Do Cardiologists at a University Hospital Adopt the Guidelines for the Treatment of Heart Failure?

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Objective – *To verify whether the guidelines for the treatment of heart failure have been adopted at a university hospital. The guidelines recommend the following: use of angiotensin-converting enzyme inhibitors for all patients with systolic ventricular dysfunction, use of digitalis and diuretics for symptomatic patients, use of beta-blockers for patients in functional classes II or III, use of spironolactone for patients in functional classes III or IV.*

Methods – *We analyzed the prescriptions of 199 patients. All these patients had ejection fraction (EF) ≤0.50, their ages ranged from 25 to 86 years, and 142 were males. Cardiomyopathy was the most frequent diagnosis: 67 (33.6%) patients had dilated cardiomyopathy, 65 (32.6%) had ischemic cardiomyopathy.*

Results – *Angiotensin-converting enzyme inhibitors were prescribed for 93% of the patients. 71.8% also had a prescription for digitalis, 86.9% for diuretics, 27.6% for spironolactone, 12% for beta-blockers, 37.2% for acetylsalicylic acid, 6.5% for calcium channel antagonists, and 12.5% for anticoagulants. In regard to vasodilators, 71% of the patients were using captopril (85.2mg/day), 20% enalapril (21.4mg/day), 3% hydralazine and nitrates. In 71.8% of the cases, the dosages prescribed were in accordance with those recommended in the large studies.*

Conclusion – *Most patients were prescribed the same doses as those recommended in the large studies. Brazilian patients tolerate well the doses recommended in the studies, and that not using these doses may be a consequence of the physician's fear of prescribing them and not of the patient's intolerance.*

Key words: heart failure, angiotensin-converting enzyme inhibitor, beta-blockers, anticoagulation

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As a consequence of new therapeutical schedules inducing a great reduction in morbidity and mortality, the treatment of heart failure has recently been modified. The publication of studies on spironolactone and beta-blockers has led to the conclusion that these drugs should be added to the conventional treatment for heart failure with angiotensin-converting enzyme inhibitors, digitalis, and diuretics, because with this association, patients become less symptomatic, decompensate less, require less hospitalization, and have a lower mortality rate as the disease progresses [1-4].

Epidemiological studies carried out in several countries, however, have shown that this management has not been adopted by most cardiologists for many reasons [5,6].

As no consistent Brazilian data on this topic exist, we assessed, for 1 month, how physicians in a tertiary hospital in São Paulo were treating heart failure and how many were adopting the guidelines currently recommended.

Methods

During October '99, we reviewed and analyzed the prescriptions of 199 patients with ventricular dysfunction (ejection fraction ≤0.50) and symptomatic heart failure classified as functional classes II, III, and IV according to the criteria of the New York Heart Association. These patients were being treated by different teams of medical specialists at the outpatient clinics of the Instituto do Coração of the HC-FMUSP (InCor).

These 199 patients comprised all patients with ventricular dysfunction, who sought the ambulatory clinics of general cardiology, coronary artery diseases, geriatrics, valvar heart diseases, and heart failure at 16 (40%) time periods of a total of 40 possible time periods during the month. In this study we named the services with letters (service A, B, C, D, and E), which do not correspond to the above presenting order. These outpatient clinics were chosen because almost all patients with ventricular dysfunction followed up at InCor were treated at them.

The age of the patients ranged from 25 to 86 years (mean 58.4±13.8 years), and 142 were males and 57 were females.

Assessment performed on M-mode echocardiography revealed the following: left ventricular mean diameter of 57.9±8.5mm, left ventricular ejection fraction of 0.40±0.07, and left atrial mean diameter of 44.9±8.8mm. In the echocardiography unit, where all echocardiographies were performed, the following values were considered normal (for adult individuals, weights ranging from 51 to 90 kg): left ventricular diastolic diameters ranging from 38 to 52mm, left atrial diameters ranging from 28 to 40mm, ejection fraction (assessed through the cube method) from 0.58 to 0.80.

The major cause of ventricular dysfunction was dilated cardiomyopathy in 67 (33.6%) patients and ischemic heart disease in 65 (32.6%) patients. Ventricular dysfunction was associated with Chagas' disease in 21 (10.5%) patients and with hypertension in 23 (11.5%) patients. It was secondary to valvar heart disease in 20 (9.5%) patients and to alcoholic cardiomyopathy in 3 (1.5%) patients.

All 199 patients were under treatment in different units at the hospital as follows: 90 (45.2%) patients were being followed up in the general cardiology outpatient clinics, 44 (22.1%) patients in the chronic coronary artery disease outpatient clinics, 28 (14.0%) patients in the geriatrics outpatient clinics, 25 (12.5%) patients in the heart failure unit, and 12 (6.0%) in the valvar heart disease outpatient clinics. Table I shows some characteristics of the population studied according to the major cause of heart disease.

We analyzed the medications prescribed for these patients and their dosages, and we checked the percentage of prescriptions in which the dosages recommended by the guidelines [7] were prescribed.

We considered a recommended dosage of the angiotensin-converting enzyme inhibitors to be minimum values of 75mg of captopril, or 20mg of enalapril, or 20mg of lisinopril (standardized drugs at the hospital), 25mg of carvedilol twice a day, and 25mg of spironolactone. We also analyzed the following: the prevalence of atrial fibrillation, the frequency of prescription of aspirin and oral anticoagulation agents, the type of prescription according to the major diagnosis, the degree of ventricular dysfunction, and the team of medical specialists taking care of the patient.

Results

In the population studied, the patients with alcoholic cardiomyopathy were younger than those with other cardiomyopathies, and the patients with Chagas' disease were younger than those with dilated, hypertensive, and ischemic cardiomyopathy. The remaining patients had similar ages.

We analyzed whether ventricular impairment was similar in the different heart diseases, and no significant differences were found in ventricular impairment assessed through ejection fraction. A trend toward higher ejection fraction was found in patients with hypertensive cardiomyopathy than in those with Chagas' cardiomyopathy (p=0.088), in those with dilated cardiomyopathy (0.055), and in those with ischemic cardiomyopathy (p=0.09).

We also assessed whether the degree of ventricular dysfunction was similar among patients of the different teams of medical specialties of InCor, and we found that the ejection fraction was lower in patients in service A than in all patients in other services. The ejection fractions were as follows: 0.36±0.06 in service A and 0.40±0.06 in service B (p=0.008), 0.40±0.08 in service C (p=0.042), 0.42±0.08 in service D (p=0.0004), and 0.42±0.06 in service E (p=0.012). Ventricular function was also different between services B and D (p=0.04) and similar for the remaining services.

Thirty-two (16.08%) patients had atrial fibrillation, which was more common in patients with valvar heart diseases.

All patients were on some type of medication. Only 5 (2.5%) patients were not receiving vasodilating drugs. Prescriptions were as follows: 185 (93%) patients were prescribed angiotensin-converting enzyme inhibitors, 6 (3.0%) patients were prescribed hydralazine associated with isosorbide dinitrate, and 3 (1.5%) patients were prescribed angiotensin II receptor antagonists. In regard to diuretics, 173 (86.9%) patients were prescribed these drugs as follows: 121 (60.80%) were prescribed furosemide, 92 (46.2%) thiazide diuretics, and 40 (20.1%) both drugs. Amiloride was used in 15 (7.5%) patients, and digoxin in 143 (71.8%) patients (fig. 1).

The patients were also prescribed the following medications: spironolactone 55 (27.6%) patients, beta-blockers 24 (12.0%) patients, acetylsalicylic acid 74 (37.1%) patients, calcium channel antagonists 13 (6.5%) patients, anticoagulants 25 (12.5%) patients, potassium 12 (6.0%) patients, and amiodarone 18 (9.0%) patients.

In regard to angiotensin-converting enzyme inhibi-

Table I – Major heart disease, mean values of age, sex, mean values of echocardiographic data, and prevalence of atrial fibrillation.

				ECHO data				Relative prevalence of AF
Heart disease	N	Age	Males	LV	EF	LA	AF	
Alcoholic	3	47.3±9.0	3	69.3±6.0	0.40±0.05	49.6±15.3	-	0.0%
Chagas' disease	21	51.5±14.3	12	69.0±8.0	0.36±0.06	46.5±6.4	3	(14.2%)
Dilated	67	57.9±15.1	45	70.4±9.9	0.38±0.06	46.2±9.5	20	(29.8%)
Hypertensive	23	59.8±13.3	16	64.5±8.7	0.42±0.08	42.6±8.7	1	(4.3%)
Ischemic	65	61.4±10.9	49	64.9±5.8	0.42±0.07	42.4±7.1	4	(6.1%)
Valvar heart disease	20	57.5±16.0	16	72.0±8.1	0.41±0.07	48.50±10.8	8	(40%)

LV– Left ventricular diastolic diameter; EF– left ventricular ejection fraction; LA– left atrial diameter; AF– atrial fibrillation.

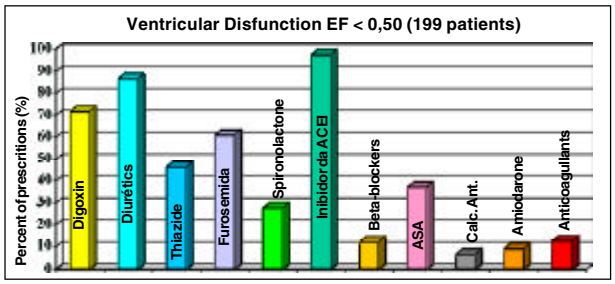

Fig. 1 – Bar graph showing the percentage of patients receiving different types of medication (92.5% received angiotensin-converting enzyme inhibitors). Dig- digitalis; Thiaz- thiazide; Fur- furosemide; Spir- spironolactone; ACEI – angiotensin-converting enzyme inhibitor; Carv- carvedilol; ASA – acetylsalicylic acid; Calc. Ant. – calcium channel antagonist; Am- amiodarone; Anticoag. - anticoagulants.

tors, 142 (71.3%) patients were prescribed captopril in a mean dosage of 85.2mg/day, of whom 102 (71.2%) were prescribed dosages considered appropriate (above 75mg/day). Thirty-nine (19.5%) patients were prescribed enalapril in a mean dosage of 21.4mg/day, 29 (74.3%) of whom were receiving appropriate dosages (above 20mg/day). Lisinopril was prescribed for 3 (1.5%) patients; all received appropriate dosages.

Thiazide diuretics were prescribed in dosages ranging from 12.5mg to 50mg/day (mean dosage 42.7mg/day). Furosemide was prescribed in dosages ranging from 20 to 240mg/day (mean dosage 40.3mg/day).

Spironolactone was used in dosages ranging from 25 to 200mg, and 43 (78.18%) out of the 55 patients on spironolactone used 25 or 50mg/day. The mean dosage was 62.72mg/day.

Carvedilol was prescribed for 19 (9.54%) patients in dosages ranging from 3.125mg once a day to 12.5mg twice a day (mean dosage of 6.5mg/day); 5 patients were prescribed other beta-blockers (propranolol 4 patients and atenolol 1 patient).

Calcium channel antagonists were prescribed for 13 patients as follows: diltiazem for 6 patients, amlodipine for 5, nitrendipine for 1 patient, and nifedipine for 1 patient.

Aspirin was prescribed for 64 patients in dosages ranging from 100 to 300mg/day (mean dosage 125mg/day).

Anticoagulation with dicumarol was being performed in 25 (12.5%) patients, and 17 patients had atrial fibrillation; 13 were not receiving antithrombotic or anticoagulant medication, 10 were receiving aspirin, and 17 were receiving anticoagulation.

Table II shows how frequently drugs are prescribed according to the major diagnosis of heart disease. We note that, in general, prescriptions were similar for different heart diseases, except for digoxin, which was less prescribed, and aspirin and calcium channel antagonists, which were mostly prescribed for patients with ischemic heart disease.

Discussion

Pharmacological management of patients with heart failure has undergone changes due to diffusion of the recent results of the large studies. Since the publication of the RALES, US-Carvedilol CIBIS II, and MERIT-HF studies, patients with heart failure should have been receiving, in addition to angiotensin-converting enzyme inhibitors, digitalis and diuretics, spironolactone, and beta-blockers [1-4]. Even though these studies have shown in an unquestionable manner that these drugs improve the evolution of patients with heart failure, they have not been prescribed for most patients.

The lower frequency of prescribing these drugs may result from several factors, among which we may cite the delay in adopting this management by cardiologists, who, without the required experience, slowly adopt new management techniques and, sometimes, adopt them without knowing how to prescribe the correct doses, prescribing lower doses than those recommended and established as effective.

In several developed countries, the analysis of medical prescriptions has shown that most physicians do not adopt the guidelines integrally [5,6]. In Brazil, we do not have reliable data on how our patients with heart failure are managed. From informal chats with doctors during medical congresses and meetings, we conclude that recommendations are obeyed but with adaptations.

In an attempt to evaluate these data more scientifically, we carried out this study in a large referral hospital in São Paulo, where we assessed the management of patients with left ventricular dysfunction and heart failure by doctors of the different services in the hospital.

The inclusion criteria of the study were the following: presence of systolic ventricular dysfunction characterized by a reduction in left ventricular ejection fraction analyzed with the aid of echocardiography (value ≤0.50) and heart failure classified according to the NYHA functional classes from II to IV. In subsequent days, we identified the patients

Table II – Treatment according to the cause of heart disease

Heart disease	N	Digitalis	Furosemide	Thiazide	Spironolactone	Potassium	Beta-blocker	ACEI	ASA	Calcium ant.	Anticoagulants
Alcoholic	3	3	2	2	1	-	-	3	-	-	-
Chagas' disease	21	17	14	12	8	2	2	21	4	-	3
Dilated	67	56	43	33	24	6	10	65	14	2	13
Hypertensive	23	13	13	13	4	1	2	21	5	4	1
Ischemic disease	65	38	35	24	14	2	10	58	45	7	2
Valvar disease	20	16	14	8	4	1	-	17	6	-	6

ACEI– angiotensin-converting enzyme inhibitor; ASA– acetylsalicylic acid.

with ventricular dysfunction in the outpatient clinics of the hospital, and we analyzed their therapeutical prescriptions. We discarded the cases of first and second medical visits, in an attempt to avoid including initial or experimental therapeutics. We could see that most patients received, as expected, the classical scheme, which comprised digitalis, diuretics, and angiotensin-converting enzyme inhibitors [7-13].

The cause of ventricular dysfunction and its severity seemed to influence the prescription of these drugs. Therefore, digitalis is less frequently prescribed for patients with ischemic heart disease, and the angiotensin-converting enzyme inhibitors more frequently prescribed for patients with hypertensive or dilated cardiomyopathies or cardiomyopathy due to Chagas' disease. This is in accordance with the evidence that digitalis may not be beneficial for patients with ischemic heart disease, and the angiotensin-converting enzyme inhibitors modify the natural history of these heart diseases, in which ventricular dysfunction is the major process [14].

In the quantitative analysis of the treatment, we observed that 97.5% of the patients were using vasodilators as follows: angiotensin-converting enzyme inhibitors in 93% of the patients, hydralazine and nitrate in 3%, and angiotensin II antagonist in 1.5%. Only 5 (2.5%) patients were not prescribed vasodilators, 71% had a prescription for captopril, 20% for enalapril, 3% for hydralazine and nitrates, 1.5% for lisinopril, and 1.5% for losartan. The mean dosage of captopril prescribed was 85.2mg/day and of enalapril was 21.4 mg/day. Considering these dosages, 71.8% of the patients were prescribed the dosages recommended in the large studies (75mg/day of captopril and 20mg/day of enalapril) [8-13]. No patient had a prescription for a dosage below 25mg/day of captopril or 5mg/day of enalapril. Of the patients with an ejection fraction below 0.35 and those with an ejection fraction above 0.36, 74% and 66%, respectively, received the dosages recommended (fig. 2). The 5 patients

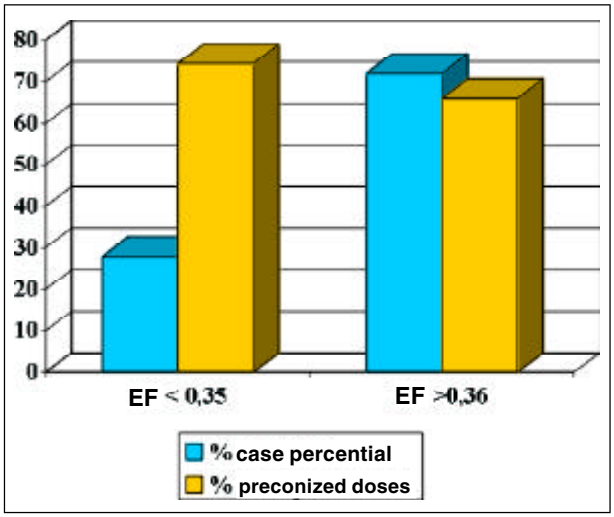

Fig. 2 – Seventy-two percent of the patients had an ejection fraction > 0.36. Of those patients with an ejection fraction < 0.35, a higher percentage of patients was prescribed doses of angiotensin-converting enzyme inhibitors recommended in the large studies.

with no prescription for vasodilators had either ventricular dysfunction secondary to coronary artery disease (4 cases) or to valvar heart disease (1 case), situations in which the physician is much more concerned with the underlying disease than with the ventricular dysfunction itself. In 3 of these patients, ventricular function was 0.50, a situation in which indication for the use of angiotensin-converting enzyme inhibitors was not evidence-based.

These results allow some inferences. Prescribing angiotensin II receptor antagonists for patients who do not tolerate angiotensin-converting enzyme inhibitors due to cough is routine management among physicians. As only 1.5% of the patients had been prescribed angiotensin receptor antagonists, one may conclude that limiting cough is a much rarer fact than usually considered. Similar results were found in the SPICE Study [15]. This study, which was carried out in a population being treated for heart failure, in which intolerance for angiotensin-converting enzyme inhibitors was being sought, has identified 3.6% of patients with cough, which is a low incidence of this side effect in patients with heart failure.

The same was found in regard to renal failure, which would be induced or worsened by angiotensin-converting enzyme inhibitors. In this situation, in our service, we replace the angiotensin-converting enzyme inhibitor by hydralazine and nitrate, and our results show that only 1.5% of our patients were receiving these medications. In the SPICE Study [15], renal failure was detected in 2.2% of the cases, which is a figure very similar to that found in our study. Data suggest that renal failure worsened by the use of angiotensin-converting enzyme inhibitors is so important that treatment with this drug should be stopped, but this is not a frequent finding in patients with heart failure on an ambulatory treatment basis.

These data show that, in general, physicians at InCor have adopted the guidelines in regard to the doses of angiotensin-converting enzyme inhibitors. Significant information deriving from the doses used is that most patients tolerate total doses of the drugs, and that in our institution, even the low doses are higher than those used by most cardiologists in their private practice. Another interesting finding that had already been observed in a previous analysis in 1997 [8] is that patients with greater ventricular impairment were receiving higher doses of inhibitors than those with a lower impairment. This is a noteworthy finding because, even though these more critically ill patients were expected not to tolerate the recommended doses, we observed exactly the opposite. Due to the fact that these are more critically ill patients, the physicians try harder to optimize their treatment, increasing the percentage of cases using the recommended doses. Tolerance of patients to these drugs is noteworthy.

Our results lead us to conclude that no reason exists for not increasing doses based on the possibility that patients would not tolerate higher doses. Considering that patients in our hospital tend to be more severely ill and that most of them tolerate high doses, and knowing that even the

low doses were higher than those usually prescribed, the non-increasing might have been due to the physician's fear of increasing the dose than to dose intolerance.

We checked whether this management had been uniform among the several services at InCor, and we observed that it was not. In general, all services at InCor have prescribed angiotensin-converting enzyme inhibitors for patients with ventricular dysfunction, with increasing doses in the last 2 years. In 1997, in a similar study [16], we found that the mean dose of captopril was 71.9mg, and in 1999 it was 85.29mg. We also found an increase in the frequency of prescription of these drugs from 87% to 97.5% (fig. 3). However, we observed that in certain services, the patients were not receiving the doses recommended in the large studies (fig. 4).

Other prescriptions included the following drugs: digitalis in 71.8% of the patients, diuretics in 86.9%, spironolactone in 27.6%, beta-blockers in 12.0%, acetylsalicylic acid in 37.2%, calcium channel antagonists in 6.5%, and anticoagulant drugs in 12.5% (fig. 1).

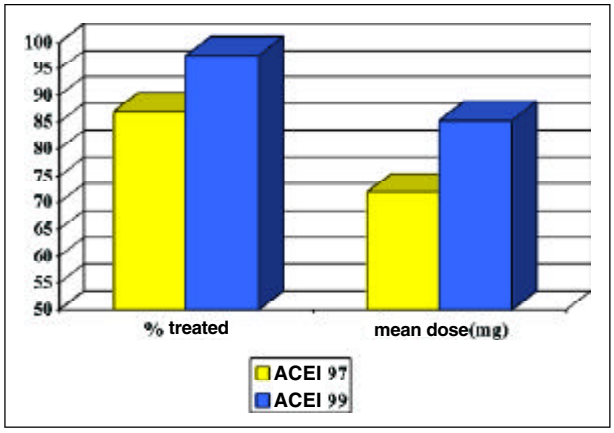

Fig. 3 – The percentage of patients treated with angiotensin-converting enzyme inhibitors or other vasodilators and of those receiving the doses recommended in the large studies increased from 1997 to 1999.

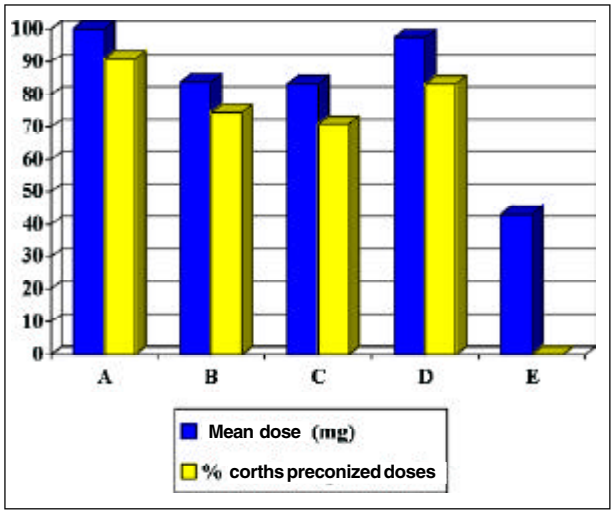

Fig. 4 – The percentage of patients who were prescribed angiotensin-converting enzyme inhibitors and total doses varied according to the service in which the patient was registered.

According to the results of the RALES Study [1], patients with functional class III or IV heart failure should receive spironolactone; we observed that at InCor outpatient clinics, 27.6% of the patients had received it. In other services at InCor, the following percentages of patients had received spironolactone: 52% of the patients in service A, 33.3% in service B, 28.5% in service C, 9.0% in service D, and no patient in service E (fig. 5). In regard to the doses, they were as follows: 25mg for 25 patients, 50mg for 18 patients, 100mg for 11 patients, and 200mg for 1 patient. Considering that the RALES Study recommend doses ranging from 25 to 50mg, it would be interesting to check why higher doses were being used.

Based on the results of the US-Carvedilol Study [2] in 1998 and the CIBIS-II [3] and MERIT-HF [4] studies in 1999, beta-blockers should be prescribed for patients with ventricular dysfunction in functional class II or III. We observed that only 24 (12.06%) patients had been prescribed carvedilol at the mean dosage of 6.57mg twice a day. Four other patients had been prescribed propranolol and another patient atenolol, for controlling hypertension or coronary artery disease.

In the outpatient clinic of service A, 44% of the patients had been prescribed carvedilol, in service C 14.2%, in service D 4.5%, in service B 2.2%, and in service E no patient. No prescription for 25mg twice a day was observed.

Calcium channel antagonists had been prescribed for 13 patients, particularly for the hypertensive ones and those with coronary artery disease. We observed that 6 patients had a prescription for diltiazem, 1 patient for nitrendipine, and 1 patient for nifedipine. Only 5 patients had been prescribed amlodipine, which, of the calcium channel antagonists, seems to interfere less with the cardiac function, according to the PRAISE Study [17].

The results of the PRAISE I and II and V-HeFT-3 studies [17,18] recommend amlodipine or felodipine (third generation antagonists) for ventricular dysfunction requiring calcium channel antagonists, because they do not increase the manifestations of heart failure. On the other hand, diltiazem and nifedipine should be suspended because they are known to increase these manifestations.

The graph in figure 6 shows the frequency of prescription compared with data observed in the SPICE [15] and SOLVD [8,9] studies, where differences are observed mainly in regard to beta-blockers. In our study, the frequency of

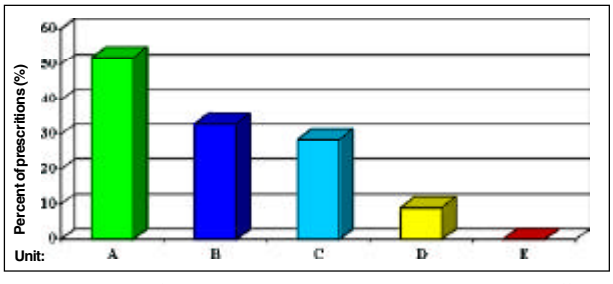

Fig. 5 – Percentage of patients who were prescribed spironolactone in the different services studied.

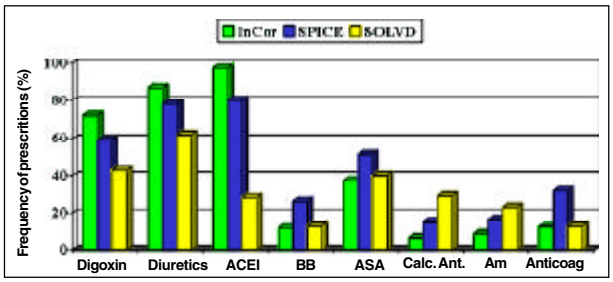

Fig. 6 – Graph showing the frequency of prescription of the drugs used in the treatment of heart failure in our study and in the SOLVD and SPICE studies.
ACEI – angiotensin-converting enzyme inhibitor, BB- beta-blockers, ASA – acetylsalicylic acid, Calc. ant. – calcium channel antagonists, Amiod – amiodarone, Anticoag- anticoagulants.

prescription was lower than that observed in the SPICE Study, but similar to that of the SOLVD Study in 1992. This result may be due to the fear of many cardiologists of prescribing beta-blockers to their patients. The same happens with anticoagulants and antiplatelet drugs, which were more frequently prescribed in the 2 international studies. On the other hand, we used less calcium channel antagonists, because in our case series we had a predominance of dilated cardiomyopathy, as apposed to the 2 international studies in which ischemic cardiomyopathy predominated.

Another controversial point is the management of patients with atrial fibrillation, which significantly increases the incidence of thromboembolic phenomena. Anticoagulation could be the best way to prevent embolism, but aspirin or another antiplatelet agent could be used in patients with contraindication to anticoagulants [19-21].

Atrial fibrillation was observed in 40 patients, 17 of whom were receiving anticoagulation therapy, 10 were using aspirin, and 13 used no medication. Was this management correct?

These numbers show that we have not yet totally adopted the correct management of anticoagulation in patients with atrial fibrillation.

Another point that deserves consideration is the prescription of aspirin for patients using angiotensin-converting enzyme inhibitors, because aspirin could reduce their effect due to its action on bradykinin [22-24].

We observed that 64 patients were using aspirin, 49 of them were using 100mg, 14 patients 200mg, and 1 patient 300mg. Considering the diagnosis of heart disease, we observed that aspirin was prescribed for 69.2% of the patients with ischemic cardiomyopathy, for 21.7% of the hypertensive patients, for 30% of the patients with valvar heart disease, for 20.8% of the patients with dilated cardiomyopathy, and for 19.0% of the patients with Chagas' disease. Some articles [22-24] and a thesis of our institution have shown that aspirin may reduce or block the vasodilating effect of angiotensin-converting enzyme inhibitors, particularly at doses of 200 or 300mg. In our outpatient clinic and in the daily clinical practice, this association is common. Should we change the antiplatelet agent in patients with heart failure?

This characteristic of aspirin use is controversial and has been discussed and analyzed in the literature. In patients with coronary artery disease, in whom the benefits of aspirin use has been well established, it is suggested that aspirin prescription should be maintained, even though some researchers suggest that aspirin may be replaced by other antiaggregating agents that do not interfere with the action of angiotensin-converting enzyme inhibitors. In patients with heart failure due to other causes, aspirin should be avoided because its beneficial effect on preventing embolic phenomena has not been shown, and, in addition, evidence exists, as in the WASH Study, that aspirin use increases events such as hospitalization and death.

Finally, we tried to assess whether the degree of ventricular impairment could explain the difference in management observed among the different services, because service A seems to be the most obedient in regard to the guidelines, prescribing high doses of angiotensin-converting enzyme inhibitors, spironolactone, and beta-blockers for the patients. Service E does not seem to abide by these rules, because no patient received high doses of angiotensin-converting enzyme inhibitors, spironolactone, and beta-blockers. The management of the remaining services lies between these 2 extremes. Even though service A handles more critically ill patients, patients in the other services are similar in regard to severity of disease. Therefore, we may not accept that differences in management are only due to the severity of cardiac impairment.

In regard to the question "Should patients with heart failure be treated by a specialized team?", our data allow answering that they should, because service A is the Heart Failure Unit, and the results have shown that a most significant percentage of patients are treated there with medications and doses recommended by the guidelines [25,26]. This fact was not observed with the same frequency in the other teams.

In conclusion, the guideline for prescribing angiotensin-converting enzyme inhibitors for patients with ventricular dysfunction is adopted by cardiologists, because only 2.5% of the patients did not receive this type of medication. Even though more recent, the prescription of spironolactone is already more frequently adopted than that of beta-blockers. Despite their noxious effects, calcium channel antagonists were prescribed in 6.5% of the patients. Aspirin, which may reduce the effects of angiotensin-converting enzyme inhibitors, was prescribed in 37.2% of the patients. Differences in management among the diverse services of InCor allow the assumption that more specialized teams in the treatment of heart failure adopt, in a more complete manner, the guidelines for the treatment of this disease.

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