

Pros, Cons Seen for ECGs in Young Athletes

BY DOUG BRUNK

Adding electrocardiography to a medical history and physical examination improves the overall sensitivity of preparticipation cardiovascular screening of college athletes, but is also associated with an increased rate of false-positive results, a single-center study demonstrated.

The analysis was undertaken because data that define the performance of screening practices in the United States “are sparse, and no studies have compared athlete screening by medical history and physical examination only with a strategy that includes ECG,” researchers led by Dr. Aaron L. Baggish, a cardiologist at Massachusetts General Hospital, Boston, reported.

The study population consisted of 510 athletes from Harvard University who underwent cardiovascular screening with a history and physical examination as well as an ECG between 2006 and 2008 (*Ann. Intern. Med.* 2010;152:269-75). Their mean age was 19 years and 61% were male.

Dr. Baggish and his associates used recommendations from the American College of Cardiology, the American Heart Association, and the National Collegiate Athletic Association to conduct the medical history and physical examination (*Circulation* 2007;115:1643-55). Current European Society of Cardiology criteria were used to screen for ECG abnormalities “because these are the only published recommendations designed for preparticipation screening,” the researchers explained.

Of the 510 study participants, 11 (2%) were found to have cardiac abnormalities relevant to sports participation. Ultimately, three were found to have an abnormality that met current recommendations for permanent or temporary sports restriction, including pulmonic valve stenosis, hypertrophic cardiomyopathy, and myocarditis. Screening with a medical history and physical exam alone detected abnormalities in 5 of the

11 athletes. This translated into a sensitivity of 45.5% and a specificity of 94.4%. It failed to catch the hypertrophic cardiomyopathy and myocarditis.

Adding an ECG helped the researchers detect an additional 5 athletes with abnormalities, for a total of 10 athletes. This improved the overall sensitivity of screening to 90.9%.

However, including ECG in the overall screening reduced the specificity of screening to 82.7% and was

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Major Finding: Adding an ECG to a medical history and physical examination improved the overall sensitivity of preparticipation cardiovascular screening of college athletes to 90.9%, but also led to an increased rate of false-positive results.

Data Source: A single-center study of 510 athletes with a mean age of 19 years.

Disclosures: The researchers in the Baggish study had no funding resources to disclose. The Wheeler study was funded by the Stanford Cardiovascular Institute, the Breetwor Foundation, and a grant from the National Heart, Lung, and Blood Institute.

linked to a false-positive rate of 16.9%, which was significantly higher than the false-positive rate of 5.5% from screening with a medical history and physical exam alone.

“A screening program that falsely identifies approximately one in six participants as having cardiac disease has substantial and perhaps prohibitive financial, emotional, and logistical ramifications,” the researchers said. “However, screening strategies that minimize sensitivity have the greatest potential to minimize the incidence of sports-related sudden death.”

They went on to discuss certain limitations of the study, including the fact that “we cannot draw definitive conclusions about the effect of the different screen-

ing strategies on the incidence of sudden death in athletes” and the potential that some of the athletes “probably received screening before arriving at college,” which may “underrepresent the true burden of occult cardiac disease.”

But perhaps the greatest shortfall of the study, they said, is the ECG abnormality criteria used in the analysis, “which are accepted for widespread clinical use but were not derived from the study of athletes and therefore do not account for the numerous abnormal but benign ECG findings common in this population.”

In a separate study that appears in the same issue of the *Annals of Internal Medicine*, researchers led by Dr. Matthew T. Wheeler of the division of cardiovascular medicine at Stanford (Calif.) University used a decision analysis, cost-effectiveness model to evaluate the cost-effectiveness of an ECG plus a cardiovascular-focused history and physical examination, compared with a history and physical examination alone, for preparticipation screening of high school and college athletes aged 14-22 years (*Ann. Intern. Med.* 2010;152:276-86). The investigators drew from published epidemiologic and preparticipation screening data, vital statistics, and other data available to the public.

Dr. Wheeler and his associates found that adding an ECG to a history and physical examination saves 2.06 life-years for every 1,000 athletes screened at a total cost of \$89 per athlete. This translated into a cost-effectiveness ratio of \$42,900 per life-year saved, compared with a history and physical exam alone.

They also estimated that, compared with a strategy of no screening, an ECG plus a history and physical examination saves 2.6 life-years for every 1,000 athletes at a total cost of \$199 per athlete. This translated into a cost-effectiveness ratio of \$76,100 per life-year saved.

“Despite concerns about total cost, the incremental life-years saved by including ECG are significant,” the researchers concluded. ■

Sweetened Beverages Linked to Cardiovascular Health

BY ROBERT FINN

SAN FRANCISCO — The increase in the consumption of sugar-sweetened beverages between 1990 and 2000 contributed to 130,000 new cases of diabetes and 14,000 new cases of coronary heart disease between 2000 and 2010, according to estimates from a computer model

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Major Finding: Consumption of sugar-sweetened beverages contributed to an estimated 130,000 new cases of diabetes and 14,000 new cases of coronary heart disease between 2000 and 2010.

Data Source: Computer simulation based on the Coronary Heart Disease Policy Model.

Disclosures: Supported by a grant from the American Heart Association Western States Affiliate.

the first decade of the 21st century.

To derive those estimates, Dr. Litsa K. Lambrakos of the University of California, San Francisco, and her colleagues used data from the 1990-2000 National Health and Nutrition Examination Survey (NHANES) on consumption of sugar-sweetened beverages. She combined that with the Coronary Heart Disease Policy Model, a computer simulation of heart disease in U.S. adults aged 35-84 years.

According to that model, the relative risk of incident diabetes related to the daily consumption of sugar-sweetened beverages was 1.32 after adjusting for body mass index. Dr. Lambrakos presented the findings during a poster session at a conference sponsored by the American Heart Association.

The estimated increase in coronary heart disease related to the increased consumption of sugar-sweetened beverages would have generated an additional \$300-\$500 million in health care costs between 2000 and 2010.

“Those numbers about excess health care costs are very conservative, because they only account for health care costs attributed to coronary heart disease,” Dr. Lambrakos said in an interview.

“We know we have an increase in diabetes as well that we can attribute to soft



A 1-cent tax on soda would have saved \$170 million in health care costs over 10 years.

drink consumption,” she continued.

The investigators also analyzed how a 1-cent per ounce tax on sugar-sweetened beverages might have limited coronary heart disease costs, had it been implemented in the year 2000. Based on economic studies, the computer model assumed that such a tax would decrease consumption by 10%. This would translate to a savings of \$170 million in health care costs over 10 years.

In a statement, the American Heart Association said that it “acknowledges the importance of limiting intake of

added sugars, including sugar-sweetened beverages. The association is still evaluating the research to determine which strategies accomplish this best, comparing more punitive strategies like taxation with more positive incentives like subsidies or lowering prices for healthy foods. The AHA will continue to monitor the best available research to more fully understand the con-

nection between taxation policy and consumption trends, and ensure that our public policy positions reflect the best available science.”

Asked what message primary care physicians should take from the findings, Dr. Lambrakos said that “what we’re talking about here is primary prevention It’s important for the general public and physicians to understand that these drinks may lead to adverse health outcomes over time, and that they really shouldn’t be considered a staple of the American diet.” ■

el of the U.S. population.

In addition, the rising consumption of sugar-sweetened beverages, which include soda, sports drinks, and fruit drinks, led to an estimated 1.4 million additional life-years burdened by diabetes and 50,000 additional life-years burdened by coronary heart disease in