**Editorial**

**Everything Counts in Large Amounts**

**Device-Detected Atrial High-Rate Arrhythmias**

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Although the risk of stroke associated with paroxysmal atrial fibrillation (AF) is comparable to that with persistent (or permanent) AF, the lower representation of patients with paroxysmal AF in clinical trials reduces the confidence of the risk estimate. As a group, patients with paroxysmal AF are heterogeneous but typically younger, with less advanced associated cardiovascular disease than those with persistent or permanent AF. Episodes of AF occur daily in some patients but in others are separated by months or even years, and the duration of episodes varies considerably as well. Nevertheless, the threshold burden of paroxysmal AF required to justify chronic anticoagulant therapy has not been clearly defined, and prophylactic therapy is prescribed less consistently for patients with this form of the arrhythmia. Clinical practice guidelines currently recommend prophylactic antithrombotic therapy based on the axiom that paroxysmal and persistent AF carry similar risks of thromboembolism. Anticoagulation decision is based on clinical features other than the pattern, chronicity, or duration of AF, specifically the presence or absence of associated valvular heart disease, prior thromboembolism, advanced age, hypertension, diabetes, impaired left ventricular function, or heart failure.

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Even in patients with symptomatic AF, asymptomatic episodes are common. In studies of unsellected patients based on standard surface ECG recordings, the prevalence of asymptomatic AF ranged from 5% to 20%. Among the challenges in antithrombotic therapy is identifying patients with asymptomatic paroxysmal AF. Longer-term Holter and event monitoring increases the detection of asymptomatic AF, and in the Prevention of Atrial Fibrillation After Cardioversion (PAFAC) trial, nearly 70% of episodes of paroxysmal AF detected by transtelephonic monitoring were asymptomatic.

Implanted dual-chamber cardiac arrhythmia devices, including pacemakers, cardioverter-defibrillators, and resynchronization devices (CRTs), are capable of continuously monitoring the rhythm. In a study of patients with paroxysmal AF and implanted pacemakers, 38% of episodes of atrial high-rate activity (AHRE; tantamount to AF or atrial flutter) lasting 48 hours or longer were asymptomatic. During 24 months of observation in a multicenter study, the incidence of AHRE, most of which was asymptomatic, was 89% and 46% in patients with and without previously documented atrial tachyarrhythmias, respectively. The sensitivity and specificity of AHRE detected by arrhythmia devices depend on multiple factors, including criteria for rate and duration, method of detection, atrial and far-field sensitivity, thresholds for mode-switching and other programmed parameters, and certain characteristics of the atrial arrhythmias. In the MOST trial, the incidence of device-detected AHRE defined by atrial rates of 220 bpm or more lasting 5 minutes or longer was 51% of 312 patients, similar to other studies of patients with pacemakers. Detection of this degree of AHRE correlated with a higher stroke rate, and multivariable analyses adjusting for other prognostic factors demonstrated that detection of AHRE raised the risk of death 2.5-fold, the risk of death or nonfatal stroke by a factor of 2.8, and the risk of developing overt AF to nearly 6 times that of patients without AHRE. Another study suggested an increased risk of thromboembolism in patients with device-detected AHRE lasting a day or longer, and the risk rose significantly with the number of stroke risk factors. These results are concordant with those in the Italian AT-500 Registry cohort of elderly patients with bradycardia and antitachycardia pacemakers, in whom the adjusted risk of thromboembolism was increased 3.1-fold in patients with device-detected AHRE of >24 hours during follow-up.

In this issue of *Circulation: Arrhythmia and Electrophysiology*, Glotzer et al shed additional light on the importance of atrial tachyarrhythmia burden in predicting thromboembolic events. The purpose of the TRENDS study was to evaluate the relationship between long-term detection of AHRE and thromboembolic events among patients with stroke risk factors and implanted dual-chamber cardiac pacemakers. The overall rate of ischemic events was low in this cohort (1.3% per year), perhaps because some patients were treated with anticoagulant medication (an uncontrolled variable). In a secondary analysis, patients who displayed AHRE (atrial rates >175 bpm lasting >20 seconds) for <5.5 hours on a single day during a 30-day period experienced a clinical thromboembolism rate of 1.1% per year, whereas the event rate among those with a greater burden of AHRE was 2.4% per year. After statistical adjustment for stroke risk factors, AHRE burden <5.5 hours per day over 30 days was associated with a risk of thromboembolism similar to that of
that initiation and withdrawal of oral anticoagulant therapy guided by continuous ambulatory monitoring of the atrial electrogram will improve clinical outcomes by reducing the combined rate of stroke, systemic embolism, and major bleeding compared with conventional clinical management.18 Intrinsic to this assessment is whether active monitoring of the atrial rhythm affords advantages in terms of other aspects of therapy, including administration of antiarrhythmic drugs. Information of this type ultimately bears on the clinical value of wireless remote surveillance of the cardiac rhythm and may define the critical threshold of AHRE burden warranting therapeutic intervention.

The irregular and seemingly unpredictable distribution of AF episodes and their relationship to the type and severity of underlying heart disease make these investigations methodologically challenging. Clinical strategies involving antithrombotic therapy for stroke prevention in patients with pacemakers or other arrhythmia devices should consider not only the frequency and duration of AHRE but also the patient’s risks of thromboembolism and bleeding. As a consequence, we must learn much more about the complex relationship between thromboembolic risk and the burden of atrial tachyarrhythmias such as AF before the information gleaned from implanted cardiac devices can be factored into this aspect of clinical practice.

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References


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