

The young hypertensive

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Abstract

Increasingly, hypertension in children and adolescents is becoming more prevalent as a result of the burgeoning obesity epidemic, and the effects of low birthweight and underlying genetic predisposition. Blood pressure (BP) is lower in children, and it is therefore imperative to consult age, gender, and height norms for BP. Pre-hypertension is defined as BP persistently above the 90th centile, and hypertension as BP persistently above the 95th centile. Before a diagnosis can be made, BP needs to be taken frequently, and 24-hour ambulatory BP monitoring is recommended. Contrary to expectation, most cases of elevated BP in adolescents are due to primary or essential hypertension. However, in each case, a full history and examination should be performed using a few basic investigations. Special investigations and referral need to be reserved for those children with a suspected secondary cause, and those with more severe hypertension. The mainstay of treatment is lifestyle modification, and pharmacotherapy should be reserved for patients with symptomatic or severe hypertension, secondary hypertension, hypertension with overt target-organ damage, type 1 and 2 diabetes, and persistent hypertension refractory to lifestyle intervention.

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Hypertension was previously uncommon in children and adolescents, but the prevalence is dramatically changing, mainly as a result of the critical influence of childhood obesity. At the hypertension clinic at Groote Schuur Hospital, a dramatic increase in referrals for young people with suspected hypertension has been observed, and it is increasingly difficult to cope with the greater numbers. Therefore, it is imperative that policies regarding the evaluation, treatment, and referral of young hypertensives are developed.

In 1977, hypertension in children was considered to be extremely rare, and would almost always prompt a search for an underlying secondary cause.¹ However, the prevalence has risen to as high as 4.5%, according to studies from the USA. The pathogenesis of this dramatic increase in prevalence is related to the childhood epidemic of obesity. In a cohort study of 1 111 subjects with a mean age of 10.5 years, followed for a mean 4.5 years, the effect of adiposity was minimal, until the body mass index (BMI) percentile reached 85, where there was a fourfold increase in effect.² This appeared to relate to increases in leptin and heart rate that mirrored the relationship between BMI and blood pressure (BP). Other important factors in the pathogenesis

of childhood primary hypertension are a family history of hypertension, a low birthweight, reduced nephron number (Barker-Brenner Hypothesis), and elevated uric acid.^{1,3}

The importance of elevated BP in childhood is several-fold. Firstly, childhood BP, especially systolic, tracks BP into adulthood. Secondly, it is associated with subclinical cardiovascular disease, and thirdly and more importantly, significant elevations in overall mortality, cardiovascular mortality, and coronary heart disease are seen, in particular, according to the Harvard Alumni Health Study.^{1,4}

BP is lower in children, and it is imperative to consult age, gender and height norms for BP. According to the *Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents*, pre-hypertension is defined as BP persistently above the 90th centile, and hypertension as BP persistently above the 95th centile.⁵ After 18 years of age, adult norms of BP should be used. Assessment of BP should not be carried out with a single reading, but rather frequent measurements, and in many instances, full 24-hour ambulatory BP monitoring, to avoid incorrect labelling.

When evaluating a child with elevated BP, it is imperative to consider the relative frequency of primary and secondary hypertension, as this will direct evaluation. In infants, > 99% have a secondary cause, in school-age children, 70-85%, and in adolescents, 5-15%. Important pointers to primary hypertension include older children and adolescents, obesity, a family history of hypertension, type 2 diabetes, and cardiovascular disease. All patients should undergo a careful clinical evaluation that searches for secondary causes, e.g. bruits and radiofemoral delay. Regarding the drug history, particular attention needs to be paid to abuse of cocaine and tik, and the use of oral contraceptive drugs. The most common secondary cause of hypertension in children is renal parenchymal and renovascular disease, and it is essential that all patients undergo a dipstick test of their urine and creatinine, and an ultrasound of the kidneys. Certain blood tests (electrolytes, uric acid, fasting glucose, and a lipogram), an electrocardiogram, and an echocardiogram are also essential. More specialised tests may be required, but are usually performed at specialist level.

Treatment of hypertension in children has not been established in randomised controlled clinical trials, although several classes of drugs have been successfully evaluated for efficacy and safety in children. Treatment decisions are based on expert opinion. All children with hypertension or borderline BP (or pre-hypertension) should undergo lifestyle changes, and in particular, increase aerobic exercise and reduce weight. Reasonable indications for pharmacological therapy are symptomatic or severe hypertension, secondary hypertension, hypertension with overt target-organ damage, type 1 and 2

diabetes, and persistent hypertension refractory to lifestyle intervention.¹ The *Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents* recommends diuretics, beta blockers, calcium-channel blockers and angiotensin-converting enzyme (ACE) inhibitors or angiotensin-receptor blockers (ARBs) as suitable drugs for initiation of treatment.⁵

However, in the author's opinion, as a result of the long-term metabolic effects of diuretics and beta blockers, ARBs or ACE inhibitors or calcium-channel blockers are the preferred initial drugs. Diuretics and beta blockers should be reserved for specific indications, and for those with more resistant hypertension.

Conclusion

The young hypertensive is becoming increasingly common, mainly because of obesity in children. Every effort needs to be made to improve the lifestyle of children to prevent this growing epidemic. Recommendations regarding evaluation and treatment of young hypertensives have been made.

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