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Original Research

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Transient Atrial Fibrillation Complicating Acute Inferior Myocardial Infarction*

Implications for Future Risk of Ischemic Stroke

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Background: **Atrial fibrillation (AF) that occurs as a frequent complication of myocardial infarction (MI) is associated with a poor clinical outcome. It nonetheless remains uncertain whether AF that occurs transiently during MI is associated with a subsequent increased risk of the development of AF and ischemic stroke.**

Methods: **We retrospectively studied the impact of transient AF on the long-term risk of the occurrence of AF, ischemic stroke, and mortality in 431 consecutive patients (mean [± SEM] age, 64 ± 1 years; 75% men). All patients had experienced an acute inferior ST-segment-elevation MI and had preserved left ventricular ejection fraction (LVEF) [> 45%].**

Results: **All patients were in sinus rhythm on hospital admission, and transient AF was observed in 59 patients (13.7%) during their hospitalization for MI. On hospital discharge, all patients were in sinus rhythm and had been prescribed antiplatelet agents alone as antithrombotic therapy. Patients in whom transient AF developed during MI were older (mean age, 70 ± 1.4 vs 64 ± 0.7 years, respectively; $p < 0.01$) and more likely to be women (37% vs 23%, respectively; $p < 0.02$) compared with those without AF. At 1-year follow-up, the incidence of AF (22.0% vs 1.3%, respectively; $p < 0.01$) and ischemic stroke (10.2% vs 1.8%, respectively; $p < 0.01$) was higher in patients with transient AF than in those without transient AF. The total mortality rate was nonetheless similar (5.6% vs 6.8%, respectively; $p = 0.73$); Cox regression analysis demonstrated that age > 65 years and transient AF during MI were independent predictors of the subsequent occurrence of AF and the development of ischemic stroke.**

Conclusion: **Transient AF complicating acute inferior MI is associated with an increased future risk of AF occurrence and ischemic stroke in patients with preserved LVEF, despite the use of antiplatelet therapy.** ***(CHEST 2007; 132:44–49)***

Key words: atrial fibrillation; myocardial infarction; stroke

Abbreviations: AF = atrial fibrillation; CI = confidence interval; HR = hazard ratio; INR = international normalized ratio; LVEF = left ventricular ejection fraction; MI = myocardial infarction

Transient atrial fibrillation (AF) occurs in up to 20% of patients during acute ST-segment-elevation myocardial infarction (MI), and is associated with an increased risk of early adverse events and in-hospital mortality.[1–3] Data on the clinical outcome of patients in whom AF develops complicating acute MI are nonetheless scarce. Prior studies[3] have suggested that patients with acute MI and AF have an increased risk of stroke compared with those without

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AF. Anticoagulation therapy is established to prevent thromboembolism in patients with AF,[4–8] but its role in patients with transient AF complicating acute MI remains unclear. In addition, the combination of an oral anticoagulant and antiplatelet agents may result in an excessive bleeding risk.[9,10] Previous

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studies[11] have revealed that only 30% of patients with AF after an acute MI are prescribed oral anticoagulation therapy.

Current clinical guidelines[12,13] for the use of oral anticoagulation therapy in patients with acute MI are likewise confusing. Oral anticoagulation therapy is recommended for patients with AF and impaired left ventricular ejection fraction (LVEF) following acute MI.[12,13] Nonetheless, data do not support the routine prescription of oral anticoagulation therapy to prevent thromboembolism in patients with transient AF and preserved LVEF following acute MI. The aim of this study was to investigate the clinical outcome of transient AF in a group of patients who had experienced acute inferior ST-segment-elevation MI and preserved LVEF.

Materials and Methods

Study Population

Clinical characteristics and long-term outcome were recorded in 504 consecutive patients who were admitted with acute inferior ST-segment-elevation MI to Queen Mary Hospital between 1997 and 2005. Demographic characteristics, symptoms, ECG, and functional status at presentation and clinical outcome during follow-up were retrospectively recorded. Clinical data were retrieved from the medical records and subsequently during the most recent clinic visit. Patients with preexisting or persistent AF ($n = 5$), in whom impaired LVEF of $< 45\%$ developed ($n = 6$), who died ($n = 57$), or who had missing clinical data ($n = 5$) were excluded from analysis. A total of 431 patients (324 male and 107 female) were included in this analysis.

Diagnosis and Clinical Outcome

Acute inferior ST-segment-elevation MI was diagnosed in the presence of typical chest pain lasting for ≥ 30 min, ST-segment elevation of ≥ 1 mm in any two of the inferior leads (*ie*, leads II, III, and aVF), and elevation in serum creatinine kinase or troponin T level of more than twice the upper limit of normal. All patients were monitored by telemetry ECG during the in-hospital period. Transient AF was defined as the occurrence of any new-onset AF that occurred during acute MI with subsequent spontaneous reversion to sinus rhythm prior to hospital discharge. All patients were in sinus rhythm on hospital discharge and were subsequently reviewed in our outpatient clinic every 3 to 4 months. The occurrence of AF, ischemic stroke, and cardiovascular mortality were retrieved from their hospital and outpatient medical records. Occurrence of AF was documented by a standard 12-lead ECG or Holter recording during outpatient follow-up or subsequent hospital admission. The occurrence of ischemic stroke was confirmed by axial CT scanning or MRI of the brain.

Statistical Analysis

Continuous variables are expressed as the mean ± SEM. Statistical comparisons were performed using the Student *t* test or the Fisher exact test, as appropriate. Hazard ratio (HR) and 95% confidence interval (CI) were calculated by univariate and multivariate Cox proportional hazards regression models. Multivariate analyses were performed with an enter regression model in which each variable with a p value of ≤ 0.1 (based on the univariate analysis) was entered into the model. Calculations were performed using a statistical software package (SPSS, version 12.0; SPSS; Chicago, IL). A p value of < 0.05 was considered to be statistically significant.

Results

Table 1 summarizes the clinical characteristics of the study population. During the acute episode of ST-segment-elevation inferior MI, transient AF developed in 59 patients (13.7%). These patients were significantly older and more likely to be female than those without AF ($p < 0.05$). There were, nonetheless, no significant differences between the two groups in the prevalence of hypertension, diabetes, hyperlipidemia, and smoking; the site and extent of MI; the use of reperfusion therapies for MI; or LVEF ($p > 0.05$ for all variables). On hospital discharge, all patients were prescribed aspirin, and none of those with AF were given oral anticoagulation therapy or an antiarrhythmic agent for the treatment of AF. There were no significant differences between patients with or without transient AF in the prescription of other cardiovascular medications such as clopidogrel, β-adrenergic blockers, angiotensin-converting enzyme inhibitors/angiotensin receptor antagonists, or statins ($p > 0.05$).

As shown in Figure 1, despite an increased use of primary coronary intervention after 2001 (2001 to 2005, 13.5%; 1997 to 2000, 0.5%; $p < 0.05$), there was no significant change in the incidence of transient AF complicating acute MI (2001 to 2005, 13.6%; 1997 to 2001, 13.8%; $p > 0.05$).

Occurrence of AF

After a mean (± SEM) follow-up time of 38.5 ± 1.4 months, AF was diagnosed in 20 patients (34%) with transient AF compared with only 9 patients (2.4%) without transient AF ($p < 0.01$) [Fig 2]. In the majority of patients (93%), the occurrence of AF was paroxysmal in nature, and was observed within the first year following acute MI. The annual incidence of the occurrence of AF within the first year was 22% and 1.3%, respectively, in patients with