

Atrial fibrillation in patients with cardiac implantable electronic devices: new perspectives with important clinical implications

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Atrial fibrillation (AF) is the most common arrhythmia encountered in clinical practice, and even if it is usually associated with palpitations, it frequently may be asymptomatic (up to 40% of cases)¹ or it may present atypical symptoms (around 25% of cases).² Asymptomatic AF is reported to be more prevalent in men, older patients, and those with permanent AF. Moreover, it is usually associated with more complex comorbidities and an increased risk of thromboembolism as well as cardiovascular and all-cause mortality, as compared with symptomatic AF.^{1,2}

In the current issue of *Kardiologia Polska* (*Kardiolog Pol, Polish Heart Journal*), Dębski et al³ report on an interesting retrospective study that evaluated the incidence of permanent AF in a cohort of 3932 patients implanted with a dual-chamber pacemaker, analyzed the predictors of permanent AF development, and considered the impact of AF on patients' outcome.

The setting of the study is quite interesting since pacemakers with an atrial lead enable a precise and detailed assessment of presence or absence of atrial tachyarrhythmia and allow to quantify, in terms of AF burden, the time spent in AF, as well as the evolution or progression of the arrhythmia, independently of the presence of symptoms or their absence.^{4,5}

During a follow-up of 4.6 years, 19% of patients developed permanent AF and at year 1, 5, 10, and 15 after device implantation, permanent AF was found in 4.4%, 13.3%, 25%, and 32.3% of patients, respectively. This indicates that with time, the burden of AF, either symptomatic or asymptomatic, is substantial, and needs for appropriate decision-making, first of all, to start oral anticoagulation in patients at risk.

Permanent AF was associated with age at baseline, with the risk increasing 2-fold for each decade of life, as well as with male sex. In this retrospective study, the position of RV lead or the type of pacing were not related with permanent AF. The authors highlight the need for follow-up to evaluate the onset of AF that would enable prompt reaction. Unfortunately, the study was not based on continuous cardiac rhythm monitoring since many implanted pacemakers had no automated storage of intracardiac electrocardiograms and most of them were not capable of detecting AF. The extended diagnostic capabilities of modern pacemakers allow continuous monitoring of the cardiac rhythm and appropriate detection of atrial tachyarrhythmias known as atrial high-rate episodes (AHREs).⁶

AHREs, currently defined as episodes of at least 5 minutes of atrial tachyarrhythmias, also including AF, with an atrial rate higher than 175 to 180 bpm, are found on follow-up at routine device check or at remote monitoring, and classified in terms of duration of a single episode or time spent in atrial tachyarrhythmias during a day.^{5,7}

The extended diagnostic capabilities of implanted devices have led to new terms, such as AF burden, defined as the overall time spent in AF during a specified period of time, and subclinical AF, defined as episodes of atrial tachyarrhythmias with their duration between 5 minutes and 24 hours, detected by a cardiac implantable electronic device in patients without clinical history or symptoms of AF.^{8,9}

In the ASSERT study (Asymptomatic Atrial Fibrillation and Stroke Evaluation in Pacemaker Patients and the Atrial Fibrillation Reduction

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Atrial Pacing Trial), subclinical atrial tachyarrhythmias that lasted at least 6 minutes were detected with device diagnostics in around 10% of patients within 3 months after implantation but during a follow-up of 2.5 years; additional subclinical atrial tachyarrhythmias occurred in around 25% of patients, and around 16% of those with AHREs developed clinically overt AF.⁹

A literature review by Freedman et al¹⁰ revealed that AHREs longer than 5 to 6 minutes are common in patients with a cardiac implantable electronic device, with the incidence of 10% to 68%.

The clinical significance of AHRE is related to the associated risk of stroke. A series of studies, which collected data on more than 22 000 patients overall, showed that the burden of AHRE with a duration of 5 to 6 minutes or longer is associated with a 2.4-fold increase in the risk of stroke or systemic thromboembolism (compared with subjects without AF) that is lower than the increased risk commonly reported for clinical AF (4.8-fold).¹¹

In view of these findings, the clinical significance of device-detected AHREs is currently debated with regard to the absolute need for prescribing oral anticoagulants, and individualized decision-making is needed before completion of the ongoing prospective trials.¹⁰

After detection of AHREs, an intensified patient follow-up is recommended, especially if anticoagulation is not instituted, possibly with remote monitoring targeted to detect clinical AF or the transition into AHRE lasting more than 24 hours as well as to detect important clinical changes such as onset or exacerbation of heart failure.^{6,12,13}

Aside from the risk of stroke, detection of atrial tachyarrhythmias or overt AF in patients with pacemakers has important implications for patient outcomes. In a study with a 4-year follow-up, detection of AHREs was associated with an increased risk of thromboembolism and death.¹⁴

In the study by Dębski et al,³ the occurrence of permanent AF was associated with a significantly increased unadjusted risk of death. In a previous study evaluating a cohort of real-world patients with AF, nonparoxysmal AF had a worse outcome in terms of all-cause mortality, which was related to a more severe patient status. Age, chronic heart failure, chronic kidney disease, and diabetes were independent predictors of an adverse outcome.¹⁵

In conclusion, nowadays, there are novel clinical perspectives in the field of cardiac pacemakers because they are not only a simple support of the electrical activity in a diseased heart but also constitute advanced diagnostic systems, with remote data transmission that allow extensive monitoring of rhythm abnormalities, and specifically of AF, also with the possibility to monitor parameters related to heart failure. Integration of these records with clinical data

could help in appropriate and timely decision-making, and further long-term registries and studies have to be planned in order to provide data on the clinical impact, organizational implications, and patient outcomes associated with these tools.

ARTICLE INFORMATION

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