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Atrial Fibrillation and Heart Failure in Cardiology Practice: Reciprocal Impact and Combined Management From the Perspective of Atrial Fibrillation

Results of the Euro Heart Survey on Atrial Fibrillation

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Objectives Our aim was to identify shortcomings in the management of patients with both atrial fibrillation (AF) and heart failure (HF).

Background AF and HF often coincide in cardiology practice, and they are known to worsen each other's prognosis, but little is known about the quality of care of this combination.

Methods In the observational Euro Heart Survey on AF, 5,333 AF patients were enrolled in 182 centers across 35 European Society of Cardiology member countries in 2003 and 2004. A follow-up survey was performed after 1 year.

Results At baseline, 1,816 patients (34%) had HF. Recommended therapy for HF with left ventricular systolic dysfunction (LVSD) with a beta-blocker and either an angiotensin-converting enzyme inhibitor (ACEI) or angiotensin II receptor blocker was prescribed in 40% of HF patients, while 29% received the recommended drug therapy for both LVSD-HF and AF, consisting of the combination of a beta-blocker, either ACEI or angiotensin II receptor blocker, and oral anticoagulation. Rate control was insufficient with 40% of all HF patients with permanent AF having a heart rate ≤80 beats/min. In the total cohort, HF patients had a higher risk for mortality (9.5% vs. 3.3%; $p < 0.001$), (progression of) HF (24.8% vs. 5.0%; $p < 0.001$), and AF progression (35% vs. 19%; $p < 0.001$) during 1-year follow-up. Of all recommended drugs for AF and LVSD-HF, only ACEI prescription was associated with improved survival during 1-year follow-up (odds ratio: 0.51 [95% confidence interval: 0.31 to 0.85]; $p = 0.011$).

Conclusions The prescription rate of guideline-recommended drug therapy for AF and LVSD-HF is low. Randomized controlled trials targeting this highly prevalent subgroup with AF and HF are warranted. (J Am Coll Cardiol 2009;53:1690–8) © 2009 by the American College of Cardiology Foundation

Atrial fibrillation (AF) and heart failure (HF) often co-exist. The Framingham Heart study showed that in a general population of ≥50 years, the incidence of HF among AF patients was 33 in 1,000 patient-years, and the incidence of AF among HF patients was 54 in 1,000 patient-years (1). The Euro Heart Surveys of current cardiology practice in patients with AF or with HF showed that HF is present in 34% of AF patients, and AF in 42% of HF patients (2,3). Both HF (4) and AF (5) alone are associated with an increase in mortality, and when these pathologies coincide,

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mortality is even higher (1). The development of AF is likely to cause worsening of HF and greatly complicates management. Worsening of HF is also likely to provoke the onset of AF. AF and worsening HF constitute a classic 'vicious circle' of deterioration in HF.

Separate guidelines exist for the management of AF and HF, both with paragraphs on their combined management that differ in their recommendations (6–8). This may add confusion to what is already a complex situation. Little information is available regarding the combined management of AF and HF in clinical practice. For these reasons, we investigated guideline adherence regarding drug therapy when both AF and HF were encountered in the Euro Heart Survey on AF. In addition, we investigated the impact of HF and its management on the management, progression, and prognosis of AF patients during 1-year follow-up.

Methods

Survey methods, center participation, patient characteristics, management, and definitions of the baseline and follow-up survey of the Euro Heart Survey on AF have previously been described (2,9). In summary, 5,333 ambulant and hospitalized patients with AF were enrolled in cardiology practices of 182 hospitals among 35 countries in 2003 to 2004. Patients were enrolled if they were ≥18 years of age and if they had an electrocardiogram or Holter recording showing AF during the qualifying admission/consultation or in the preceding 12 months. A follow-up was performed to assess mortality and incidence of major adverse events during 1 year.

Definitions. The previous publications on the general results of the baseline and follow-up surveys of the Euro Heart Survey on AF contain definitions of variables reported here (2,9). Definitions of variables specific for this paper are listed in the following text.

HF: the presence of signs and symptoms of either right (elevated central venous pressure, hepatomegaly, dependent edema) or left ventricular failure (exertional dyspnea, cough, fatigue, orthopnea, paroxysmal nocturnal dyspnea, cardiac enlargement, rales, gallop rhythm, pulmonary venous congestion) or both, confirmed by noninvasive or invasive measurements demonstrating objective evidence of cardiac dysfunction.

Heart failure with left ventricular systolic dysfunction (LVSD-HF): a clinical diagnosis of HF in combination with echocardiographic study within the preceding year showing left ventricular ejection fraction <45% (8).

Heart failure with preserved left ventricular systolic function (PSF-HF): a clinical diagnosis of HF in combination with echocardiographic left ventricular ejection fraction ≥45% (8).

Recommended drug therapy: according to both the European Society of Cardiology and American College of Cardiology/American Heart Association 2001 guidelines on HF (10,11), valid during the recruitment period of the survey, the combination of a beta-blocker and an angiotensin-converting enzyme inhibitor (ACEI) or angiotensin II receptor blocker (ARB) was considered to be "recommended drug therapy for LVSD-HF." Guidelines for both AF (12) and HF (11) also recommended use of oral anticoagulants (OAC) in patients with HF and AF. Therefore, a combination of beta-blocker, ACEI, or ARB and OAC at discharge or end of visit was defined as "recommended drug treatment for LVSD-HF and AF" and we will also refer to this as "the full package." There is less evidence of the efficacy of these drugs in PSF-HF.

Abbreviations and Acronyms

ACEI = angiotensin-converting enzyme inhibitor
AF = atrial fibrillation
ARB = angiotensin II receptor blocker
CAD = coronary artery disease
CI = confidence interval
COPD = chronic obstructive pulmonary disease
HF = heart failure
LVSD = left ventricular systolic dysfunction
NYHA = New York Heart Association
OAC = oral anticoagulation
OR = odds ratio
PSF = preserved systolic function

Contraindications for recommended drug therapy: for "recommended drug therapy for LVSD-HF," we took into account the following potential contraindications: ventricular rate <50 beats/min, renal failure, chronic obstructive pulmonary disease (COPD), sick sinus syndrome, systolic blood pressure <85 mm Hg, and atrioventricular block grade 2 to 3. For the full package of "recommended therapy for AF and LVSD-HF" the same contraindications were used, with the addition of major bleeding and malignancy as potential contraindications for OAC. All these contraindications are also applicable to PSF-HF patient and were only taken in account for analysis when explicitly stated in the text.

Rate control drugs: drug therapy at discharge or end of visit with beta-blockers, digoxin, digitoxin, diltiazem, verapamil, and also amiodarone and sotalol, since these 2 drugs have rate control properties.

$CHADS_2$ score: stroke risk score, calculated by adding 1 point for each of the following conditions: congestive HF, hypertension, age ≥75 years or diabetes, and 2 points for prior stroke or transient ischemic attack (13).

Statistical analysis. Data analysis was performed with SPSS statistical software (version 12.01, SPSS Inc., Chicago, Illinois). Continuous variables are reported as mean (±SD), or with a skewed distribution as median (25th to 75th percentile), and categorical variables as observed number (percentage). Differences were tested with independent *t* test for continuous variables with normal distribution, Mann-Whitney for continuous variables with skewed distribution, and with chi-square statistic for categorical variables.

Multivariable logistic regression was performed to identify patient characteristics that were associated with a lower or higher likelihood to receive appropriate drug therapy