Pediatric Hypertension
A Growing Problem

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KEYWORDS

• Pediatric hypertension • Pediatric obesity • Pediatric screening • Pediatric workup • Pediatric lifestyle change

KEY POINTS

- Hypertension in children and adolescents, once thought to be rare, has been estimated at a current prevalence of between 1% and 5% in the United States.
- The frequency of hypertension in children can be expected to increase along with the occurrence of metabolic syndrome as childhood obesity rates rise.
- Many issues are still controversial, but the issue cannot be ignored.
- While systematic reviews and guidelines are in process, clinicians must follow the best evidence available to monitor and treat this related disorder.

INTRODUCTION: A GROWING PROBLEM

Hypertension in children and adolescents, once thought to be rare, has been estimated at a current prevalence of between 1% and 5% in the United States. Most estimates are derived from school screening studies among junior or high school students.[1] Among children younger than 6 years, 83% had secondary hypertension, with renal or renovascular disease the most common comorbidity.[1] In this age category, the children were less likely to be obese and more likely to have elevations in their diastolic pressures. Primary hypertension is more likely to be diagnosed in older children and adolescents. The prevalence of primary hypertension continues to increase with the increasing body mass index (BMI) of the pediatric population, a phenomenon documented in Asia, Europe, and Latin America as well as in the United States.[2] It is estimated that the prevalence of hypertension among obese children in the United States is 11%.[3]

In contrast to the adult population, in which absolute values of diastolic and systolic readings define the diagnosis of hypertension, blood pressure measurements in

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children steadily increase as the child grows, varies with gender, and must be interpreted by referring to data collected from 70,000 healthy children in the United States. The measurements in this national database are organized into percentiles based on age, gender, and height.[4] A child is considered normotensive if both the systolic and diastolic readings are below the 90th percentile, and is considered prehypertensive if the systolic or diastolic pressures reach the 90th percentile but are less than the 95th percentile or reach 120/80 mm Hg. Stage 1 pediatric hypertension is diagnosed when the measurements are at or above the 95th percentile but less than the 99th percentile plus 5 mm Hg. Values exceeding the 99th percentile plus 5 mm Hg define stage 2 pediatric hypertension.[5]

Recommendations for blood pressure screening in asymptomatic children are controversial. The American Heart Association National Heart, Lung and Blood Institute[6] expert panel recommends annual screening blood pressures for children between the ages of 3 and 17 years.[3] The American Academy of Pediatrics recommends screening of children ages 3 years and older at every "health care episode." By contrast, the United States Preventive Services Task Force and the American Academy of Family Practice state that there is insufficient evidence for or against routine screening for high blood pressure in this age group.[3]

THE FIRST QUESTION THAT MUST BE ANSWERED: IS THE PATIENT TRULY HYPERTENSIVE?

The gathering of accurate data is an essential part of any diagnosis, and several pitfalls must be avoided when monitoring blood pressures in the pediatric population.

First, the proper cuff size must be selected. The cuff bladder width should span at least 40% of the upper extremity circumference measured halfway between the elbow and the shoulder, while its length should cover 80% to 100% of the circumference. If a cuff is too small it will overestimate blood pressure readings. If 2 sizes of cuff appear to meet these criteria, the larger cuff should be used.

Systolic or diastolic readings that exceed the 90th percentile by automatic (oscillometric) devices should be confirmed by auscultation after the patient has been seated for 5 minutes with the back supported and the feet uncrossed on the floor. Pressures should be evaluated in the right arm supported at the level of the heart. Two readings should be done and averaged together. In one study of 390 children, 74% had significantly lower blood pressures when data were gathered by trained personnel using the Fourth Task Force recommendations than those obtained using an automated device at the vital signs station.[7]

During the initial screening, it is important to assess for coarctation of the aorta. Blood pressures should be measured in both arms while the child is seated and in one leg with the patient prone. Pressures should be 10 to 22 mm Hg higher in the leg but approximately equal in the arms. Femoral pulses should also be assessed. Coarctation of the aorta should be suspected when pressures in the left arm are significantly lower than in the right upper extremity, the expected higher pressure is not found in the leg, or the femoral pulses are diminished.[8]

Patients whose blood pressure remains elevated should be brought back for further evaluation. The diagnosis of prehypertension or hypertension is confirmed when the readings remain elevated on 3 separate occasions at least 1 week apart. A study of 1071 9- to 10-year-olds in Iceland found the prevalence of elevated blood pressures to be 13.1% at the first screen, 6% at the second screen, and 3.1% at the third screen.[2] In a study of more than 6000 adolescents in Hong Kong, the prevalence of