

AHA/ACC SCIENTIFIC STATEMENT

Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Task Force 9: Arrhythmias and Conduction Defects



A Scientific Statement From the American Heart Association and American College of Cardiology

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A broad range of variations in heart rates and rhythms, specific cardiac arrhythmias, and atrioventricular (AV) and intraventricular conduction disturbances are observed in athletes. Although most are common among nonathletes as well, the special circumstances and pressures related to athletic performance demand a high level of attention. The distinction between normal variants, often exaggerated by the specific physiology of the conditioned athlete, and arrhythmias

that may be symptomatic or life-threatening may be significant challenges.

BRADYCARDIA

Sinus Bradycardia

Sinus bradycardia, defined as a sinus rate <60 beats per minute (bpm), is common in the athlete (1). Generally, it is attributed to enhanced vagal tone

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caused by conditioning and is thus physiological. Occasionally, heart rates can be as slow as 30 to 40 bpm at rest in the highly conditioned athlete and decrease to <30 bpm during sleep. Some athletes with marked sinus bradycardia will exhibit periods of low atrial or junctional escape rhythms with rates of 40 to 60 bpm. This is a normal phenomenon, and these will become suppressed with exercise-induced increases in the sinus rate.

Evaluation of the athlete with sinus bradycardia includes a careful history to determine whether the athlete has symptoms related to the bradycardia. In addition, physical examination and an ECG are warranted, with selective use of additional tests such as an echocardiogram and exercise stress test if underlying structural heart disease is suggested. Stress testing can also be used to verify a normal rate response to exercise, if judged to be necessary. The same approach applies to the sinus arrhythmia commonly observed in the athlete. Generally, asymptomatic sinus pauses or sinus arrest (<3 seconds) are not considered clinically significant unless accompanied by symptoms. Pauses of longer duration may fall within the spectrum of physiological responses to athletic conditioning; however, when accompanied by symptoms, sinus bradycardia, sinoatrial exit block, and sick sinus syndrome with pauses at the termination of a supraventricular tachycardia (SVT) are considered abnormal. Athletes with symptoms potentially associated with these arrhythmias should have an ECG, 24-hour ambulatory monitoring, and an exercise test. Clinical assessment for structural heart disease and noninvasive assessment of sinus node function with ambulatory monitoring and stress testing are also appropriate in symptomatic patients or those with resting heart rates <30 bpm or pauses >3 seconds.

Invasive electrophysiology studies (EPS) play a very limited role in the assessment of sinus node function. An athlete with symptoms related to sinus bradycardia caused by high vagal tone related to training should restrict athletic training and have clinical reassessment of symptoms and sinus node function (1). Patients with symptomatic bradycardia not responsive to other measures such as deconditioning or the withholding of nonessential medications that are contributing to the bradycardia may need to be treated with a permanent pacemaker, although this is very rarely needed in the athlete (2,3).

Recommendations

- 1. Athletes with sinus bradycardia, sinus exit block, sinus pauses, and sinus arrhythmia without symptoms can participate in all competitive athletic activities unless otherwise excluded by underlying structural heart disease or other arrhythmias (Class I; Level of Evidence C).**
- 2. Athletes with symptomatic bradycardia should be evaluated for structural heart disease and be treated for the bradycardia, generally by an implanted pacemaker. They should be restricted from training and athletic competition while being evaluated. If treatment of the bradycardia eliminates symptoms, they can participate in athletic training and competition unless otherwise excluded by structural heart disease or other arrhythmias (Class I; Level of Evidence C).**

AV BLOCK

Athletes with AV block should be assessed for symptoms attributable to the block with a history and for any underlying structural heart disease with a cardiovascular examination and ECG. Other tests, including an echocardiogram, ambulatory monitoring, exercise stress test, and invasive EPS, should be used in a selective fashion.

First-Degree AV Block

In asymptomatic athletes with structurally normal hearts who have first-degree AV block identified on a pre-participation or other incidental ECG, the PR interval will shorten during a stress test in most cases. However, stress testing is rarely necessary for the evaluation of an athlete with a PR interval <0.3 second and a normal QRS duration. An echocardiogram is not necessary unless the cardiovascular examination or ECG suggests structural heart disease. If the QRS complex is abnormal, or the PR interval is excessively prolonged (≥ 0.3 second), an exercise stress test, 24-hour ambulatory monitor, and echocardiogram are warranted. EPS is rarely necessary but might be performed in selected cases, such as those with exercise-induced AV block suspected of having type II AV block, to determine the site and duration of conduction delay (AV node or intra-His/infra-His) and ensure that the patient is not at risk for progression to higher-degree block that would cause symptoms. Patients with congenitally corrected transposition of the great arteries can exhibit first-degree AV block with very little else on physical examination.

Recommendations

- 1. Asymptomatic athletes with no structural heart disease and first-degree AV block (PR interval <0.3 ms) can participate in all competitive sports unless there are findings that indicate that the person is at risk for progression to higher-degree block that would symptoms (Class I; Level of Evidence C).**
- 2. Asymptomatic athletes with first-degree AV block, in whom type I second-degree AV block appears with exercise, should be evaluated further for possible intra-His or infra-His block with EPS (Class I; Level of Evidence C).**

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