First-Degree Atrioventricular Block and Hypertrophic Cardiomyopathy: "I Have a Bad Feeling About This"

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While stuck in a starship trash compactor and muttering, "I have a bad feeling about this," Han Solo[1] likely feared a worse prognosis compared with that of heart disease patients with first-degree atrioventricular block (AVB). However, while P-R interval prolongation is often considered a benign finding, the evidence linking it with a variety of adverse cardiovascular outcomes continues to accumulate.

Prolongation of the P-R interval to >200 ms typically does not warrant therapy absent the rare scenario where severe elongation leads to symptoms arising from atrial contraction immediately after ventricular systole. The infrequent need for therapy has led to a general impression of first-degree AVB to represent a benign finding. Among healthy adults, the data remain mixed as to its prognostic significance. Some large cohort studies show no association with adverse outcomes,[2,3] whereas others report an association with increased risk of atrial fibrillation.[4] However, among patients with coronary artery disease and/or heart failure, significant associations are reported between P-R interval prolongation and a variety of end points, including mortality and hospitalization for heart failure.[5,6] A comprehensive review of population and heart disease studies relating to first-degree AVB and clinical outcomes has been reported by Nikolaidou and colleagues.[7]

In this issue of the *Journal of the American Heart Association* (*JAHA*), Higuchi and colleagues[8] report the association between first-degree AVB and outcomes in a cohort of 414 patients with hypertrophic cardiomyopathy (HCM). Although such associations have been described in heart failure cohorts, this report is the first to focus on HCM. Approximately one quarter of the cohort demonstrated P-R prolongation ≥200 ms, which associated in multivariable analyses with HCM-related death (adjusted hazard ratio, 2.41; 95% CI, 1.27–4.58) as well as a secondary end point of sudden death or potentially lethal arrhythmic events (adjusted hazard ratio, 2.60; 95% CI, 1.28–5.27).[8] Variables used in the risk adjustment included risk factors associated with sudden death in HCM, as well as known modifiers of the P-R interval. Of note, given limited numbers of events, the multiple variables informing the European Society of Cardiology HCM risk calculator[9] were combined to create a single risk variable to be used in the multivariable modeling.

Specific strengths of this report include its robust adjudication of outcomes as well as an approximate similarity in event rates to other HCM observational studies.[10–12] Over a median follow-up of 8.8 years, 56 patients (13.5%) experienced HCM-related deaths: 47 patients (11.4%) had sudden death or potentially lethal arrhythmic events (17 patients [4.1%] with sudden death, 10 [2.4%] with successfully resuscitated cardiac arrest, and 20 [4.8%] with appropriate implantable cardioverter defibrillator shocks); the remaining 9 patients included 6 (1.4%) with heart failure–related death and 3 (0.7%) with stroke-related death. The annualized HCM death rate was 1.53%, and the aborted cardiac event rate was 0.9%. Although higher than the estimates of a recent study,[13] the event rates in the current study are still consistent with the overall trend of declining morbidity and mortality over the past several decades.

A key limitation of the current report is the lack of robust phenotyping of cardiac structure and function. Parameters of interest include myocardial strain imaging, as well as direct assessment of focal and diffuse myocardial fibrosis,[14,15] which have been associated with P-R interval and outcomes in other conditions.[16] Specific to HCM, left atrial remodeling, diastolic dysfunction, and myocardial fibrosis are prevalent[14] and likely to influence conduction parameters. The authors do describe a lack of association between echocardiography septal peak velocity of early diastolic transmitral flow/peak velocity of early diastolic mitral annular motion (E/e') and

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first-degree AVB, although this observation in isolation provides limited insight into the health of the myocardium, given the wide variety of structural derangements known to occur in HCM. In addition, longitudinal study of such parameters as they relate to P-R interval in patients with HCM would be of great interest. Such data may inform the mechanism by which P-R interval prolongation associates with outcomes: is it merely reflective of underlying structural heart disease, or might there be a direct deleterious effect on cardiac function leading to adverse remodeling and outcomes?

In summary, the current report by Higuchi and colleagues[8] demonstrates an intriguing association between first-degree AVB and cardiac outcomes among patients with HCM, even after moderate risk adjustment for common risk factors. Clinical application of this potential risk marker is not yet warranted. Further investigation is required to characterize this prognostic association in relation to comprehensive cardiac imaging parameters, as well as to delineate its ability for risk reclassification in the context of current guideline-recommended algorithms.[9,17] Nonetheless, this report reminds the clinician that the ECG will likely remain a fundamental part of the evaluation of the patient with HCM, whether on Earth or in galaxies far, far away.

Disclosures

None.

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