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BJSM Online First, published on October 1, 2015 as 10.1136/bjsports-2015-095554

Is cardiovascular screening in athletes justified? Inconsistent messages from the American Heart Association

Jonathan A Drezner

Recent reports from the American Heart Association (AHA) and by lead authors of the 2014 AHA guidelines for cardiovascular screening in athletes present many inconsistencies that need to be critically examined. In three different AHA statements (1996, 2007, 2014), the AHA has endorsed cardiovascular screening: "Both AHA and ESC consensus panels have agreed previously that screening to detect cardiovascular abnormalities in asymptomatic young competitive athletes is justifiable in principle on ethical, legal, and medical grounds."[1] Furthermore, the AHA has not endorsed cardiovascular screening for young non-athletes: "Consideration for large-scale, general population, and universal cardiovascular screening in the age group 12 to 25 years with history-taking and physical examination alone is not recommended (including on a national basis in the United States) (Class III, no evidence of benefit; Level of Evidence C)."[1]

However, <1 year from publication, the AHA and leaders of the 2014 guidelines have called into question the very ethics of screening only young athletes, and recommended that all young persons be screened, with a cardiac history and physical examination as part of an expanded public health policy[2 3]—two points in direct contradiction to recommendations in the 2014 AHA guideline.

WHY CARDIOVASCULAR SCREENING IN ATHLETES IS WARRANTED

The first question to guide the ethical justification of cardiovascular screening programmes in athletes is whether they are at greater risk of major cardiac events. In a US study of high school athletes, student athletes demonstrated a 3.6 times greater relative risk for sudden cardiac arrest (SCA) than student non-athletes.[4] Male student athletes were higher risk than male non-athletes (RR 4.95), however, data did not find that female high school athletes were higher risk than female non-athletes.[4]

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NCAA incidence studies and data from the US National Registry for Sudden Death in Athletes demonstrate that some athlete groups are clearly at the highest risk. Male college basketball players of any ethnicity carry an annual risk of sudden cardiac death (SCD) of 1 in 9000.[5] This does not include SCA cases with successful resuscitation, so the true incidence of major cardiovascular events is certainly higher. Men's basketball represents only 4% of male NCAA athletes, but nearly 20% of all SCD cases.[5] Current data demonstrate that male basketball, American football and soccer comprise about 75% of all SCD—despite traditional screening methods.

Comparing other causes of sudden death in young athletes provides further support for cardiovascular screening programmes. In a study examining all-cause mortality in NCAA athletes, SCD in college athletes is the leading medical cause of death and represents 75% of sudden death during exertion—making it more common than homicide and suicide combined.[5] Motor vehicle accidents, by far the most common cause of death in the general young population, were only twice as frequent as SCD in college student athletes. In fact, in male basketball players, the risk of dying from SCD was twice as high as the risk of dying from a motor vehicle accident.

NO LEGISLATED MANDATES

The AHA also has maintained a position against mandatory, national or legislated cardiovascular screening programmes inclusive of ECG. Yet they are willing to support and promote state legislation that mandates cardiovascular screening by only history and physical examination?[3] There are robust data demonstrating that screening by history and physical examination alone is woefully inadequate (sensitivity approximately 10%) to detect pathological cardiac conditions associated with SCD.[6] Studies also demonstrate high positive response rates (low specificity) to cardiac screening questionnaires in the high school and college athletic populations, ranging 14–68%.[7 8] Given the limitations of cardiovascular screening by history and physical examination, it is impossible to justify state legislation mandating the AHA 14-point questionnaire in athletes and/or non-athletes. It is also contrary to the position of the 2014 AHA guideline.

THE NEW MODEL FOR SCREENING SHOULD BE BASED ON RISK AND RESOURCES

We need to move away from a 'one size fits all' model of cardiovascular screening, and stratify our screening procedures based on risk and available resources. ECG increases the likelihood of detecting conditions at risk for SCD—which is the purpose of preparticipation cardiovascular screening. While any athlete may warrant advanced screening, ECG should be encouraged in targeted high-risk groups when adequate cardiology resources are available. When performed by experienced clinicians using modern interpretation standards that account for physiological adaptations, the ECG false-positive rate is between 2% and 6%.[6] Concurrent with any recommendation for ECG screening, there must be an effort to develop adequate physician infrastructure to ensure accuracy and the proper secondary evaluation of ECG abnormalities. In other words, recommendations for ECG screening should be tied to avenues for physician education in ECG interpretation and sports cardiology evaluation/management. Indeed, as stated by the AHA: "ECG screening is supported in principle if well designed and prudently implemented."

For all the reasons a history and physical examination aimed at early detection was designed, expert use of ECG will accomplish the same goal with greater effectiveness. The future course of cardiovascular screening in athletes needs a consistent message, and fair assessment of current and evolving science. The inconsistent position of the AHA on the ethical justification of cardiovascular screening in athletes and the promotion of legislation mandating a history and physical examination proven inadequate for either the detection of at risk conditions or the prevention of SCD is puzzling.

Competing interests None declared.

Provenance and peer review Not commissioned; internally peer reviewed.

To cite Drezner JA. *Br J Sports Med* Published Online First: [*please include* Day Month Year] doi:10.1136/bjsports-2015-095554

Accepted 15 September 2015

Br J Sports Med 2015;**49**:1–2. doi:10.1136/bjsports-2015-095554

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