CLINICAL RESEARCH STUDY

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Trends in Atrial Fibrillation in Patients Hospitalized with an Acute Coronary Syndrome

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ABSTRACT

BACKGROUND: Atrial fibrillation is common among patients with cardiovascular disease and is a frequent complication of the acute coronary syndrome. Data are needed on recent trends in the magnitude, clinical features, treatment, and prognostic impact of preexisting and new-onset atrial fibrillation in patients hospitalized with an acute coronary syndrome.

METHODS: The study population consisted of 59,032 patients hospitalized with an acute coronary syndrome at 113 sites in the Global Registry of Acute Coronary Events Study between 2000 and 2007.

RESULTS: A total of 4494 participants (7.6%) with acute coronary syndrome reported a history of atrial fibrillation and 3112 participants (5.3%) developed new-onset atrial fibrillation during their hospitalization. Rates of new-onset atrial fibrillation (5.5%-4.5%) and preexisting atrial fibrillation (7.4%-6.7%) declined during the study. Preexisting atrial fibrillation was associated with older age and greater cardiovascular disease burden, whereas new-onset atrial fibrillation was closely related to the severity of the index acute coronary syndrome. Patients with atrial fibrillation were less likely than patients without atrial fibrillation to receive evidence-based therapies and more likely to develop in-hospital complications, including heart failure. Overall hospital death rates in patients with new-onset and preexisting atrial fibrillation were 14.5% and 8.9%, respectively, compared with 1.2% in those without atrial fibrillation. Short-term death rates in patients with atrial fibrillation declined over the study period.

CONCLUSIONS: Despite a reduction in the rates of, and mortality from, atrial fibrillation, this arrhythmia exerts a significant adverse effect on survival among patients hospitalized with an acute coronary syndrome. Opportunities exist to improve the identification and treatment of patients with acute coronary syndrome with, or at risk for, atrial fibrillation to reduce the incidence and resultant complications of this dysrhythmia.

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KEYWORDS: Acute coronary syndrome; Atrial fibrillation; Mortality

Atrial fibrillation is one of the most common cardiovascular diseases worldwide, and the global burden of atrial fibrillation is increasing.[1,2] The acute coronary syndrome is a potent risk factor for atrial fibrillation, with atrial fibrillation occurring in up to 1 in every 5 patients hospitalized with an acute coronary syndrome.[3,4]

To date, most investigations into the magnitude and impact of atrial fibrillation in the setting of an acute coronary syndrome have been limited by modest sample sizes, short duration of follow-up, or inclusion of less-generalizable patient populations.[5-7] Perhaps because of the heterogeneous nature of these investigations, there remains a lack of consensus as to whether the development of atrial fibril-

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lation confers an increased risk of dying in patients with an acute coronary syndrome independently of underlying risk factors.[5,8-12] Moreover, because studies have focused largely on patients who develop new-onset atrial fibrillation during hospitalization for an acute coronary syndrome,[13-15] the impact of preexisting atrial fibrillation on prognosis in this setting is poorly defined.[16]

Despite significant changes in the demographics, treatment, and prognosis of patients hospitalized with an acute coronary syndrome during the last 30 years,[17,18] limited data are available describing recent trends in the magnitude, treatment, and prognosis of patients with acute coronary syndrome and new-onset[19] or preexisting atrial fibrillation.[20] The purpose of this study was to describe changing trends in patients with and without atrial fibrillation who were enrolled in the Global Registry of Acute Coronary Events (GRACE) study between 2000 and 2007.

CLINICAL SIGNIFICANCE

- Preexisting and new-onset atrial fibrillation are common among patients hospitalized for an acute coronary syndrome.
- Rates of heart failure and death are higher among patients with new-onset and preexisting atrial fibrillation than among patients without atrial fibrillation.
- Perhaps because of better monitoring and treatment, rates of atrial fibrillation and its complications are decreasing in patients hospitalized for an acute coronary syndrome.

MATERIALS AND METHODS

Details of the design of and data-collection methods used in the GRACE Registry have been published.[21] In brief, GRACE was a large, multinational, observational study of patients hospitalized with an acute coronary syndrome.[22] A total of 113 hospitals from 14 countries contributed data to this investigation.

Adult patients admitted with a presumptive diagnosis of acute coronary syndrome at any of the 113 participating GRACE hospitals were considered eligible for study inclusion, and patients' eligibility status was assessed on the basis of predetermined criteria.[21,22] Trained staff abstracted patients' demographic, clinical, biochemical, and electrocardiographic characteristics, as well as treatment practices and hospital outcomes, from hospital medical records using standardized case reporting forms. Standardized definitions of patient-related variables and outcomes were used (www.outcomes.org/grace).[21] As previously described, atrial fibrillation was defined on the basis of atrial fibrillation or atrial flutter on the admission 12-lead electrocardiogram.[20] Patients were categorized into those with preexisting atrial fibrillation and those with new-onset atrial fibrillation according to the presence of a history of atrial fibrillation in hospital medical records.[20] A GRACE risk score was calculated on the basis of a validated 8-variable model.[23] All acute coronary syndrome events were assigned to 1 of 3 categories using pre-established criteria: ST-segment elevation myocardial infarction, non-ST-segment elevation myocardial infarction, and unstable angina.[21]

Data Analysis

Differences in the characteristics, treatment, and outcomes of patients who developed new-onset atrial fibrillation were compared with patients who remained free of this arrhythmia using the chi-square and Kruskal-Wallis or Wilcoxon rank-sum tests for categoric and continuous variables, respectively. Variables considered for inclusion in all multivariable adjusted regression models were selected on the basis of established associations with atrial fibrillation or reduced survival in patients with an acute coronary syndrome. Candidate variables included age, sex, current smoking status, medical history, clinical characteristics on hospital presentation, and electrocardiogram characteristics (**Table 1**). Variables were retained in the final regression model if they were associated with the development of new-onset atrial fibrillation on univariate testing ($P < .20$). The end points examined included the development of cardiogenic shock, sustained ventricular tachycardia, renal failure, major bleeding, or stroke during hospitalization, in-hospital death, and death at 30 days after hospital admission.

RESULTS

Of the 59,032 patients who were enrolled in GRACE between 2000 and 2007, 4494 (7.6%) had preexisting atrial fibrillation and 3112 developed new-onset atrial fibrillation (5.3%) during hospitalization (**Table 1**). The mean age of study participants was 66 years, 33% were women, 10% had a history of heart failure, and 37% presented with an ST-segment elevation myocardial infarction.

Baseline Characteristics of Study Sample

Patients with atrial fibrillation (new-onset or preexisting atrial fibrillation) were on average older; female; and more likely to have a left bundle branch block, a higher average GRACE risk score, a lower ejection fraction, a higher initial serum creatinine level, a longer hospital stay, and a history of heart failure, hypertension, diabetes, or major bleeding in comparison with patients without prior atrial fibrillation who remained in sinus rhythm during hospitalization (**Table 1**). Patients who did not develop atrial fibrillation had a significantly higher body mass index, higher blood pressure, higher serum cholesterol, and lower initial heart rate on hospital presentation