Overview of acute decompensated heart failure in Argentina: Lessons learned from 5 registries during the last decade

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Background The acute decompensated heart failure (ADHF) is not as well characterized as the chronic phase, particularly in Latin American countries. Thus, the aim of this overview was to describe the clinical profile, treatment, and inhospital course of ADHF during the last decade in Argentina.

Methods Results obtained from 5 Argentinean prospective and multicenter registries, involving 2974 patients admitted for ADHF, were assessed. These registries were performed and published between 1992 and 2004.

Results The mean age was 65 to 70 years, and nearly 40% were female. Coronary artery disease was the main etiology in nearly 30% of the patients. Between 1992 and 2004, the use of angiotensin-converting enzyme inhibitors increased from 29.9% to 53.4% before admission and from 48.5% to 69.3% before discharge; the use of β-blockers rose from 4.2% to 33.2% at admission and from 2.5% to 42.4% at predischarge (all $P < .0001$). Inhospital mortality rates in the first to the fifth registries were 12.1%, 4.6%, 10.5%, 8.9%, and 4.7% (P [trend] = .006). However, there were 98 (7.7%) deaths among 1272 patients before 2002, compared with 129 (7.6%) among 1702 since 2002 (P = .9).

Conclusions The clinical profile of this largest sample of ADHF reported from a Latin American country is different from that observed in clinical trials and comparable to registries worldwide. Although an improvement in the use of recommended drugs was observed in the last decade, the average mortality has not changed. These findings might have implications in the design of multinational clinical trials. (Am Heart J 2006;151:84-91.)

Significant progress has been made in the management of cardiovascular disorders in the United States and in Argentina in the last 2 decades, as reflected by an approximately 50% and 31% reduction in age-specific coronary artery disease (CAD) mortality, respectively.[1-3] Despite such advances, the frequency of chronic heart failure (CHF) has been increasing in the United States with a prevalence of 5 000 000 cases and an incidence of 550 000 new cases every year.[4] Hospitalization due to acute decompensated heart failure (ADHF) is estimated at 1 million in the United States. This represents a >100% raise in the last 2 decades.[4,5] In Europe, an international survey showed that 24% of deaths or hospital discharges were diagnosed or suspected as CHF.[6]

Over the last 15 years, >70 000 patients were enrolled in randomized, controlled trials with drug therapies that have yielded major advances in the treatment of CHF, deriving from the generation of several guidelines for the treatment of this population.[7-11] However, the evidence generated during the hospitalization for ADHF is scarce despite the fact that mortality, morbidity, and readmission rates are considerably higher than in acute coronary syndromes, and involve about 60% to 70% of the overall cost of CHF.[4,12] Moreover, available guidelines about the management of ADHF are limited.[13]

Although some differences have been noted among Hispanic minorities and non-Hispanics in the United States, in process of care and outcome in patients with acute myocardial infarction and CHF,[14-16] Latin American citizens represent a conglomerate of different cultures and nationalities. Recently, the rising incidence of CHF in Latin American countries has been considered as related to an increasing prevalence of risk factors such as diabetes, hypertension and obesity, and aging of the population.[16] Moreover, there are limited data concerning the ADHF from Latin America, and this information might influence the design of international clinical trials that include those countries.

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Table I. Characterization of registries

Name	ENUC-1993	CONAREC-1999	IC-SAC-2002	IC-SAC-2004	CONAREC-2004
No. of patients	521	751	400	615	687
Inclusion period	1992-1993	Dec 1996-Oct 1997	Feb-Dec 1999	May 2002-May 2003	Jul 2003-Apr 2004
No. of sites	82	31	74	36	25
Public (%)/private practice (%)	30/70	39/61	39/61	42/58	30/70
% Distribution per region (% of population)*					
Center (66)	70.1†	64.5‡	83.7†	94.6†	60.4‡
Litoral (9.2)	2.5†	19.7‡	1.4†	0†	30.4‡
Northwest (10.9)	6.2†	8.2‡	5.4†	2.7†	3.1‡
Cuyo (7.7)	15†	7‡	1.4†	0†	3.8‡
Patagonia (6.2)	6.2†	0.6‡	8.1†	2.7†	2.3‡

*Argentinean territory (excluding Antartida and Islands) was divided in 5 regions: Center (States: Buenos Aires, Córdoba Entre Ríos Santa Fe), Litoral (Misiones, Formosa, Chaco Corrientes), Northwest (Jujuy, Salta, Catamarca, Tucuman, Santiago del Estero), Cuyo (La Rioja, San Juan, Mendoza, San Luis), and Patagonia (La Pampa, Neuquen, Rio Negro, Chubut, Santa Cruz, Tierra del Fuego). The percentage of the inhabitants of each region is provided.[24]
†The distribution was made according to proportion of center corresponding to the region.
‡The distribution was made according to proportion of patients corresponding to the region.

Table II. Baseline characteristics

	ENUC-1993 (%)	CONAREC-1999 (%)	IC-SAC-2002 (%)	IC-SAC-2004 (%)	CONAREC-2004 (%)	*P*
Age (y)	67.2 ± 14.1	65.5 ± 15	68.3 ± 14.8	70.2 ± 14.8	69.8 ± 12.9	<.0001
Male	60.9	58.9	66.0	54.9	57	.007
Dyslipemia	26.3	–	–	–	25	.61
Hypertension	57.2	65.9	70.5	65.5	69.3	<.0001
Diabetes	21.8	20.8	24.3	24.2	26.1	.15
COPD	–	16.1	19.0	13.8	13.8	.079
Renal insufficiency	–	9.6	10.5	9.7	11.8	.52
Prior MI	25.1	24	23.0	21.9	19	.098
Atrial fibrillation	28.9	28	34	27.1	21	<.0001
Prior hospitalization	57.4	50	63.7	42.6	44.7	<.0001
Functional class III-IV before admission	–	30	26	78.6	47	<.0001

COPD, Chronic obstructive pulmonary disease.

In Argentina, there is an estimated 70 000 annual admissions for ADHF, 20% to 30% of the total cardiovascular hospitalization.[3] Although there are no data in Medline about ADHF in our country, 5 multicenter surveys were completed during the last decade.[17-21] Thus, the aim of this overview was to describe the clinical profile, use of resources, treatment, and inhospital course of patients admitted with worsening heart failure during the last 10 years in Argentina to estimate the trend of practice patterns and event rates in a Latin American country.

Materials and methods

Five Argentinean registries of hospitalized patients with ADHF were reported in an Argentinean journal during the last decade.[17-21] Pooled data included 2974 subjects prospectively collected in several sites throughout the country. None of them were followed up after discharge.

The main characteristics of the registries are summarized in Table I. In The National Survey of Coronary Care Units (Encuesta Nacional de Unidades Coronarias [ENUC]), the data collection was restricted to admissions in the coronary care unit (CCU) because of ADHF, and accounts for the most severely ill patients of the 5 registries.[17]

Two national surveys of heart failure from Argentinean cardiology fellows (Consejo Argentino de Residentes de Cardiologia [CONAREC] VI-1999 and CONAREC XII-2004) were completed.[18,21] Patients that met the Framingham modified criteria,[22] hospitalized in any hospital area, were admitted.

The Argentine Society of Cardiology carried out 2 national registries of heart failure, Registro Nacional de Internación por Insuficiencia Cardiaca (IC-SAC)-2002 and IC-SAC-2004.[19,20] Heart failure diagnosis was left to investigator criteria. Some centers had no cardiovascular facilities, and admission was not restricted to the CCU/ICU.

Centers were classified according to predominant practice as private if most patients admitted had social security or health insurance; or in other cases, they were considered as public. To assess the whole country representation, a proportional distribution of centers or patients per geographic region was estimated according to the World Health Organization Argentinean territorial division in 5 groups of states:

Table III. Etiology

	ENUC-1993 (%)	CONAREC-1999 (%)	IC-SAC-2002 (%)	IC-SAC-2004 (%)	CONAREC-2004 (%)	*P*
CAD	28.7	29.3	34	27.4	38.4	<.0001
Chagas disease	2.5	3.6	4.3	8.4	1.3	<.0001
Hypertensive heart disease	32.3	21.2	21.8	18.2	23.7	<.0001
Valvular disease	21.7	16.7	17.0	16.4	20.7	.045
Idiopathic	1.3	13.8	5.0	3.7	7.6	<.0001
Alcoholic	5.4	1.1	1.2	–	0.7	<.0001

Table IV. Presentation and reason for decompensation

	ENUC-1993 (%)	CONAREC-1999 (%)	IC-SAC-2002 (%)	IC-SAC-2004 (%)	CONAREC-2004 (%)
Pulmonary edema	31.5	18.0	22.2	–	12.7
Cardiogenic shock	9.2	6.1	–	3.09	1
Low output state/hypoperfusion	7.2	–	4.5	–	5.5
Pulmonary/systemic congestion	–	–	73	67.2	86.9
Poor treatment compliance	31.1	11.9	16.2	16.1	16
Dietary disorder	43.2	10	16.7	11.5	33.5
Hypertension	25.5	–	10.5	10.7	10.2
Atrial arrhythmias	21.7	–	5.5	–	10.8
Infection	16.9	12.3	8.5	10.2	11.2
No reason detected	29.9	42.3	30.5	–	17.8

Center, Litoral (Northeast), Northwest, Cuyo (West), and Patagonia (South).[23]

Statistical analysis

Categorical variables are expressed as percentages and numeric variables with mean ± SD. Differences in categorical variables among the 5 studies were assessed by the χ^2 test and the χ^2 test for trend. Differences in numeric variables were tested using the 1-way analysis of variance. Differences in *P* values <.01 were considered statistically significant.

Results

Baseline characteristics

History, risk factors, and comorbidity are shown in Table II. The mean age was 65 to 70 years, with older patients in the last IC-SAC-2004 and CONAREC-2004 registries. The proportion of female patients was about 40%.

Of the 5 registries, 3 assessed socioeconomic aspects. In the CONAREC-1999 survey, only one third had high school or university education; 21.5% were employed and >60% had health insurance. The IC-SAC registries showed consistently that a quarter of the population lacked health insurance, and only 12% were employed.

Demographics, risk factors, and comorbidity were comparable, except for a higher prevalence of hypertension in the IC-SAC-2002 and CONAREC-2004 registries. Diabetes was found in 21% to 26% of the patients. Previous myocardial infarction was recorded in about a quarter, and 21% to 34% showed atrial fibrillation.

Approximately one half of the patients had a history of hospitalization caused by CHF. The prevalence of functional class III or IV patients was greatly different among all studies.

Etiology

The proportion of suspected CAD as the principal etiology of CHF varied from 27.4% to 38.4%. Hypertensive heart disease was diagnosed in >20% as the only etiology. The prevalence of Chagas disease was consistently low. Idiopathic cardiomyopathy was more frequently diagnosed in CONAREC-1999 (Table III).

Clinical presentation

One of the most important differences among the registries was the clinical profile at admission. Although most of the patients presented evidence of fluid overload, the ENUC patients' condition was more severe, with a higher prevalence of acute pulmonary edema, shock, and peripheral hypoperfusion than in the others (Table IV).

Poor medication compliance and dietary disorder accounted for worsening CHF in a high proportion of patients, and >30% of them had no clear cause for decompensation (Table IV).

Mean systolic and diastolic blood pressures were normal in the 5 registries, but they were higher in IC-SAC-2002 and lower in CONAREC-2004. There were clear differences among studies in renal function and hematology (Table V).

Table V. Admission parameters

	ENUC-1993	CONAREC-1999	IC-SAC-2002	IC-SAC-2004	CONAREC-2004	*P*
Systolic blood pressure (mm Hg)	134.8 ± 38.6	133.7 ± 30.6	141 ± 64.9	135 ± 37	131.3 ± 31.3	.004
Diastolic blood pressure (mm Hg)	81.2 ± 21.2	78.6 ± 17	82.3 ± 22.9	80 ± 18	78.6 ± 17	.003
Cardiac rate (beat/min)	106.4 ± 25.6	–	98.5 ± 24.9	97 ± 26	–	<.0001
Third sound (%)	59.3	28.2	36.3	25	23	<.0001
Hematocrit (%)	41.4 ± 7.5	40.8 ± 6.3	38.9 ± 9.6	39 ± 6	38.2 ± 7	<.0001
Plasmatic sodium (mEq/L)	137.7 ± 5.8	136.9 ± 6.1	133 ± 23.2	136 ± 5	136 ± 5.7	<.0001
BUN (mg/dL)	56.2 ± 2.9	55 ± 32	53.5 ± 31	56 ± 29	63 ± 40	<.0001
Creatinine (mg/dL)	–	1.33 ± 0.7	1.15 ± 0.9	–	1.52 ± 0.9	<.0001
LBBB (%)	17.3	26.6	22	20.8	21	<.0001
RBBB (%)	12.5	9.9	–	–	9	.13

LBBB, Left bundle brunch block; *RBBB*, right bundle brunch block.

Table VI. Prior admission and before discharge treatment

Medication	Time	ENUC-1993 (%)	CONAREC-1999 (%)	IC-SAC-2002 (%)	IC-SAC-2004 (%)	CONAREC-2004 (%)	*P**	*P* (trend)†
ACE-I	Prior	29.9	57.7	47.5	45.8	53.4	<.0001	<.0001↑
	Discharge	48.5	68.8	72.6	–	69.3	<.0001	<.0001↑
Diuretics	Prior	42	59.0	52.7	52.8	48.5	<.0001	.82
	Discharge	78.1	84.2	75.1	–	75	<.0001	.006↓
β-Blocking agents	Prior	4.2	10.5	9.3	26	33.2	<.0001	<.0001↑
	Discharge	2.5	11.7	14.3	–	42.4	<.0001	<.0001↑
Aspirin	Prior	–	38.5	35	–	45.7	.0009	.006↑
	Discharge	–	53.3	54.7	–	58	.20	.076
Digital	Prior	39.1	48.5	38	28.9	23.6	<.0001	<.0001↓
	Discharge	50.5	53.9	49.9	–	24.9	<.0001	<.0001↓
Antialdosteronic	Prior	–	–	17	18.5	26.1	.0003	.0001↑
	Discharge	–	–	31.3	–	48	<.0001	<.0001↑
Amiodarone	Prior	12.3	21.6	23	–	17	<.0001	.15
	Discharge	7.8	21.0	29.3	–	18	<.0001	<.0001↑
Oral anticoagulation	Prior	8.8	17.2	18	–	17.9	<.0001	.0002↑
	Discharge	8.1	22.1	25.7	–	23.4	<.0001	<.0001↑

↑, increasing trend; ↓, decreasing trend.
*χ^2 Test.
†χ^2 Test for trend.

Trends in the use of drugs

Between 1992 and 2004, the temporal trends in the use of angiotensin-converting enzyme (ACE) inhibitors increased from 29.9% to 53.4% before admission and from 48.5% to 69.3% before discharge; the use of β-blockers rose from 4.2% to 33.2% at admission and from 2.5% to 42.4% at predischarge (all $P < .0001$). The β-blocker more frequently indicated was atenolol (13.5%) in IC-SAC-2004 and carvedilol (29%) in CONAREC-2004. Spironolactone was not registered before 2002; however, it was increasingly indicated since that year (Table VI). In most of the drugs, the prescription rate augmented at discharge.

Use of resources and inhospital course

Only in the ENUC registry, all patients were admitted in the CCU (Table VII). The mean hospital stay was reported as 9.3 days in IC-SAC-2002 and as a median of 7 days in IC-SAC-2004. Echocardiography was done on only 37% of patients in the first study; thereafter, 65.3% to 85% of the subjects had an evaluation of left ventricular (LV) function. Less than one third of the echocardiograms reported a preserved or only mildly impaired LV systolic function. Hemodynamic monitoring, angiogram, and mechanical ventilation were rarely used. Intravenous inotropics were administered in >30% of the cases in the ENUC and IC-SAC-2002 registries, but in <19% in the others.

The incidence of complications during hospital stay was low, predominating renal dysfunction and hypotension. Inhospital mortality rates in the first to fifth registries were 12.1%, 4.6%, 10.5%, 8.9%, and 4.7% (test for trend $P = .006$). However, there were 98 (7.7%) deaths among 1272 patients before 2002, compared with 129 (7.6%) among 1702 since 2002 ($P = .9$).

Table VII. Inhospital work-up

	ENUC-1993 (%)	CONAREC-1999 (%)	IC-SAC-2002 (%)	IC-SAC-2004 (%)	CONAREC-2004 (%)	*P**	*P* (trend)†
ICU/CCU admission	100	–	63	57.5	54.4	<.0001	.007↓‡
Echocardiogram	36.7	85	65.3	71.7	74	<.0001	<.0001↑
Preserved LV systolic function§	31.8	36	25.3	20	27	<.0001	<.0001↓
Swan-Ganz catheter	7.1	–	6.5	11.8	2.3	<.0001	.017↓
Coronary angiogram	3.5	20	–		4.1	<.0001	.52
Mechanical ventilation	5.4	–	8.8	5.2	3.2	.001	.015↓
Intravenous treatment							
Any inotropes	35	17.6	30.8	18.2	10.8	<.0001	<.0001↓
Nitroglycerin	35.1	–	–	–	28.7	.017	.017↓
Nitroprusside	7.8	–	–	–	4.2	.007	.007↓
Hospitalization duration (d)	–	–	9.3 ± 7.9	7	–	–	–
Inhospital complication							
Pulmonary edema	17.1	–	–	–	–	–	
Hypotension/shock	8.4	6.1	9.8	9.1	5.8	.031	.54
Refractory heart failure	8.2	3.2	–	–	3.3	<.0001	.0001↓
Renal dysfunction	–	–	9.8	6.1	7.1	.099	.18
Inhospital mortality	12.1	4.6	10.5	8.9	4.7	<.0001	.006↓

*χ^2 Test.
†χ^2 Test for trend.
‡*P* value computed excluding ENUC-1993.
§Left ventricular function preserved or mildly decreased among patients with echocardiogram.

Discussion

This overview of 5 registries of patients admitted because of ADHF in Argentina showed a low rate of CAD, equivalent rates of comorbidities, and slightly higher mortality rates compared with European and American reports, with a lower than expected prevalence of the Chagas cardiac disease. Although an improvement in the use of recommended drugs for this condition was observed in the last decade, the average mortality has not changed.

The mean ages in the Argentinean registries are slightly higher than the range of 50 to 65 years for patients enrolled in randomized trials, similar to the average shown in 2 European surveys, but 5 to 10 years younger than observed in the nonrandomized community hospitals' registries.[6,24-29] This fact might be interpreted as a bias related to the selection of sites affiliated to the Argentine Society of Cardiology and also as a referral bias because younger patients could be referred to secondary or tertiary centers that have better technology. Furthermore, different studies have reported that the population treated by a cardiologist is younger than that managed by an internist.[25] On the other hand, high rates of comorbidities and about 40% of women better reflect what is seen in actual hospital patient population[6,25,28] than those seen in clinical trials with minor comorbidities and male predominance.

Coronary artery disease was diagnosed as the CHF etiology in <40% of the patients. This rate is lower than the 60% to 70% reported in other studies.[24] These differences (or underestimation) might be related to the fact that these registries were consecutive and nonselective, and to the scarce search of CAD, as reflected by the low use of angiography or functional studies. Beyond economic limitations, a recent survey among Argentinean cardiologists showed a low willingness to indicate cardiac catheterization because only <40% based the diagnosis of CAD as the CHF etiology on an additional test.[30] In contrast with the common concept,[16] there was a surprisingly low prevalence of Chagas disease, and the reported 750 000 Chagasic cardiac diseases appeared excessive.[31,32] This divergence might be related to a subregistry, lack of routine search, and the fact that most patients were recruited in non-endemic areas. The use of a routine serological test demonstrated that the prevalence of Chagas in outpatients with CHF was higher than suspected by clinical diagnosis, with a significant increment from 2.7% to 13%.[33]

As a trigger for hospitalization, these data showed that noncompliance and dietary disorders accounted for >30% of the cases. The low prevalence of the functional class III to IV before the exacerbation emphasized the need for better education of patients and families to treat these otherwise stable subjects. Other potential factors of decompensation, such as myocardial damage detected by troponin T, was not systematically collected in any of the registries.[34]

The hospital stay appears to be longer than the mean time reported in the OPTIME trial.[35] However, it is

equivalent to data generated from community hospitals in the United States,[26,27] even shorter than in Europe.[6,25,36] A drop in length of stay has been reported in Medicare patients hospitalized for ADHF, from 8.5 days in 1991 to 5.7 days in 1997.[27]

There was an improvement at the time of discharge in ACE inhibitors and β-blockers prescription. Furthermore, the practice patterns changed from the first to the last report. Nevertheless, only around 50% of the patients were treated with ACE inhibitors and 30% with β-blockers at the time of admission in the 2004 registries. Although a trend toward increasing the use of medication known to improve survival was seen, the rate was low, considering a population that could greatly benefit. However, this rate appears similar or even better than reported in other community settings with unselected population,[25-29,36,37] and the variability in the use occurs not only in Argentina.[38]

The inhospital work-up showed that although most patients were hospitalized in the CCU/ICU with a high percentage of pulmonary edema and low output rates, the use of inotropics and right heart catheterization were relatively low. This fact might suggest that inotropics are mostly indicated for treating hypotension or low output states rather than for volume overload.

The echocardiogram was performed in a low proportion despite the fact that most of the population had previous CHF diagnosis, including at least one prior hospitalization. The sub-use of echocardiography in CHF was associated with low use of ACE inhibitors and decreased survival rates.[39]

There were important differences among the 5 registries that could explain the different inhospital mortality rates. More severely ill patients could have influenced the 12.1% mortality rate of the ENUC registry. On the other hand, CONAREC-1999 and CONAREC-2004, with lowest mortality rates, recruited patients at centers where training programs were available, thus allowing the assumption that better treatment was provided. In these 2 registries, inotropics use was low, reflecting a less sick population as well as an intention to avoid risky drugs. IC-SAC surveys, with intermediate mortality rates, had differences in inclusion criteria, as well as unrestricted CHF diagnosis where patients with other confounding diseases might have been included. However, the proportion of death before and after 2002 was similar. Worldwide data of mortality during hospitalization vary from <2.5% in clinical trials[35] through 4% to 8% in recent studies,[6,25,28] reaching >9% in some European countries,[6] with a 52.8% reduction in the mortality trend between 1991 and 1997.[29] One possible explanation may be that many patients included are the most severe ones referred to participant institutions, but also can be related to the greater patient risk within the health care system in Latin America.[40]

Lessons learned and future challenges

The suggestions for future registries comprise the need of including more extensive regions from Argentina and to expand it to other Latin American countries. It should also be necessary to evaluate how the process of care is developed, including additional measures with potential impact of the outcome, such as counseling, physical activity, CHF specialist referral, drugs use, and discharge orders. Outpatient follow-up would provide a perspective on how the acute treatment impacts on long-term outcome. An Argentinean study of 1518 CHF outpatients randomized to telephonic intervention, compared with usual care, demonstrated a significant 20% reduction in the combined end point of death and heart failure hospitalization in the active group; however, the incidence of worsening CHF hospitalization was 22.3% at 457 days in the usual care group, underscoring the prognosis of CHF in our country.[41]

Limitations

These registries were performed by different organizations, and the relation between public and private centers was 1:2. Therefore, differences in academic affiliation and availability of hospital resources could not be excluded. Private and public hospitals in Argentina, as well as in other Latin American countries, experience different processes of care. In addition, the participation was voluntary with different centers recruiting patients at different points of time. Therefore, the differences may not be only due to temporal trends, but by different practice patterns.

Other possible concerns might be the geographical regions evaluated. As an estimation, except for IC-SAC-2004 in which the most developed region is overrepresented, the other registries proportionally included patients from all regions, and the results can be considered representative of the whole country.

The statistical assessment should be taken with caution, as it was performed using data available from publications instead of individual data and, therefore, are useful only to provide a general overview. In accordance with these results, the only available comparison between the IC-SAC-2002 and IC-SAC-2004 databases established that in spite of divergences in demography, clinical profile, and treatment between cohorts, the length of stay and mortality were similar.[20]

Conclusions

The exacerbation of chronic heart failure in Argentina with its particular characteristics and practice patterns provides a good example of the current situation in Latin America, which should be carefully considered at the time of extrapolating clinical trial data that involve these areas. From the health care point of view, the need of applying the more cost-effective therapies to this

high-risk and costly population would greatly benefit a region where the lack of resources is the rule.

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An unexpected inverse relationship between HbA_{1c} levels and mortality in patients with diabetes and advanced systolic heart failure

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Background In diabetes, poor glycemic control, as indexed by hemoglobin $A1_c$ (HbA_{1c}), is associated with increased risk of cardiovascular events and new-onset heart failure (HF). However, in patients with diabetes and HF, the relationship between glucose control and survival has not been investigated. Our study aimed to evaluate the relationship between HbA_{1c} levels and mortality in patients with diabetes and advanced systolic HF.

Methods We studied a cohort of 123 patients with diabetes and advanced systolic HF referred to a single center with HbA_{1c} values measured at presentation. The patients were grouped based on HbA_{1c}: $HbA_{1c} \leq 7.0$ (n = 49) and $HbA_{1c} > 7.0$ (n = 74).

Results The cohort was 70% men, ejection fraction of 25% ± 7, 59% ischemic etiology, HbA_{1c} 7.9 ± 1.8, and diabetes duration of 8.6 ± 9.0 years. The HbA_{1c} groups were similar in age; sex; New York Heart Association class; body mass index; diabetes duration; and insulin, metformin, and glitazone use. $HbA_{1c} > 7.0$ was associated with higher ejection fraction, increased β-blocker, and sulfonlyurea use. Patients with $HbA_{1c} \leq 7.0$ had significantly increased all-cause mortality, compared with those with $HbA_{1c} > 7.0$ (35% vs 20%, hazard ratio 2.6, 95% CI 1.3-5.2, $P < .01$). In multivariate analysis, $HbA_{1c} \leq 7.0$ remained associated with i ncreased mortality (hazard ratio 2.3, 95% CI 1.0-5.2).

Conclusions Paradoxically, elevated HbA_{1c} levels were associated with improved survival in this cohort of patients with diabetes and advanced HF. Further investigation is necessary to determine the nature of this relationship and optimal HbA_{1c} in patients with diabetes and HF. (Am Heart J 2006;151:91.e1-91.e6.)