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More or Less Irregularity in Understanding an Irregular Rhythm: Atrial Fibrillation Classification and Racial Differences

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The past few years have witnessed unprecedented advances in the field of atrial fibrillation (AF) research. This includes developing new AF risk prediction models,[1–3] introducing safer anticoagulants,[4–6] and identifying several novel AF risk factors.[7] Despite these great advances, however, we still do not have a full understanding of some of the basic concepts about this common arrhythmia that affects over 2 million people in the United States— a number that is expected to double in the next few decades.[8] AF is a complex disease with a multifactorial etiology and far-reaching complications. Although we may now know several traditional and novel AF risk factors, it is not entirely clear how they interact with each other under different predispositions to AF. This lack of holistic understanding of exactly how and why AF develops makes this irregular cardiac rhythm difficult to understand or even describe.

In this issue of *JAHA*, there are 2 separate articles in which the authors sought to address some of the irregularities in understanding the epidemiology of AF. In one article Lubitz et al[9] address the classification of AF patterns in longitudinal studies, and in another article Thomas et al[10] address the racial differences in the prevalence of AF.

Classification of AF Patterns

The current recommended classification of AF patterns by the American College of Cardiology (ACC), the American Heart Association (AHA), and the European Society of Cardiology (ESC) is based on the timing of detection, method of conversion to sinus rhythm, whether self-terminating or induced, recurrence, and duration of AF.[11] AF is classified as "first-detected" if diagnosed in individuals who have no history of this arrhythmia. AF that recurs after the first-detected episode is considered "paroxysmal" if it self-terminates within 1 week, "persistent" if it continues beyond this period and is not self-terminating, or "permanent" if efforts to terminate the rhythm fail or are not attempted. This classification scheme represents a consensus driven by a desire for simplicity and clinical relevance.[11] As could be imagined, patients could be moving from one AF pattern to another based on the natural history of the disease or intervening treatment. Even cases with permanent AF could change label to be persistent AF if an intervention (eg, catheter ablation) is successfully applied at a later stage. Hence, it may not be always simple to consistently classify AF using the ACC/AHA/ESC classification scheme, and subsequently it may not be always feasible to examine or compare the clinical relevance of different AF patterns since we cannot identify each pattern precisely and consistently in the first place.

In the clinical setting, the main purpose of giving a certain label to an AF pattern is to rationalize the need for a specific treatment option(s) at the time the patient is seen. Since changes are expected in patients' conditions and subsequent treatment plans even in the short-term, having different labels for AF at different times should not pose significant challenges in patient care. In this context, the recommended ACC/AHA/ESC AF classification fulfills its purpose as part of patient care. However, it may not be ideal in the research setting, especially in long-term population studies where using a highly reproducible easy-to-apply method for AF classification is critical. With most of our evidence-based knowledge obtained from large population studies, using an AF classification that fits both clinical and research settings is needed. The article by Lubitz et al[9] published in this issue of *JAHA* is a significant step toward this aim.

Using data from the Framingham Heart Study, Lubitz et al[9] proposed using a fixed 2-year time window to classify AF into 3 patterns: AF without recurrence, recurrent AF, and sustained AF. Compared with individuals without 2-year AF

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recurrences, the authors showed that the 10-year prognosis was worse for individuals with either sustained or recurrent AF. The simplicity of this proposed classification makes it likely to be reproducible in the research setting. Similarly, its ability to separate participants according to their levels of risk makes it a useful clinical tool as well. However, whether the 2-year window for classification of AF patterns, as proposed by Lubitz et al, is the ideal time window compared to other time windows is not clear at this stage. Also, several paroxysmal AF episodes can go undetected unless long-term rhythm monitoring is applied, and hence not detecting AF on a routine resting 12-lead electrocardiogram (ECG) does not mean that the patient really has no AF (or recurrent AF). This could lead to misclassification of "AF without recurrence" in the proposed classification. Regardless of this limitation, which is expected to be affecting any AF classification, the proposed classification by Lubitz et al should lessen some of the challenges in classifying AF in longitudinal studies by using a simple potentially reproducible approach.

Atrial Fibrillation in Blacks

The prevalence and incidence of AF have been repeatedly reported to be less in blacks compared to whites.[12–15] On the other hand, blacks are known to have increased prevalence of AF risk factors compared to whites[16] which contradicts the reported low AF prevalence in blacks. Notably, blacks also are at particularly higher risk for stroke, a known complication of AF, with 2 to 5 times the risk of incident stroke and 2 to 4 times the risk of stroke mortality compared to whites.[17,18] This disconnect between the racial distribution of AF risk factors and prevalence/incidence of AF has been referred to as the AF race paradox.[19]

In this issue of *JAHA*, Thomas et al[10] confirm such a paradox using data from 135 494 hospitalizations for heart failure at 276 hospitals participating in the American Heart Association's Get With The Guidelines HF Program. They showed that despite having many risk factors for AF, black patients relative to white had a lower prevalence of AF. Notably, in-hospital mortality did not significantly differ by race in this study, but length of stay was more in blacks compared to whites.

Several possible explanations for this paradox have been proposed, but none has explained it fully. These possible explanations include: limited methodology to detect paroxysmal/intermittent AF in population studies coupled with the possibility of blacks having more paroxysmal/intermittent AF than whites, differential access to health care with blacks having less access and subsequently less detected AF, survival bias with whites living longer and subsequently having more AF, and finally differential impact of AF risk factors with whites being more affected or blacks less affected by AF risk factors whether this is genetically determined or via other unknown predispositions.[19] Most of these possibilities have been tested and proved not to provide convincing explanation for the paradox of AF in blacks. This is with the exception of thoroughly examining the hypothesis that blacks might have more AF patterns that are harder to detect because of their intermittent nature such as paroxysmal AF or atrial flutter, which require long-term rhythm monitoring to detect. Implementation of long-term rhythm monitoring in population studies has been traditionally challenged by logistics and cost. Nevertheless, with the new generations of small long-term rhythm recording and monitoring devices, this may be the time to test this hypothesis.

In summary, despite the great progress in AF research, we still need to straighten out some of the irregularities in our basic understanding of this irregular rhythm. This includes the need to explain the paradoxical associations of AF with race that defy logic, as well as coming up with a better way for classifying AF that is appropriate in both clinical and research settings. In this regard, the studies by Lubitz et al[9] and Thomas et al[10] could be seen as either steps toward less irregularity in understanding AF or examples of the challenges we face in understanding this common cardiac rhythm disorder. What is sure, however, is that with the increasing life expectancy and aging of the US population, having more research in an age-related disease such as AF is really needed and worth investing.

Disclosures

None.

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