



AMERICAN ACADEMY OF PEDIATRICS

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POLICY STATEMENT

Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of All Children

Cardiovascular Monitoring and Stimulant Drugs for Attention-Deficit/Hyperactivity Disorder

ABBREVIATIONS: AHA, American Heart Association; ECG, electrocardiogram; ADHD, attention-deficit/hyperactivity disorder; AAP, American Academy of Pediatrics; FDA, Food and Drug Administration; SCD, sudden cardiac death.

INTRODUCTION

A recent American Heart Association (AHA) statement¹ recommended electrocardiograms (ECGs) routinely for children before they start medications to treat attention-deficit/hyperactivity disorder (ADHD). The AHA statement reflected the thoughtful work of a group committed to improving the health of children with heart disease. However, the recommendation to obtain an ECG before starting medications for treating ADHD contradicts the carefully considered and evidence-based recommendations of the American Academy of Child and Adolescent Psychiatry (AACAP)² and the American Academy of Pediatrics (AAP).^{3,4} These organizations have concluded that sudden cardiac death (SCD) in persons taking medications for ADHD is a very rare event, occurring at rates no higher than in the general population of children and adolescents. Both of these groups also note the lack of any evidence that the routine use of ECG screening before beginning medication for ADHD treatment would prevent sudden death. The AHA statement pointed out the importance of detecting silent but

clinically important cardiac conditions in children and adolescents—a goal the AAP shares. The primary purpose of the AHA statement is to prevent cases of SCD that may be related to stimulant medications. The recommendations of the AAP and the rationale for these recommendations are the subject of this statement.

This statement has been endorsed by the American Academy of Child and Adolescent Psychiatry, the Society for Developmental and Behavioral Pediatrics, and the National Initiative for Children's Healthcare Quality.

BACKGROUND

ADHD affects 5% to 8% of children and adolescents,^{5,6} and stimulant medications have been shown to be effective for treatment of the disorder for decades.⁷ Sudden death is rare in the pediatric population as a whole,⁸ and screening to predict and hopefully to prevent sudden death in the general population is a frequent topic of discussion. Despite the absence of scientific data to establish an increased risk of sudden death in individuals receiving stimulant medications for ADHD,⁹ much attention has been directed to warning about and screening for causes of sudden death in this population.

Substantial evidence exists concerning the efficacy and safety of ADHD treatments, including both stimulant medications and behavior therapies.⁷ Limiting children's access to effective treatment for ADHD could have serious implications, because there are substantial risks of not treating ADHD. Untreated ADHD in adolescence is associated with higher rates of substance use and abuse,¹⁰ academic failure,¹¹ and automobile accidents.¹² Therefore, the evidence supporting any recommendation that may inhibit care givers from treating ADHD effectively must be considered very carefully.

STATEMENT OF THE PROBLEM

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The AHA scientific statement¹ is controversial because of its extensive recommendations for children without heart disease and the lack of information on the methods used to arrive at the recommendations. Ultimately, the authors recommend that in addition to a careful history, family history, and physical examination, “...an ECG be added to increase the likelihood of identifying significant cardiac conditions such as HCM [hypertrophic cardiomyopathy], LQTS [long QT syndrome] and WPW [Wolff-Parkinson-White syndrome] that might place the child at risk.” However, no data were provided that document a higher risk for patients with these diagnoses treated with stimulant drugs. In fact, elsewhere in the report, the authors state that “We would agree with the conclusion of a recent special article in *Pediatrics* that states that ‘there does not seem to be compelling findings of a medication-specific risk necessitating changes in our stimulant treatment of children and adolescents with ADHD.’”⁹

In addition, the AHA scientific statement’s final recommendation states that “The consensus of the committee is that it is reasonable and useful to obtain ECGs as part of the evaluation of children being considered for stimulant drug therapy. We recognize there are no clinical trials to inform us.... There are no widely accepted recommendations or standards of care for cardiac monitoring on stimulant medications. It is not known if the risk of SCD on stimulants is higher than in the general population or that the approach described will decrease the risk.” Despite this lack of evidence, the authors assign the recommendation, using AHA and American College of Cardiology classification, a class IIa (weight of evidence/opinion is in favor of usefulness/efficacy) and level of evidence C (only consensus opinion of experts, case studies or standard of care) label. The AAP and its constituent groups disagree with the AHA statement as to both the classification and the level of evidence. Using AHA criteria, the AAP would, at most, classify this recommendation as IIb (“the level of evidence is less well established by

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evidence/opinion..... Additional studies with broad objectives needed.”) In addition, using the AAP classification of recommendations,¹³ the AAP would assign the recommendation a category D level of evidence (based on expert opinion without even observational studies.) The AAP avoids making guideline recommendations with level D evidence. Moreover, the substantial expert opinion and reasoning outlined in the AHA statement suggests that harm outweighs the benefit of recommending routine ECGs for healthy children starting stimulant medication for ADHD. Accordingly, the AAP would recommend against such routine ECG screening.

No relationship has been established between medicines used to treat ADHD and SCD. Specifically, the FDA has collected 25 anecdotal reports of sudden death documented during industry-sponsored medication trials as well as adverse events reported for individual patients to the FDA. The mechanism leading to sudden death in these patients is unknown. The frequency of sudden unexpected death among those taking stimulants is no higher than in the general population of children. Only 19 children and adolescents out of the 2.5 million taking stimulants died suddenly over 5 years, suggesting a base rate among children and adolescents of 4 incidents of sudden death per year per 2.5 million children or fewer than 2 incidents per million, but reported rates of SCD in the general child and adolescent population are substantially higher, with reports varying from 8 to 62 per million.

Screening methods for underlying cardiac abnormalities, which could predispose to SCD, have typically included personal and family history, physical examination, but have not routinely included electrocardiography and echocardiography. Assessment of personal and family history and a physical examination seem quite appropriate for a physician evaluating a patient with ADHD for many reasons unrelated to risk of sudden death. Electrocardiography or echocardiography in this population would not otherwise be routine or recommended. Because

the risk of sudden death in the population of patients pharmacologically treated for ADHD is no higher than in the general population, performance of cardiac screening tests would not seem to be any more indicated than in the general population, and the AHA, along with the AAP, does not recommend routine ECG screening for children and adolescents because of problems with the sensitivity and specificity of the ECG as a general screening test.¹⁴

The AHA report provides no cost-effectiveness analysis justifying ECG screening of young people receiving ADHD medications or for special evaluation by pediatric cardiologists. Importantly, in some communities, difficulties in obtaining an ECG and pediatric cardiology consultation may serve as additional barriers to care for patients with ADHD.

SUMMARY

Although the sudden death of a child is a tragedy, there are no studies or compelling clinical evidence demonstrating that the likelihood of sudden death is higher in children receiving medications for ADHD than in the general population. It has not been shown that screening ECGs before starting stimulants have an appropriate balance of benefit, risk, and cost-effectiveness for general use in identifying risk factors for sudden death. Until these questions can be answered, a recommendation to obtain routine ECGs for children receiving ADHD medications is not warranted.

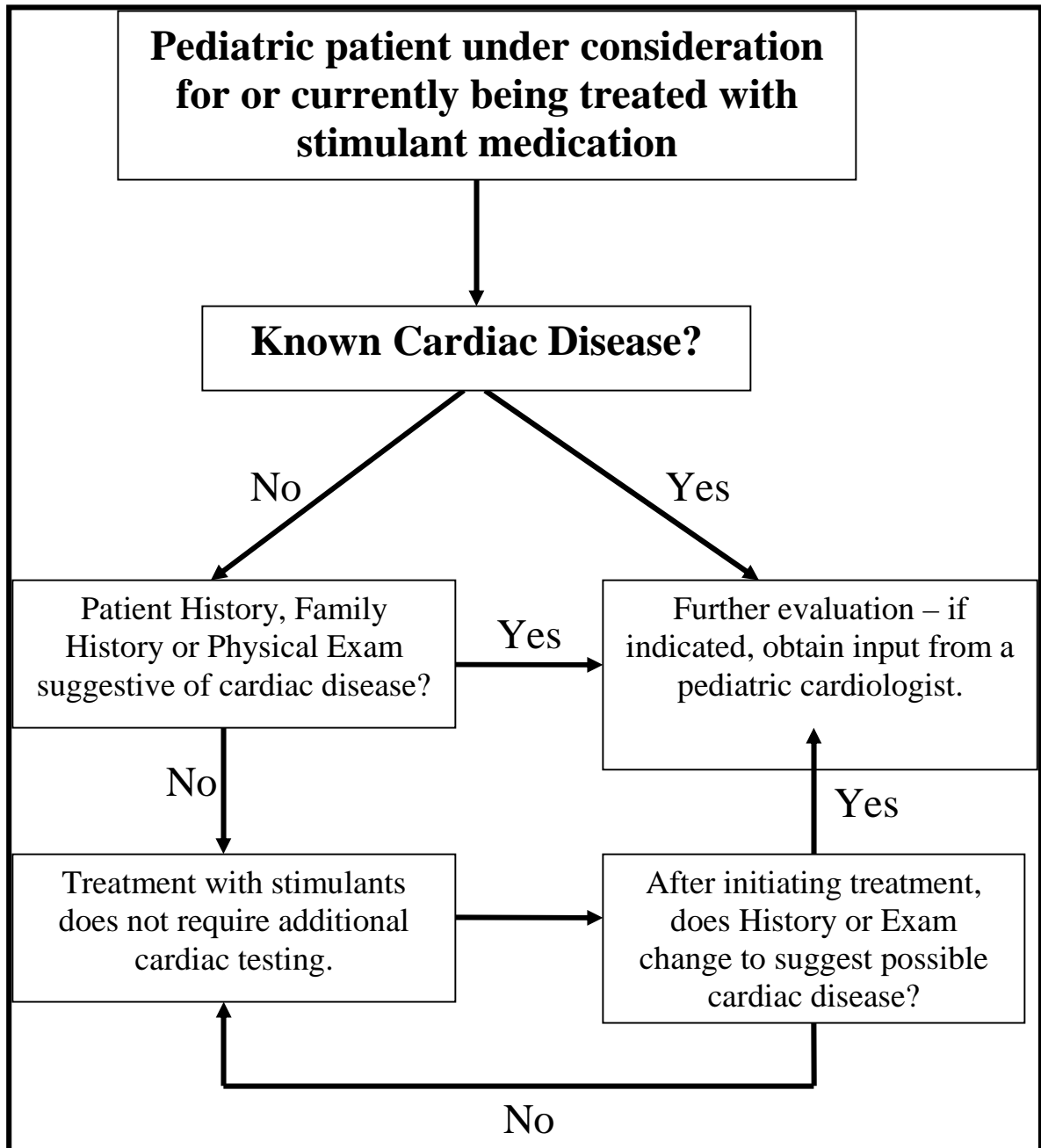
The AAP recommends that clinicians carefully assess all children for cardiac abnormalities, including those in whom ADHD treatment is being considered, using history and physical assessment. The AAP does not recommend the routine use of ECGs before initiating stimulant therapy for ADHD. An algorithm developed by the AAP Section on Cardiology and Cardiac Surgery designed to aid clinicians in the evaluation of children on medicines to treat ADHD is shown in Fig 1.

The AAP shares the concern of the AHA about improving the diagnosis of silent but clinically significant cardiac conditions in children and adolescents and urges further research into effective methods to detect these conditions and to reduce the incidence of sudden cardiac death.

RECOMMENDATIONS

1. The AAP continues to recommend a careful assessment of all children, including those starting stimulants, using a targeted cardiac history (eg, patient history of previously detected cardiac disease, palpitations, syncope, or seizures; a family history of sudden death in children or young adults; hypertrophic cardiomyopathy; long QT syndrome) and a physical examination, including a careful cardiac examination. (Evidence Quality: C; Strength: Recommendation).
2. Given current evidence, the AAP encourages primary care and subspecialty physicians to continue currently recommended treatment for ADHD, including stimulant medications, without obtaining routine ECGs or routine subspecialty cardiology evaluations for most children before starting therapy with these medications (see Fig 1). (Evidence Quality D; Strength: Option).
3. The AAP urges further research on risk factors for SCD among all children and adolescents, including those with ADHD treated with stimulant medications. Improved methods to detect children with hidden cardiac disease should be another focus of such research efforts.

Fig 1. Cardiac evaluation of children and adolescents receiving or being considered for stimulant medications.



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ADDITIONAL READING

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All policy statements from the American Academy of Pediatrics automatically expire 5 years after publication unless reaffirmed, revised, or retired at or before that time.