MINISTRY OF HEALTH OF UKRAINE

ODESA NATIONAL MEDICAL UNIVERSITY

Departments of Pediatrics №2

CONFIRMED by

Vice-rector for research and educational work

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METHODOLOGICAL RECOMMENDATIONS ON PRACTICAL CLASSES FOR STUDENTS

International Medical Faculty, course 6

Educational discipline "**PEDIATRICS**"

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1. *Topic* №10

   Peculiarities of medical observation of adolescent children. The procedure for mandatory preventive medical examinations of adolescent children. Rational nutrition: prevention of obesity, diabetes. Assessment of puberty. Medical and psychological counseling.

   Peculiarities of medical observation of adolescent children. Differential diagnosis of primary and secondary arterial hypertension in adolescent children.

   Peculiarities of medical observation of adolescent children. Tactics of managing a patient with arterial hypo- and hypertension in outpatient conditions. Provision of emergency care for syncopal states and hypertensive crisis. Prevention of arterial hypo- and hypertension in children. Medical supervision.

2. *Relevance of the topic*

Caring for the health of children as the future of the state, nation, people is one of the most important social problems and tasks of the pediatric service. Knowledge of the principles of organization of pediatric service, patterns of growth and development of the child is the basis of effective pediatric service.
Hypertension is one of the most pressing problems of modern pediatric cardiology. Hypertension at this time is the most common disease of the cardiovascular system, and its sources are usually in adolescence. AH is an independent disease and one of the main modified risk factors that contribute to the development of coronary heart disease, myocardial infarction, stroke and ultimately disability and mortality. The appearance of high blood pressure in adolescence is a risk of its persistence in subsequent years and an unfavorable prognosis for the occurrence of the above-mentioned cardiovascular diseases. Therefore, early diagnosis of hypertension in adolescence is quite relevant in order to carry out effective and timely prevention and treatment, which will prevent a serious prognosis in adulthood. Adequate preventive measures aimed at eliminating FR at a young age will have a medical, social and economic effect much higher than the treatment of hypertension in adults.
The urgency of the problem of obesity in children and adolescents is due primarily to adverse metabolic disorders, which is the basis for the emergence and progression of pathological changes in all organs and systems.
Also, obesity is an important problem today. It is a fairly common pathology, and according to studies conducted in different countries, from 3.8 to 20% of children are overweight. In the structure of diseases of the endocrine system among children and adolescents in Ukraine, obesity is 11.1%. Annually, obesity is recorded in 18-20 thousand patients aged 0 to 17 years. Thus, in 2007 this figure was 23,325 new cases (2.73 per 1,000 population of the corresponding age). The incidence of obesity and its prevalence among children is constantly growing, and among adolescents over the past 7 years, these figures have almost doubled. Simultaneously with the spread of obesity, the number of associated somatic diseases is growing, which include: diabetes mellitus (DM) type 2, hypertension (AH), cardiovascular disease (CVD), etc., which lead to reduced quality of life in adolescence and adulthood.
The syndrome of autonomic dysfunction in adolescents in children is due to a complex of hereditary and acquired factors and can be a "starting point" for the formation of organic changes in the internal organs and systems. Therefore, early diagnosis of autonomic dysfunction, quality and adequate treatment can significantly affect the health of children.

3 . Objectives of the lesson:

3.1 General goals: to get acquainted with the modern definition of this pathology, to be able to diagnose these types of pathology, to prescribe quality treatment and to plan preventive measures.

3.2 Educational goals: to make the student a participant in the process of providing medical care to the patient, his family members, to be able to work in a team of students, doctors and other participants in the

provision of medical care; to form a responsible attitude of the student as a future specialist for the level of his training and improvement during his studies.

3.3 *Specific goalss:*

- *know:*

1. Conditions that are accompanied by hypertension in adolescents
2. Alimentary obesity in adolescents. Assessment of puberty
3. Pituitary obesity in adolescents
4. Classification of autonomic dysfunctions
5. Clinic of various forms of autonomic dysfunction
6. Diagnosis of autonomic dysfunction
7. Vegetative crises.
8. Methods of correction of obesity in adolescents
9. Therapy of autonomic dysfunction
10. Methods of correction of arterial hypertension in adolescents

3.4 Based on theoretical knowledge on the topic:

- *be able to:*

1. Collect anamnesis

2. To find out risk factors for the development of hypertension in adolescents

3. Conduct a clinical examination of an obese patient, SVD

4. Choose the most informative methods of examination to determine the diagnosis and conduct differential diagnosis

5. Interpret the results of laboratory and instrumental research

6. Establish a diagnosis according to the classification

7. Make a plan of treatment and preventive measures

4. Interdisciplinary integration

№	Disciplines	Know	Be able
1.	Previous disciplines		
	1. Anatomy	Anatomical structure of CCC, endocrine, digestive, autonomic nervous systems	Identify features in children.
	2. Normal physiology	Functional state of CCC, endocrine, digestive, autonomic nervous systems in children.	Identify features in children.
	3. Pathological anatomy and pathological physiology	Diseases of the CCC, endocrine, digestive, autonomic nervous systems in children.	It is correct to assess the nature of the process
	4. Biochemistry	Components of biochemical analysis of blood, which reflect	Correctly evaluate the results of the study

		the function of the CCC, endocrine, systems in children.	
	5. Propaedeutics of children's diseases	Anatomical - physiological CCC, endocrine, digestive, autonomic nervous systems in children. Semiotics of disorders. Methods of examination.	Conduct a clinical examination of the child
2.	The following disciplines		
	1. Pediatrics	Methods of diagnosis and differential diagnosis of CCC, endocrine, digestive, autonomic nervous systems in children.	To make a differential diagnosis with other nosoforms with a similar clinical and laboratory picture.
3.	Intra-subject integration		
	Primary hypertension	Methods of diagnosis and differential diagnosis.	Conduct a clinical examination of the patient. Evaluate the results of paraclinical tests.
	Alimentary obesity	Methods of diagnosis and differential diagnosis.	Conduct a clinical examination of the patient. Evaluate the results of paraclinical tests.

5. Content of the topic.

According to the WHO definition, adolescence is the period during which sexual development takes place - from the appearance of secondary sexual characteristics to the onset of puberty; psychological children's processes are replaced by behavior typical of adults; there is a transition from complete socio-economic dependence on adults to relative independence; it is proposed to consider as teenagers persons aged 10 to 19 years. The grounds for the selection of adolescence for medical purposes are the following features: morphological, physiological, clinical, psychological, social.

Hypertension in adolescents - conditions that are accompanied by a constant or periodic increase in blood pressure for 3-6 months. Systolic and diastolic blood pressure values below the 90th percentile for the respective age, sex and height are considered normal blood pressure levels.

Normal and high blood pressure in children and adolescents (recommendations of the Ukrainian Association of Cardiologists for the prevention and treatment of hypertension, 2008)

Article	Age, years					
	2	3-5	6-9	10–12	13–15	16–17
	The upper limit of normal blood pressure, mm Hg. Art.					
Boys						
Short stature	104/70	108/70	114/74	122/78	130/80	136/84
Tall	111/73	115/75	121/77	125/81	135/85	140/90
Girls	Up to 15 years of systolic blood pressure in girls by 2-3 mm Hg. Art. lower than in boys, diastolic - 1 mm Hg. Art.					Lower 130/85

Systolic and diastolic blood pressure in the 90th to 95th percentiles are referred to as "high normal blood pressure". Blood pressure values above the 95th percentile confirm the presence of hypertension.
Prior to measuring blood pressure, the child should be in a calm environment for 1 hour, do not eat products containing caffeine, do not smoke. Blood pressure measurement is performed after 5 minutes of rest, at least 3 times with an interval of 2-3 minutes. Take into account the average values of 3 measurements. When blood pressure rises above the 95th percentile, blood pressure measurement is performed on the lower extremities.
Epidemiology. Hypertension is found in 4-18% of children and adolescents; in 17–20% of adolescents it is characterized by a progressive course and in the absence of timely therapy in 30–40% of cases it transforms into hypertension.
Etiopathogenesis. In people with a hereditary predisposition, the frequency of hypertension is 5-6 times higher. The parity of hereditary genes of a certain trait given to each parent (allelism) extends to the genes of angiotensin hormone, the genes of expression of the enzyme aldosterone synthetase and other biologically active substances that determine the development of hypertension. Significant weight gain (obesity), alimentary factors (fat content in the diet more than 30% of daily calories, salt, etc.) contribute to the development of hypertension. Hypodynamia, prolonged psycho-emotional stress, stressful situations may play a role in the development of hypertension. The value of blood pressure is determined by the ratio of cardiac output and vascular resistance. If at increase of one component there is no compensatory decrease in another, then arterial hypertension arises. The state of the renin-angiotensin-aldosterone system plays a special role in the pathogenesis of hypertension. Angiotensinogen, which is produced by the liver under the influence of renin, is converted into angiotensin I. With the participation of ATP, angiotensin I is converted into angiotensin II - a powerful vasoconstrictor and antidiuretic that stimulates the synthesis of other hormones (norepinephrine, adrenaline, adrenaline, coronaline, nadrosalin, and vaso. Aldosterone contributes to fluid retention and potassium loss. At the same time, aldosterone enhances the reversible absorption of sodium and water in the renal tubules. This increases the intracellular content of sodium and water in the vascular wall, which leads to its swelling (edema). As a result, there is a narrowing of blood vessels with increasing total peripheral vascular resistance. Due to the activity and increased secretion of antidiuretic hormone, reabsorption of sodium and water increases. This leads to an increase in circulating blood volume (BCV) and minute circulating volume. Lack of balance between cardiac output and total peripheral vascular resistance leads to increased blood pressure.

Classification.

Hypertension	
Primary (essential)	Secondary (symptomatic)
	Nephrogenic genesis: renoparenchymatous (glomerulonephritis, interstitial nephritis, chronic pyelonephritis, obstructive uropathy, acute and chronic renal failure, urinary tract malformations, kidney tumors, kidney damage in SZST - SLE, dermatomyositis
	Renovascular: polycystic kidney disease, renal vascular abnormalities, renal vein thrombosis, systemic vasculitis with kidney disease - nodular polyarteritis, hemorrhagic vasculitis, Goodpasture's syndrome
	of cardiac origin: cardiovascular and hemodynamic hypertension (VVS - KA and aortic valve insufficiency, DMShP, complete atrioventricular block)
	Endocrine genesis: diabetes mellitus - diabetic glomerulosclerosis, diabetic nephropathy; pheochromocytoma, adrenogenital syndrome - hypertensive form; Itsenko-Cushing's disease; primary hyperaldosteronism; hyperthyroidism; chromaffin tumors of the adrenal glands
	Neurological genesis: brain tumors, brain injuries, encephalitis with lesions of the diencephalon, polio - boulevard form, psycho-emotional stress.

Clinic and diagnosis. The symptoms of hypertension are nonspecific. Children may complain of headache with worsening at the end of the day, associated with changes in body position dizziness, short-term pain

in the heart, irritability, visual disturbances, palpitations, fatigue, nosebleeds, nosebleeds, "ringing" in the ears. However, often the increase in blood pressure is detected during preventive examinations of children who do not make any complaints, so blood pressure should be measured annually in all children.

Stages of hypertension		
Stage	Indicators	Medical observation
And stage	Blood pressure within the 90th and 95th percentiles +5 mm Hg. Art. at 2-fold and repeated measurements	Dynamic observation of children for 6 months. Carrying out daily monitoring of blood pressure;
Stage II	Blood pressure is equal to 99th percentile and above +5 mm Hg. Art	children are recommended examination and therapy.

Examination of adolescents with high blood pressure includes:
- general analysis of blood with platelets;
- general analysis of urine (proteinuria, hematuria);
- biochemical blood tests (lipids, glucose, urea, creatinine), potassium;
- hormones in the blood (renin, aldosterone, catecholamines - adrenaline, norepinephrine, dopamine); - hormones in the urine (catecholamines);
- Ultrasound of internal organs, angiography of renal vessels, echocardiography.

Complications of hypertension can be: hypertensive crisis, stroke, myocardial infarction.
Hypertensive crisis is a sudden increase in blood pressure (systolic and / or diastolic above 95-99 percentiles, characterized by clinical symptoms of dysfunction of vital organs (acute cerebrovascular disorders, HF, etc.) and / or neurovegetative reactions that require immediate decrease in blood pressure, but not necessarily to normal values.
Diagnostic criteria for hypertensive crisis in children: acute general disturbance with impaired consciousness; vomiting not related to food intake; visual disturbances (diplopia, "flies" in front of the eyes; on the fundus - retinal vasospasm, optic disc edema, hemorrhage); severe headache, dizziness; paleness, cold sweat; tachycardia, intense pulse, heart tones weakened (or increased), systolic murmur at the apex of the heart and aorta, arrhythmia and conduction of the heart, the development of heart failure; on the ECG - myocardial hypertrophy and ischemia, congestion of the heart cavities, arrhythmia and conduction.

Hypertensive crises	
Hyperkinetic Develops in the early stages of hypertension.	Acute onset, agitation, autonomic reactions (tremor, palpitations, sweating, red spots on the skin) Duration - no more than 3-4 hours. Increased systolic blood pressure, tachycardia. Hyperglycemia, hyperkalemia (the result of high adrenaline).
Hypokinetic Develops in later stages of the disease.	Heavier and longer course (up to 4-5 days). Very high systolic and diastolic blood pressure is determined, more due to diastolic (the result of high concentrations of norepinephrine, which increases peripheral vascular resistance). Severe cerebral and cardiac symptoms develop more often.
Complication	hypertensive encephalopathy, cerebral edema (headache, loss of consciousness, nausea, vomiting, convulsions, coma); acute cerebrovascular accident (focal neurological symptoms); eclampsia; CH; angina, myocardial infarction; stratification of the aortic aneurysm (severe chest pain, shock); aortic insufficiency.

Treatment of hypertension is determined by the degree of increase in blood pressure and the cause. Recommended low-calorie diet with fat restriction (not more than 30% of daily calories), salt (not more than 4-5 g per day), the appointment of foods rich in potassium (baked potatoes, raisins, dried apricots,

etc.). Need weight control, regular exercise. Exercise is limited or prohibited only in severe hypertension and / or heart disease. In children without CNS, heart,
rock and without concomitant pathology, blood pressure should be reduced to at least the 95th percentile. At defeat of target organs and existence of accompanying pathology BP decrease below the 90th percentile.
Drug therapy of hypertension in children is prescribed empirically. The following classes of drugs are recommended: β-blockers, ACE inhibitors, calcium antagonists, diuretics.
The principle of monotherapy with consistent administration of drugs is used. Treatment begins with the minimum dose; until normalization of blood pressure, the dose can be increased; if you get side effects - reduce. Monotherapy of children with hyperkinetic type of hemodynamics begins with β-adrenolytics (eg atenolol). In the absence of tachycardia, ACE inhibitors (captopril, enalapril), calcium antagonists (eg nifedipine) are used.
If monotherapy is ineffective, a combination of two drugs is prescribed, but with a different mechanism of action. It is most effective to combine β-blockers with diuretics. Calcium antagonists or ACE inhibitors are used.

Treatment of hypertensive crisis is determined by its severity, the presence of complications.
Treatment of uncomplicated hypertensive crisis (blood pressure above the 95th percentile) is performed on an outpatient basis. Bed rest, position in bed with slightly raised head end to ensure airway patency. According to the indications, oxygen therapy is used.
Drugs for the treatment of uncomplicated hypertensive crises in adolescents and adults
(Recommendations of the Ukrainian Association of Cardiologists, 2008; quoted by LO Bezrukov, 2011)

Preparation	Dose and method of application
Clonidine 0.01% solution	0.5–2 ml v / m 0.075–0.3 mg *per person*
Nifedipine	10–20 mg *per person*
Captopril	12.5–50 mg *per os* or sublingually
Prazosin	0.5–2 mg *per person*
Propranolol	20–80 mg *per person*
Dibazole 1% solution	3.0–5.0 ml iv or 4.0–8.0 v / m
Pyroxane 1% solution	2.0–3.0 ml v / m
Diazepam 0.5% solution	1.0–2.0 ml v / m
Furosemide	40–120 mg *per os* or intravenously
Torasemide	10–100 mg *per os* or intravenously

In case of intracranial hypertension (headache, vomiting) diuretics are recommended (1% solution of lasix at a dose of 1 mg / kg per day intramuscularly, intravenously); when excited - seduxen - 0.5% solution at a dose of 0.1 ml / kg per day or 0.5 mg / kg intramuscularly. In the absence of effect, sodium nitroprusside (naniprus) is administered at a dose of 0.5–1 μg / (kg · min) intravenously, titrated, under blood pressure control; hydralazine - 0.1–
0.5 mg / kg per day intravenously or diazoxide - 1 mg / kg per day intravenously. Therapy is considered effective if the blood pressure in children with uncomplicated hypertensive crisis is reduced by 20%.
Complicated hypertensive crisis (increase in blood pressure above the 99th percentile, hypertensive encephalopathy, eclampsia, heart failure, etc.) is an indication for immediate hospitalization in the intensive care unit or intensive care unit. Use the same groups of drugs; therapy is considered effective if in the first 12 hours blood pressure is reduced by 25%; in the following days - by 25-30%. Normalization of blood pressure occurs no earlier than 3-4 days. Prevention includes adherence to a proper daily routine, adequate sleep, nutrition, regular exercise, annual blood pressure monitoring (more often if necessary), especially in adolescents and children at risk of developing hypertension.

Obesity is a chronic recurrent disease that manifests itself in excessive accumulation of adipose tissue and is the result of an imbalance in consumption and energy expenditure

in persons with hereditary predisposition or in its absence.
Etiopathogenesis. There are a number of factors that precede the development of obesity:
bone overeating), unbalanced (with a predominance of fats and carbohydrates) diet, sedentary lifestyle. The pathogenesis of obesity is based on hormonal and metabolic disorders. The main type of metabolic disorders is insufficient utilization of glucose by muscle tissue and its active metabolism in adipose tissue. Conversion of glucose into reserve lipids leads to excessive fat formation, thereby increasing the blockage of glucose to the muscles. Hyperinsulinism and decreased tissue sensitivity to insulin (insulin resistance) play an important role in the development of the disease. Hyperinsulinism stimulates appetite and increases the deposition of fat in the subcutaneous layer. Hyperlipidemias, both primary (hereditary) and secondary, play an important role in the pathogenesis of obesity.

Classification. Depending on the causes of obesity, there are primary and secondary (symptomatic) forms. The former include alimentary and exogenous-constitutional obesity. Symptomatic forms include cerebral (due to gross damage to the cerebral cortex), hypothalamic (diencephalic) and pituitary, endocrine (adrenal, thyroid, pancreatic, hypogonadal); obesity in hereditary syndromes (Prader-Willi, Lawrence-Moon-Borde-Biedl, Frelich).
There is an abdominal (android) type of obesity, which is diagnosed if the waist circumference: hip circumference (OT / OS) for boys> 0.9, for girls> 0.8.

Clinic and diagnosis. Obesity is diagnosed by increasing body weight due to adipose tissue, exceeding the body mass index (BMI) of more than 95 percentiles for a given age and sex. There is also the concept of "obesity risk", which is diagnosed with a BMI value of 85-95 percentiles.
In paraclinical diagnosis to clarify the causes of obesity use common
clinical methods, determination of fasting blood glucose, analysis of lipid profile, functional status of the thyroid gland, adrenal glands, determine the "bone age", conduct an X-ray of the skull, computed tomography or magnetic resonance imaging.

Differential diagnosis of obesity

Clinical sign	Alimentary constitutional obesity	Hypothalamic obesity
Reason	Often - heredity, early artificial feeding, hypodynamics, overeating	Traumatic brain injury, infection CNS, tumors of the hypothalamic structures of the brain, anesthesia
Increase speed body weight	Usually elevated from birth, obesity may progress during puberty with the development of diencephalic disorders	Increased since the disease
Manifestation of the disease	At an early age	At any age, but more often - during puberty
Subcutaneous distribution fat layer	Proportional	Uneven, mainly on the abdomen, in section VII of the cervical vertebra, thoracic iron
Skin condition	No pathological changes	Stretch marks pink, crimson or mixed; varying degrees of acrocyanosis, cyanosis of the buttocks, thighs, marbling pattern skin may be *acne vulgaris*
"Bone age"	Corresponds to the passport age	Corresponds to the passport age or is ahead of the passport age
Sexual development	Corresponds to the passport age	Different: may correspond to the passport age or ahead of it by 2 years and

		more. The guys may be delayed sexual development. In girls - menstrual disorders, development polycystic ovaries
Blood pressure	Normal	Normal or elevated
Appetite	Increased	Increased
Headache	Missing	IS
Signs of cerebrospinal fluid hypertension	Missing	IS
Glucose tolerant test	Normal glycemic curve	Normal glycemic curve or impaired glucose tolerance
The level of C-peptide in the blood on an empty stomach	Normal	Normal or elevated

Treatment. In case of alimentary-constitutional obesity, treatment begins with diet therapy (low-calorie diet), using dosed physical activity, therapeutic exercise. At signs of hyperinsulinism and impaired glucose tolerance, metformin is prescribed at an initial dose of 500-750 mg per day, for up to 3-6 months. At hypothalamic obesity and signs of cerebrospinal fluid hypertension apply moderate dehydration therapy (diacarb, 25% solution of magnesium sulfate). In the presence of hyperlipidemia, it is advisable to use lipid-lowering drugs for 2 months. (atorvastatin, simvastatin), alpha-lipoic acid, drugs with essential phospholipids.

Prevention. A balanced diet can prevent obesity
physical activity. In case of hypothalamic obesity, courses against recurrent treatment are performed once every 6–12 months.

Autonomic dysfunction syndrome in adolescents . This is a disease of the body, characterized by a symptom complex of disorders of psychoemotional, sensorimotor and autonomic activity, associated with suprasegmental and segmental disorders of autonomic regulation of various organs and systems.

Every teenager usually has several causal factors:
1) hereditary (features of the ANS, sensitivity of receptors, etc.);
2) unfavorable course of pregnancy and childbirth;
3) CNS damage (infections, tumors, injuries, etc.);
4) psycho-emotional stress, neurosis;
5) hormonal imbalance;
6) acute and chronic infectious diseases, somatic diseases, chronic foci of infection.

Depending on the etiological factor that causes autonomic dysfunction, there are:
- Juvenile VD, due to hormonal imbalance in the pre- and pubertal periods of childhood;
- Stress-emotional VD associated with psycho-emotional stress, acute and chronic stress;
- Intoxication VD, due to the influence of foci of chronic infection, somatic and infectious diseases on the autonomic structures that regulate cardiac activity;
- Perinatal-caused, caused by adverse pregnancy and childbirth;
- Idiopathic VD; this diagnosis is made if the cause of the disease cannot be determined.

Autonomic dysfunction is expressed in changes in autonomic reactivity and supply, which, in turn, causes metabolic disorders (hypercholesterolemia, dysproteinemia, hyper- and hypoglycemia, etc.), blood coagulation systems and fibrinolysis. Numerous data from the literature indicate that under the control of the hypothalamus are the processes of erythro-, granulocyto- and lymphopoiesis, as well as the processes

of immunogenesis. Irritation of sympathetic structures has been shown to stimulate antibody production; the regulatory mechanism remains unclear.

Classification and clinical manifestations. The variety of clinical manifestations, different levels of autonomic disorders and the number of etiological factors that cause the disease, require the selection of separate classification groups in this pathology.

Clinical and pathogenetic form	The level of damage	Characteristics of vegetative homeostasis	Phases of the disease
Neurocirculatory dysfunction (NCD)	Supersegmental (cerebral)	A. Initial vegetative tone: • amphotonia; • vagotonia; • sympathicotonia	Clinical manifestations
Autonomic vascular dysfunction (VVD): • by cardiac type; • by vascular type (hypertensive or hypotensive)	Segmental	B. Vegetative reactivity: • normal (sympathicotonic); • hypersympathicotonic; • asympathicotonic	Remissions
Autonomic-visceral dysfunction (VVD)	Combined vegetative damage	B. Vegetative security: • normal (sufficient); • insufficient; • excessive	
Paroxysmal autonomic insufficiency (PVA): • generalized form (vagoinsular, sympathoadrenal or mixed crises); • localized form (cerebral, cardiac, abdominal, etc.)			

Neurocirculatory dysfunction
• Neurocirculatory syndrome - constant headache, dizziness.
• Psycho-emotional disorders - psycho-emotional lability, distrust, predisposition to obsessions, anxiety, etc.
• Disadaptation syndrome - lethargy, fatigue, decreased efficiency, inadequacy to physical activity, weather sensitivity, hypersensitivity to hypoxia.
• Hypothalamic syndrome - thermoregulatory disorders, obesity, sleep disorders, etc.
• Syndrome of transcapillary metabolism - swelling of the face, limbs, polyarthralgia.

Vegetative-vascular dysfunction
• Syndrome of excitability, myocardial conduction - tachycardia and bradycardia, extrasystole, acceleration of atrioventricular conduction, slowing of intraventricular conduction.
• Hypertensive syndrome - hypertension (AH), increased stroke volume.
• Syndrome of contractile myocardial dysfunction - unpleasant sensations in the heart, shortness of breath during exercise, hypotension.
• Syndrome of tonic myocardial dysfunction - prolapse of heart valves, tonicity of papillary and chordal muscles of the heart.
• Myocardial (myocardial dystrophic syndrome) - constant cardialgia, exacerbated by exercise, signs of repolarization disorders.

Vegetative-visceral dysfunction
• Dysfunction of the digestive tract (dyskinesia of the biliary tract and intestines, psychogenic vomiting, abdominal pain of a paroxysmal nature).
• Bladder dysfunction (neurogenic bladder, nocturnal and diurnal incontinence, etc.).
• Respiratory disorders (vagotonic asthma, attacks of paroxysmal neurotic cough, shortness of breath, attacks of psychogenic dyspnea).

Paroxysmal autonomic insufficiency. There are clinical signs of sympathoadrenal or vagoinsular crisis, accompanied by emotional and affective disorders in the form of palpitations, sweating, chills, tremors, shortness of breath, not associated with an attack of asthma, discomfort in the left half of the chest, chest and abdomen , numbness of the extremities, waves of heat or cold, fear of death, fainting.

The main clinical signs of sympathoadrenal and vagoinsular crises in children		
Signs	Sympathoadrenal crisis	Vagoinsular crisis
Frequency of crisis	Often	Rarely
The presence of harbingers	Absent, the beginning is sudden	Available (lethargy, brokenness, anxiety)
Blood pressure	Increased	Reduced
Sweating	Not expressed	Expressed
Chills, cold extremities	Available	Missing
Pain	In the heart	Headache, abdominal pain
Asthma attacks	Missing	Can be
Pulse rate	Acute tachycardia	Brady or tachycardia

In all children with autonomic dysfunction, regardless of clinical variants, there is a "syndrome of general maladaptation" in the form of increased fatigue, decreased physical activity, increased sensitivity to changes in weather conditions, lethargy, reduced efficiency, memory impairment, changes in adrenergic sensitivity vascular system and heart.

Methods for assessing the state of the autonomic nervous system: includes assessment of the initial autonomic tone, autonomic reactivity and autonomic support of organs and systems, such as cardiovascular. Initial vegetative tone (IUT) is understood as relatively stable characteristics of vegetative indicators at rest. Regulatory devices that maintain metabolic balance, the relationship between the sympathetic and parasympathetic systems are actively involved in ensuring tone. The type of IED is inherited mainly autosomal dominant, mainly through the maternal line. IUD characterizes mostly phenotypic manifestations and complaints that allow to determine the direction of the ANS at rest.
The initial vegetative tone can be parasympathicotonic, sympathicotonic, eytonic (normotonic) and mixed (amphotonic) .

Evaluation of the initial autonomic tone in children			
Criteria (clinical symptoms)	**Sympathicotonia**	**Eitonia**	**Vagotonia**
Skin			
Color	Pale	White and pink	Predisposition to redness
Vascular pattern	Not expressed	Not expressed	Marbling, cyanosis of the extremities
Greasiness	Reduced	Normal	Increased
Sweating	Reduced or increased (viscous sweat)	Normal	Increased, hyperhidrosis of the extremities (liquid sweat)
Dermographism	Pink, white	Red, unstable	Red, elevated, stable
Predisposition to edema	Not expressed	Not expressed	Characteristic
Thermoregulation			
Body temperature	Tendency to increase	Normal	Reduced
Tolerability of suffocating rooms	Satisfactory	Satisfactory	Bad
Body weight	Tendency to thinness	Normal	Predisposition to obesity
Temperature in infections	High	Subfebrile	Subfebrile, prolonged subfebrile possible
Appetite	Increased	Normal	Reduced
Thirst	Increased	Normal	Reduced
Cardiovascular system			
Heart rate	Increased	Normal	Reduced respiratory arrhythmia
SAT	Normal or elevated	Normal	Reduced
DAT	Normal or elevated	Normal	Normal or reduced
Palpitation	Characteristic	Not typical	It is rare

Cardialgia	Possible	Not typical	They happen often
Fainting	Rarely	Not typical	Characteristic
III tone on top of the heart in a supine position	It does not happen	It does not happen	Characteristic
Vestibular changes			
Dizziness, intolerance of driving in transport	Not typical	Not typical	Characteristic
Respiratory system			
Respiration rate	Normal or elevated	Normal	Breathing is infrequent, deep
Complaints of suffocation	Not typical	Not typical	Characteristic
Asthmatic bronchitis	Not typical	Not typical	Characteristic
Gastrointestinal tract			
Salivation	Reduction	Normal	Increased
Complaints of nausea, abdominal pain	Not typical	Not typical	Characteristic
Intestinal motility	Atonic constipation is possible, peristalsis is weak	Normal	Spastic constipation, tendency to flatulence, diarrhea
Symptoms from other systems			
Urination	Infrequent, large volume	Normal	Frequent, small volume
Enuresis	It does not happen	It does not happen	Often
Allergic reactions	Rarely	Rarely	Often
Enlarged lymph nodes	Not typical	Rarely	Characteristic
Pupil	Advanced	Normal	Narrowed

Headache	It happens	Rarely	Characteristic, especially migraine-like
Criteria (clinical symptoms)	Sympathicotonia	Eitonia	Vagotonia
Temperament	Temperamental, inflammatory	Balanced	Apathetic, prone to depression
Physical activity	Increased in the morning	Enough	Reduced
Mental activity	Inattention, activity is higher in the evening	Normal	Attention is satisfactory, the greatest activity before lunch
Sleep	Late falling asleep, waking up early, sleep is restless	Beautiful, calm	Deep, long
Vegetative paroxysms	More often increase in blood pressure, fever, tremors, fear	It does not happen	More often increased sweating, abdominal pain, vomiting, dizziness, low blood pressure and fever
Blood test			
Erythrocytes, number	Increased	Normal	Reduced
Leukocytes, number	Increased	Normal	Reduced
Lymphocytes, number	Normal	Normal	Increased
Eosinophils, number	Normal	Normal	Increased
SHOE	Increased	Normal	Reduced
ECG data			
Heart rate	Tachycardia	Normal	Bradycardia
Sinus arrhythmia	It does not happen	It is rare	Characteristic
Amplitude RII-III	Increased	Ordinary	Reduced
PQ interval (PR)	Abbreviated or normal	Normal	Prolonged until the blockade of the I-II degree

T-wave (leads I, II, V5)	Compacted, two-phase, negative at rest or in orthopedic position	Normal	Tall, pointed
ST interval	Offset below the isoline at rest during the wedge orthography	Normal	Offset above the isoline
Cardiointervalography			
Stress index	More than 90 minds. from at rest and after orthocline test	30-90 d. from at rest and after orthocline test	Less than 30 minds. from at rest and after orthocline test
Notes: heart rate - heart rate; Blood pressure - blood pressure; SAT - systolic blood pressure; DBP - diastolic blood pressure; ESR - erythrocyte sedimentation rate; ECG - electrocardiogram.			

Under vegetative reactivity (BP) is understood the nature of the development of autonomic reactions that occur in response to external and internal influences. There are 3 options for BP:
- Sympathicotonic (normal).
- Hypersympathicotonic (excessive).
- Asympathicotonic (insufficient).

Cardiointervalography is widely used to determine IHD and BP of the cardiovascular system. The method is based on the ability of the sinus node to respond to the slightest autonomic disorders of the cardiovascular system. This is due not only to the peculiarities of the innervation of the sinus node, but also its connections with the cerebral cortex and subcortical formations of the CNS.

It is well known that an important indicator of the coherence of the body's regulatory systems is the body's autonomic support (VC) , which means maintaining the optimal level of ANS due to various loads (physical, mental, emotional, mental, etc.). At the same time it is necessary to consider physical training, sex, psychoemotional features of the patient. BP is assessed by calculating heart rate (HR) and measuring blood pressure (BP) by performing an active clinoorthostatic test (CPC), the data of which are sufficiently informative to determine the adequacy of the functioning of neurohumoral mechanisms of blood circulation regulation.

The method of CPC is to assess heart rate and blood pressure in a horizontal position, and then during the transition to vertical every minute for 10 minutes.

Normal response to COPD is determined by the absence of complaints, an increase in heart rate by 20-40% of baseline, an increase in systolic (SAT) and diastolic (DBP) blood pressure by no more than 5-15% (depending on baseline). The reduction of pulse pressure during orthostatic testing does not exceed 50%. At the 3-4th minute of the study, the indicators in almost healthy children return to baseline.

There are 5 pathological variants of hemodynamic response to COPD: with excessive involvement of the sympathoadrenal system (hypersympathicotonic), with insufficient involvement of the sympathoadrenal system (asympathicotonic, hyperdiastolic), mixed options (sympathoastonic), sympathoastanotic, asthenic.

Hypersympathicotonic variant - a sharper increase in CAT, BP and heart rate, heart rate also increases, the face reddens, the patient complains of a feeling of heat in the head (reflection of hyperadaptation associated with impaired nervous regulation).

Hyperdiastolic variant - isolated excessive increase in BP in SAT, which does not change or even decreases, significantly reduces heart rate and compensatory increase in heart rate (the most maladaptive variant of COPD).

Asympathicotonic variant - decreased cardiac index, CAT and BP do not change or decrease sharply, heart rate may remain normal or with a decrease in heart rate by more than 50% compensatory increase (with a significant decrease in CAT may faint).

Sympathoasthenic variant - immediately after the transition to the vertical position there is a normal or even hypersympathicotonic reaction, then at 3-6 minutes there is a marked decrease in CAT and DBP, heart rate increases to 100%, often with sharp pallor, cold sweat, dizziness, collapse .
Asthenosympathetic variant - in the first minutes of orthostasis there is a sharp decrease in CAT and BP, a sharp increase in heart rate, then there is a hypersympathicotonic reaction, as a result of which blood pressure returns to baseline or higher (this option is observed in 23% of children with mitral valve prolapse). In terms of minute volume, the hypersympathicotonic (and partially asthenosympathetic) variant of COP corresponds to excessive, and others - insufficient VZ.
It is important to note that the most informative non-invasive method for quantifying autonomic regulation to date is the analysis *of heart rate variability* (HRV) using Holter monitoring.
HRV analysis is a method of assessing the state of mechanisms of regulation of physiological functions in humans and animals, in particular the general activity of regulatory mechanisms, neurohumoral regulation of the heart, the relationship between sympathetic and parasympathetic departments of the ANS.
HRV analysis consists of three stages:
1. Measurement of the duration of RR-intervals and representation of time series of cardiointervals in the form of cardiointervalogram.
2. Analysis of time series of cardio intervals.
3. Evaluation of the results of HRV analysis.
HRV assessment is performed in time-domain and frequency-domain analyzes in accordance with the recommendations of the European Society of Cardiology and the North American Society .

Other methods of studying the autonomic nervous system :
- Electrocardiography (ECG) - according to the Center for Autonomic Dysfunctions, in children with autonomic disorders, heart rhythm disorders are detected in 30% of cases. Non-specific changes of the ST segment and the T wave, reduction of the PQ interval, negative T wave are also possible. These changes increase after physical activity. The nature of excitability disorders is largely determined by the age and sex of the child, which indicates in favor of the functional nature of these disorders, while conduction disorders are mostly organic in nature. It is possible that according to the ECG in patients with autonomic dysfunction there will be no pathological changes.
- Doppler - in autonomic dysfunction there is an increase in speed, mainly myocardial velocity during systole and acceleration during the expulsion of blood from the left ventricle.
- Echoencephalography - in the absence of obvious clinical brain disorders often indicates a violation of hemoliquorodynamics. Many patients with SVD have internal hydrocephalus with subcompensated hypertension [20]. There are changes in the amplitude of the signal, rounding of angles, splitting of the signal vertex.
–Electroencephalography - detects desynchronous α -rhythm, which is interspersed with paroxysms of the Q range, its asymmetry, deterioration of β -rhythm. It allows to differentiate epileptic and non-epileptic vegetative paroxysms.
- Rheoencephalography - allows you to assess the tone and elasticity of blood vessels, their dystonia, identify areas of difficulty of venous outflow, hemispheric asymmetry of tone, diagnose vascular disorders of the CNS.

- Biochemical tests for SVD reveal dysproteinemia, electrolyte disturbances, changes in the amount of catecholamines and acetylcholine, hyper- and hypocoagulation.
- In case of suspicion of organic changes in the CNS, assistance in the differential diagnosis of SVD is provided by such methods of brain examination as computed tomography and magnetic resonance imaging.

Basic principles of treatment of autonomic dysfunctions . Despite the rather large arsenal of drugs used to treat autonomic disorders, the problem remains relevant today, as drugs used by pediatricians to correct autonomic disorders do not completely solve it.
Treatment of such children should be comprehensive and long - only this guarantees its effectiveness

- Mode - sufficient night (and in many cases day) sleep, alternation of mental and physical activities, morning exercises, hardening, water treatments. An important link in the complex therapy of autonomic dysfunction is the optimization of work and rest. It is necessary to alternate mental and physical loadings, to apply various methods of psychological unloading, autotraining. If possible, reduce the time spent watching TV, working on the computer. In the absence of such a possibility, preventive breaks while working with a computer, eye exercises, etc. are mandatory.
- Diet - is determined by the form of autonomic dysfunction and may include restrictions on salty, spicy foods, fats of animal origin. A child with SVD should receive a complete diet with sufficient minerals and vitamins. Children with increased sympathoadrenal activity should moderately limit the use of salt, tea and coffee. It is advisable to include in the diet foods that reduce vascular tone and activity of autonomic innervation, such as barley porridge, beans, salads, spinach, milk, cheese. Smoked, spicy foods and chocolate should be excluded from the diet. Children with high parasympathetic activity, hypotension are recommended foods that contain plenty of fluids, marinades, tea, coffee (preferably with milk), chocolate and chocolates, kefir, buckwheat porridge, peas, ie those products that could stimulate the activity of the ANS and adrenoceptors responsible for vascular tone. If you do not have allergies, with all options SVD it is advisable to take honey at night (a long course of at least 2-3 months), as well as various juices, infusions, compotes (sea buckthorn, viburnum, rose hips, mountain ash, carrots, cranberries, chokeberry, raisins , apricots, dried apricots) and mineral water.
- Physiotherapeutic measures - galvanization, diathermy of the sinocarotid zone, electrophoresis, general ultraviolet radiation, electrosleep, alternating magnetic field, etc. Water treatments are shown, psychotherapy is important.
- Vegetotropic drugs - belladonna tincture, belataminal, beloid, belaspon, valerian tincture, dog nettle, etc.
- Symptomatic and pathogenetic therapy taking into account the variant of autonomic dysfunction.
- Etiotropic therapy should be started as early as possible. In the case of the predominance of psychogenic effects on the patient should, if possible, eliminate the effects of psycho-emotional and psychosocial stressful situations. Other areas of etiotropic therapy: remediation of chronic foci of infection, the elimination of excessive physical activity, a gradual increase in physical activity.

Tranquilizers have a calming effect, reduce neurotic manifestations (fear, anxiety, fear), have vegetotropic properties, have a good effect on functional cardiopathy (extrasystoles, cardialgia), vascular dystonia (eliminate lability of blood pressure), facilitate sleepiness, some fall asleep. The main targets of neuroleptics and anxiolytics are the structures of the limbic-reticular complex, in which the higher autonomic and emotional centers are concentrated. When prescribing tranquilizers, it is necessary to take into account the characteristics of the patient's psycho-emotional state (hyper- or hypotensive state) and the direction of autonomic dysfunction (weight and sympathicotonia). At hypertensive symptomatology tranquilizers with sedative effect which are appointed in three receptions a day or in the afternoon and in the evening (meprobromat, atarax, seduxen, sibazon, relanium, diazepam, phenazepam, tazepam) are shown. In case of hyposthenic neurotic state, arterial hypotension, drugs with moderate activating effect are prescribed - day tranquilizers, which are taken in two doses (morning and afternoon) (grandaxin, medazepam). In mixed versions of SVD good effect gives meprobamate, phenibut, beloid and belaspon (belataminal). These drugs are characterized by both adreno- and cholinolytic activity. The duration of the course of tranquilizers - 4-6 weeks, it is possible to repeat courses.

Neuroleptics are indicated for children with acute and chronic anxiety, motor restlessness, tics, hypochondria, fears, persistent pain. They have vegetotropic properties, antipsychotic antiphobic activity, reduce the reaction to external stimuli. In children with SVD in case of ineffectiveness of tranquilizers use mild neuroleptics, which are usually well tolerated by patients. Frenolone, meleryl (sonapax), terylene are most often used in this group of drugs. If necessary, neuroleptics can be combined with tranquilizers.

Neurometabolic stimulants (nootropic drugs) improve metabolic processes in the CNS. They are indicated for children with severe manifestations of SVD. Neurometabolic stimulants not only have a positive effect on metabolic processes and blood circulation to the brain, but also stimulate redox processes, enhance glucose utilization, improve energy potential, increase the resistance of brain tissue to hypoxia, improve memory, improve learning, facilitate. For this purpose it is possible to appoint nootropil, phenibut. Cortexin, glutamic acid, cerebrolysin are also used. Treatment with these drugs is carried out 2-3 times a year.

Herbal psychostimulants. Children with vagotonic orientation of SVD are prescribed psychostimulants that increase the activity of the SNA. For this purpose, you can prescribe caffeine, duplex, ginseng tincture, Chinese magnolia, Eleutherococcus, Rhodiola rosea, lures, pantocrine. All these drugs are prescribed for 1-2 months, alternating them with each other, with intervals of 2-3 weeks.
At a persistent headache, intracranial hypertension courses of diacarb, diuretic herbs are shown. To improve microcirculation appoint trental, cavinton, vincapan. In tachycardia, β-blockers are prescribed to reduce the increased activity of the sympathoadrenal system, but they have age restrictions.
In the complex therapy of SVD pathogenetically justified the appointment of B vitamins, which are known to normalize metabolic processes in the brain, affect non-specific reactivity of the body and activate reparative and restorative processes. The use of B vitamins in the treatment of SVD increases resistance to psycho-emotional and physical stress.
Vitamin-like substances (coenzyme Q10, L-carnitine), microelements (zinc, selenium and others) are also used in the treatment of any form of SVD. The main task of these drugs is the correction of frequent, albeit different in severity, metabolic changes in children with autonomic dysfunction.

Sanatorium treatment is important as a factor in the rehabilitation of patients with SVD, which is an effective method of restorative medicine for the correction of autonomic disorders. Sanatorium treatment has no negative effects of drug therapy and is aimed at stimulating compensatory and adaptive mechanisms by improving hemodynamics, physical performance, increased metabolism, improved thermoregulatory function, beneficial effects on the cardiovascular system and respiratory organs, normalization, normalization and immunological disorders. The main spa factors used in the treatment of SVD: climatotherapy, mineral waters, sea bathing, physical therapy, health care, balneotherapy, the basis of which is the impact on the neuro-regulatory mechanisms.

Prevention. Must be carried out at an early age. It is based on hardening of the child taking into account individual adaptive capabilities, exclusion of chronic emotional and stressful influences, remediation of chronic focal infection, rational dosing of school and sports activities.

6. Materials of methodical support of employment
6.1 Tasks for self-examination of the initial level of knowledge and skills
Questions for control
- definition of "essential hypertension"
- definition of "obesity"
- classification of arterial hypertension
- the difference between the main types of obesity
- classification of autonomic dysfunction syndrome
- characteristics of autonomic disorders in adolescents
- treatment of obesity in adolescents
- drug therapy of arterial hypertension
- clinical, laboratory and instrumental methods of examination used to diagnose obesity
Tests for control
Tests:
1. An 18-year-old boy was sent to the military registration and enlistment office for examination. He did not file a complaint. BMI = 30, hypertensive physique, short pale pink stretch marks on the abdomen and shoulders, bilateral gynecomastia, blood pressure 140 and 90 mm Hg Your diagnosis?
1. Hypertension 1 tbsp., Risk 1.
* 2. Hypothalamic syndrome of puberty.
3. Alimentary obesity 2 degrees.
4. Itsenko-Cushing's disease.

2. Arterial hypertension of the II degree is:
A. Increasing blood pressure to 140-159 and / or 90-99 mm Hg

* B. Increasing blood pressure to 160-179 and / or 100-109 mm Hg
B. Increase in blood pressure over 180 and / or 110 mm Hg
G. Crisis during hypertension.
D. The presence of damage to target organs.

3. The antihypertensive drugs of the first row include, in addition to:
A. Calcium antagonists
B. ACE inhibitors
*IN. Central alpha2-adrenoceptor agonists
G. Diuretics
E. Beta-blockers

4. Characteristic of nephrotic syndrome in children are the following signs:
* 1. significant proteinuria
2. hypoproteinemia
3. leukocyturia
* 4. hypercholesterolemia
5. the presence of erythrocytes in the urine

5. Choose the clinical symptoms most characteristic of acute pyelonephritis in children, except:
* 1. hypertension
2. abdominal pain
3. accelerated urination
4. increase in temperature

6. What manifestations are most characteristic of aortic coarctation in older children:
* 1. headache
* 2. the pressure on the arms is higher than on the legs
3. the pressure on the legs is higher than on the arms
4. right ventricular hypertrophy
5. frequent pneumonia

7. Higher pressure on the arms than on the legs of the child is usually associated with:
1. autonomic dysfunction syndrome
* 2. coarctation of the aorta
3. non-rheumatic carditis
4. aortic valve insufficiency
5. observed in the norm

8. At detection on the roentgenogram of an uzur of edges it is necessary to think first of all about:
1. pulmonary arterial hypertension
2. abnormal drainage of the pulmonary veins
* 3. coarctation of the aorta
4. systemic hypertension
5. arterial valve insufficiency

9. What is the value of systolic blood pressure in normal children under one year:
1. 40-60 mm Hg
2. 60-80 mm Hg
* 3. 80-100 mm Hg
4. 100-120 mm Hg
5. 120-140 mm Hg

10. What is the value of systolic blood pressure normal in children aged 12-14 years:
1. 60-90 mm Hg
2. 70-100 mm Hg
3. 80-100 mm Hg
* 4. 100-120 mm Hg
5. 120-140 mm Hg

11. For the syndrome of autonomic dysfunction in children with a predominance of parasympathotonus are characteristic, except:
1. marbling of the skin
* 2. pale skin
3. red dermographism
4. increased sweating

12. For the syndrome of autonomic dysfunction in children with a predominance of sympathotonus is characterized by:
1. marbling of the skin
* 2. pale skin
3. red dermographism
4. dry skin
5. pasty skin

6.2 The information needed to develop knowledge and skills can be found in textbooks

- *main:*

1. Volosovets OP, Snisar VI Recommendations for cardiopulmonary resuscitation in children. Methodical manual. Dnepropetrovsk: ART-PRESS, 2015. 48 p.
2. D 362 State form of medicines. Issue ten. Kyiv, 2018 https://moz.gov.ua/uploads/1/5052-dn_20180510_868_dod_2.pdf
3. Differential diagnosis of the most common diseases of childhood. Textbook / ed. V.M. Dudnik, 1st Edition. Vinnytsia: Nilan Ltd., 2017. 560 p.
4. Karen J. Markdante, Robert M. Kligman. Fundamentals of Pediatrics according to Nelson: translation of the 8th English. edition: in 2 volumes. Volume 1. Kyiv: VSV "Medicine", 2019. XIV, 378 p.
5. Karen J. Markdante, Robert M. Kligman. Fundamentals of Pediatrics according to Nelson: translation of the 8th English. edition: in 2 volumes. Volume 2. Kyiv: VSV "Medicine", 2019. XIV, 426 p.
6. Kryuchko TA, Abaturov AE, Kushnereva TV Pediatrics: textbook (University IV level); under ed. AND. Крючко, A.E. Abaturov. Kyiv: VSI "Medicine", 2020. 224 p.
7. Emergencies in pediatric practice: Textbook. way. for students. honey. ZVO, interns. - 2nd view. Recommended by the Ministry of Education and Science, Recommended by the Academic Council of the National Medical University. O.O. Bogomolets / Marushko YV, Chef GG etc. Kyiv: VSV "Medicine", 2020. 440 p.
8. Pediatrics: a national textbook: in 2 volumes / Ed. prof. Berezhny VV Kyiv, 2013. Vol.1. Kyiv, 2013. 1040 p.
9. Pediatrics: a national textbook: in 2 volumes / Ed. prof. Berezhny VV Kyiv, 2013. Vol.2. Kyiv, 2013. 1024 p.
10. Pediatrics: a textbook for students. higher education institutions IV level accred. / for ed. prof. OV Severe. View. 5th, ed. and add. Vinnytsia: Nova Kniga, 2018. 1152 pp .: ill.

- *additional:*

1. Autonomic dysfunctions in children. / Maidannik VG, Smiyan OI, Binda TP, Savelieva-Kulik NO / Sumy: Sumy State University, 2014. - 186p.

2. Orders of the Ministry of Health of Ukraine № 465 "On improving the organization of medical care for adolescents" from 12.12.2002
3. Orders of the Ministry of Health of Ukraine № 18 of 13.01.2005
4. Orders of the Ministry of Health of Ukraine № 399 of 11.08.2005
5. Orders of the Ministry of Health of Ukraine № 580 of 12.12.2003
6. Orders of the Ministry of Health of Ukraine № 436 of 31.08.2004
7. Primary arterial hypertension in children and adolescents / Ed. V.G. Maidanika, VF Moskalenko. -K.-2007.-389 p.

6.3 Guidance map for independent work with literature on the topic of the lesson

№ p.p.	The main tasks	Instructions	Answers
1	2	3	4
1	Explore the concept of hypertension	Define the concept of hypertension	Emphasize that these are conditions that are accompanied by a constant or periodic increase in blood pressure over 3-6 months.
2	Etiology and pathogenesis of hypertension	Describe the factors that precede and contribute to the development of hypertension	Factors influencing the development of hypertension: - hereditary predisposition - weight gain (obesity) - alimentary factors - hypodynamia is long - psycho-emotional stress - stressful situations
3	Clinical characteristics of hypertension	Describe the clinic of primary hypertension	Criteria for assessing the degree of increase in blood pressure: Systolic and diastolic blood pressure in the 90th to 95th percentiles are referred to as "high normal blood pressure". Blood pressure values above the 95th percentile confirm the presence of hypertension.
4	Tactics of a family doctor in hypertension	Determine tactics for the patient with hypertension	Focus on early diagnosis and adequate therapy
5	The main preventive directions in arterial hypertension	Specify methods of primary and secondary prevention of hypertension	

7. Materials for self-control of the quality of training

1. Etiopathogenesis, clinical picture, differential diagnosis, treatment and prevention of hypertension in adolescents
2. Etiopathogenesis, clinical picture, differential diagnosis, treatment and prevention of obesity in adolescents
   Etiopathogenesis, clinical picture, differential diagnosis, treatment and prevention of vegetative-vascular dystonia in adolescents.

8. Materials for classroom independent training

8.1 List of educational practical tasks to be performed during the practical lesson

1. Collect anamnesis, highlight data indicating hypertension, obesity, SVD in adolescents

2. Identify the most informative signs of the disease during the objective and laboratory-instrumental examination of the patient

3. Establish a clinical diagnosis according to modern classification

9. Instructional materials for mastering professional skills.

9.1 Methods of work, stages of implementation

1. Evaluate the obtained data on the anamnesis of life and disease, identify risk factors
2. Conduct a clinical examination of a patient with hypertension, obesity, SVD
3. Make a plan for additional examination
4. Evaluate the results of laboratory and instrumental examination
5. Formulate a clinical diagnosis according to the classification

10. Materials for self-control of mastering the knowledge, skills, abilities provided by this work

10.1 Tests of different levels and tasks (attached)

1. A 14-year-old boy treated in an endocrinology hospital had complaints of a sharp intense headache, severe lethargy, nausea and vomiting, impaired vision, tremor of the hands. From the anamnesis it is known that he suffers from obesity with growth retardation for 3 years. Objectively: body temperature 36.5˚C, fat deposition is uneven, mainly in the face, neck, chest, abdomen, hypertrichosis, acne (see Fig.). Peripheral lymph nodes are not palpable. Blood pressure 195/120 mm Hg Pulse 100 per minute, tense, left border of the heart 1 cm outside the midclavicular line in the V intercostal space, heart tones are muffled, rhythmic, clean, clear percussion sound above the lungs, pulmonary breathing auscultatory. Liver +2 cm, the edge is dense, painless, the spleen is not palpable. General blood test: Hb 110 g / l, er. 4.2 T / l, leukocytes 10 G / l, neutrophils: rod 8%, segmental 35%; eosinophils 1%, lymphocytes 44%, monocytes 12%, ESR 12 mm / h. Blood: sodium 159 mm / l, potassium 3.4 mm / l.

Answer the questions:

1. What is the probable underlying diagnosis? What complications did the child develop?
2. Principles of treatment of complications accompanied by the above complaints of the child.

Correct answers.

1. Itsenko-Cushing's disease / syndrome. Hypertensive crisis.
2. Antihypertensive.

2. A 13-year-old girl with systemic lupus erythematosus (see Fig.) Complains of hyperthermia, cough, difficulty breathing, slight chest pain, which decreases in a sitting position. Heart rate - 120 per minute, BP - 22 per minute, blood pressure - 140/95 mm Hg Physically hepatomegaly, swelling of the jugular veins, deafness of heart sounds, heart murmurs are absent. ECG: sinus tachycardia, decreased voltage of the main teeth. General blood test: H b 108 g / l, er. 3.4 T / l; CP - 0.9; leukocytes - 7 G / l; neutrophils: nuclear / nuclear - 15%, nuclear / -43%; eosinophils -6%; lymphocytes -35% monocytes -1%; ESR -32 mm / year. There are traces of protein in the urine. C-reactive protein - +++, seromucoid -500 units. wholesale dense Radiograph - see Fig. S a0 $_2$ - 99%.

Answer the question :

1. Preliminary diagnosis.
2. What are the possible causes of high blood pressure?
3. Therapeutic tactics.

Correct answers.

1. Systemic lupus erythematosus .
2. Congestive heart failure, renal mechanism.