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Incidence and hospital death rates associated with heart failure: A community-wide perspective

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ABSTRACT

PURPOSE: Despite often stated references to the emerging epidemic of heart failure in the United States, relatively little data are available describing the incidence and short-term death rates associated with this clinical syndrome. The objectives of this study were to describe the hospital incidence and death rates associated with acute heart failure and factors associated with an adverse hospital prognosis in residents of the Worcester, Mass, metropolitan area hospitalized at all greater Worcester medical centers with new onset heart failure in 2000.

SUBJECTS AND METHODS: We reviewed the medical records of patients hospitalized for acute heart failure at all 11 area medical centers during 2000. New onset heart failure was diagnosed using standardized criteria. Regression analyses were performed to examine demographic and clinical factors associated with hospital death rates.

RESULTS: During 2000, 2604 men and women from greater Worcester were diagnosed with new onset heart failure; 637 (24.5%) of these cases were initial events. The incidence and attack rates (per 100 000) of heart failure were 219 and 897, respectively. Occurrence of heart failure increased with advancing age, and women were at greater risk for heart failure than men (incidence rates [per 100 000] = 250 and 194, respectively). Hospital case-fatality rates were 5.1%. Hospital death rates were associated with several demographic and clinical characteristics.

CONCLUSIONS: The results of this study suggest that heart failure is an important clinical syndrome affecting residents of this large northeast community. Several groups at high risk for developing or dying from heart failure can be identified and targeted for preventive efforts as well as for the receipt of effective treatment modalities.

Although heart failure is often referred to as one of the new "epidemics" of cardiovascular disease in the 21st century,[1-3] a paucity of data exists about the magnitude and short-term outcomes associated with this clinical syndrome, particularly from the more generalizable perspective of a population-based investigation.

The purpose of the present study was to describe the incidence and attack rates of heart failure among residents from a large northeast metropolitan area, hospital death rates, and factors associated with a poor short-term prognosis in patients hospitalized with new onset heart failure during the year 2000.

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Methods

Residents of the Worcester, Mass, metropolitan area (2000 census estimate = 478 000) hospitalized for possible heart failure at all 11 greater Worcester medical centers during 2000 comprised the study sample. The medical records of patients with primary or secondary (any position but first) discharge diagnoses consistent with the possible presence of heart failure were reviewed. The primary *International Classification of Diseases, Ninth Edition (ICD)-9* code reviewed for the identification of cases of acute heart failure was ICD code 428. Additional *ICD-9* diagnostic rubrics reviewed for the possible presence of heart failure included rheumatic heart failure (398.91), hypertensive heart disease (402), hypertensive heart and renal disease (404), acute cor pulmonale (415), other diseases of the endocardium (424), primary cardiomyopathies (425.4), pulmonary heart disease and congestion (416.9 and 514), acute lung edema (518.4), edema (782.3), and dyspnea and respiratory abnormalities (786). Confirmation of the diagnosis of heart failure, based on use of the Framingham criteria, included the presence of 2 major criteria or 1 major and 2 minor criteria.[4-6]

Because 1 of the objectives of this study was to identify incident cases of acute heart failure occurring in greater Worcester residents, medical records of previous hospitalizations or outpatient visits for heart failure were reviewed. An incident event of heart failure was defined as the absence of a prior hospitalization for heart failure, a physician diagnosis of heart failure, or treatment for heart failure in the past based on the review of data contained in hospital medical records. Patients who developed heart failure secondary to admission for another illness (eg, acute myocardial infarction) or after an interventional procedure (eg, coronary artery bypass surgery), were not included.

Data collection

Information was collected about demographic, medical history, laboratory and physiologic measures, and clinical characteristics of the study sample through the review of information contained in hospital medical records. This included information about patients' age, sex, race, prior comorbidities (including heart failure), body mass index, admission levels of blood pressure, serum sodium, potassium, creatinine, and blood urea nitrogen, and presenting symptoms.

Data analysis

Incidence and attack rates (initial and prior episodes of acute heart failure) of heart failure were calculated in a standard manner using available published census data. Age- as well as sex-specific incidence and attack rates were calculated based on US census estimates of the greater Worcester adult population (≥25 years) in 2000.

Results

Descriptive characteristics

A total of 2604 adult men and women of all ages from the Worcester metropolitan area with independently confirmed decompensated heart failure requiring hospital admissions comprised the study population. Of these, 637 patients (24.5%) experienced a first episode of heart failure; the remainder of the study sample consisted of patients with prior heart failure in whom a new episode of decompensated heart failure occurred during hospitalization in 2000. The median age of the study sample was 79 years. The majority of patients were women, white, and had a history of heart failure, coronary heart disease, and hypertension. Dyspnea and edema were the most commonly reported symptoms by patients at the time of hospital presentation (Table 1). Similar characteristics were noted in the subset of patients experiencing their first episode of heart failure.

Attack rates of heart failure

The overall, age-, and sex-specific incidence rates of heart failure are shown in Table 2. The incidence and attack rates (per 100 000 population) of heart failure were 219 and 897, respectively. The occurrence of heart failure in the greater Worcester population increased markedly with the aging of this population. Women experienced higher incidence (250 vs 194) as well as attack rates (976 vs 811) of heart failure than men (Table 2).

In each of age strata examined, men experienced higher incidence and attack rates of heart failure than women (Figure). The overall incidence and attack rates of heart failure, however, were higher in women than in men because of the greater number and proportion of women in the oldest age groupings.

Hospital death rates associated with acute heart failure

In the total study sample, 5.1% of patients died during the acute hospitalization. Among patients with a first documented episode of heart failure, 5.3% of patients died, whereas 5.0% of patients with a previous episode of heart failure died.

In examining factors associated with hospital case-fatality rates, patients dying during the acute hospitalization were more likely to be older, of desirable body weight, and have a history of anemia or stroke (Table 3). Patients with higher concentrations of blood urea nitrogen, serum creatinine, and admission heart rates were more likely to die than respective comparison groups. On the other hand, patients with lower serum sodium concentrations and lower systolic and diastolic blood pressure values were at greater risk for dying during hospitalization than patients with higher levels of these clinical variables (Table 3).