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Letters

New-Onset Atrial Fibrillation During Hospitalization

Current guidelines (1) acknowledge that atrial fibrillation (AF) may be triggered by potentially reversible, or acute, causes such as surgery (cardiac and noncardiac), hyperthyroidism, myocarditis or pericarditis, myocardial infarction, pulmonary embolism, pneumonia, and alcohol intoxication. Incidence and risk for new-onset AF associated with acute conditions are unclear.

We investigated the epidemiology of new-onset AF associated with acute conditions in a population-based sample of hospitalized patients using 2011 data from the California State Inpatient Database (2). We excluded patients <40 years of age, in whom AF is rare (incidence < 0.1%) (1). We abstracted demographics, comorbidities, and guideline-defined (1) AF-associated acute conditions using International Classification of Diseases-Ninth Revision-Clinical Modification (ICD-9-CM) codes that were present upon admission. Because alcohol intoxication generally resolves at admission, we did not report alcohol-associated new-onset AF. We identified new-onset AF through ICD-9-CM code 427.3 not present on admission. Surgical procedures were defined by diagnosis-related group and ICD-9-CM codes. We performed multivariate logistic regression for new-onset AF adjusting for demographics, comorbid conditions, and acute conditions (**Table 1**). We conducted analyses investigating associations between infection site and new-onset AF and associations between increasing infection and myocardial infarction severity and new-onset AF. Procedures were approved by the Boston University Medical Campus Institutional Review Board.

We identified 2,275,588 patients hospitalized in California during 2011. Patients' mean age was 66 ± 14 years, 53% were women, 61% were white, 9% were black, 8% were Asian, and 21% were Hispanic. Any AF diagnosis was present during 342,778 (15%) hospitalizations, with new-onset AF constituting 22,780 of the AF cases (6.7%). Of new-onset AF cases, 18,575 (81.5%) were associated with guideline-identified acute conditions (1).

Table 1 demonstrates the proportion of new-onset AF cases during hospitalization associated with each acute condition and the multivariate-adjusted odds ratio (OR) for risk for new-onset AF associated with each condition. Most cases of new-onset AF were associated with noncardiac surgery (37.2% of new-onset AF) and infection (34.9%). Cardiac surgery was associated with 21.9% of new-onset AF cases and conferred a 50-fold increased adjusted odds of AF compared with other hospitalized patients. Conditions, such as pulmonary embolism, thyrotoxicosis, and myocarditis or pericarditis, showed modest associations with new-onset AF (adjusted OR: 1.43 to 1.78) but represented fewer than 2.5% of cases.

Among infectious conditions, pneumonia (12.2% of new-onset AF; adjusted OR: 2.6), urinary tract infection (11.6%; adjusted OR: 1.4), and intra-abdominal infection (10.5%; adjusted OR: 1.6) were associated with new-onset AF. Greater disease severity was associated with increased new-onset AF risk (i.e., infection alone: OR: 1.30; septic shock: OR: 4.53; myocardial infarction alone: OR: 1.33; with cardiogenic shock: OR: 2.3).

Our findings have implications for acute management and post-hospitalization follow-up of patients with new-onset AF. The majority of new-onset AF cases occur after noncardiac surgery or in patients with infections. Thus, most hospitalized patients with new-onset AF are unlikely to be under the direct care of cardiologists or cardiac surgeons, who may be most adept at treating new-onset AF. In addition, emerging evidence suggests that new-onset AF associated with acute conditions, (e.g., sepsis [3]) has high rates of recurrence and adverse long-term outcomes. Improved communication of long-term AF risks between hospital and outpatient providers is warranted.

Our findings also differ from opinions expressed in recent guidelines (1). For example, most cases of new-onset AF occurred in patients admitted with infections or in post-operative patients. Although pneumonia is explicitly identified in guidelines as a condition associated with new-onset AF, infections from other sources were similarly represented among cases of new-onset AF. Conditions such as pulmonary embolism, thyrotoxicosis, and pericarditis were rarely present among hospitalized patients with new-onset AF.

TABLE 1 Acute Conditions Associated With New-Onset AF Among Hospitalized Adults

Acute Condition	Number With New-Onset AF* (Total N = 22,780)	% New-Onset AF With Condition*	% Condition With New-Onset AF	Multivariate-Adjusted† OR for New-Onset AF (95% CI)
Noncardiac surgery (n = 641,071)	8,481	37.2	1.3	3.08 (2.99–3.18)
Infection (n = 730,379)	7,944	34.9	1.1	1.54 (1.49–1.59)
Cardiac surgery (n = 23,083)	4,804	21.9	20.8	52.4 (50.2–54.7)
Myocardial infarction (n = 77,848)	2,234	9.8	2.9	1.41 (1.34–1.48)
Pulmonary embolism (n = 20,939)	244	1.1	1.2	1.43 (1.26–1.63)
Thyrotoxicosis (n = 10,172)	141	0.6	1.4	1.78 (1.49–2.12)
Myocarditis or pericarditis (n = 3,705)	126	0.6	3.4	1.73 (1.41–2.12)

*Individual patients may have multiple diagnoses associated with new-onset AF. †Model adjusted for age, race, sex, history of diabetes mellitus, hypertension, heart failure, chronic pulmonary disease, stroke, metastatic cancer, prior myocardial infarction, and the acute conditions infection, surgery (cardiac and noncardiac), myocardial infarction, alcohol intoxication, pulmonary embolism, thyrotoxicosis, and myocarditis or pericarditis.

AF = atrial fibrillation; CI = confidence interval; OR = odds ratio.

Our study was limited by the ability of ICD-9-CM codes to identify temporal proximity between acute diagnoses and AF, especially when multiple diagnoses occurred simultaneously. Our results may not be generalizable outside of hospitalized patients. We were unable to identify whether AF present at the time of admission was new or pre-existing, a limitation that may result in underestimates of the association between some acute conditions and new-onset AF. Furthermore, cardiac rhythm monitoring may be more likely in some clinical scenarios (e.g., after cardiac surgery), and may have influenced our results.

In conclusion, we have examined risks for new-onset AF associated with acute conditions in a representative sample of hospitalized patients. Our findings inform prior knowledge gaps regarding acute conditions associated with new-onset AF and may provide targets for improved processes of care.

*Allan J. Walkey, MD, MSc
Emelia J. Benjamin, MD, ScM
Steven A. Lubitz, MD, MPH

*Boston University School of Medicine
The Pulmonary Center, R-304
715 Albany Street
Boston, Massachusetts 02118
E-mail: alwalkey@bu.edu

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Frequency of Inappropriate and Nonrecommended Prasugrel Prescription

Great Variations

We read with great interest the work by Hira et al. (1) presenting a high rate of prasugrel prescription with inappropriate or nonrecommended indications. In previous studies, prasugrel was prescribed at hospital discharge despite the presence of at least one contraindication in 9.6% of patients, while inappropriate prasugrel prescription within 24 h of admission was observed in 1.8% of patients (2,3). Differences in provider type, data elements collected, and definitions applied may account for these variations, and this should be highlighted.

No net clinical benefit from prasugrel compared with clopidogrel has been described, not only in the subgroup of patients ≥75 years of age but also in those with low body weight (<60 kg). Therefore, in the prasugrel package insert, body weight < 60 kg is reported as a risk factor for bleeding, constituting, in our view, a nonrecommended indication. It would be interesting to know the prevalence of patients weighing <60 kg in the studied population, providing an estimate of how many additional patients likely received prasugrel for a nonrecommended indication. Additional risk factors increasing the risk for bleeding are included in the black-box warning and have been specifically reported to affect nonrecommended selection of prasugrel (4).

Data on prasugrel's use in patients receiving concomitant aspirin and warfarin are extremely important, and it would be very interesting to have some idea about this subgroup's outcomes. In a much