



Reframing the debate: Screening athletes to prevent sudden cardiac death

Jonathan A. Drezner, MD,* Benjamin D. Levine, MD,[†] Victoria L. Vetter, MD, MPH, FHRS[‡]

From the *Department of Family Medicine, University of Washington, Seattle, Washington, [†]Institute for Exercise and Environmental Medicine, University of Texas Southwestern Medical Center, Dallas, Texas, and [‡]The Perelman School of Medicine at the University of Pennsylvania, Philadelphia, Pennsylvania.

In a recent issue of *HeartRhythm*, Maron¹ and Sharma² shared their opinions regarding a mandatory, national cardiovascular screening program for athletes in the United States. The point/counterpoint centered on the inclusion (or not) of a resting 12-lead electrocardiogram (ECG) in addition to a history and physical examination during preparticipation screening of athletes. In response to these articles, we were invited to write a position paper on cardiovascular screening in athletes and to “agree with one position or the other, or with neither, or conclude that more information is needed before an opinion can be offered.” Rather than restate the arguments for and against ECG screening and the many points on which these experts disagree, we hope to reframe this debate in an attempt to help the medical community refocus on ways to improve cardiovascular screening in young athletes.

Over the past decade, the debate on ECG screening has become highly polarized. While there is much known about sudden cardiac death (SCD) in athletes and screening intended to prevent such tragedies, there is just as much unknown. Continuing efforts are seriously needed to fill these knowledge gaps. This article outlines areas in which physicians on either side of the debate will likely agree; presents current acceptable screening practices and their requirements and limitations; and puts forth research directions that may help answer some of the remaining questions.

Reframing the debate

Unfortunately, the current debate regarding ECG screening with a focus on “mandatory” or “national” programs does not serve the community at whom it is directed (the young athlete), nor does it serve the medical or lay communities. Indeed, it is this emphasis on forcing a particular screening strategy through government-driven legislation that is

perhaps the biggest stumbling block toward a more constructive discussion of how to best protect the health of athletes. Therefore, we state unequivocally that the authors of this editorial, who have argued forcefully on both sides of this debate, agree that a mandatory, legislatively established program of ECG screening is neither feasible nor supported by current evidence at this time. However, we also agree this does not mean that ECG screening should or should not be done.

It is time to refocus the core of this debate away from a question of mandatory mass screening programs and toward a discussion of “best practice.” Which screening procedures, and under what standards, with what balance of risk and benefit should an individual physician or community perform to provide effective screening? How can the medical community improve training for physicians who conduct preparticipation screening using history and physical examination with or without ECG? What education should be provided to the community, schools, parents, and young athletes about SCD to improve their understanding of this problem?

What can we agree on?

There are, in fact, many areas of common ground that can serve to move the common goals of these seemingly divergent camps closer together. As a first principle, we agree that all those involved with the cardiovascular care of young athletes want to find the best methods to protect athletes and ensure safe participation without causing undue harm. We agree that there is insufficient evidence at this time to confirm that either methodology of preparticipation screening (history and physical examination alone or with the addition of an ECG) has been shown to achieve the desired end points of accurately identifying athletes at risk and/or preventing SCD. We agree that *it is reasonable to add an ECG* to the current preparticipation examination, but it should be clear what is known and not known about the benefits and pitfalls of ECG screening, as well as the physician infrastructure needed to properly conduct ECG screening and to provide adequate and appropriate follow-up evaluation and care. Likewise, *it is reasonable not to screen with an ECG*, especially for physicians with no training or

KEYWORDS Electrocardiogram; Prevention; Sport; Sudden cardiac arrest

ABBREVIATIONS ECG = electrocardiogram; SCD = sudden cardiac death (*Heart Rhythm* 2013;10:454–455)

Address reprint requests and correspondence: Dr Jonathan A. Drezner, Department of Family Medicine, University of Washington, Box 354410, Seattle, WA 98195. E-mail address: jdrezner@uw.edu.

expertise in ECG interpretation in athletes, but the recommended standards for a history and physical examination should be followed and the limits of these methods in detecting pathologic cardiac disorders understood.

We agree that physicians and communities should be allowed to determine the preferred method of screening for their patients, community, school/institution, or sports team, with a clear understanding of the risks and benefits of the chosen approach. Education is needed for health-care providers involved in screening athletes to implement either form of screening using best practices. Improvements in and standardization of forms and a better understanding of the relevant history and physical examination components is needed. Likewise, advances in ECG standards and physician training are required to improve interpretations and decrease false positives and false negatives. We agree that if ECG is included in the cardiovascular screen of an athlete, it must be interpreted with modern, age-appropriate interpretation standards for athletes and with adequate cardiology resources to assist with secondary evaluations. Screening without follow-up of abnormalities and an understanding of the significance of findings from any type of screening is unacceptable.

We agree that the purpose of screening athletes is the early detection of potentially lethal cardiovascular disorders to reduce the risk of SCD and that cardiovascular screening aimed to identify silent but high-risk disease in a population largely without signs or symptoms is challenging regardless of the protocol chosen. We recognize that history and physical examination has a limited sensitivity to detect conditions that predispose to SCD, although this alone does not mean another protocol should be recommended at this time. We agree that the addition of ECG to history and physical examination enhances sensitivity to detect conditions associated with SCD, but there are limited data linking early detection to lower mortality in athletes. All these areas involve knowledge gaps that should be investigated and more clearly defined.

While the exact magnitude or scope of SCD in young athletes remains uncertain, there is general agreement that exercise may be a trigger for SCD in persons with pathologic cardiac disorders and that exercise limitations and/or other interventions may reduce risk in athletes regardless if that disorder is detected by history, physical examination, or ECG during screening. We acknowledge that there are potential harms of screening and early detection, namely, unnecessary activity restriction or procedures with rare but serious risks (ie, ablation, implantable cardioverter-defibrillator placement, and surgery). Although this is true for any protocol of cardiovascular screening in athletes, inclusive or not of ECG, the greater number of false positives associated with any screening process will expose more individuals to both potential harm and potential benefit. Lastly, we assert that incidence calculations for SCD in young populations without reliable methodology for case ascertainment should be viewed with caution and that more

rigorous databases are needed to confirm the precise number of youth affected by SCD, including those who survive and those who do not.

Future directions

Determination of best practices used in the implementation of either model of screening requires more data. All methods of screening used should be evaluated in a systematic format, collecting and evaluating immediate findings and early and late outcomes so that research in this area will eventually provide more answers than currently available. This evaluation should include determination of both the risks of participation in physical activity related to the disease and the risks of not allowing or modifying participation. Similarly, the potential harms from over- or underdiagnosis related to both forms of screening should be determined. Rigorous collection of data is essential, and the risks and benefits of the specific screening methodology and its downstream effects should be determined by data, rather than being led by opinion. ECG interpretation and secondary evaluations also represent critical knowledge gaps that need to be addressed through additional research and education, and both types of screening should be evaluated for timing, frequency, and process.

Conclusions

On the basis of current data and feasibility, legally mandated ECG screening for athletes is not supported, and continued focus on national or legislatively established mandatory programs will divert our attention from issues that can assist physicians improve cardiovascular screening in their practice. It is a reasonable strategy for a physician or community to include an ECG in their approach to screening athletes, recognizing that such screening may be difficult to implement with a high degree of expertise, may exclude athletes with diseases that may never result in a problem, and exposes athletes to potential harms by requiring a diagnosis, workup, and therapy that carries known risks (ie, implantable cardioverter-defibrillators for primary prevention). Likewise, it is also a reasonable strategy for physicians and communities not to include an ECG in their approach to screening athletes, understanding that such a strategy will certainly miss some athletes with diseases that can (but may not) cause SCD during sports. Both approaches have at their core the desire to make sports as safe as we can for the greatest number of athletes, given our current knowledge base. We all agree that more data are needed and that more “debates” will not provide more “answers.”

References

1. Maron BJ. Counterpoint: mandatory ECG screening of young competitive athletes. *Heart Rhythm* 2012;9:1646–1649.
2. Sharma S. Point/mandatory ECG. screening of young competitive athletes. *Heart Rhythm* 2012;9:1642–1645.