del servicio de ingreso (estudio INCARGAL)

Antecedentes. La insuficiencia cardíaca es la enfermedad cardiológica de más crecimiento en las naciones desarrolladas, y supone ya la primera causa de ingreso en ancianos. No se ha estudiado bien la diferencia que el servicio de ingreso supone en cuanto al manejo de la insuficiencia cardíaca ni los factores que condicionan el servicio de ingreso.

Objetivos. Establecer si existen diferencias de manejo o pronóstico en función del servicio de ingreso (cardiología frente a medicina interna y geriatría) en pacientes con insuficiencia cardíaca.

Pacientes y método. Estudio transversal en que 951 pacientes (505 varones y 446 mujeres) ingresados consecutivamente por insuficiencia cardíaca en los servicios de cardiología (n = 364), medicina interna y geriatría (n = 587) de 14 hospitales de Galicia fueron reclutados durante un período máximo de 6 meses, registrándose en el momento del ingreso

ABBREVIATIONS

AMI: acute myocardial infarct.
AF: atrial fibrillation.
ICU: intensive care unit.
APE: acute pulmonary edema.
AHT: arterial hypertension.
COPD: chronic obstructive pulmonary disease.
CVA: cerebrovascular accident.
ECG: electrocardiogram.
ACEI: angiotensin converting enzyme inhibitor.
EF: ejection fraction.
CI: confidence interval.

las principales variables epidemiológicas y clínicas, complicaciones, tratamientos y situación en el momento del alta.

Resultados. Los pacientes con insuficiencia cardíaca tenían una edad media de 75,5 ± 12,4 años (78,5 ± 10,6 en mujeres y 72,7 ± 13,5 en varones). La estancia media fue de 11 ± 8 días, con un 50,8% de primeros ingresos, siendo la mortalidad global hospitalaria del 6,8%. El 58,9% de los pacientes tenía hipertensión arterial, el 31,8% cardiopatía isquémica, el 27,7% valvulopatía, el 28,4% diabetes mellitus y el 32,5% EPOC. Por servicios, los pacientes atendidos en servicios de cardiología son más jóvenes (72,5 ± 13,3 frente a 77,4 ± 11,4 años; p < 0,005), con más varones (51,9 frente a 43,7%; p < 0,01), mayor proporción de primeros ingresos (54,8 frente a 48,4; p < 0,05) y de edema agudo de pulmón (22,8 frente a 9,2%; p < 0,001). Las *odds ratio* (y sus intervalos de confianza [IC] del 95%) de realización de procedimientos diagnósticos y terapéuticos en función del servicio de ingreso (el grupo de referencia es medicina interna-geriatría), ajustando por edad, sexo, función sistólica, número de ingresos y antecedentes personales de demencia, hipertensión arterial, EPOC, infarto agudo de miocardio, valvulopatía, arteriopatía periférica y cardiopatía isquémica, son: ecocardiograma, 3,31 (2,42-4,52); cateterismo, 6,61 (2,78-15,73); ingreso en UCI, 3,4 (1,48-7,8); revascularización, 2,93 (0,54-15,74), y tratamiento con bloqueadores beta 2,87 (1,37-6,04). No se observaron diferencias en la mortalidad temprana (6,6% en cardiología frente a 7% en medicina interna-geriatría) ni en la estancia media.

Conclusiones. El servicio de ingreso determinó una clara diferencia en el manejo de la insuficiencia cardíaca, con una mayor adhesión a los protocolos de tratamiento y uso de recursos por parte de los cardiólogos que no se tradujo en diferencias en la mortalidad temprana. Se precisa un seguimiento de los pacientes para evaluar el impacto de estas diferencias en el pronóstico y la evolución de la insuficiencia cardíaca a medio y largo plazos, así como la relación coste-beneficio en una población de edad media avanzada.

Palabras clave: *Insuficiencia cardíaca. Tratamiento. Procedimientos diagnósticos. Cardiología. Medicina interna.*

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INTRODUCTION

Cardiac insufficiency has become a great public health problem in recent years,[1] and is the most frequent cause of hospitalization in our country for patients older than 75 years of age.[2] It is a disorder that complicates a large number of advanced stage cardiac diseases, with a growing prevalence due, among other causes, to the aging of our population and to advances in the treatment of ischemic heart disease, which has engendered the survival of patients with acute myocardial infarcts (AMI). In developed countries, cardiac insufficiency is the only cardiac disease which is increasing in terms of prevalence and total mortality.[2-8] These factors have resulted in an increase in the burden of health care, particularly in the hospital setting, due to cardiac insufficiency. On the other hand, the clinical profile of cardiac insufficiency has changed, affecting a patient population with characteristics at variance from those of past decades, with higher age and comorbidity in those affected. In addition, it is a serious and progressive complication, with a mortality rate of 50% at 5 years, similar to the mean mortality rate for all types of cancer.[3]

Little information has been systematically collected on how to manage cardiac insufficiency in the health care setting; in other words, in a nonselect paient population[9-13] different from the population included in major clinical trials; the incidence of using accepted clinical treatments[14-18] derived from the results of these clinical trials has also not been systematically studied.[19-30] This raises an interesting question as, over the past 10 years, incorporating diagnostic and treatment guidelines from new understanding of the physiopathology of cardiac insufficiency, better and greater access to diagnostic and therapeutic procedures, and the advent of pharmacological treatments that diminish the mortality rates for cardiac insufficiency (such as angiotensin converting enzyme inhibitors [ACEI] and beta-blockers) do not appear to have resulted in an improvement in prognosis, as observed in clinical trials, for the general population treated for cardiac insufficiency.[31]

There is little data in the literature on one factor in particular that appears to have a bearing on the various ways of managing cardiac insufficiency — which hospital service the patient is admitted to; in other words, cardiology vs internal medicine/geriatrics. Recently, an Italian study examined this issue,[12] resulting in a controversy in the medial community as to which services should be made responsible for the treatment of cardiac insufficiency, a controversy that the Sociedad Española de Cardiología (Spanish Society of Cardiology) has echoed in a recent editorial[32] that generated a large number of letters to the director.

Our study analyzes the hospital management of

cardiac insufficiency in the Galician community and the differences between cardiology and internal medicine/geriatric specialists (who are the physicians most often involved in the hospital treatment of cardiac insufficiency), an interesting topic with potentially practical implications and about which there is no information available in our country.

The aim of this study is to respond to the question as to whether treatment by different specialists (cardiologists vs internal medicine/geriatrics specialists) results in differing hospital management of cardiac insufficiency.

Patients and methods

The INCARGAL study (INsuficiencia CARdíaca en GALicia) (Cardiac Insufficiency in Galicia) is a cross sectional study, performed in selected services of the 14 public hospitals of the SERGAS network in Galicia, in which patients who were admitted with a primary diagnosis of cardiac insufficiency were studied consecutively during a sample period of a maximum of 6 months. The study included 951 patients from 14 hospitals (from centers with a specific population; we did not include regional hospitals that are foundations and 1 private hospital). Depending on the size and previous activity of each center, and without exceeding the maximum period of 6 months from the beginning of sample collection, 50, 100, or 150 patients were included who had a primary diagnosis upon admission of cardiac insufficiency and who were admitted to the participating services (cardiology, internal medicine/ geriatrics in 2 centers). Patients who did not end up being admitted due to death or discharge from the emergency department were not included. All patients were asked on a consent form for their permission to be included in the study and for their data to be used as informational support for the study, and for permission to be contacted at a later date for follow-up purposes. In the development of the study protocol, the researchers met to agree on a definition of the syndrome of cardiac insufficiency[14-16] that was used habitually in the clinical setting. The clinical diagnosis according to the researchers involved (cardiologists, internists/gerontologist) was accepted without comparing the uniformity of the use of the diagnosis, with the goal of better reflecting health care practices in patients, so that those included in the study would be representative of what the clinics recognize as cardiac insufficiency in clinical practice.

During the admission, the researchers collected information directly from the patient (or when this was not possible, from members of the immediate family) by administering a structured questionnaire with sociodemographic variables (age, sex, marital state, work situation); physical variables (weight and height); a personal history of risk factors; clinical history and outpatient pharmacological treatment at the time of admission; type of admission (first admission or not); hospital where the patient initially presented and precipitating factors for hospital visit; characterization of the cardiac insufficiency (left or overall). The information was provided by the treating physician in terms of the diagnostic and therapeutic management of the patient during their hospital admission and after discharge. Investigators recorded complications during the admission and the status of the patient at discharge. An attempt was always made to establish a fundamental etiological cause for the cardiac insufficiency and associated diagnosis of ischemic cardiopathy based on the presence of previous AMI, or the presence of a test that showed myocardial ischemia or the presence of coronary lesions.

The sample size (n=951) provided an accuracy of ±2%, with a 95% confidence interval (CI) of 50% estimate of prevalence (for example, the percentage of first admissions). The sample collection phase was begun in January, 1999.

Statistical analysis

Data management and analysis performed centrally. For the description of categorical variables percentages were used, and mean and standard deviation (SD) were used as continuous variables. The comparison of the continuous variables between groups was performed by comparison using the Student t test and, for qualitative variables, the contrast hypothesis was performed using the χ^2 test. The accepted alpha error for all contrast hypotheses was 0.05 bilaterally. Logistic regression analysis was used to estimate the odds ratio (OR) and the 95% CI for the performance of various diagnostic and terapeutic interventions according to the admitting service, adjusted by including the covariables that could have an independent influence on the dependent variable being studied — age, sex, history of dementia, AMI, chronic obstructive pulmonary disease (COPD), valvulopathy, ischemic heart disease and arterial hypertension (AHT), the presence of acute pulmonary edema (APE) and type of admission (first admission or previous admissions). The inclusion of these variables in the model was made necessary by their likely effect on the dependent variables (diagnostic test or treatment) as a function of its clinical relevance. Each OR and 95% CI resulted in a logistic regression model. Finally, regression analysis was performed with admission to a particular service as the dependent variable and the inclusion of 13 variables in the predictive model. The SPSS statistical package, version 9.0, was used for the analysis.

RESULTS

The study included 951 patients, 505 (53.2%) men and 446 (46.8%) women, with a mean age of 75.5±12.4 years (78.5 years±10.6 years for the women and 72.7 years ±13.5 years for the men). In terms of age, 7.8% of the patients were older than 60 years of age; 17.7% were between 60 and 69 years of age, 36.4% between 70 and 79 years of age, 31.7% between 80 and 89 years of age, and the remaining 6.4% of patients were more than 90 years of age. Fifty point eight percent of patients (n=486) were admitted for the first time for cardiac insufficiency, and 466 patients (49.2%) had already been admitted previously. The mean length of hospital stay was 11 days±8 days, with an average stay of 9 days. Of the patients, 38.2% (n=364) were admitted to the cardiology service, and 61.8% (n=587) were admitted to the internal medicine/geriatric service. Table 1 shows the principal characteristics of the study population, both overall and according to the admitting service.

With regard to the prevalence of risk factors, only 4.6% of patients stated they were active smokers, and 24.8% (n=236) were exsmokers. Of the patients, 28.4% were diabetic, 20.1% had hypercholesterolemia, and 58.9% presented with AHT, which was the most frequent risk factor for cardiac insufficiency in our study population; 7.5% of patients had an enolic ingestion of more than 60 g per day. The frequency of ischemic cardiopathy was 31.9% of patients (n=303), and 14.8% of patients (n=141) had a history of AMI, 27.6% (n=263) had a period of valve disease, 32.5% (n=309) were catagorized as having COPD, and 7.5% (n=71) had clinical dementia. The most frequently occurring presenting symptoms were dyspnea (95.6%), edema (52.5%), chest pain (24.2%), and oliguria (19.9%). In those patients who underwent an electrocardiogram during their admission (n=490), 25.7% presented with severe systolic dysfunction (ejection fraction [EF]<35%, and 42.7% had an EF>50%). As far as sex is concerned, a greater number of men had severe ventricular dysfunction (35.7% of men vs 16.7% of women; *P*<.005).

The patients admitted to internal medicine/geriatrics services vs cardiology services constituted distinct patient populations (Table 1), with a statistically significant difference in average age (5 years older for patients admitted to the internal medicine/geriatric services) and also constituted a higher number of women and greater frequency of atrial fibrillation (AF). On the other hand, on the cardiology services, there was a higher number of first admissions and male patients, and a higher incidence of valve disease. It should be pointed out that no difference was found

TABLE 1. **Demographic and clinical variables of the study population upon admission and as a function of the admitting service (cardiology vs internal medicine/geriatrics)**

	Internal medicine-geriatrics (n=587)	Cardiology (n=364)	*P*	Total (n=951)
Age, years ($\bar{X}$±SD)	77.4±11.4	72.5±13.3	<.001	75.5±12.4
Men	43.7	51.9	.01	53.2
First admission	48.4	54.8	.05	50.8
Hospital stay, days ($\bar{X}$±SD)	10.8±8.1	11.4±8.1	.27	11±8
Active smoker	4.6	4.7	.93	4.6
Alcohol consumption > 60 g/day	4.7	11.8	.05	7.5
Arterial hypertension	61.7	54.4	.03	58.9
Dyslipemia	17.6	24.2	.016	20.1
Diabetes mellitus	29.5	26.3	.298	28.4
Peripheral arteriopathy	17.0	9.1	<.001	14
COPD	35.9	26.9	<.001	32.5
CVA	16.7	11.3	.023	14.6
Dementia	9.9	3.6	<.001	7.5
Personal history of ischemic cardiopathy	32.5	30.5	.520	31.8
Valvulopathy	24.4	33	.005	27.7
Arrhythmias	29.5	34.1	.150	31.3
AMI	13.5	16.8	.187	14.7
Atrial fibrillation-flutter	54.7	48.1	.04	52.2
Q-wave AMI on ECG	13.5	17.6	.09	15
Cardiomegaly	90.8	88.5	.24	89.9
EF<35% (n=490)	21.5	29.5	.04	25.7
Ischemic cardiopathy by positive test	36.5	40.3	.242	37.9
Shock	1.9	3	.273	2.3
Acute pulmonary edema	9.2	22.8	<.001	14.4
Left cardiac insufficiency	33.7	46.7	<.001	38.7
Nosocomial death	7	6.6	.895	6.80

All values are expressed as percentages, except where specified.
COPD indicates chronic obstructive pulmonary disease; CVA, cerebrovascular accident; Q-wave AMI, infarct Q-waves on electrocardiogram; EF, ejection fraction.

TABLE 2. **Use of diagnostic and therapeutic procedures according to the admitting service**

Diagnostic/therapeutic management	Internal medicine-geriatrics (n=587)	Cardiology (n=364)	*P*
Spirometry	5.5	6.9	.37
Echocardiogram	40.6	73.8	<.001
Catheterization	2	17.6	<.001
Admission to ICU	3.1	16.8	<.001
ACEI	59.9	59	.80
Beta-blockers	3.9	13	<.001
Revascularization	0.7	2.7	.010
Transfer to another center	2.7	4.1	.18
Transplant	0	0.5	.07

All values are expressed in percentages unless otherwise specified. ACEI indicates angiotensin converting enzyme inhibitors; ICU, intensive care unit.

with regard to length of hospital stay, mortality, or prevalence of previous AMI or ischemic heart disease as shown on diagnostic testing.

Table 2 shows the differences as a function of the admitting service with regard to the use of the most common diagnostic and therapeutic procedures administered. A difference can be seen in the diagnostic and therapeutic management of patients with cardiac insufficiency according to the service to which they were admitted, with a greater use on the cardiology services of diagnostic measures such as echocardiogram and cardiac catheterization, and therapeutic measures such as more frequent admissions to intensive care units (ICU) and the use of beta-blockers and of coronary revascularization. Table 3 shows the differences in the services with regard to the frequency of performance of echocardiograms and cardiac catheterizations categorized according to first admission or with previous admissions. In both categories, these tests were performed more frequently on the cardiology services.

Table 4 shows the OR of using different diagnostic tests according to the admitting service after adjustmenting for the variables that were considered to influence the frequency of using these tests, as indicated in the Patients and methods section.

TABLE 4. **Odds ratio (OR) of performing various tests and treatments as a function of the health care service (internal medicine/geriatrics vs cardiology), adjusted for age, sex, acute pulmonary edema, systolic function, the existence of previous admissions and personal history of dementia, COPD, AMI, CVA, valvulopathy, peripheral artery disease, and AHT**

Diagnostic-therapeutic procedure	OR[a]	95% CI of the OR	*P*
During admission			
Spirometry	1.04	0.50-2.16	.92
Echocardiograma[a]	3.31	2.43-4.52	<.001
Catheterization[b]	6.61	2.78-15.73	<.001
Revascularization[b]	2.93	0.54-15.74	.21
Admission to ICU	3.40	1.48-7.80	<.001
Upon discharge			
Beta-blockers[b]	2.87	1.37-6.04	.005
ACEIb	1.27	0.85-1.90	.23
Spironolactoneb	1.02	0.75-1.93	.43

Reference group, internal medicine/geriatrics. An OR>1 indicated a greater probability of performing the test in patients treated by cardiology services compared with patients treated by the internal medicine/geriatric services. [a]Co-variable of system function was excluded from the regression analysis of the dependent variable «performance of echocardiogram» because the systolic function expressed in EF was estimated by said test. [b]No.=886, the number of live patients for whom treatment was indicated on discharge. ACEI indicates angiotensin converting enzyme inhibitors; ICU, intensive care unit.

Table 5 shows the results of the multivariate analysis model using logistical regression of those factors that could be relevant for the decision to admit patients to one service or the other, using as a reference point the admission to the internal medicine/geriatric service in those centers where the possibility existed of choosing between the 2 types of services.

TABLE 3. **Percentage of performance of echocardiogram and coronary angiography by type of service, categorized as first admission or with previous admissions**

	Internal medicine-geriatrics	Cardiology	Overall	*P*
Echocardiogram				
First admission	51.8 (146/282)	82.4 (164/199)	64.4 (310/481)	<.001
Previous admissions	30.6 (92/301)	62.8 (103/164)	41.9 (195/465)	<.001
Coronary angiography				
First admission	2.1 (6/282)	22.1 (44/199)	10.4 (50/481)	<.001
Previous admissions	2 (6/302)	12.2 (20/164)	5.6 (26/466)	<.001

The numbers that each percentage is based on are indicated in parentheses.
For 4 patients a history of previous admissions was not adequately recorded, and whether or not an echocardiogram was performed was not recorded in the case of 1 patient.

TABLE 5. **Determinants for admission to the cardiology service in an exploratory logistical regression multivariate analysis**

Variable	OR	95% CI of the OR	*P*
Age	0.96	0.95-0.98	<.001
PH AMI	1.69	1.06-2.71	.028
PH valve disease	1.61	1.13-2.28	.008
PH AHT	0.75	0.54-1.05	.09
PH COPD	0.62	0.44-0.88	.006
PH dementia	0.40	0.20-0.79	.009
PH CVA	0.47	0.29-0.76	.002
AF-flutter	0.75	0.54-1.03	.075
APE	2.51	1.60-3.94	<.001

PH indicates personal history; AMI, acute myocardial infarct; AHT, arterial hypertension; COPD, chronic obstructive pulmonary disease; CVA, cerebrovascular accident; AF-flutter, atrial fibrillation-atrial flutter; APE, acute pulmonary edema. In the analysis, only patients who were admitted to centers in which services of both types participated in the study were included. In addition to the permanent variables, in the final model, sex, previous admissions, and personal history of heart disease and diabetes were included; these variable were removed as they did not add anything substantial to the final model.

DISCUSSION

A meeting was held to standardize the diagnostic criteria but, due to the fact that the diagnosis of cardiac insufficiency is primarily clinical, it is possible that differences exist between centers in the use of this diagnosis. Although on occasion this may present a problem,[33] we believe that in this case it is generally a strength of the study, in the sense that the patient inclusion criteria is conducive to the study population reflecting a habitual clinical practice and improves the possibility of generalizing the study to the environment in which it was performed. Of the 14 hospitals that participated in the study, 3 are tertiary hospitals with cardiology services, a referral center for hemodynamics, electrophysiology, and cardiac surgery, with teaching and training of cardiology residents; and generally the remaining hospitals had internal medicine and cardiology services, and were teaching hospitals (but had no cardiology specialists and, in 2 centers, had a geriatric service). Some of the participating hospitals did not have a cardiology service that was independent of the internal medicine service.

On overall analysis of the sample, what primarily stands out is the advanced age of the patients, with a mean of 75 years of age, which is greater than that of patients included in the principal clinical studies of cardiac insufficiency. On the other hand, the proportion of women (46.8%) was notably higher than that in the majority of clinical studies on cardiac insufficiency, which include less than 30% of women,[20,21] in part due to their higher age. Our first thought is that, as has been observed in other studies,12 the clinical studies of cardiac insufficiency have been on populations that are very different from those seen in clinics.

The low nosocomial mortality rate (6.8%; 65 deaths out of 951 admissions) coincides with the data in the literature on a decrease in mortality by cardiac insufficiency,[2] which is associated with a better prognosis and consequently contributes to the increase in the prevalence rate (since the disease has, until recently, been associated with elevated mortality rates.) In this study, 42.7% of patients who underwent an echocardiogram had a normal EF, a number higher than in other series which show between 15% and 30% of patients with a normal EF and classic symptoms of cardiac insufficiency.[34,35] In this respect, the most frequently occurring risk factor for cardiac insufficiency in this study was AHT, which was present in 60% of cases. The mortality rate in our study (5.6%) is, also, very similar to that observed in a previous study carried out in hospitals participating in the INCARGAL.[13]

It is notable that the patients treated by cardiologists vs those treated by internists/gerontologists had different clinical profiles. By service (Table 1), the patients who were admitted to the cardiology service were younger, contained a higher proportion of men, and were being admitted for the first time, and also had a higher prevalence of valve disease and left cardiac insufficiency. In contrast, the patients treated by internists/geriatrists were older, comprised more women than men, had a greater prevalence of congestive heart failure, and were patients who had been admitted to the hospital previously with cardiac insufficiency, without no difference in the rate of ischemic heart disease or AMI; there was also a greater prevalence of comorbidity (cerebrovascular accident [CVA], dementia, COPD, and artery disease).

With respect to management, on univariate analysis (Table 2) there was no difference with regard to the use of ACEI, but there was a much greater use of beta-blockers on the part of the cardiologists; the use of either agent was low in both services. We did not perform an analysis of the efficacy of the various treatments; in addition, the data presented is 3 years old; however, it appears that there is a wide margin for improvement in treatment, especially in treatment with beta-blockers. We also observed a clear difference with respect to the more frequent use of electrocardiograms, cardiac catheterization, coronary revascularization, and admission to the ICU for those patients cared for by the cardiology service. The difference in the frequency of use of echocardiography and catheterization among the services is present both for patients who were treated from the first admission and for the rest of the patients (Table 3). In spite of the differences in clinical management, we did not note a difference in the mean length of stay between the 2 services (Table 1).

The differences in patient management between cardiologists and internists may be due exclusively to the differing patient profiles. The higher age and comorbidity of the internal medicine patients may

mean that these patients were subjected to more conservative management and less use of diagnostic and therapeutic resources. This was not confirmed after performing individualized multivariate analysis for each diagnostic and treatment variable, adjusted for those covariables that could have an influence on the dependent variable being studied (Table 4). After adjustment for all these variables, the service to which the patient is admitted remained an independent variable that resulted in, generally, a trend showing a greater use of diagnostic and therapeutic resources by the cardiology services. These variations in treatment were not associated with the overall detectable nosocomial mortality rate, although the nosocomial mortality rate was relatively low.

On the other hand, the benefits of the differences in management, should they exist, would be manifest in the long term. We investigated what determined whether a patient was admitted to one service or the other, as it appears that this variable most importantly affects the management and treatment of cardiac insufficiency. In this analysis, we only included those centers that had the option of admission to both services (cardiology or internal medicine-geriatrics. We attempted to identify the independent factors that influenced the patient´s admission to one type of service or the other, finding in the multivariate analysis of the covariables studied (Table 5) that the only independent variables that favored admission to the cardiology service were presenting with valve disease, having had a previous AMI and admission in APE; advanced age, COPD, having had a CVA, or presenting with AF or flutter and dementia favored admission to the internal medicine service. On the other hand, the sex of the patient did not have any influence when the decision was made as to the service to which the patient was admitted, thus omitting a bias such as the Yentl syndrome, which has been described in other illnesses.[36-39]

Although the data available in the literature is scarce, it has been shown that, at least in a study of clinical followup in a tertiary hospital in the USA with a transplantation program,[40] the use of invasive therapeutic measures, such as catheterization, angioplasty, implant of pacemakers or defibrillators, revascularization surgery, valve replacement, and cardiac transplantation in the patient population admitted for cardiac insufficiency has increased significantly in the decade of 1986 to 1996, especially in the triennium 1994-1996, with this increased interventionism being associated with a decrease in the standardized mortality rate (mortality observed/mortality predicted), and a decrease in adjusted hospital mortality, as well as a reduction in average length of stay. At the same time, an increase in costs was not observed in the biennium of 1990 through 1991, when the highest nonadjusted rate of expenditure noted, which decreased from that point on. It seems that following an increase in initial costs, in the medium term, the invasive strategy not only saves lives, but also can be profitable for the health system from the cost-benefit point of view.

This study did not include followup that allowed for evaluation of the impact on prognosis in the medium term for the patients who received different management of cardiac insufficiency; additional studies are needed for this determination. Nevertheless, the differences exist and are sizable, and the correction of management practices, if considered necessary, must involve various professionals.

CONCLUSIONS

Cardiac insufficiency in our country is an illness that affects patients of advanced middle age that carries with it a low early hospital mortality rate, which may be related to the increased proportion of cardiac insufficiency with normal systolic function. Medical internists/gerontologists care for patients with cardiac insufficiencies that are older than those cared for by cardiologists; a greater number of women are treated by the internists/gerontologist than by cardiologists. Treating more women is not due to sexism with regard to patient selection, but to their higher age. Women comprise approximately half of the total number of patients with cardiac insufficiency treated in hospitals, which is an amount higher than that indicated by clinical trials on cardiac insufficiency. There is a clear difference in the treatment of cardiac insufficiency according to the treating service. Cardiologists more frequently use beta-blockers and diagnostic and therapeutic interventionism, especially in the case of ischemic heart disease. This does not translate into a difference in early nosocomial death, but could predispose to a more favorable prognosis and a better quality of future life for the patient. It would be convenient to evaluate this aspect at followup, as well as the future health care load of the health system, which would allow evaluating the cost-benefit of the new therapeutic measures for cardiac insufficiency for this population of patients of advanced age.

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