

Clinical Trials

The Role of N-terminal PRO-Brain Natriuretic Peptide and Echocardiography for Screening Asymptomatic Left Ventricular Dysfunction in a Population at High Risk for Heart Failure. The PROBE-HF Study

IRENE BETTI, MD,¹ GABRIELE CASTELLI, MD,² ALESSANDRO BARCHIELLI, MD,³ CINZIA BELIGNI, PhD,¹ VITTORIO BOSCHERINI, MD,⁴ LEONARDO DE LUCA, MD,⁵ GIANNI MESSERI, MD,⁶ MIHAI GHEORGHIADU, MD,⁷ ALAN MAISEL, MD,⁸ AND ALFREDO ZUPPIROLI, MD¹

Firenze, Italy; Rome, Italy; Chicago, Illinois; San Diego, California

ABSTRACT

Background: Screening for asymptomatic left ventricular dysfunction (ALVD) in subjects at risk for heart failure (HF) can affect clinical management. The aim of the present study is to examine the role of NT-pro BNP in the diagnosis of ALVD in subjects with hypertension and diabetes from primary care.

Methods and Results: A total of 1012 subjects with hypertension and/or diabetes and no symptoms or signs of HF were assessed by B-type natriuretic peptide (NT-proBNP) assay and echocardiography. Diastolic dysfunction was present in 368/1012 subjects (36.4%): 327 (32.4%) with mild diastolic dysfunction and 41 (4%) with a moderate-to-severe diastolic dysfunction. Systolic dysfunction was present in 11/1012 (1.1%). NT-proBNP levels were 170 ± 206 and 859 ± 661 pg/mL, respectively, in diastolic and systolic dysfunction and 92 ± 169 in normal subjects ($P < .0001$). Pooling moderate-to-severe diastolic with systolic dysfunction, a total of 52 subjects (5.1 %) were obtained: best cutoff value of NT-proBNP was 125 pg/mL (males <67 years: sensitivity [Sens] 87.5%, specificity [Spec] 92.7%, negative predictive value [NPV] 99.5%, positive predictive value [PPV] 33.3%; females <67 years: Sens 100%, Spec 84.1%, NPV 100%, PPV 33.3%; males ≥ 67 years: Sens 100%, Spec 77.1%, NPV 100%, PPV 32.5%; females ≥ 67 years: Sens 100%, Spec 59.9%, NPV 100%, PPV 23%).

Conclusions: The prevalence of ALVD in subjects at risk for HF is 5.1%. Because of its excellent NPV, NT-proBNP can be used by general practitioners to rule out ALVD in hypertensive or diabetic patients. (*J Cardiac Fail* 2009;15:377–384)

Key Words: Natriuretic peptides, systemic hypertension, diabetes.

The Task Force for the Diagnosis and Treatment of Chronic Heart Failure of the ESC considers symptoms of heart failure (HF) and evidence of cardiac dysfunction at rest as essential components of the syndrome¹; conversely, the American College of Cardiology/American Heart

Association Guidelines for the Evaluation and Management of Chronic Heart Failure in the Adult² identifies four stages of HF recognizing that there are established risk factors and structural prerequisites for the development of HF.

From the ¹Unità Operativa di Cardiologia; ³Unità di Epidemiologia, Ospedale S. Maria Annunziata, Azienda Sanitaria di Firenze, Italy; ²Cardiologia Generale I, Dipartimento del Cuore e dei Vasi, Azienda Ospedaliero-Universitaria Careggi, Firenze, Italy; ⁴Cooperativa Leonardo, Firenze, Italy; ⁵Department of Cardiovascular Sciences, Division of Cardiology, European Hospital, Rome, Italy; ⁶Dipartimento di Diagnostica di Laboratorio, Azienda Ospedaliero-Universitaria Careggi, Firenze, Italy; ⁷Cardiology Clinical Service, Northwestern University Medical School, Chicago, Illinois and ⁸Division of Cardiology and the Department of Medicine, Veteran's Affairs, Medical Center and University of California, San Diego, California.

Manuscript received December 16, 2007; revised manuscript received November 16, 2008; revised manuscript accepted December 3, 2008.

Reprint requests: Irene Betti, MD, Via Faenza, 33 – 50123 Firenze, Italy. Tel: (+39) 3357731408, Fax: (+39) 0552496553 E-mail: irenebetti@yahoo.it

Conflict of interest:

Partially supported by an unrestricted grant from Roche Diagnostics. 1071-9164/\$ - see front matter

© 2009 Elsevier Inc. All rights reserved.

doi:10.1016/j.cardfail.2008.12.002

Outcomes are tightly connected with the stage of the disease, so that an early diagnosis is needed to guide appropriate treatment strategies to delay or reverse progression of disease,³ especially in hypertensive or diabetic subjects.

Natriuretic peptide (NP) levels are simple and objective measures for ruling out the presence of HF with a very high negative predictive value.^{4–6} Despite a relatively large number of studies in general practice,^{7–11} the added value of this approach when compared with the echocardiographic screening of left ventricular (LV) dysfunction needs further confirmation.^{12,13}

The aim of the present study was to assess the prevalence of asymptomatic left ventricular dysfunction (ALVD) in subjects at high risk of developing HF and to evaluate the diagnostic reliability of NP assay compared with echocardiography in this setting.

Methods

From the primary care population database of “Cooperativa Leonardo,” which includes 110 general practitioners for a population of about 130,000 citizens, 1012 consecutive subjects (486 males, 48.0%; 526 females, 52.0%; mean age 66.4 ± 7.8 years, range 36–88) with 1 or both the following risk factors for HF have been selected: type 2 diabetes, on medication at least for the last 6 months or systemic hypertension, on medication at least for the last 6 months with 2 or more drugs. All these subjects are by definition at high risk of developing HF either without (Stage A) or with a structural heart disease (possible Stage B).²

Systemic hypertension¹⁴ was defined by systolic blood pressure (BP) values ≥ 140 mm Hg or diastolic blood pressure values ≥ 90 mm Hg.

Exclusion criteria were: history of HF or acute coronary syndrome or myocardial infarction; known moderate-to-severe valvular heart disease; known congenital heart disease; primary or secondary myocardial disease; previous severe ventricular arrhythmias; chronic atrial fibrillation or flutter; severe obstructive lung disease; previous pulmonary embolism; chronic renal failure (serum creatinine ≥ 2.0 mg/dL).

Study Protocol and Definition of Terms

Selected subjects were invited to visit their general practitioner where the following tests were performed in a single blind manner: 1) B-type natriuretic peptide (NT-proBNP) plasma concentration assay was measured in plasma-EDTA samples by noncompetitive immunoassay and electrochemiluminescence detection. The assay was run by a full automatic analyzer (Elecsys Modular E)¹⁵—both the reagents and the machine were supplied by Roche Diagnostic (Basel, Switzerland); 2) a complete color-Doppler transthoracic echocardiography was performed by a single operator with a commercially available machine using 2.0- to 3.5-MHz frequencies, according to the recommendations of the American Society of Echocardiography.¹⁶

Table 1A. Demographic, Clinical, and Humoral Characteristics of Patients with Different Patterns of Left Ventricular Dysfunction

	a) No Dysfunction n = 633	b) Diastolic Dysfunction n = 368	c) Systolic Dysfunction n = 11	P a) vs. b)	P a) vs. c)	P b) vs. c)
Gender	314 M (50.4%) 319 F (49.6%)	164 M (44.5%) 204 F (55.4%)	8 M (72.7%) 3 F (27.3%)	NS	NS	NS
Age (mean)	64.8 ± 7.8	69 ± 6.8	73 ± 7.5	<.0001	.0006	.05
Hypertension	577 (91.1%)	342 (92.9%)	10 (90.9%)	NS	NS	NS
Diabetes	238 (37.6%)	166 (45.1%)	7 (63.6%)	.02	NS	NS
Family history of CAD	218 (34.5%)	121 (32.8%)	4 (36.4%)	NS	NS	NS
BMI (kg/m^2 , mean)	28.1 ± 4.1	28.4 ± 4.8	29.3 ± 7.9	NS	NS	NS
Systolic BP (mm Hg, mean)	140 ± 14	142 ± 15	143 ± 22	NS	NS	NS
Diastolic BP (mm Hg, mean)	83 ± 8	82 ± 8	89 ± 12	NS	.01	.008
Heart rate (beats/min, mean)	69 ± 11	71.3 ± 10.9	73 ± 15	<.01	NS	NS
Alcohol consumption	138 (21.8%)	56 (15.2%)	2 (18.1%)	.01	NS	NS
Dyslipidemia	254 (40.1%)	144 (39.1%)	3 (27.3%)	NS	NS	NS
Smoke	107 (16.9%)	53 (14.4%)	2 (18.2%)	NS	NS	NS
Metabolic syndrome	67 (10.6%)	57 (15.5%)	1 (9%)	.02	NS	NS
NT-pro BNP (pg/mL, median)	65 (95% CI 60–70)	115 (95% CI 100–129)	551 (95% CI 410–1210)	<.01	<.001	<.01

CAD, coronary artery disease; BMI, body mass index; BP, blood pressure; NS, not significant.

Download English Version:

<https://daneshyari.com/en/article/2960115>

Download Persian Version:

<https://daneshyari.com/article/2960115>

[Daneshyari.com](https://daneshyari.com)