An Emergency Department Intervention to Increase Warfarin Use for Atrial Fibrillation

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Background: Emergency department (ED) encounters represent lost opportunities to facilitate anticoagulation for stroke prevention in atrial fibrillation (AF). However, screening of warfarin eligibility in the ED may not be feasible. We evaluated whether a practical quality improvement initiative increased postdischarge warfarin use in ED patients with AF. *Methods:* This quasiexperimental study was conducted in a single academic health system. Eligible subjects were consecutive patients with AF identified by electrocardiogram during an ED evaluation who were discharged from the ED or the subsequent hospitalization off warfarin. The study consisted of data collection during 2 time periods: (1) preintervention (October 2009 to April 2010), serving as a baseline, and (2) intervention (June 2010 to December 2010). The intervention consisted of a mailing to the subjects and their primary care physicians. The primary outcome was the proportion of subjects taking warfarin 1 month after ED presentation. Differences between the proportion of preintervention and intervention subjects taking warfarin and warfarin or aspirin were compared with Chi-square tests. *Results:* At 1 month, 111 of 204 (55%) of the eligible preintervention and 90 of 160 (56%) of the eligible intervention group patients participated. There was no difference between the preintervention and intervention groups in the proportion of subjects taking warfarin at 1 month (12% *v* 9%; $P = .54$) or the proportion of subjects taking either aspirin or warfarin at 1 month (72% *v* 75%; $P = .59$). *Conclusions:* This practical stroke prevention quality improvement initiative was not associated with an increase in warfarin use among ED patients with AF. **Key Words:** Atrial fibrillation—emergency department—health services research—stroke prevention.

Emergency physicians (EPs) must provide problem-focused, efficient care to overcome the continued problems of emergency department (ED) overcrowding and long wait times.[1] Nevertheless, the ED provides an opportunity to screen for potential catastrophic conditions that may be unrelated to patients' presenting complaints. The key to quality improvement (QI) in the ED is finding a screening process and intervention mechanism that requires virtually no additional EP or nursing staff time. We applied this framework to the study of patients presenting to the ED who were found to have atrial fibrillation (AF).

AF is the most common sustained heart rhythm abnormality, affecting more than 2.2 million Americans, and is

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expected to increase to 5.6 million by the year 2050.[2,3] AF is a potent independent risk factor for stroke, increasing the risk of stroke approximately fivefold.[2] Despite warfarin's impressive 64% relative risk reduction in cardioembolic stroke, it is significantly underused.[4,5] Previous work at our institution revealed that more than half of patients with AF seen in the ED are not receiving anticoagulation, and that anticoagulation is rarely initiated in this setting.[6,7] Therefore, we designed and tested a practical, stroke prevention, QI initiative to increase postdischarge warfarin use in ED patients identified with AF.

Methods

This quasiexperimental study was conducted in a single academic health system. The study was divided into 2 phases: preintervention (October 2009 to April 2010) and intervention (June 2010 to December 2010).

Patients

Eligible subjects were consecutive patients evaluated in the ED with AF identified by electrocardiogram (EKG) who were not on warfarin therapy at the time of discharge from the ED or subsequent hospitalization. Exclusion criteria included being <18 years of age, pregnant, homeless, incarcerated, or requiring a foreign language interpreter. To reduce future EP and nursing staff burden, we included all patients with AF rather than attempting to screen for warfarin eligibility. Evaluation of warfarin contraindications in an emergency setting is challenging without the benefit of extensive medical records and gait assessment, and therefore would be impractical if this QI program were to be disseminated.

Intervention

The intervention was designed to provide feedback to the patient's primary care physician (PCP) about the ED visit. The intervention consisted of a plain language informational sheet mailed to the patients at a median of 8 days (interquartile range [IQR] 6-13 days) after their ED encounter. It notified the patients of their AF, provided information about AF as a risk factor for stroke, and described the roles of warfarin and aspirin in stroke prevention. Finally, it encouraged discussing these issues with their PCP.

The patients' PCPs were identified from the medical record or, if not listed (n = 1), every attempt was made to identify the patients' PCP, including contacting the patient. PCPs were both mailed and faxed a copy of the patient's ED EKG and a copy of the information sheet mailed to the patient. The PCP was also sent an informational sheet providing information on the $CHADS_2$ stroke risk scoring system to guide the appropriate use of warfarin and aspirin.[8]

Outcomes Measures and Covariates

A telephone interview assessed warfarin and aspirin use 1- and 6-months post-ED encounter. All outcome measures were selected a priori. The primary outcome was the proportion of subjects taking warfarin 1 month post-ED encounter. The secondary outcomes were warfarin or aspirin use 1 month and warfarin use 6 months post-ED encounter. At the 1-month interview, subjects were queried on contraindications to warfarin. Demographics, admission status, and comorbidities obtained from the medical record were used to calculate $CHADS_2$ scores.[8] Subjects with a chief complaint of palpitations, tachycardia, or shortness of breath were categorized as presenting for an AF-related complaint.

Sample Size and Statistical Analysis

Power was calculated a priori based on an estimate of AF patients seen in the ED during a 6-month preintervention and 9-month intervention period (although 7 months was used for each phase in the actual study) using a Chi-square test of proportions and the following assumptions: a conservative estimate of 50% warfarin initiation in the preintervention group, 2-sided test, and an alpha of .05. Based on this calculation, with at least 51 subjects in the preintervention group and 77 in the intervention group, we estimated a power of at least 90% to detect a 30% absolute difference in 1 month post-ED encounter warfarin use between the preintervention and intervention phases.[6]

Descriptive statistics were used to assess subject demographics, comorbidities, and hospital admission (yes versus no and missing). Differences between the proportion of preintervention and intervention subjects taking warfarin and warfarin or aspirin were compared with Chi-square tests at 1 and 6 months post-ED encounter. Statistical analysis was performed using Stata software (version 11.0; StataCorp, College Station, TX). The study was approved by the University of Michigan Institutional Review Board.

Results

During the 14-month enrollment period, 1005 patients had an EKG with AF. Of these, 364 (36%) were not taking warfarin and were eligible to participate in the 1- and 6-month interviews (Fig 1). At 1 month of follow-up, 55% (111/204) of the preintervention group subjects and 56% (90/160) of the intervention group subjects participated. At 6 months, 84 of 204 (41%) of the preintervention and 80 of 160 (50%) of the intervention group subjects participated. Subjects were younger than those who did not participate, but there was no significant difference in gender. More than half (64%) of the subjects presented with a chief complaint unrelated to AF. Most (86%) were admitted to the hospital. No significant differences between