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Η υπέρταση στα παιδιά

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ΠΕΡΙΛΗΨΗ:

Πρόσφατα δεδομένα δείχνουν ότι την τελευταία δεκαετία ο μέσος όρος της Αρτηριακής Πίεσης (Α.Π.) έχει αυξηθεί στον παιδικό πληθυσμό. Η αξιολόγηση και εκτίμηση της περιλαμβάνει μια προσεκτική και πλήρη ιστορική και φυσική εξέταση. Ιδιοπαθής ή βασική υπέρταση περικλείει πολλαπλούς παράγοντες κινδύνου όπως παχυσαρκία και οικογενειακό ιστορικό υπέρτασης. Η υπέρταση σε παιδιά έχει πρόσφατα αναγνωριστεί σαν ένα σοβαρό πρόβλημα υγείας. Η θεραπεία περιλαμβάνει απώλεια βάρους, σωματική άσκηση και διατροφικές τροποποιήσεις. Η φαρμακολογική θεραπεία περιλαμβάνει ενζυμικούς παρεμποδιστές της αγγειοτενσίνης, β-αναστολείς και διουρητικά.

Λέξεις Κλειδιά: Υπέρταση, παιδιά, παχυσαρκία, δίαιτα

INTRODUCTION

Hypertension is the most common public health problem in developed countries. Untreated hypertension leads to many degenerative diseases including congestive heart failure, end-stage renal disease end peripheral vascular disease. The Task Force in Blood Pressure[1] indicated that detection and prevention of hypertension in a pediatric population and its early treatment contribute to a reduction in the risk of morbidity in adulthood. Hypertension in youth tracks into adulthood and has been linked with carotid intimal-medial thickness[2], left ventricular hypertrophy[3] and fibrotic plaque formation[4]. Children and adolescents with severe elevation of BP are also at increased risk of adverse outcomes, including hypertensive encephalopathy, seizures and even cerebrovascular accidents and congestive heart failure[5,6]. Even hypertension that is less severe contributes to target-organ damage when it occurs with other chronic conditions such as chronic kidney disease[7-9].

DEFINITION OF HYPERTENSION IN CHILDREN

In children, hypertension is defined as blood pressure (BP) readings greater than the 95th percentile for a given height on at least three separate occasions[10]. Pediatric hypertension has been classified by the National High Blood Educational Program into 4 groups (Table 1).

Table 1: Classification of pediatric hypertension	
Normal	Systolic/diastolic < 90th percentile
Prehypertension	>90th and <95th percentile or if BP exceeds 120/80 mmHg
Stage 1	BP between 95th percentile and 5mmHg above 99th percentile
Stage 2	BP > 99th percentile plus 5 mmHg

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The definition of hypertension in children and adolescents is based on the normative distribution of BP in healthy children. Normal BP is defined as SBP and DBP that are <90th percentile for gender, age and height. Hypertension is defined as average SBP or DBP that is ≥95th percentile for gender, age and height on at least 3 separate occasions. Average SBP or DBP among 90th and 95th percentile are characterized as prehypertension. Prehypertension is an indicator of elevated risk for developing hypertension.

MEASURING BLOOD PRESSURE

The preferred method of measuring the BP is auscultation, because the BP reference values are based on auscultatory measurements. To confirm hypertension, the BP in children should be measured with a standard clinical sphygmomanometer. The use of the belt of the stethoscope may allow Korotkoff sounds to be heard better[11,12]. Preparation of the child before the measurement can be as important as the technique[13-15]. Correct measurement of BP in children requires use of a cuff that is appropriate to the size of the child's upper right arm. The recommended dimensions for BP cuff bladders are presented in table 2.

Table2. Recommended dimensions for BP cuff bladders

Age range	Width, cm	Length, cm	Maximum Arm Circumference, cm
Newborn	4	8	10
Infant	6	12	15
Child	9	18	22

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Elevated BP must be confirmed on repeated visits before characterizing a child as having hypertension.

EVALUATION OF HYPERTENSION

Although primary hypertension is identifiable in children and adolescents, secondary hypertension is more common in children than in adults. The possibility that some underlying disorder may be the cause of hypertension should be considered in every child or adolescent who has elevated BP. Very young children, children with stage 2 hypertension, and children or adolescents with clinical sights that suggest the presence of systemic conditions associated with hypertension should be evaluated more extensively, as compared with those with stage 1 hypertension[16].

Because obesity is strongly linked to hypertension, BMI should be calculated from the height and weight, and the BMI percentile should be calculated.

Some of the most important physical examination findings[17] in hypertensive children are presented in the table 3.

TABLE 3: Physical examination findings in hypertensive children

	Finding	Possible etiology
Vital signs	Tachycardia	Hyperthyroidism, pheoshromocytoma, neuroblastoma, primary hypertension
	Decreased lower extremity pulses; drop in BP from upper to lower extremities	Coarctation of the aorta
Eyes	Retinal changes	Severe hypertension, more likely to be associated with secondary hypertension
Ear, nose and throat	Adenotonsillar hypertrophy	Suggests association with sleep-disordered breathing (sleep apnea) snoring
Height/weight	Growth retardation	Chronic renal failure
	Obesity (high BMI)	Primary hypertension
	Truncal obesity	Cushing syndrome, insulin resistance syndrome
Head and neck	Moon facies	Cushing syndrome
	Elfin facies	Williams syndrome
	Webbed neck	Turner syndrome
	Thyromegaly	Hyperthyroidism
Skin	Pallor, flushing, diaphoresis	Pheochromocytoma
	Acne, hirsutism, striae	Cushing syndrome, anavolic steroid abuse
	Café-au-lait spots	Neurofibromatosis
	Adenoma sebaceum	Tuberous sclerosis
	Malar rash	Systemic lupus erythematosus
	Acanthosis nigricans	Type 2 diabetes
Chest	Widely spaced nipples	Turner syndrome
	Heart murmur	Coarctation of the aorta
	Friction rub	Systemic lupus erythematosus (pericarditis), collagen-vascular disease, end stage renal disease with uremia
	Apical heave	LVH/chronic hypertension
Abdomen	Mass	Wilms tumor, neuroblastoma, pheochromosytoma
	Epigastric/flank bruit	Renal artery stenosis
	Palpable kidneys	Polycystic kidney disease, hydronephrosis, multicystic-dysplastic kidney, mass

Genitalia	Ambiguous/virilization	Adrenal hyperplasia

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HYPERTENSION AND OBESITY

Both hypertension and pre-hypertension have become a significant health issue in the young because of the strong association between BP and being overweight and the marked increase in the prevalence of overweight children[18]. About 5% of the pediatric population suffers from hypertension[19] and this percentage rises up to 30% when we refer to overweight or obese pediatric population[20-22].

Researchers have reported that the relative risk of hypertension is threefold higher for obese individuals compared to non-overweight adults[23]. When age is also evaluated, the risk of hypertension is dramatically (5.6 times) higher for overweight young adults (age 20–45) compared with older adults (age 45–75). In adults there is evidence that weight gain may be the most common cause of essential hypertension[24].

HYPERTENSION AND DYSLIPIDEMIA

Hypertension is a traditional risk factor for dyslipidemia. Glowiska et al[25] studied 285 children (79 control group, 49 obese, 56 obese and hypertensive, 58 hypertensive and 122 diabetic) and found that the highest concentrations of LDL were seen in obese children, and in obese, hypertensive children. They also observed that the highest levels in triglyceride concentration, over 70% than those of the controls, were observed in children with obesity and coexisting hypertension. Moreover, this group showed the highest values regarding lipid profile.

In another study[26] the authors have noticed that homocysteine (Hcy) concentrations in healthy children showed a significant link between both systolic and diastolic blood pressure of black and white children. Also, Glowinska in her study[25] found that children who were hypertensive had the highest concentrations of Hcy.

TREATMENT OF HYPERTENSION

Drug therapy

The therapy of hypertension with drugs is recommended when there is symptomatic hypertension or stage 2 hypertension or stage 1 hypertension that persists despite the therapy without drugs.

Pharmacological therapy, when indicated, should be initiated with a single drug. The most common drugs which can be used in children are angiotensin-converting enzyme (ACE) inhibitors, angiotensin-receptor blockers (ARBs), β-blockers, calcium channel blockers (CCBs) and diuretics. The first (1977) and the second task reports (1987) recommend the use of diuretics and β-adrenergic blockers as initial therapy for the hypertension in children. These drugs have a long history of safety and efficacy based on clinical experience in hypertensive children. The newer classes of antihypertensive drugs, include ACE inhibitors, CCBs and ARBs, appear to be safe and effective, on the basis of short term use in children[27-30].

Hypertensive emergencies should be treated by an intravenous antihypertensive that can produce a controlled reduction in BP. The reduction should be by <25% over the first 8 hours and then gradually normalizing the BP over 26 to 48 hours[31,32].

Diet therapy

The Dietary Approaches to Stop Hypertension (DASH) study has recently shown that implementation of a diet rich in fruits, vegetables, non-fat dairy products, and whole grains can effectively lower blood pressure in adults with hypertension. Although there are no comparable clinical trial data in children, there is no reason to suspect that the DASH diet would not be safe to implement in older children and adolescents as long as protein and calorie needs are met[33,34]. Decrease consumption of sugar and saturated fatty acids, and increased consumption of fruits and vegetables is recommended by a lot of studies[35-39].

Although it is generally accepted that a reduction of sodium consumption would be beneficial to hypertensive individuals[40], evidence for a direct relation between sodium and blood pressure level in children with hypertension has been less conclusive. Some studies support that sodium reduction in children and adolescents is connected with small reductions in BP[34,41-44].In addition, increased intake of potassium and calcium also have been suggested as

nutritional strategies to lower blood pressure.[45,46] Whatever lifestyle changes are recommended, a family-centered rather than patient-oriented approach usually is more effective.[19]

CONCLUSION:

Hypertension in children has become a major problem and can be viewed as a significant risk factor for the development of cardiovascular disease in adulthood. Obesity, physical inactivity and increased intake of high-calorie, high-salt foods, are thought to be responsible for this trend. Management is multifaceted. Non-pharmacological treatments include weight reduction, exercise and dietary changes. Recommendations for pharmacologic treatment are based on symptomatic hypertension, evidence of an end-organ damage, stage 2 hypertension or stage 1 hypertension that does not respond to lifestyle modifications.

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