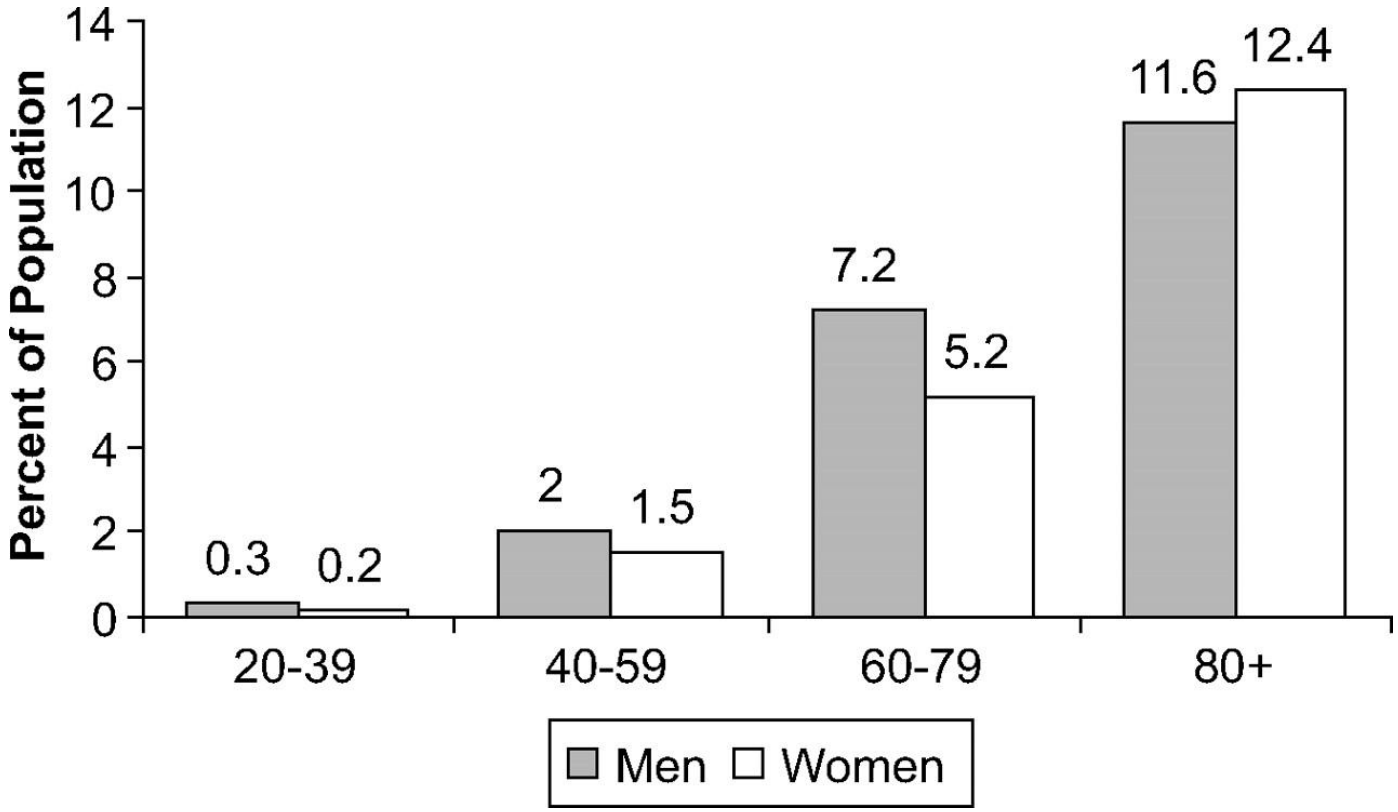
Gruppo di ricerca geriatrica

Journal Club
19 Marzo 2010

SCOMPENSO CARDIACO: IL PUNTO DELLA RICERCA

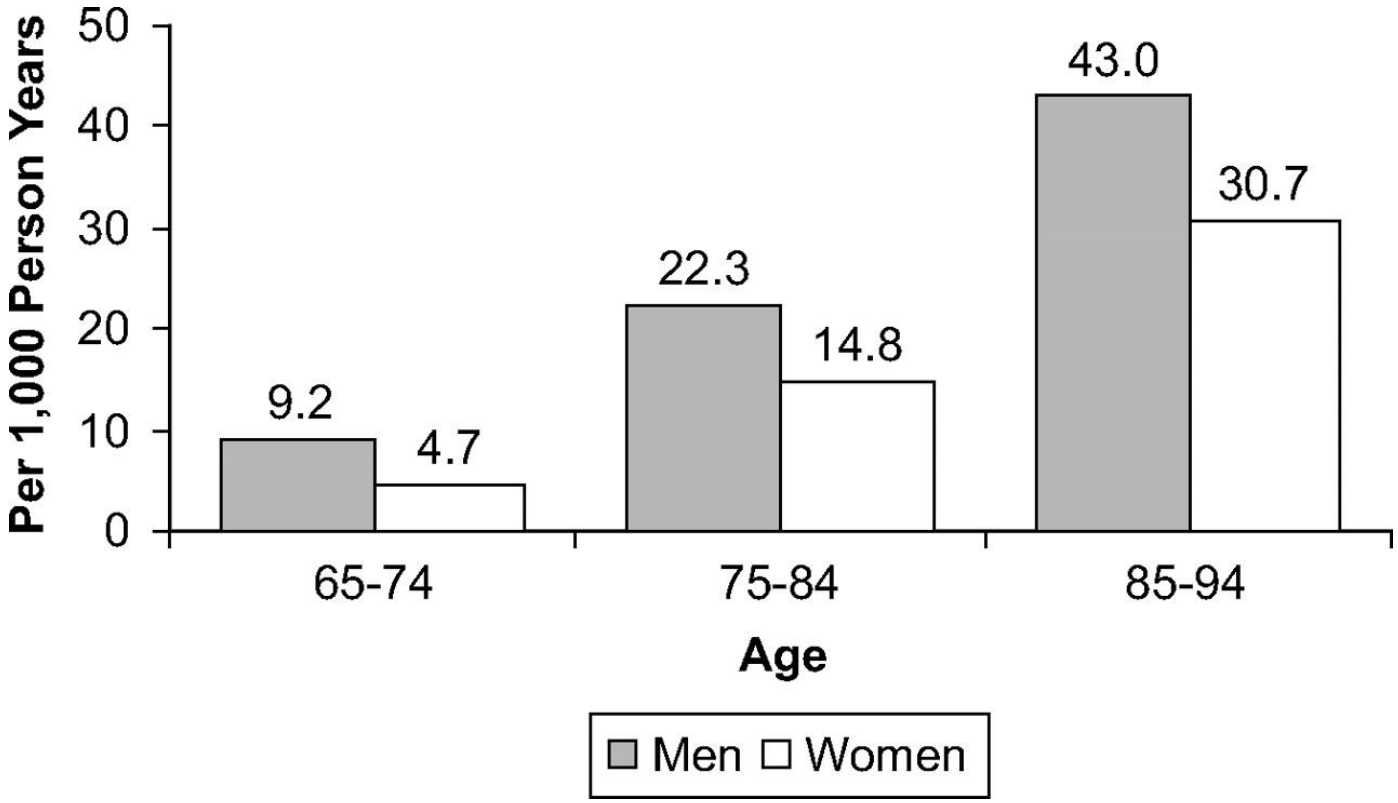
Alessandro Giordano

Prevalence of heart failure by sex and age (NHANES:1999-2004)



Circulation 2007

Incidence of heart failure by age and sex (FHS 1980-2003)



Circulation, 2007

Table 5 Classification of heart failure

• **New onset**	First presentation Acute or slow onset
• **Transient**	Recurrent or episodic
• **Chronic**	Persistent Stable, worsening, or decompensated

Table 6 Classification of heart failure by structural abnormality (ACC/AHA), or by symptoms relating to functional capacity (NYHA)

ACC/AHA stages of heart failure		NYHA functional classification	
Stage of heart failure based on structure and damage to heart muscle		**Severity based on symptoms and physical activity**	
Stage A	At high risk for developing heart failure. No identified structural or functional abnormality; no signs or symptoms.	**Class I**	No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, or dyspnoea.
Stage B	Developed structural heart disease that is strongly associated with the development of heart failure, but without signs or symptoms.	**Class II**	Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in fatigue, palpitation, or dyspnoea.
Stage C	Symptomatic heart failure associated with underlying structural heart disease.	**Class III**	Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity results in fatigue, palpitation, or dyspnoea.
Stage D	Advanced structural heart disease and marked symptoms of heart failure at rest despite maximal medical therapy.	**Class IV**	Unable to carry on any physical activity without discomfort. Symptoms at rest. If any physical activity is undertaken, discomfort is increased.

ACC = American College of Cardiology; AHA = American Heart Association. Hunt SA *et al*. *Circulation* 2005;**112**:1825–1852.
The Criteria Committee of the New York Heart Association. Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels. 9th ed. Little Brown & Co; 1994. pp 253–256.

European Heart Journal, 2008

Table 3 Definition of heart failure

Heart failure is a clinical syndrome in which patients have the following features:

- **Symptoms typical of heart failure**
  (breathlessness at rest or on exercise, fatigue, tiredness, ankle swelling)

  and
- **Signs typical of heart failure**
  (tachycardia, tachypnoea, pulmonary rales, pleural effusion, raised jugular venous pressure, peripheral oedema, hepatomegaly)

  and
- **Objective evidence of a structural or functional abnormality of the heart at rest**
  (cardiomegaly, third heart sound, cardiac murmurs, abnormality on the echocardiogram, raised natriuretic peptide concentration)

Table 4 Common clinical manifestations of heart failure

Dominant clinical feature	Symptoms	Signs
Peripheral oedema/congestion	Breathlessness Tiredness, fatigue Anorexia	Peripheral oedema Raised jugular venous pressure Pulmonary oedema Hepatomegaly, ascites Fluid overload (congestion) Cachexia
Pulmonary oedema	Severe breathlessness at rest	Crackles or rales over lungs, effusion Tachycardia, tachypnoea
Cardiogenic shock (low output syndromes)	Confusion Weakness Cold periphery	Poor peripheral perfusion SBP <90 mmHg Anuria or oliguria
High blood pressure (hypertensive heart failure)	Breathlessness	Usually raised BP, LV hypertrophy, and preserved EF
Right heart failure	Breathlessness Fatigue	Evidence of RV dysfunction Raised JVP, peripheral oedema, hepatomegaly, gut congestion

European Heart Journal, 2008

Circulation
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2009 Focused Update: ACCF/AHA Guidelines for the Diagnosis and Management of Heart Failure in Adults: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines: Developed in Collaboration With the International Society for Heart and Lung Transplantation

Natriuretic peptides are sensitive to other biological factors, such as age, sex, weight, and renal function. BNP levels tend to be less elevated in HF with preserved EF than in HF with low EF and are lower in obese patients. Levels of natriuretic peptides may be elevated meaningfully in women and in people over 60 years of age who do not have HF, and thus these levels should be interpreted cautiously in such individuals when distinguishing between cardiac and noncardiac causes of dyspnea. <u>Elevated levels of BNP should not be used in isolation to confirm or exclude the diagnosis of HF</u>

BNP e diagnosi di HF

- **Valori elevati di BNP non escludono la presenza di patologie alternative allo scompenso di cuore (es: embolia polmonare), particolarmente nei range di valori compresi tra 100- 400 pg/ml**
- **Valori < 100 pg/ml hanno buona sensibilità, specificità e accuratezza**
- **La maggior parte dei pazienti con scompenso cardiaco ha valori di BNP >400 pg/ml**

SYSTEMATIC REVIEW

The accuracy of plasma natriuretic peptide levels for diagnosis of cardiac dysfunction and chronic heart failure in community-dwelling elderly: a systematic review

Conclusion: we found limited evidence supporting the use of plasma natriuretic peptide measurement for diagnosis of cardiac dysfunction or heart failure in the elderly of 75 years and over in the general population. Important questions about the implementation of plasma natriuretic peptide measurement in daily practice remain unresolved.

Age and Ageing 2009

Plasma B-Type Natriuretic Peptide Levels in Ambulatory Patients With Established Chronic Symptomatic Systolic Heart Failure

W.H. Wilson Tang, MD; John P. Girod, MD; Michael J. Lee, MD; Randall C. Starling, MD, MPH; James B. Young, MD; Frederick Van Lente, PhD; Gary S. Francis, MD

Background—The diagnostic and prognostic values of plasma B-type natriuretic peptide (BNP) testing are established. However, the range of plasma BNP levels present in the setting of chronic, stable systolic heart failure (HF) is unclear.

Methods and Results—We followed up 558 consecutive ambulatory patients with chronic, stable systolic HF (left ventricular ejection fraction <50%) treated at a specialized outpatient HF clinic between November 2001 and February 2003. Retrospective chart review was performed to determine clinical and functional data at the time of BNP testing (Biosite Triage). The clinical characteristics of patients with plasma BNP levels <100 pg/mL and those with ≥100 pg/mL were compared. In our cohort, 60 patients were considered asymptomatic, and their plasma BNP levels ranged from 5 to 572 pg/mL (median, 147 pg/mL). Of the remaining 498 symptomatic (NYHA functional class II–III) patients, 106 (21.3%) had plasma BNP levels in the "normal" diagnostic range (<100 pg/mL). Patients in this "normal BNP" subgroup were more likely to be younger, to be female, to have nonischemic pathogenesis, and to have better-preserved cardiac and renal function and less likely to have atrial fibrillation.

Conclusions—In the ambulatory care setting, both symptomatic and asymptomatic patients with chronic, stable systolic HF may present with a wide range of plasma BNP levels. In a subset of symptomatic patients (up to 21% in our cohort), plasma BNP levels are below what would be considered "diagnostic" (<100 pg/mL). **(*Circulation*. 2003;108:2964-2966.)**

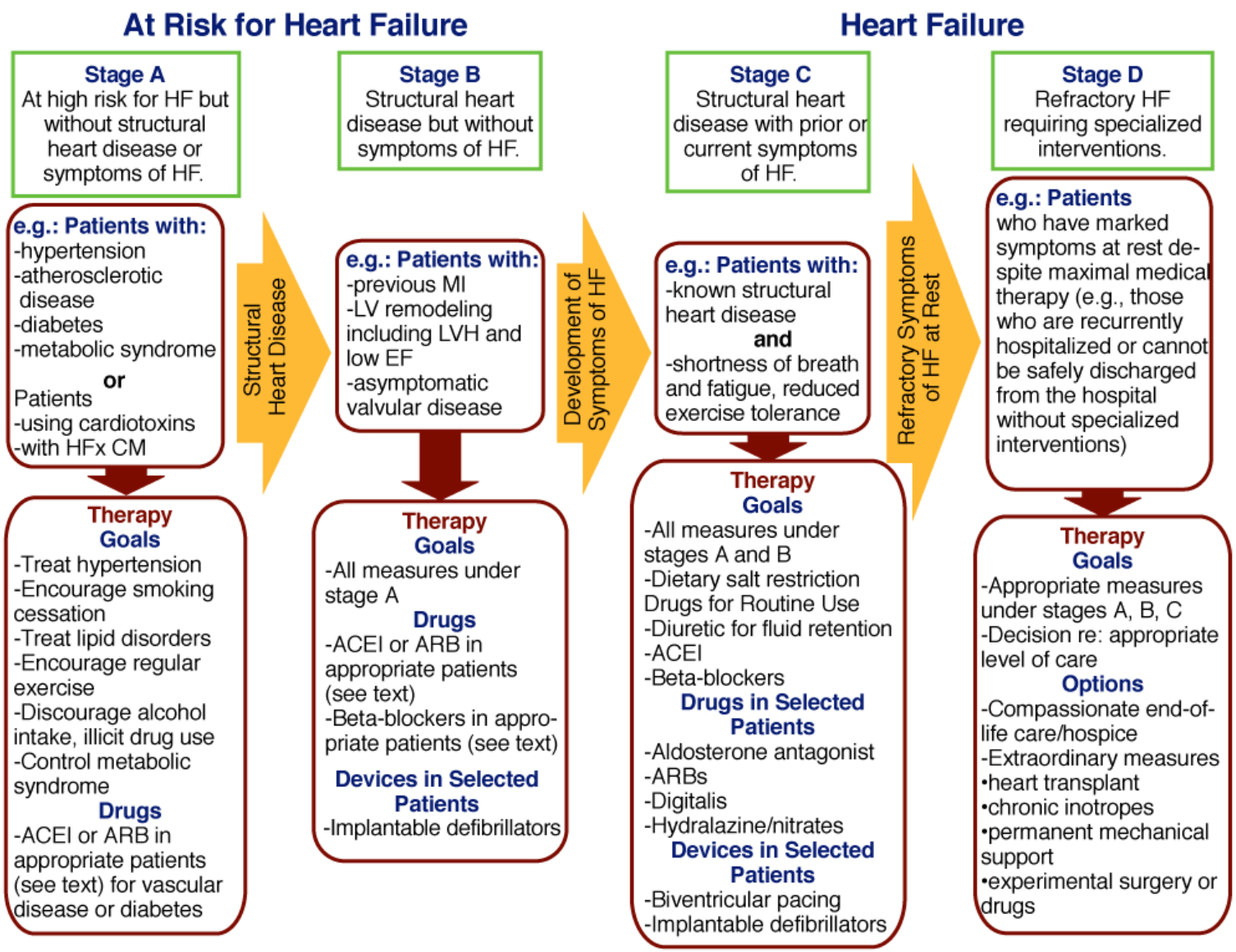
BNP e diagnosi di HF

Measurement of natriuretic peptides can be useful in the evaluation of patients presenting in the urgent care setting in whome the clinical diagnosis of HF is uncertain. (Level of evidence: A)

Repeated measurement of BNP can be more usefull than single value in the clinical diagnosis of HF

Measurement of natriuretic peptids can be useful in risk stratification (Level of evidence: A)

Circulation 2009



Circulation 2009

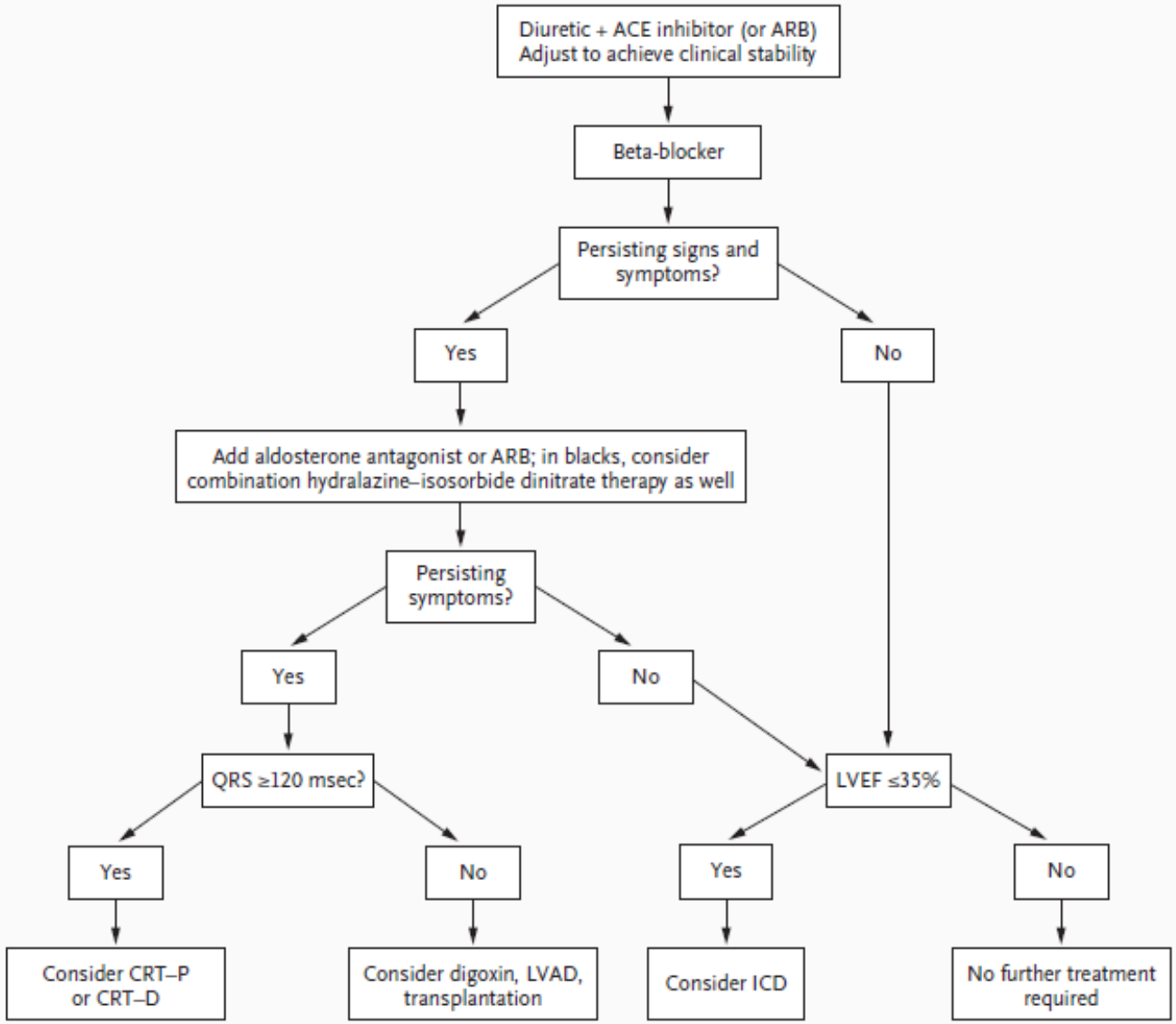


Figure 2. Treatment Algorithm for Systolic Heart Failure.

ACE denotes angiotensin-converting enzyme, ARB angiotensin-receptor blocker, CRT–D cardiac-resynchronization therapy that has both pacing and cardioverter and defibrillating functions, CRT–P cardiac-resynchronization therapy that has pacing functions only, ICD implantable cardioverter–defibrillator, LVAD left ventricular assist device, and LVEF left ventricular ejection fraction. Adapted from Dickstein et al.[7]

NEJM 2010

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2009 Focused Update: ACCF/AHA Guidelines for the Diagnosis and Management of Heart Failure in Adults: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines: Developed in Collaboration With the International Society for Heart and Lung Transplantation

Implantable cardioverter-defibrillator therapy is recommended for primary prevention of sudden cardiac death to reduce total mortality in patients with non-ischemic dilated cardiomyopathy or ischemic heart disease at least 40 days post-MI, a LVEF less than or equal to 35%, and NYHA functional class II or III symptoms while receiving chronic optimal medical therapy, and who have reasonable expectation of survival with a good functional status for more than 1 year . *(Level of Evidence: A)*

An implantable cardioverter-defibrillator is recommended as secondary prevention to prolong survival in patients with current or prior symptoms of HF and reduced LVEF who have a history of cardiac arrest, ventricular fibrillation, or hemodynamically destabilizing ventricular tachycardia.
(Level of Evidence: A)

Circulation 2009

Patients with LVEF of less than or equal to 35%, sinus rhythm, and NYHA functional class III or ambulatory class IV symptoms despite recommended, optimal medical therapy and who have cardiac dyssynchrony, which is currently defined as a QRS duration greater than or equal to 0.12 seconds, should receive cardiac resynchronization therapy, **with or without an ICD**, unless contraindicated. *(Level of Evidence: A)*

For patients who have LVEF less than or equal to 35%, a QRS duration of greater than or equal to 0.12 seconds, and atrial fibrillation (AF), CRT with or without an ICD is reasonable for the treatment of NYHA functional class III or ambulatory class IV heart failure symptoms on optimal recommended medical therapy.
(Level of Evidence: B)

Circulation 2009

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 OCTOBER 1, 2009 VOL. 361 NO. 14

Cardiac-Resynchronization Therapy for the Prevention of Heart-Failure Events

METHODS

During a 4.5-year period, we enrolled and followed 1820 patients with ischemic or nonischemic cardiomyopathy, an ejection fraction of 30% or less, a QRS duration of 130 msec or more, and New York Heart Association class I or II symptoms. Patients were randomly assigned in a 3:2 ratio to receive CRT plus an implantable cardioverter–defibrillator (ICD) (1089 patients) or an ICD alone (731 patients). The primary end point was death from any cause or a nonfatal heart-failure event (whichever came first). Heart-failure events were diagnosed by physicians who were aware of the treatment assignments, but they were adjudicated by a committee that was unaware of assignments.

CONCLUSIONS

CRT combined with ICD decreased the risk of heart-failure events in relatively asymptomatic patients with a low ejection fraction and wide QRS complex. (ClinicalTrials.gov number, NCT00180271.)

Open questions

Risparmiatore di potassio in scc NHYA 2?

Risincronizzazione cardiaca per pazienti 1NHYA I e II o in fibrillazione atriale?

Quali pazienti necessitano della sola risicronizzazione e quali di risincronizzatore + defibrillatore?

La terapia guidata dai valori del BNP migliora morbilità e mortalità?

ORIGINAL ARTICLE

Outcome of Heart Failure with Preserved Ejection Fraction in a Population-Based Study

R. Sacha Bhatia, M.D., M.B.A., Jack V. Tu, M.D., Ph.D.,
Douglas S. Lee, M.D., Ph.D., Peter C. Austin, Ph.D., Jiming Fang, Ph.D.,
Annick Haouzi, M.D., Yanyan Gong, M.Sc., and Peter P. Liu, M.D.

NEJM, 2006

Table 1. Characteristics of Patients.*

Characteristic	Reduced Ejection Fraction (<40%) (N=1570)	Preserved Ejection Fraction (>50%) (N=880)	P Value
Mean LVEF — %	25.9	62.4	<0.001
Age — yr	71.8 ± 12	75.4 ± 11.51	<0.001
Male sex — no. (%)	983 (62.6)	302 (34.3)	<0.001
Coronary artery disease or ischemia — no. (%)	764 (48.7)	312 (35.5)	<0.001
Hypertension — no. (%)	772 (49.2)	485 (55.1)	0.005
Hyperlipidemia — no. (%)	350 (22.3)	136 (15.5)	<0.001
Diabetes — no. (%)	611 (38.9)	279 (31.7)	<0.001
Cerebrovascular accident or transient ischemic attack — no. (%)	229 (14.6)	133 (15.1)	0.72
Angina — no. (%)	440 (28.0)	201 (22.8)	0.005
Ever smoked — no. (%)	754 (48.0)	322 (36.6)	<0.001
Currently smoking — no. (%)	271 (17.3)	106 (12.0)	<0.001
Peripheral vascular disease — no. (%)	236 (15.0)	92 (10.5)	<0.001
Atrial fibrillation — no. (%)	370 (23.6)	280 (31.8)	<0.001
Cancer — no. (%)	182 (11.6)	105 (11.9)	0.80
COPD — no. (%)	207 (13.2)	156 (17.7)	0.002
Prior myocardial infarction — no. (%)	612 (39.0)	146 (16.6)	<0.001
Prior CABG — no. (%)	203 (12.9)	51 (5.8)	<0.001
Prior PCI — no. (%)	48 (3.1)	16 (1.8)	0.07
Peptic ulcer disease — no. (%)	94 (6.0)	74 (8.4)	0.02
Hepatitis or cirrhosis — no. (%)	20 (1.3)	16 (1.8)	0.28
Dementia — no. (%)	76 (4.8)	49 (5.6)	0.43
Hemoglobin <10 g/dl — no. (%)	155 (9.9)	186 (21.1)	<0.001
Mean systolic blood pressure — mm Hg	146	156	<0.001
Mean respiratory rate — breaths/min	26	26	0.17
Serum sodium <136 mmol/liter — no. (%)	362 (23.1)	209 (23.8)	0.70
Serum creatinine >150 mmol/liter — no. (%)	296 (18.9)	195 (22.2)	0.95
Dialysis — no. (%)	18 (1.1)	9 (1.0)	0.78

* Plus–minus values are means ±SD. LVEF denotes left ventricular ejection fraction, COPD chronic obstructive pulmonary disease, CABG coronary-artery bypass grafting, and PCI percutaneous coronary intervention.

NEJM, 2006

Table 3. In-Hospital Care, Complications, and Outcomes.

Variable	Reduced Ejection Fraction (<40%) (N=1570)	Preserved Ejection Fraction (>50%) (N=880)	P Value
	no. (%)		
In-hospital care			
Cardiologist as primary physician	527 (33.6)	217 (24.7)	<0.001
Consultation with a cardiologist	687 (43.8)	328 (37.3)	0.002
Sodium restricted	1069 (68.1)	539 (61.2)	<0.001
Fluid restricted	216 (13.8)	113 (12.8)	0.52
Weight recorded on >50% of hospital days	301 (19.2)	154 (17.5)	0.31
Complications			
Atrial fibrillation or flutter	116 (7.4)	64 (7.3)	0.92
Hypotension	94 (6.0)	30 (3.4)	0.005
Cardiac arrest	36 (2.3)	11 (1.2)	0.07
Cardiogenic shock	16 (1.0)	2 (0.2)	0.03
Acute coronary syndrome (myocardial infarction or unstable angina)	81 (5.2)	38 (4.3)	0.35
Renal failure	437 (27.8)	235 (26.7)	0.55
Bilevel positive airway pressure or continuous positive airway pressure	124 (7.9)	57 (6.5)	0.20
Mechanical ventilation	94 (6.0)	28 (3.2)	0.002
Readmission to coronary care unit or intensive care unit	77 (4.9)	29 (3.3)	0.06
Assessment for heart transplantation at admission	7 (0.4)	4 (0.5)	0.98
Outcomes			
30-Day mortality	112 (7.1)	47 (5.3)	0.08
1-Yr mortality	400 (25.5)	195 (22.2)	0.07
30-Day readmission for heart failure*	73 (4.9)	38 (4.5)	0.66
1-Yr readmission for heart failure*	240 (16.1)	114 (13.5)	0.09
30-Day mortality or readmission for heart failure	182 (11.6)	83 (9.4)	0.10
1-Yr mortality or readmission for heart failure	566 (36.0)	274 (31.1)	0.01

* Readmission rates were calculated for the 2339 patients who survived the index admission: 1493 with reduced ejection fraction and 846 with preserved ejection fraction.

NEJM, 2006

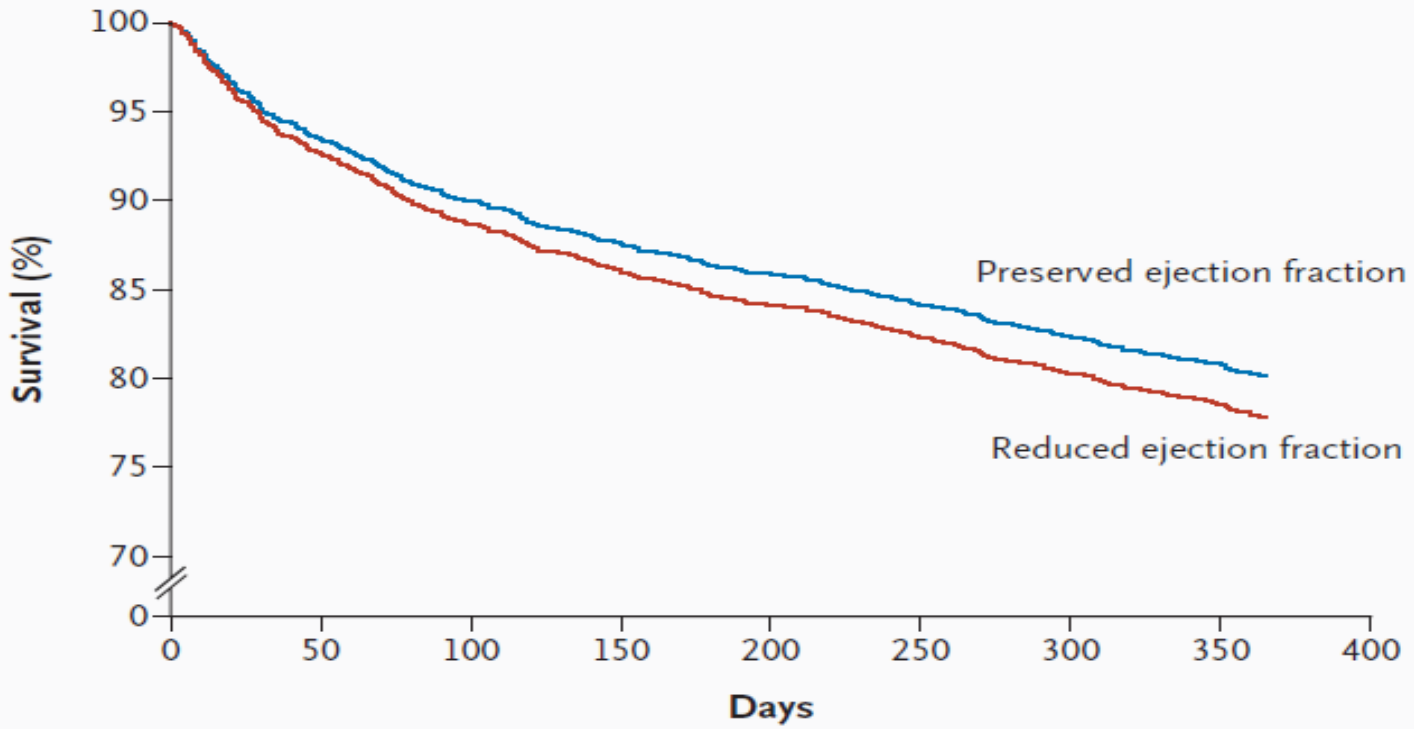

Figure 1. Adjusted Survival Curves for Patients with Heart Failure with Reduced or Preserved Ejection Fraction over the Year after the First Hospital Admission.

The data were adjusted for differences in baseline variables, including age, sex, and coexisting conditions. The adjusted mortality rate was not significantly higher for patients with reduced ejection fraction than for patients with preserved ejection fraction at one year (hazard ratio, 1.13; 95 percent confidence interval, 0.94 to 1.36; P=0.18).

NEJM, 2006

Diagnostic criteria for diastolic heart failure

Signs or symptoms of heart failure
Exertional dyspnea [eventually objective evidence by reduced peak exercise oxygen consumption (<25 mL/kg per min)]
Orthopnea
Gallop sounds
Lung crepitations
Pulmonary edema **AND**
Normal or mildly reduced left ventricular systolic function:
LVEF ≥45 percent and LVEDIDI <3.2 cm/m2 or LVEDVI <102 mL/m2 **AND**
Evidence of abnormal left ventricular relaxation, filling, diastolic distensibility and diastolic stiffness:
Slow isovolumic left ventricular relaxation:
LV dP/dt <1100 mmHg per sec
and/or IVRT >92 to 105 ms (based on age)
and/or >48 ms
And/or slow early left ventricular filling:
PFR <160 mL/sec per m2
and/or PFR <1.6 to 2 EDV/sec (based upon age)
and/or E/A <0.5 to 1.0 and DT >220 to 280 ms (based upon age)
and/or S/D >1.5 to 2.5 (based upon age)
And/or reduced left ventricular diastolic distensibility
LVEDP >16 mmHg or mean PCW >12 mmHg
and/or PV A Flow >35 cm/sec
and/or PV A t>MV A t + 30 ms
and/or A/H >0.20
And/or
b>0.27 and/or
and/or b'>16

LVEF: left ventricular ejection fraction; LVEDIDI: left ventricular end-diastolic internal dimension index; LVEDVI: left ventricular end-diastolic volume index; LV dP/dt: peak negative left ventricular dP/dt; IVRT: isovolumic relaxation time (indexed for age groups); t : time constant of LV pressure decay; PFR: peak LV filling rate (indexed for age groups); EDV: end-diastolic volume; E/A: ratio of peak early to peak atrial Doppler flow velocity (indexed for age groups); S/D: ratio of pulmonary vein systolic and diastolic flow velocities (indexed for age groups); LVEDP: left ventricular end-diastolic pressure; PCW: pulmonary capillary wedge pressure; PV A Flow: pulmonary venous atrial flow velocity; PV A t: pulmonary venous atrial flow velocity duration; MV A t: mitral atrial flow velocity duration; A/H: ratio of atrial wave to total signal excursion on the apexcardiogram; b: constant of LV chamber stiffness; b': constant of muscle stiffness.

Adapted from European Study Group on Diastolic Heart Failure. Eur Heart J 1998; 19:990.

Management principles for patients with diastolic heart failure

Goal	Treatment*	Daily dose of medication•
Reduce the congestive state	Salt restriction Diuretics	<2 g of sodium per day
		Furosemide, 10-120 mg
		Hydrochlorothiazide, 12.5-25 mg
	ACE inhibitors	Enalapril, 2.5-40 mg
		Lisinopril, 10-40 mg
	Angiotensin II-receptor blockers	Candesartan, 4-32 mg
		Losartan, 25-100 mg
Maintain atrial contraction and prevent tachycardia	Cardioversion of atrial fibrillation	
	Sequential atrioventricular pacing	
	Beta-blockers	Atenolol, 12.5-100 mg
		Metoprolol, 25-100 mg
	Calcium channel blockers	Verapamil, 120-360 mg
		Diltiazem, 120-540 mg
	Radiofrequency ablation modification of atrioventricular node and pacing	
Treat and prevent myocardial ischemia	Nitrates	Isosorbide dinitrate, 30-180 mg
		Isosorbide mononitrate, 30-90 mg
	Beta blockers	Atenolol, 12.5-100 mg
		Metoprolol, 25-200 mg
	Calcium channel blockers	Diltiazem, 120-540 mg
		Verapamil, 120-360 mg
	Coronary-artery bypass surgery, percutaneous coronary intervention	
Control hypertension	Antihypertensive agents	Chlorthalidone, 12.5-25 mg
		Hydrochlorothiazide, 12.5-50 mg
		Atenolol, 12.5-100 mg
		Metoprolol, 12.5-200 mg
		Amlodipine, 2.5-10 mg
		Felodipine, 2.5-20 mg
		Enalapril, 2.5-40 mg
		Lisinopril, 10-40 mg
		Candesartan, 4-32 mg
		Losartan, 50-100 mg

* Treatments listed for the first four goals are those generally used in clinical practice. Angiotensin-converting-enzyme (ACE) inhibitors, angiotensin-receptor blockers, and spironolactone inhibit the renin-angiotensin-aldosterone system and thus have a theoretical benefit, but more data are required to show that they reduce the risk of heart failure.

• The list of medications is not comprehensive but rather, includes examples that are in common clinical use or have been included in studies of pathophysiologic mechanisms in diastolic dysfunction or heart failure or were included in larger trials that generally were not designed to assess outcomes in diastolic heart failure. Candesartan is the only agent studied in a randomized, controlled trial involving patients with diastolic heart failure. A more exhaustive list of antihypertensive agents can be found in the guidelines of the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.

Reproduced with permission from: Aurigemma, GP, Gaasch, WH. Clinical practice, Diastolic heart failure. N Engl J Med 2004; 351:1097. Copyright ©2004 Massachusetts Medical Society.

Management principles for patients with diastolic heart failure, continued

Goal	Treatment*	Daily dose of medication•
Measures with theoretical benefit in diastolic heart failure		
Promote regression of hypertrophy and prevent myocardial fibrosis	ACE inhibitors	Enalapril, 2.5-40 mg
		Lisinopril, 10-40 mg
		Ramipril, 5-20 mg
		Captopril, 25-150 mg
	Angiotensin-receptor blockers	Candesartan, 4-32 mg
		Losartan, 50-100 mg
	Spironolactone	25-75 mg

* Treatments listed for the first four goals are those generally used in clinical practice. Angiotensin-converting-enzyme (ACE) inhibitors, angiotensin-receptor blockers, and spironolactone inhibit the renin-angiotensin-aldosterone system and thus have a theoretical benefit, but more data are required to show that they reduce the risk of heart failure.

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Treatment for patients with heart failure and preserved ejection fraction

Control of systolic and diastolic hypertension

Control of ventricular rate in patients with atrial fibrillation

Control of pulmonary congestion and peripheral edema with diuretics

Coronary revascularization in patients with CHD in whom ischemia is judged to have an adverse effect on diastolic function

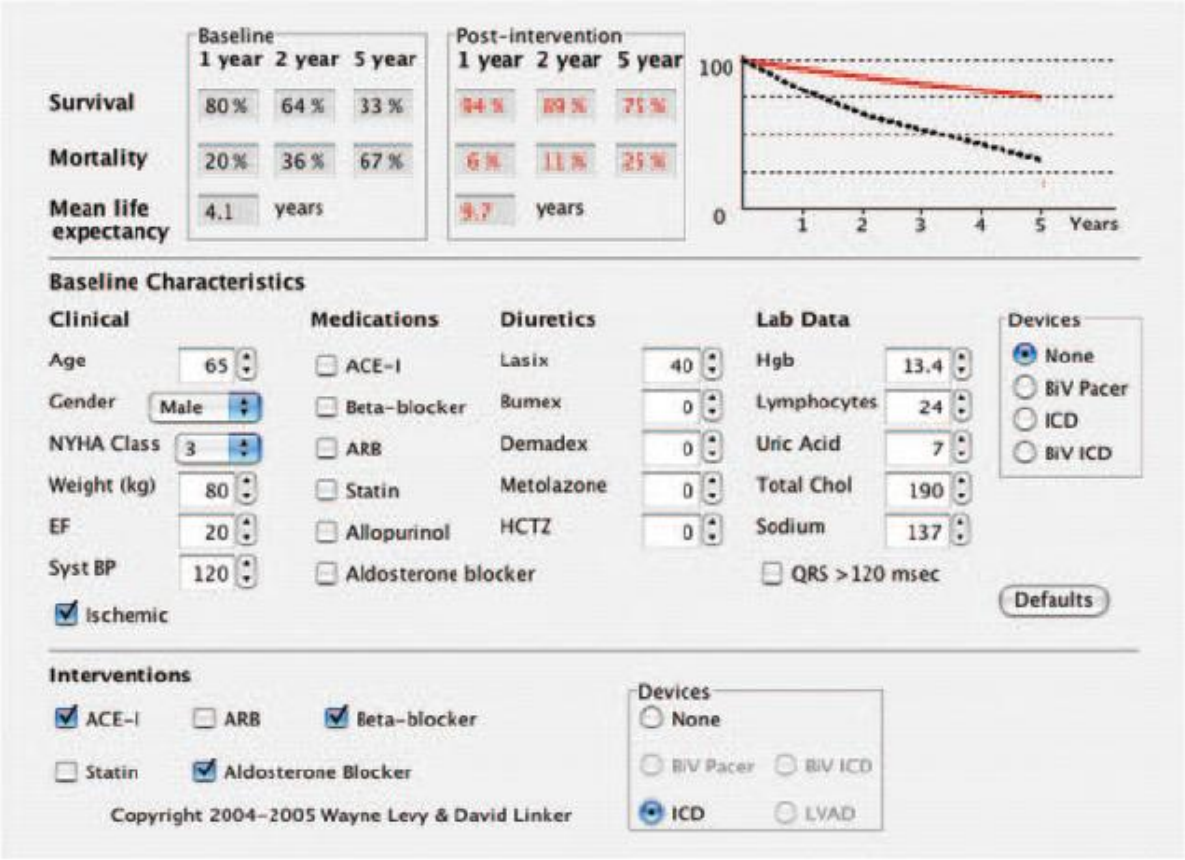
Table 17 Conditions associated with a poor prognosis in heart failure

Demographics	Clinical	Electrophysiological	Functional/ exertional	Laboratory	Imaging
Advanced age*	**Hypotension***	**Tachycardia** **Q waves**	**Reduced work, low peak VO_2***	**Marked elevation of BNP/NT pro-BNP***	**Low LVEF***
Ischaemic aetiology*	**NYHA functional class III–IV***	**Wide QRS***		**Hyponatraemia***	
Resuscitated sudden death*	**Prior HF hospitalization***	**LV hypertrophy** **Complex ventricular arrhythmias***		**Elevated troponin*** **Elevated biomarkers, neurohumoral activation***	
Poor compliance	Tachycardia	Low heart rate variability Atrial fibrillation	Poor 6 min walk distance	Elevated creatinine/BUN	Increased LV volumes
Renal dysfunction	Pulmonary rales	T-wave alternans	High VE/VCO_2 slope	Elevated bilirubin Anaemia	Low cardiac index
Diabetes	Aortic stenosis		Periodic breathing	Elevated uric acid	High LV filling pressure
Anaemia	Low body mass index				Restrictive mitral filling pattern, pulmonary hypertension
COPD	Sleep-related breathing disorders				Impaired right ventricular function
Depression					

* = powerful predictors.

European Heart Journal 2009

The Seattle Heart Failure model



Circulation 2006

Depression and Major Outcomes in Older Patients With Heart Failure

Association Based on Cox Regression Analysis of Groups of Risk With 6-Month Mortality in 800 Hospitalized Elderly Patients*

		Crude Analysis		Adjusted Analysis‡	
Characteristic†	**No. of Patients/No. of Events**	**RR**	**95% CI**	**RR**	**95% CI**
No HF and no depression	353/14	1.0	Reference	1.0	Reference
No HF and yes depression	361/23	1.9	0.9-4.0	1.8	0.8-4.3
Yes HF and no depression	47/7	3.2	1.0-10.3	3.1	1.0-10.4
Yes HF and yes depression	39/8	6.9	2.6-18.3	5.8	2.1-16.6
Disability in BADL	143/22	2.8	1.6-4.9	2.2	1.1-4.6
Serum albumin <3.5 g/dL	112/16	2.4	1.3-4.4	2.0	0.9-4.1
APACHE score >5	76/14	3.3	1.7-6.2	2.3	1.1-5.0

*RR indicates relative risk; CI, confidence interval; HF, heart failure; BADL, basic activities of daily living; and APACHE, Acute Physiology and Chronic Health Evaluation.

†Variables failing to qualify for entering the multivariate regression model were age, male sex, cognitive impairment, anemia (hemoglobin level <8 g/dL), diabetes mellitus, chronic obstructive pulmonary disease, and gastrointestinal diseases.

‡Adjusted for potential confounders (disability in BADL, serum albumin levels <3.5 g/dL, and APACHE score >5).

Arch Intern Med 2002

Short-Term Survival in Elderly Patients Hospitalized for Heart Failure: the Role of Diabetes and newly Recognized Hyperglycemia.

Characteristic	Without History of Diabetes Mellitus and Normal Glycemic Values n = 204	With History of Diabetes Mellitus n = 101	*P*-Value*	Without History of Diabetes Mellitus and Abnormal Glucose Values n = 35	*P*-Value†	*P*-Value‡
Age, mean ± SD	79.2 ± 8.0	78.9 ± 8.3	.71	77.6 ± 7.7	.20	.4
Male, n (%)	80 (39.2)	37 (36.6)	.30	19 (54.)	.06	.05
Mini-Mental State Examination score, mean ± SD (range 0–30)	25.3 ± 5.4	24.6 ± 4.8	.21	23.6 ± 6.1	.09	.3
Preadmission Barthel Index, mean ± SD (0–100)	90.7 ± 16.5	85.7 ± 22.4	.02	83.6 ± 22.9	.02	.6
Charlson Index, mean ± SD (0–33)	4.8 ± 1.3	5.0 ± 1.5	.12	5.1 ± 1.5	.21	.8
APS Score, mean ± SD (0–33)	2.7 ± 3.1	3.2 ± 3.3	.10	3.5 ± 3.8	.12	.6
Left ventricular ejection fraction, mean ± SD§	58.9 ± 19.9	59.3 ± 19.3	.93	57.7 ± 19.5	.72	.7
Serum glocuse, mg/dL, mean ± SD	92.8 ± 13.3	133.1 ± 51.2	< .001	143.9 ± 17.2	< .001	.2
Serum cholesterol, mg/dL, mean ± SD	193.0 ± 51.1	186.4 ± 52.2	.20	191.9 ± 42.2	.83	.5
Serum albumin, g/dL, mean ± SD	4.0 ± 0.7	3.8 ± 0.6	.01	3.8 ± 0.5	.05	.8
Serum creatinine, mg/dL, mean ± SD	1.1 ± 0.7	1.3 ± 0.8	.61	1.2 ± 1.0	.52	.9
Serum urea, mg/dL, mean ± SD	25.8 ± 11.4	28.8 ± 13.1	.04	26.7 ± 10.6	.61	.3
Sodium, mmol/L, mean ± SD	138.5 ± 4.6	137.6 ± 5.2	.24	137.0 ± 4.5	.54	.7
Troponin I, ng/mL, mean ± SD	0.39 ± 1.34	0.40 ± 1.32	.31	0.42 ± 1.35	.62	.4
Heart rate, beats per minute, mean ± SD	85.0 ± 19.0	83.0 ± 18.0	.63	98.0 ± 21.0	.02	.02
Systolic blood pressure, mmHg, mean ± SD	153 ± 35	159 ± 38	.60	157 ± 37	.70	.6
New York Heart Association Class III-IV, n (%)	123 (60.3)	63 (62.4)	.42	25 (71.4)	.11	.2
Comorbidity, n (%)						
Anemia‖	86 (42.2)	42 (41.6)	.91	17 (48.6)	.42	.4
Hypertension	190 (93.0)	94 (93.0)	.94	30 (85.7)	.13	.1
Previous myocardial infarction	129 (63.0)	68 (67.3)	.43	25 (71.4)	.42	.8
Valve disease	18 (8.8)	11 (10.9)	.52	4 (11.4)	.60	.9
Atrial fibrillation	67 (32.8)	39 (38.6)	.31	8 (22.9)	.14	.04
Chronic n (%)	31 (15.2)	12 (11.9)	.40	6 (17.1)	.62	.3
Number of drugs at admission, mean ± SD	5.4 ± 2.3	6.5 ± 3.0	.001	6.6 ± 2.6	.01	.9
Length of stay in hospital, days, mean ± SD	6.0 ± 2.6	7.1 ± 4.3	.007	6.5 ± 4.1	.30	.5

*Comparisons between patients without history of diabetes mellitus and normal glycemic values and patients with history of diabetes mellitus.
†Comparisons between patients without history of diabetes mellitus and normal glycemic values and patients with history of diabetes mellitus and abnormal glucose values.
‡Comparisons between patients with history of diabetes mellitus and patients without history of diabetes mellitus and abnormal glucose values.
§Report of left ventricular ejection fraction was available in 287 patients.
‖Hemoglobin concentration <13.5 g/dL in men and <12 g/dL in women.
SD = standard deviation.

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Table 2: Factors Associated with 3 Month Mortality in a Group of 340 Elderly Patients with Heart Failure According to Glycemic Status

	N/events	Unadjusted *RR (95% C.I.)*	Adjusted* *RR (95% C.I.)*
Moderate to Severe Dementia (Mini-Mental State Examination Score <18)	121/16	3.4 (1.3-8.7)	3.1 (1.2-7.8)
Acute Physiology Score† (> 4)	78/11	3.8 (1.7- 8.4)	1.8 (1.1-7.4)
Without history of Diabetes and normal glycemic value	204/11	1.0-Ref	1.0-Ref
With history of Diabetes	101/10	1.8 (0.8-4.1)	1.4 (0.5-4.4)
Without history of Diabetes and abnormal glucose value	35/7	3.6 (1.4-9.3)	2.7 (1.0-9.4)

Univariate analysis and multiple logistic regressions were applied to identify factors statistically associated with 3 month mortality.

* Variables associated to 3 month mortality and not entered in multivariate Cox proportional hazards model were: age (80+), gender, number of drugs, hyponatraemia, serum albumin, and left ventricular ejection fraction.

For Review Only

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ORIGINAL INVESTIGATION

Long-term Survival in Elderly Patients Hospitalized for Heart Failure

14-Year Follow-up From a Prospective Randomized Trial

Bao C. Huynh, MD, PharmD; Aleksandr Rovner, MD; Michael W. Rich, MD

Table 3. Multivariate Predictors of Mortality

Predictor	Regression Coefficient	HR (95% CI)	*P* Value*
Age, per 5 y	0.13	1.14 (1.03-1.26)	.01
Serum sodium <135 mEq/L	0.51	1.67 (1.19-2.32)	.003
CAD	–0.41	1.51 (1.16-1.95)	.002
Dementia	–0.70	2.02 (1.13-3.61)	.02
PVD	–0.55	1.74 (1.20-2.52)	.004
SBP, per 10 mm Hg	–0.05	0.95 (0.92-0.98)	.004
SUN, per 10 mg/dL (3.57 mmol/L)	0.18	1.20 (1.12-1.29)	<.001

Abbreviations: CAD, coronary artery disease; CI, confidence interval; HR, hazard ratio; PVD, peripheral vascular disease; SBP, systolic blood pressure; SUN, serum urea nitrogen.

*Cox regression χ^2 statistics.

Arch Intern Med 2006

Table 5. Median Survival and Mortality According to the Number of Prognostic Factors

Risk Factors	No.	Median Survival (95% CI), d	Mortality, No. (%)			*P* Value*
			6 mo	1 y	5 y	
0-1	89	1652 (1386-1918)	7 (7.9)	8 (9.0)	51 (57.3)	<.001
2-3	153	789 (579-999)	15 (9.8)	34 (22.2)	121 (79.1)	
≥4	37	152 (84-220)	22 (59.5)	27 (73.0)	37 (100)	

Abbreviation: CI, confidence interval.
*$P<.001$ for each risk class comparison.

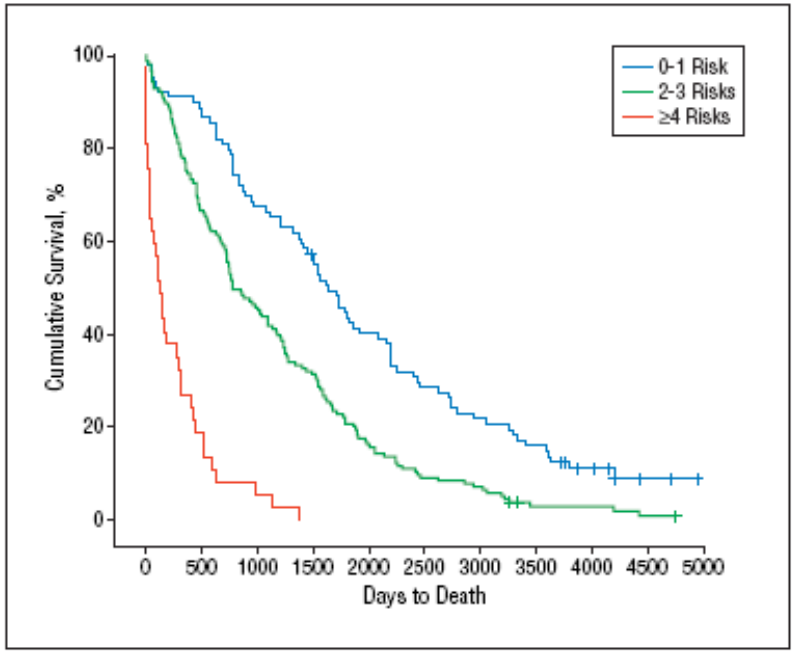


Figure 3. Probability of survival based on number of prognostic risk factors (log-rank $\chi^2=127.63$; $P<.001$).

Arch Intern Med 2006

Role of Frailty in Patients With Cardiovascular Disease

Jonathan Afilalo, MD[a,*], Sathya Karunananthan, MSc[b], Mark J. Eisenberg, MD, MPH[c,d], Karen P. Alexander, MD[e], and Howard Bergman, MD[b]

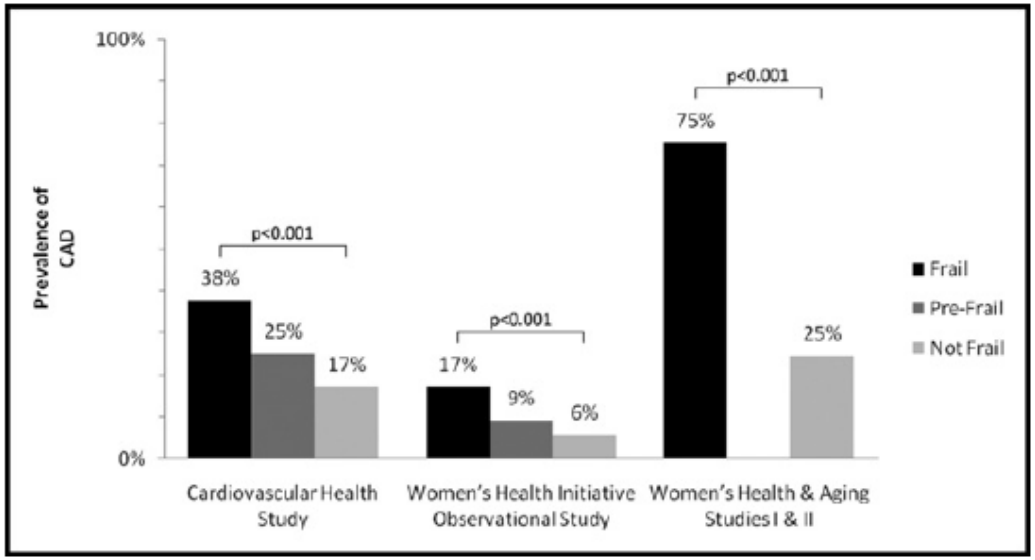
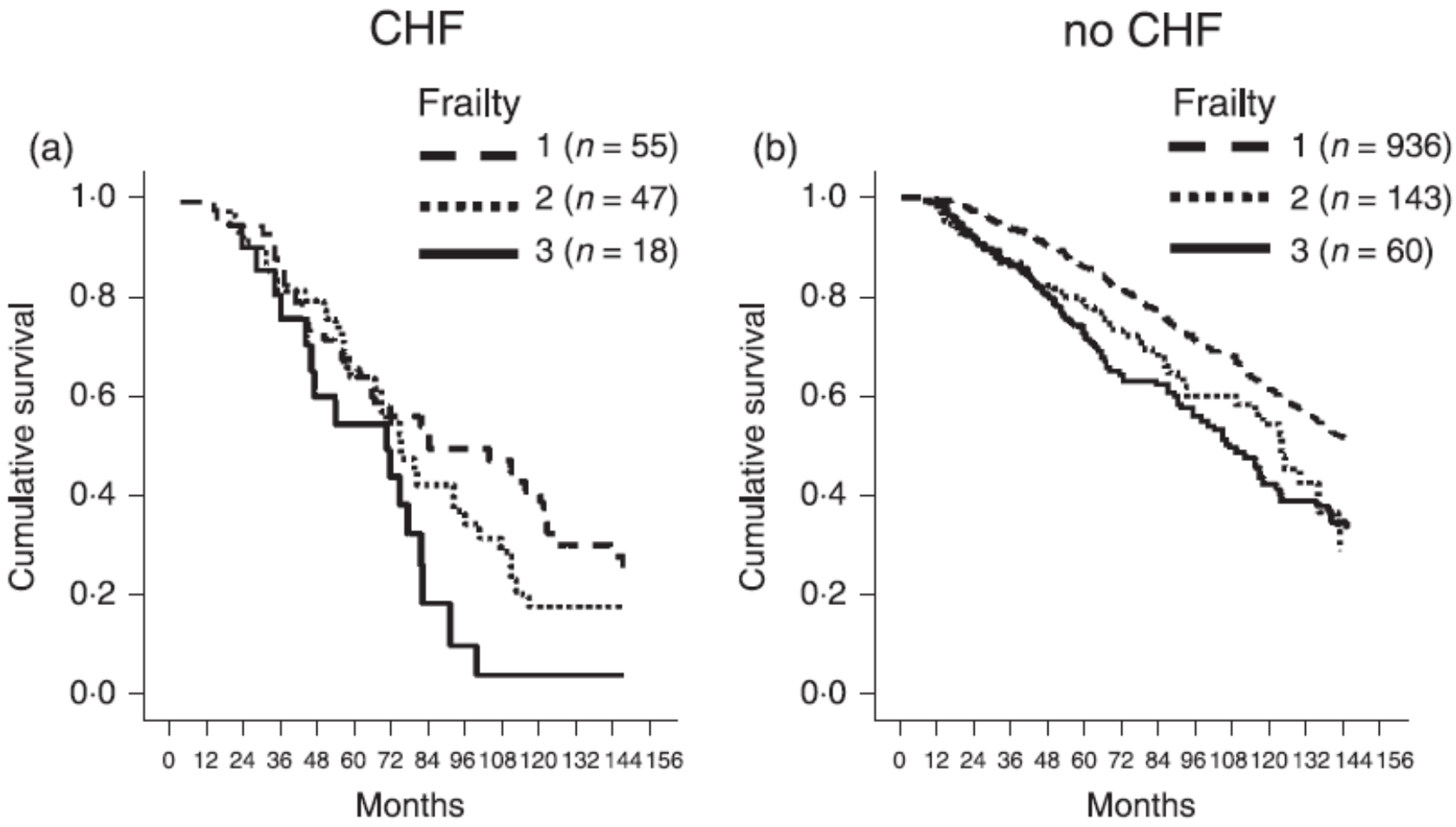


Figure 3. Prevalence of cardiovascular disease stratified by frailty status. Depicted studies used the same definition of frailty, based on Fried's criteria, with 3 of 5 criteria required for a diagnosis of frailty and 1 or 2 of 5 criteria for a diagnosis of prefrailty. CAD = coronary artery disease.

Am j Cardiol 2009

Cox regression adjusted survival curve in subjects with (a) CHF (*n* = 120) and without (b) CHF (*n* = 1139) chronic heart failure (CHF) stratified by frailty (FSS).



Circulation
Heart Failure
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association
Learn and Live

Multidimensional Prognostic Index Based on a Comprehensive Geriatric Assessment Predicts Short-Term Mortality in Older Patients With Heart Failure

Alberto Pilotto, Filomena Addante, Marilisa Franceschi, Gioacchino Leandro, Giuseppe Rengo, Piero D'Ambrosio, Maria Grazia Longo, Franco Rengo, Fabio Pellegrini, Bruno Dallapiccola and Luigi Ferrucci

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Table 1. MPI Score Assigned to Each Domain Based on the Severity of the Problems

	Problems		
	No	Minor	Severe
Assessment	(Value=0)	(Value=0.5)	(Value=1)
ADL*	6–5	4–3	2–0
Instrumental ADL*	8–6	5–4	3–0
Short portable mental status questionnaire†	0–3	4–7	8–10
Comorbidity index (cumulative illness rating scale-CI)‡	0	1–2	≥3
Mini nutritional assessment§	≥24	17–23.5	<17
Exton-smith scale¶	16–20	10–15	5–9
No. of medications	0–3	4–6	≥7
Social support network	Living with family	Institutionalized	Living alone

*No. of active functional activities.

†No. of errors.

‡No. of diseases.

§Mini Nutritional Assessment score: ≥24, satisfactory nutritional status; 17–23.5, at risk of malnutrition; <17, malnutrition.

¶Exton-Smith Scale score: 16–20, minimum risk; 10–15, moderate risk; 5–9 high risk of developing scores.

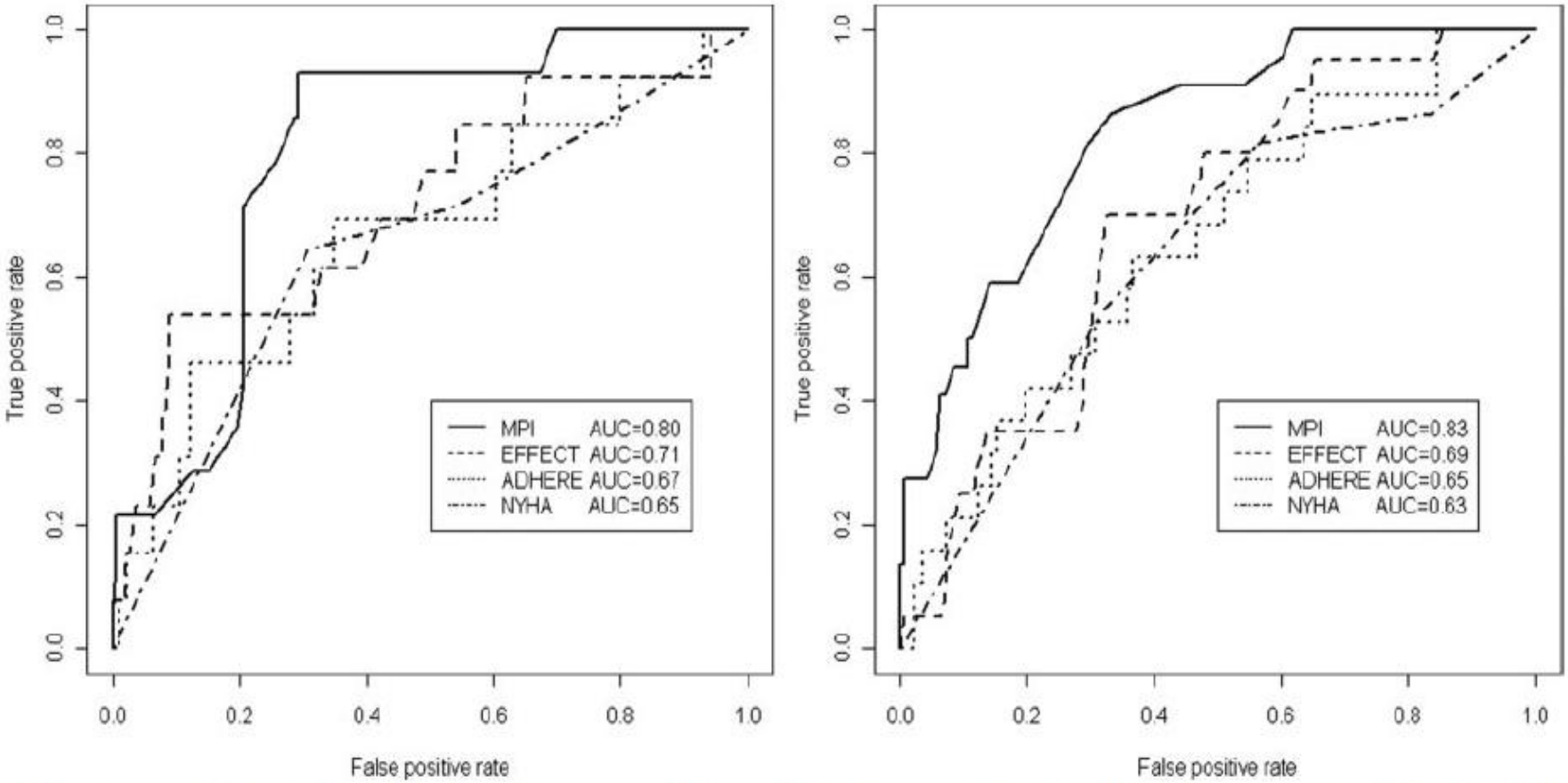

Figure. ROC curves for the MPI, NYHA, EFFECT, and ADHERE risk scores at 30 days of follow-up in men (right) and women (left).

Contemporary management of octogenarians hospitalized for heart failure in Europe: Euro Heart Failure Survey II

Michel Komajda[1]*, Olivier Hanon[2], Matthias Hochadel[3], Jose Luis Lopez-Sendon[4], Ferenc Follath[5], Piotr Ponikowski[6], Veli-Pekka Harjola[7], Helmut Drexler[8], Kenneth Dickstein[9], Luigi Tavazzi[8,10], and Markku Nieminen[7]

Table 5 Predictors of hospital mortality in octogenarians

Variable	Bivariate odds ratio (95% CI)[a]	Adjusted odds ratio (95% CI)[b]
Age (per 5 year increase)	1.36 (1.01–1.82)	1.42 (1.04–1.95)
Cardiogenic shock	12.99 (5.28–31.97)	5.20 (1.77–15.33)
STEMI	3.02 (1.65–5.53)	3.62 (1.79–7.32)
SBP (per 10 mmHg decrease)	1.19 (1.10–1.29)	1.09 (1.01–1.18)
Confinement to bed	4.31 (2.09–8.89)	3.08 (1.32–7.20)
Acute infection	1.79 (1.04–3.07)	1.96 (1.08–3.58)
Somnolence/confusion	3.48 (2.13–5.66)	1.97 (1.10–3.55)
Cold periphery	3.17 (1.79–5.60)	1.92 (1.00–3.69)
Creatinine (mg/dL)	1.69 (1.28–2.24)	1.63 (1.17–2.27)

$C = 0.793$, Hosmer–Lemeshow test $P = 0.60$.
STEMI, ST-segment elevation myocardial infarction; SBP, systolic blood pressure.
[a]Calculated by simple logistic regression separately for each variable.
[b]Calculated by multiple logistic regression, including all the factors shown in the table as co-variates.

Table 6 Predictors of follow-up mortality after discharge in octogenarians

Variable	Crude hazard ratio (95% CI)[a]	Adjusted hazard ratio (95% CI)[b]
Age (per 5 year increase)	1.55 (1.29–1.87)	1.51 (1.24–1.84)
SBP (per 10 mmHg decrease)	1.05 (1.00–1.10)	1.04 (0.99–1.09)
Diabetes mellitus	1.36 (0.98–1.89)	1.56 (1.12–2.18)
Self-care problems	1.82 (1.21–2.75)	1.60 (1.03–2.49)
Creatinine (mg/dL)	1.51 (1.26–1.80)	1.48 (1.21–1.80)
ACE-inhibitors/ARB	0.48 (0.35–0.66)	0.56 (0.40–0.79)
Statins	0.59 (0.41–0.85)	0.67 (0.45–0.99)
Beta-blockers	0.72 (0.53–0.98)	0.87 (0.63–1.20)

SBP, systolic blood pressure; ARB, angiotensin receptor blockers.
[a]Calculated by simple Cox regression separately for each variable.
[b]Calculated by multiple Cox regression, including all the factors shown in the table as co-variates.

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EDITORIAL

Treatment of heart failure in the elderly: never say it's too late

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RCTs have yielded <u>limited evidence of the efficacy of medical treatment in elderly patients</u> with HF. However, we have no data suggesting that therapies shown to be beneficial in RCTs should have a different effect in elderly subjects with HF and low LVEF. Subgroup analyses have never shown a conclusive interaction between age and the effects of treatment on outcomes in RCTs. Thus, elderly patients with HF caused by LV systolic dysfunction should be treated with the same medications shown to be effective in the overall population of patients with HF. More importantly, however, is that so far no treatment has been shown to improve outcomes in patients with HFPEF, who comprise the majority of elderly patients, and this remains a critical unmet need.