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THE DIAGNOSTIC CRITERIA FOR ARTERIAL HYPERTENSION IN CHILDREN AND ADOLESCENTS

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Annotation. This article describes etiopatogenesis, clinic and criteria for the diagnosis of arterial hypertension in children and adolescents. Types and methods of measurement of arterial hypertension in children are described. Given normal blood pressure and measures of protection of hypertension depending on age.
Key words: *arterial hypertension, teenager, diagnostic criteria.*

Arterial hypertension (AH) is a multifactorial disease based on a genetic polygonal structural defect that causes high activity of long-acting compressor mechanisms. The increase in AD is due to the complex interaction of genetic, psychosocial and physiological mechanisms. The disease exhibits a persistent chronic increase in SAP or DAP, characterized by a frequency of 15 to 45% in the population. In the United States, 30-40% of adults have increased AP. According to an epidemiological study conducted in Belarus, 31% of men over 35 have AH. Increased blood pressure in children and adolescents is found in 5-14% of children.

Risk factors AH (acceleration factors) - excessive consumption of table salt, kidney, adrenal glands, renal arteries diseases.The following AH risk factors are distinguished:

1. Main: family history of early cardiovascular diseases, increase in cholesterol >6.5 mmol/l; diabetes mellitus.
2. Additional, affecting negatively the prognosis of the patient with AH: HDL cholesterol reduction, increased LDL cholesterol, microalbuminuria in diabetes, impaired glucose tolerance, increased fibrinogen, obesity, hypodynamy, socio-economic risk group. Excess body mass is associated with increased plasma triglycerides and reduced lipoprotein cholesterol, high glucose fasting and immunoreactive insulin in the blood, reduced glucose tolerance, that in combination with arterial hypertension is classified as a «metabolic quartet». In these patients, metabolic shifts combined with dyslipidemia contribute to early and accelerated development of atherosclerosis. Depending on the degree of increase in AP, the presence of risk factors, defeat of target organs and related diseases, all AH patients can be classified into one of four risk levels: low, medium, high and very high. It has been proven that there is a correlation between risk factors, AP level and total cardiovascular risk when assessing the severity of AG flow. Before puberty, secondary (symptomatic) AH is more common. Secondary AH is associated with kidney disease (about 70%), endocrine system disease (Itsenko-Cushing syndrome, hyperaldosteronism, thyrotoxicosis, pheochromocytoma, etc.), cardiovascular system (coarctation of aorta, aortic estuary stenosis, aortic valve deficiency, open arterial duct), CNS lesion (brain tumors, dieencephalic lesions, etc.). In the pubertal period, AH is primarily due to hormonal restructuring, in which increased adrenaline and

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aldosterone production is more important. The origin of AH is a hereditary polygon genetic defect manifesting a number of structural changes (from known cell membrane changes) and triggering RAAS mechanism causing vasoconstriction and sodium retention. By contrast, the activation of the pressor system activates the depressor system of prostaglandins. However, after exhaustion of the depressor system, AH is fixed. The depressor system of angiotensin also matters. Thus, under the influence of renin, two types of angiotensin I are formed from angiotensin: AT1-10 and AT 1-9. Then under the action of APF1 from AT1-10 formed habitual ATII (AT1-8), and under the action of PF2 - a new ATII (AT1-7).

The main causes of hypertension in children depending on age It is assumed that persons with congenital oligonepropathy are predisposed to the development of AH (more often in infants with low body weight). In the development of AH, the role of the agmatinergic system (imidazoline receptors and agmatin) has been proven, the deficiency of which leads to sympathetic hyperactivity, increased AP, and the development of metabolic syndrome. In patients with AH, the vasodilatory response of peripheral vessels to acetylcholine is suppressed, indicating endothelium dysfunction (NO production), the value of the latter at AH has not yet been sufficiently studied. The value of cellular mechanisms in the development of AH is shown. The dysfunction of the Na+-K+ pump appears to be heterogeneously deterministic, as well as an increase in Na+-Li+-transmembrane metabolism, leading to an increase in intracellular Na+ and Ca+, an increase in tonus arteriol and venul smooth-brain cells. Fixing AH is realized by increasing the overall peripheral vascular resistance. There are three types of hemodynamics identified by MBV and GPVR: eukinetic, hyper- and hypokinetic.

In most cases, elevated AP in children is revealed accidentally, runs asymptomatically, especially in young children. Less commonly manifested are physical retardation, signs of heart failure, shortness of breath, vomiting, increased or decreased excitement, cramps. In children of prepubescent and pubertal age, AP enhancement is more common in autonomic dysfunction syndrome and manifests asthenic-neurotic complaints of poor health, irritability, mild fatigue, heart pains, headaches, etc. An objective examination reveals emotional lability, tachycardia, amplified terminal tremor, functional noise, sometimes a II tone accent over the aorta. Frequent asymptomatic flow AH requires mandatory measurement of AP at the examination of children from 5-6 years old, at each examination in the clinic and at home with the mandatory use of cuffs appropriate to age. AH may have a crisis current. Hypertonic Crisis (HC) is a clinical syndrome characterized by sudden, acute rise of AP to high values and the appearance or aggravation of cerebral, cardiac symptoms against the background of vegetative and humoral disorders. There are complicated crises characterized by acute or progressive damage to the target organs, which pose a direct threat to the patient's life and require immediate, within 1 hour, reduction of AP, and uncomplicated. The latter flow without acute or progressive damage to target organs, pose a potential threat to life and require a reduction in AP within a few hours. Neurovegetative form of GC is characterized by a rapid onset, expressed by neurovegetative syndrome, accompanied by arousal, chills, hand tremors, sweating, abdominal pain. Patients complain of throbbing headaches, dizziness, nausea, feelings of lack of air. The pulse is frequent, intense, and there is a marked increase in SAP and a slightly smaller increase in DAP. The crisis is short-lived (no more than 2-3 h), often ending in polyuria.

Hydro-salt crisis (due to the disruption of renin-angiotensin-aldosterone system) develops gradually and lasts up to 5-6 days, with puffiness of pale type, shepherd tissues, muscle weakness, depressing heart pains. Severe increasing headache, nausea, vomiting,

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reduced diuresis are characteristic. There may be transient focal symptoms: aphonia, impaired hearing and vision. Both SAP and DAP are increasing, but DAP gain is greater, heart tones are muted, II tone accent on aorta may be disturbed heart rhythm. Diagnosis of HC can be made in the presence of the following signs: sudden onset, individually high AP level, the presence of complaints of cardiac or cerebral nature and (or) neurovegetative syndrome (chills, tremors, sweating, fever, etc.). The level of AP during HC may vary, so it is important to assess the severity of clinical symptoms and the risk of complications.

Arterial pressure, like other indicators of the child, increases with age. The most intense - in infants - 1 mm Rth. art. per month. In children from 1 to 5 years of age, blood pressure practically does not change and again increases from 6 years of age to puberty.The systolic AP (2 mm Hg. art. a year for boys and 1 mm Hg. c. girls) is increased more significantly than the diastolic AP (0.5 mm Hg. a year). In adolescence, diastolic AP is almost not increasing. The level of AP is determined not so much by the age of the child as by growth. Comparing the age and height of the child avoids hypertension at high growth and underestimation of AP values at low. There is also a pronounced correlation between AP levels and mass growth indices - the Ketle index (the ratio of body mass in kg and growth in m2). At the age of 10-13, systolic AP is usually higher for girls, and at the age of 13 for boys. At the same age, higher AP values are observed in menstruating girls.

AP levels depend on national circumstances and climatic zones. Generally, children living in the southern regions have a slightly higher AP than children from the northern zones. However, given the timing of puberty in children, the AP levels are close in different geographical areas. Arterial pressure is measured using the auscultative method N. S. Korotkov. One-off measurements of AP do not always reflect true values, i.e., an increase in AP often occurs due to the patient's anxious reaction to the «white coat», the process of cuff application, etc. Blood pressure should be measured several times (at least 3) during the child's various visits to the doctor.

The AP level is assessed more precisely by means of daily AP monitoring (DAPM). The DAPM allows to determine initial changes in the size and daily rhythm of AP, to carry out differential diagnostics of various forms of AH. Indications for DAPM are: arterial hypertension and hypotension; syncopal states; short-term, difficult to record in random measurements, AP oscillations; hypertension «white coat» (white coat hypertension); refractory to AH drug therapy. There are no contraindications to the use of DAPM in pediatrics. Relative contraindications may be edema of the forearm and hand; petechial hemorrhages; contact dermatitis. Semi-automatic and automatic units for single AP measurements and monitors for daily AP monitoring are used for the DAPM. The standard method is that of automatically pumping air into the cuff and decompressing at intervals of 15 minutes a day and 30 minutes a night (1 to 120 minutes), depending on the purpose of the research. During the study, the patient keeps a diary, which reflects some moments of vital activity: physical, emotional, mental load; complaints (headache, heartbeat, etc.), eating time, taking medication; sleep time, sleep quality, etc. Most monitors provide the possibility for the patient to mark certain events during the study, as well as the possibility (if necessary) of extraordinary measurement of AP. The most commonly analyzed with DAPM are: the average values of systolic, diastolic and average AP per day, day, night; time indices (IV) and area of hypertension during wakefulness and sleep; variability of AP in different periods of day; Daily index; the size and speed of morning AP. The maximum permissible daily AP value for children is 95 percentiles for the respective sex, age and height. The maximum permissible AP

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value for the night period is taken to be 10% less than the day. The Hypertension Time Index (TI) is calculated from the percentage of measurements exceeding the normal AP values in 24 hours or separately for each time of day. It is not expected to exceed 25% for SAP. In a labile form, the time index is 25-50%, with a stable form exceeding 50%. The daily AD index (DI AP) is calculated as the difference between the average daily and night AP values as a percentage of the daily average (calculated by the formula: DI = (AP m.d.) - (AP m.n.)/AP m.d. × 100%). Healthy children have a minimum value of the average hemodynamic AP at 2 hours a night with an increase in its level and reaching the first peak at 10-11 hours a morning, then a moderate decline to 16 h and a second peak of 19-20 h. Most healthy children are characterized by a night decrease of AP by 10-20% compared to daily AP. Children with symptomatic AH have an excess of the average night AP over day AP (daily index less than 0%).

There are 4 groups of SI AD:

1) the optimal degree of night SAD reduction of 10-22% (dippers -«descending discharge»);

2) Insufficient night SAP reduction of 0-10% (non dippers - more often in patients with symptomatic AH (pheochromocytoma, diabetes mellitus, Itsenko-Cushing's disease, vasor AH, CRF, malignant EG, etc.), which is not characteristic and significantly less pronounced (reduced) physiological circadian oscillations of AP;

3) an excessive degree of nocturnal SAP decline - more than 22% (over-dippers) - can occur in children with EG;

4) Night peaks of SAP, which may exceed the daily values of AP (night-dippers), are more common in patients with pronounced degrees of EG, in severe kidney function disorders, etc. and correlate with a higher probability of complications. Daily AP monitoring data allow to avoid hyperdiagnosis of AH in case of excessive anxiety reaction in the form of increased AP associated with examination of the doctor («hypertension on white coat» - white coat hypertension»). However, the phenomenon shows only short-term increases in AD above age, while average AP values remain within the norm. When calculating the «index of hypotension» the percentage of time when the AP was below the 5th percentile for age and sex is calculated. When assessing the DAPM, you can focus on the chart of the heart rate: at the time of falling asleep, there is a sharp reduction in the heart rate, and at awakening - increase. According to the chart of the heart rate you can indirectly control the depth of sleep: if at night there was a significant increase in the pulse rate, then the sleep was restless.

Thus, daily monitoring provides the most complete information on the level and fluctuations of AP during the day, during waking and sleep, to identify patients with insufficient or excessive AP reduction during night hours, patients with night hypertension, which are high-risk target organs. The method makes it possible to assess the adequacy of AD correction at the end of the intercostal interval and the absence of excessive hypertension at the peak of the drug action, which is especially important when using prolonged antihypertensive drugs taken once a day.

For labile forms of AH, according to daily AP monitoring, it is characteristic:

a) An increase in the mean values of the SAP and/or DAP within the range of 90 to 95 per cent of the distribution of these parameters; b) Increase above the standard values of the day and/or night hypertension time index in the range of 25-50%;

c) Increased variability of AP.

Stable AH forms are characterized by:

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a) An increase in the average SAP and/or DAP above the 95th centile of the distribution of these parameters;

b) Increases above the standard values of the day and/or night hypertension time index above 50%.

To estimate the AP level, either the criteria of arterial hypertension in infants are used (recommendations of experts of the working group of the National Institute of Heart, Lung and Blood (USA), average age of AP (common criteria)), or the percentage distribution of children's AP by age, sex and height. For normal AP values of systolic and diastolic AP are taken, which do not exceed 10 and 90 centles of distribution, taking into account the sex, age and body length of the child. The AP values between the 90s and 95th centiles are taken as «high normal AP» or «borderline» arterial hypertension. Children with borderline hypertension are subject to long-term clinical monitoring and active preventive intervention due to the threat of AH development. Arterial hypertension is thought to be a level of AP greater than 95% of the distribution curve at three-fold measurement.

Arterial hypertension in children under 1 year of age is established only at the level of systolic AP. In children in this age group, it is usually symptomatic hypertension associated with aortic coarculation, renal vein thrombosis, adrenal damage, etc. Normal AP is the systolic AP (SAP) and diastolic AP (DAP), which is the 10th and 90th percentiles of the AP distribution curve in the population for the respective age, sex and growth. High normal AP - SAP and/or DAP, the level of which is 90th and < 95th percentile of the AP distribution curve in the population for the appropriate age, sex and growth or 120/80 mmHg. art. (even if it is < 90th percentile). Arterial hypertension is defined as the condition in which the average level of systolic and/or diastolic AP is calculated from three separate measurements of the 95th percentile of the population distribution curve for the respective age, sex and growth. AH can be primary (essential) or secondary (symptomatic).

LITERATURE:

1. Anikin V.V. Kurochkin A.A., Kushnir S.M. Neurocircular dystonia in adolescents. - Tver: Provincial Medicine, 2008. - 184 p.
2. Anthropov Y.F. Psychosomatic disorders in children and adolescents. - M.: Special lit, 2008 - 145 p.
3. Belenkov Y.N., Oganova R.G. Autonomic heart dysfunction// Cardiology. National leadership. - M.: GEOTAR-Media, 2008. - P.1158-1168.
4. Yuldasheva G.G., Nasimova D.U. Epidemiology and integral assessment of risk factors for the development of autonomic dysfunction in children of pubertal period/ Education science and innovative ideas in the world. Issue of the magazine -34 Part-2_ December -2023 r9-18 https://ww.newjournal.org/index.php/01/article/view/9660
5. Yuldasheva G.G., Nasimova D.U. Prevalence and causes of autonomic dysfunction syndrome in puberty children/ International Journal of Scientific Pediatrics/ published: 31 October 2023 p357-361 https://www.ijsp.uz/index.php/journal/article/view/167/129
6. Pubertal hormonal changes and autonomic nervous system: potential role in child orthostatic intolerance /Cassandra E. Kupal , Natalie D. Heaney , Brooke S.D. Hokin, Rebecca Ronsley , Catherine Armstrong Shubhian and Victoria Klaydon. https://www-ncbi-nlm-nih-gov.translate.goog/pmc/articles/PMC6861527/?_x_tr_sl=en&_x_tr_tl=ru&_x_tr_hl=ru&_x_tr_pto=sc

Western European Journal of Medicine and Medical Science
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https://westerneuropeanstudies.com/index.php/3
ISSN (E): 2942-1918 Open Access| Peer Reviewed

7. Shankar R.R., Ekert G.J. , Sakha K., Tu V., Pratt J.H. (2005). Alteration of blood pressure during puberty. J. Kline. Endocrinol. Metab. 90 163-167. 10.1210/jc.2004-0926 [PubMed] [CrossRef] [Google Academy]
8. Mtinangi B.L., Heinworth R. (1999). moderate exercise to study volume, baroreceptor sensitivity and orthostatic tolerance in healthy people. Эксп. Физиол. 84 121–130. 10.1111/j.1469-445x.1999.tb00077. x [PubMed] [CrossRef] [academy Google]
9. Logacheva I. V. 1, Gunicheva E. A. Influence of various antihypertensive therapies on daily profile of blood pressure, hemodynamics, endothelium function in adolescents with essential arterial hypertension / Russian cardiological journal 1 (99) |2013 p98-104
https://cyberleninka.ru/article/n/vliyanie-razlichnyh-sposobov-antigipertenzivnoy-terapii-na-sutochnyy-profil-arterialnogo-davleniya-gemodinamiku-funktsiyu-endoteliya
10. Nature of endothelium dysfunction in essential arterial hypertension in teenagers (clinical and perimental study) Aflatumova G.N., Sadykova D. I., Nigmatullina R. R., Chibireva M. D. https:/leninka/artin/naryakteryaktiynarpri-essentsialnoy-arterialnoy-gipertenzii-u-podrostkov-klinikoeksperalnoe