Federal state budgetary educational institute of the higher education

 «Orenburg state medical university» of Ministry of Health of the Russian Federation»

**METHODOLOGICAL RECOMMENDATIONS**

**FOR THE TEACHER**

**ON THE ORGANIZATION OF THE STUDY OF THE DISCIPLINE**

PROPAEDEUTICS OF INTERNAL DISEASES

majoring in (specialty)

31.05.01 General medicine

(faculty of international students)

It is part of the main professional educational program of higher education majoring in (specialty)

31.05.01 General medicine,

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Orenburg

**1. Methodological recommendations for the lecture course**

**Module № 1 Direct research methods in propaedeutical practice**

**Lecture № 1.**

**Subject:** Introduction. The subject and tasks of propaedeutics of internal diseases. The concept of semiotics, diagnosis and diagnosis. The general plan of the patient's examination. Basic and additional (laboratory and instrumental) methods of examination of the patient. Medical history. The significance of the medical history as a scientific, medical and legal document. Domestic therapeutic schools. The concept of medical ethics and deontology. Methods of research of the patient. The question.

**Purpose:** To formulate concepts about the subject and tasks of propaedeutics of internal diseases, direct research methods in propaedeutical practice, medical ethics and deontology, semiotics, diagnosis. Systematize and summarize information about the main therapeutic schools. To acquaint students with the sequence of mastering therapeutic knowledge, medical documentation, the rules of medical deontology, the methodology of questioning and its components.

**Abstract of the lecture:** General ideas about the sequential study of internal diseases: propaedeutic, faculty and hospital clinics. Propaedeutics of internal diseases as an initial stage (introduction) to the clinic of internal diseases. Tasks of propaedeutics: methods of examination of the patient, semiology, methods of constructing a clinical diagnosis. The scheme of the patient's examination. Methods of direct investigation: questioning, examination, palpation, percussion, auscultation. Complete clinical trial. Introduction to laboratory and instrumental methods. Semiology-the study of symptoms and syndromes. Classification of symptoms and syndromes, their place in the diagnostic search. Methodology of clinical diagnosis. Principles of diagnosis: etiological, pathogenetic, morphological. The main, functional, concomitant, combined, competing, background diagnosis. Chart of the medical history, requirements for registration of the medical history. Domestic therapeutic schools with the main representatives: Moscow (Mudrov, Zakharyin, Konchalovsky, Myasnikov), St. Petersburg (Botkin, Lang), Kiev (Obraztsov, Strazhesko). Main achievements and contributions to the development of therapeutic science. Medical deontology as the science of relationships in the clinic. Features of relationships with the patient, relatives of the patient, medical staff. Requirements for the behavior of students in the clinic. Features of deontology in the pedagogical process. Questioning is an important diagnostic method that a doctor of any specialty should possess. The Russian (Moscow) therapeutic school founder Matvey Yakovlevich Mudrov (1776-1831) first introduced the patient's survey to the internal medicine clinic. He also developed a scheme of clinical research and put into practice the medical history ("mournful list"). The analytical method in the diagnosis of therapeutic diseases was developed by Professor of the Moscow University Grigory Antonovich Zakharyin (1829-1897). According to the French clinician Yushar, Zakharyin "raised the question to the height of art." Subsequently, S. P. Botkin, A. A. Ostroumov, V. P. Obraztsov, M. P. Konchalovsky and many other outstanding therapists were engaged in the development of the question as a medical method of research. Conducting a proper interview is a difficult task, especially for a novice doctor. It requires endurance, tact, knowledge and skill. Usually, at the beginning of the interview, the patient is given the opportunity to speak freely about what led him to the doctor. To do this, the doctor asks a general question: "What is bothering you?" or "What are you complaining about?". This technique makes a lot of sense. First, it is a demonstration of the doctor's attention to the patient, contributes to the emergence of a sense of trust on the part of the patient. Secondly, during the presentation of the patient's complaints, the doctor examines the patient, assesses his mental state, attitude to the disease, and intellectual level. In the course of the patient's story, the doctor forms the first diagnostic hypothesis about what disease this patient has, or what system is affected. Then the doctor should conduct a targeted inquiry, clarifying and detailing each complaint, strictly adhering to certain rules. The formulation of questions, their form and content should be adapted to the level of general development of the patient should be simple and clear. The doctor's speech should be friendly. The conversation is conducted in a calm atmosphere, preferably alone with the patient. Remember that the question brings the doctor and the patient closer together, provided that it is conducted skillfully, carefully, delicately. The doctor must win over the patient, enlist his trust. And this requires the participation of the doctor in the fate of the patient, the desire to help. If the doctor only asks questions, then this is only an interrogation, which is unacceptable in a medical institution. If the doctor only listens to the patient's story "excitedly", then this is only a memoir. Ask the patient purposefully, but so that the patient does not become isolated. Do not forget to ask not only the patient, but also his relatives and friends. All sections of the survey provide for the identification of the patient's first individual signs of the disease-symptoms. Further, the symptoms are combined into symptom complexes, and, finally, the doctor builds a specific combination of internally interrelated symptoms, i.e., identifies the syndromes of the disease. The general scheme of the inquiry consists of: the passport part, the patient's complaints, the anamnesis of the disease (anamnesis morbi) and the anamnesis of life (anamnesis vitae). Official data (passport data: Last name, first name, patronymic, age, gender, nationality, education, profession, position held, home address of the patient or close relatives, who was sent to the clinic, date of admission to the clinic, the diagnosis with which he was sent to the clinic, the preliminary diagnosis at admission to the clinic. Patient complaints: first, list the complaints that the patient himself notes at the time of the interview or noted at the time of admission to the clinic. At the same time, it is necessary to distinguish the main (leading) complaints and general ones. On the basis of the submitted complaints, make a determination of the general condition of the patient and an assumption about the defeat of which system is in question (the respiratory system, blood circulation, etc.). Specify whether there are any other complaints that characterize the pathology of this system, which the patient did not mention. History of the present disease (Anamnesis morbi) relevant questions find out when and how the disease began (suddenly or gradually); what were its manifestations and its further course (progressive or intermittent). For chronic diseases, the duration of periods of exacerbations, relapses, and remissions. Working capacity for the period of the present disease. It is necessary to establish the causes and provoking factors of the disease (severe nervous tension, injuries, physical overload, eating errors, colds, and others). Whether the patient went to the doctor, whether he was treated, and with what result; what additional studies were conducted (blood tests, urine tests, ECG, X-ray, etc.) What diagnoses were made by the attending doctors. Characteristics of the period preceding the present request for medical help (deterioration of the condition, the appearance of new symptoms, etc.). Life history (Anamnesis vitae): start asking about the patient's life with general biographical information: time and place of birth (geographical area), place of residence, where he lived before. Social history: the family environment in which he was born; the age of the parents, the previous illnesses. School years: when I started studying, how my studies went (it was easy or difficult to learn), how long I studied. Did you do physical education and sports at school? General and special education of the patient. Professional history: the beginning and nature of work, professional harms in the past. Current working conditions (duration, mental or physical, night or day work). The number of days off, vacations. Characteristics of the working room (lighting, temperature, presence of drafts, dust, harmful substances). Family history: married, married, at what age. For women, the nature of menstruation: the beginning, duration and regularity of the menstrual cycle, duration and amount of discharge. Pregnancy and childbirth: how many children, abortions (including complicated ones), miscarriages and stillbirths. The presence of gynecological diseases. Living conditions. Bad habits: smoking (from what age he smokes and how many cigarettes a day), the use of alcoholic beverages (frequency, quantity, how he tolerates them) and drugs. Heredity: the state of health of close relatives (father and mother, children and grandchildren, grandparents, sisters and brothers of the patient, sisters and brothers of the father and mother), if they died, at what age and from what causes. Pay attention to those diseases that especially affect the offspring: syphilis, tuberculosis, neuropsychiatric diseases, metabolic diseases, blood disorders, alcoholism, neoplasms, etc.Operations, injuries, diseases, their duration and severity, complications, treatment (in hospital, at home, outpatient, sanatorium-resort). Pay attention to sexually transmitted diseases, tuberculosis, viral hepatitis, HIV. Epidemiological history: find out whether there was contact with infectious patients (in the family, school, among neighbors, colleagues, etc.), whether there was contact with sick animals. Whether he traveled to regions that were not well-equipped for the epidemic or had contact with people who came from there. Ask where the patient eats (in the dining room, buffet, at home), what kind of water he uses (raw, boiled, from the water supply or other sources). Have you noticed any recent fever, vomiting, or stool disorders? Drug intolerance: the presence of itching, rash, swelling of the face after taking antibiotics and other medications. Blood transfusion history: blood transfusion and its components in the history, when and for what reasons, the presence of complications, tolerability. The following is information about some features of complaints (basic and general), the history of the disease and life in the pathology of individual organ systems that make up the concept of internal pathology. This will help the student to purposefully use the survey to build a preliminary diagnosis directly at the patient's bedside.

**The form of organization of the lecture:** introductory, explanatory, traditional.

**Teaching methods used in the lecture:** verbal, visual.

**Training tools:**

- didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector).

**Lecture № 2.**

**Topic:** Methods of patient research. General and private inspection.

**Purpose:** To introduce the methodology of general and private inspection.

**Abstract of the lecture:** The examination begins with the first glance at the patient, that is, almost simultaneously with the question. The inspection should be carried out in a room with an optimal (comfortable) temperature (22-24°C), with natural light or daylight lamps. The examination consists of a general and local examination, with a record of the data obtained in the section of the medical history " Present condition (Status praesens)” and an examination of organ systems, the description of which precedes the data of physical methods of research (palpation, percussion, auscultation). During the general examination, the following indicators are evaluated: the general condition of the patient; consciousness with a mental state; position; physique; body temperature. At a local examination, the following is performed: examination of individual parts of the body: head, face, neck, torso, arms and legs; assess the condition of the skin, skin appendages (nails, hair) and visible mucous membranes; subcutaneous fat with existing formations in it (blood vessels, lymph nodes, etc.); determine the condition of the muscles; bone and joint system. General condition of the patient. Consciousness, types of its violations. The patient's position (active, passive, forced). Body type. The concept of the constitutional type. Body temperature. Skin and visible mucous membranes. Changes in skin color. Pigmentation and depigmentation. Scars, rashes, hemorrhages, scratching. Trophic changes in the skin: ulcers, bedsores. Turgor and skin elasticity. Skin moisture. Development and distribution of subcutaneous fat. Edema, its localization, prevalence and severity. Methods for the study of lymph nodes. Muscles: degree of development, tone, muscle strength, soreness. Bones: shape, presence of deformities, soreness. Joints: shape, mobility, changes in the periarticular tissues. Private examination of the respiratory, cardiovascular, digestive and urinary systems.

**Form of organization of the lecture:** explanatory, traditional.

**Teaching methods used in the lecture:** verbal, visual.

**Training tools:**

**-** didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector).

**Lecture № 3.**

**Topic:** Methods of patient research. Palpation. General principles, methodology. Palpation of the chest, heart, abdominal cavity, liver, spleen, kidneys, lymph nodes, thyroid gland.

**Purpose:** To introduce the method of palpation.

**Abstract of the lecture:** Palpation is a clinical method of direct examination of the patient with the help of touch to study the physical properties of tissues and organs, the topographic relationships between them, and their soreness.

This method of research has been known since the time of Hippocrates, but until the XIX century, the use of palpation was limited to the study of the condition of the skin, joints, bones and the properties of the pulse. Since the middle of the XIX century, the study of vocal tremor and apical heartbeat (Laennek, Piorri, Skoda) has been included in clinical practice. Systematic palpation of the abdominal cavity became possible only from the end of the last and the beginning of the present century after the publication of the works of S. P. Botkin, F. Glenar, V. P. Obraztsov and N. D. Strazhesco. Further development of the method of palpation of the abdominal organs led to the creation of a coherent teaching about deep, sliding, topographic, methodical palpation. The physiological basis of palpation is touch. A tactile sensation occurs when probing an organ through an intermediate medium, if the density of the palpable organ is greater than the density of the medium. It appears when the consistency of the tissues under the fingers changes or when movement is hindered. In order to palpate a relatively soft body (the intestine), it is necessary to press the examined organ against a dense base (the pelvic bone, the doctor's palm, placed under the patient's lower back). General rules of palpation. When performing palpation, certain rules must be strictly observed. The doctor's hands should be warm (cold causes reflex muscle contraction), dry, with clipped nails, hand movements-smooth, any increase in pressure-gradual. Palpation can be performed in the position of the patient lying on his back, lying on his side and in an upright position. Depending on the goals pursued, two types of palpation are used: superficial and deep. Surface palpation of the skin, joints, chest, abdomen is used as a general, indicative study. Deep palpation is used for a more detailed study of the organ. The most fully developed deep, sliding methodical palpation of the abdomen. A type of deep palpation is a penetrating palpation used to determine soreness at certain points in the abdomen. It is performed by pressing with one finger, directed perpendicular to the abdominal wall. The most frequently examined are the appendicular point of McBurney (at the border of the lower and middle third of the line connecting the navel with the tip of the ilium), the cystic point (at the intersection of the outer edge of the rectus abdominis and the right costal arch) and the pyloroduodenal point (located two transverse fingers to the right and up from the navel). Push-like palpation is used to determine the balloting of dense bodies in the abdominal cavity with the accumulation of fluid in it, the patella with effusion in the knee joint. Sliding palpation by V. P. Obraztsovu is used for the study of the abdominal organs. The technique of palpation of the chest. Determination of painful areas, their localization. Determination of the resistance (elasticity) of the chest. Study of voice tremor in symmetrical areas. Diagnostic value in the main bronchopulmonary syndromes. Palpation of the apical and cardiac shocks. Characteristics of the apical shock, localization, strength, height, prevalence. Negative apical push. Determination of systolic and diastolic tremor in the heart area. Palpation of the base of the heart. Palpatory study of epigastric pulsation, its causes (differences in the pulsation of the heart, aorta, liver). Palpation of the peripheral arteries. The method of superficial indicative palpation of the abdomen. The condition of the skin and subcutaneous tissue of the abdomen. Detection of hernias and divergences of the muscles of the anterior abdominal wall. Determination of areas of hypersensitivity of the skin and painful places of the abdomen during palpation. Determination of resistance and muscle protection, diagnostic significance of this symptom. A symptom of peritoneal irritation. Shchetkin-Blumberg. Deep methodical sliding palpation of the abdomen according to the method of V. P. Obraztsov and N. D. Strazhesco. Four points of palpation. The sequence of intestinal palpation. Palpation data: location, mobility, soreness, consistency, the size of the palpable segment of the intestine, the nature of the surface, the presence and absence of rumbling. Determination of the lower border of the stomach using the percussion method (splashing noise). The method of palpation of the liver. Characteristics of the edge of the liver and its surface. Liver soreness. The method of palpation of the liver in ascites. The method of palpation of the gallbladder and the characteristics of the results obtained when it is enlarged. Symptoms of Ortner, Kerr, Mussy-Georgievsky. Palpation of the spleen. Diagnostic value of the increase in the size of the spleen. The method of palpation of the right and left kidneys. Omission, displacement, enlargement, and soreness of the kidneys. Examination of pain points characteristic of diseases of the urinary tract. Palpation of superficially located lymph nodes, their size, consistency, mobility, solidity of the skin with the surrounding tissues and among themselves, the condition of the skin above them. Palpation of the thyroid gland. Palpation of joints and bones.

**Form of organization of the lecture:** explanatory, traditional.

**Teaching methods used in the lecture:** verbal, visual.

**Training tools:**

- didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector).

**Lecture № 4.**

**Topic:** Methods of patient research. Percussion. History of development. General principles, methodology. Percussion of the chest, heart, abdominal cavity, liver, spleen, normal and abnormal.

**Purpose:** To introduce the technique of percussion. To form the concept of percussion sounds.

**Abstract of the lecture:** Percussion is an objective method of studying the patient, which consists in tapping out areas of the body and determining the physical properties of the organs and tissues located under the percutated place by the nature of the sound that occurs. The scientific basis of the method of systematic percussion was developed by the Viennese physician L. Auenbrugger, who in 1761 published a treatise "A new discovery that makes it possible to detect hidden chest diseases on the basis of chest tapping". The author proposed to produce percussion by striking four fingers of the right hand bent and pushed together on the chest (direct percussion). Currently, this technique is used very rarely, mainly to detect bluntness in the interscapular space. Later, V. P. Obraztsov proposed another method of direct percussion. According to this technique, blows to the chest are applied with the pulp of the end phalanx of the index finger of the right hand. To increase the force of the blow, the index finger is thrown over the middle finger and slides off it. The advantage of direct percussion according to V. P. Obraztsov is the possibility of obtaining not only sound phenomena, but also palpatory sensations. In 1827, Geibner and Leichternstern proposed a plessimeter for percussion (plessio-I strike, metron-measure) - a plate that is applied to the body and blows are applied to it. After 14 years, they began to use a special percussion hammer. Percussion using instruments (or a finger) is called mediated percussion. The resulting sounds are listened to either directly with the ear, or with a stethoscope located near the percutaneous area. Currently, the most widely used method of indirect percussion with a finger on the finger, proposed by the Russian scientist G. I. Sokolsky in 1835, has become widespread all over the world. The middle finger of the left hand is used as a plessimeter, and the blows are applied with the middle finger of the right hand. This method of percussion allows you to evaluate the change in percussion sound not only by hearing, but also by touching with a plessimeter finger. Some of these vibrations have a frequency and amplitude sufficient for auditory perception of sound. Distinguish between high and low percussion sounds. The pitch of the sound is directly proportional to the density of the underlying media. So, when percussion of the chest areas in the place of the air lung tissue, low sounds are formed, and in the area of the dense heart tissue, high sounds are formed. The strength or volume of the sound depends on the amplitude of the vibrations, which, on the one hand, is determined by the force of the percussive impact, on the other - is inversely proportional to the density of the vibrating body. The duration of the percussion sound is characterized by the time of vibration extinction, which is directly dependent on the initial amplitude of the vibrations and inversely - on the density of the oscillating body. The tissues of the human body are heterogeneous in density. Bones, muscles, fluids in the cavities, liver, spleen, and heart have a high density. Percussion in the area of the location of these organs gives a short, quiet, high or dull percussion sound. Low-density tissues or organs are those that contain a lot of air (lungs). Percussion of the lungs with normal airiness gives a fairly long, loud, low sound, which is called clear pulmonary. Above the stomach, the loops of the intestines, when air accumulates in the pleural cavity, a loud, prolonged, low, harmonic musical sound occurs, similar to the sound when hitting a drum - tympanic sound (tympanon - drum). In places where parenchymal organs and organs containing air overlap, you can get a blunted percussive sound (for example, over the heart, covered with lung tissue). Depending on the strength of the percussion, there is a loud, quiet and quiet percussion. With loud percussion, the vibrations penetrate to a depth of 4-6 cm, so it is used to identify deeply located foci. With quiet percussion, the vibrations extend deep into 1-2 cm, so it is used to identify superficially located pathological foci. Threshold percussion is a special kind of silent percussion. In this case, the force of the percussion stroke is reduced to the threshold of sound perception, so that sounds are perceived only over the air-containing organ. Basic rules of percussion: the middle finger of the left hand, the finger-plessimeter, is applied to the surface of the body tightly throughout without much pressure. The other fingers should not be pressed against it; the percussion blow is applied by moving the hand in the wrist joint with the middle finger of the right hand along the middle phalanx of the plessimeter finger, strictly perpendicular to it. It is necessary to strike two blows (approximate and estimated). The blows should be of equal force, short and jerky. The nail of the hammer finger should be cut short to avoid injury. Depending on the goals, there are two types of percussion: topographical and comparative. In topographic percussion, the boundaries and dimensions of organs or formations are determined. In topographic percussion, the following rules must be observed: when determining the boundaries of the percutaneous organ, the finger-plessimeter is located parallel to the desired border of the organ; percussion is always carried out from a clear sound to a blunt one; the border of the organ should be marked along the outer edge of the finger-plessimeter, facing the zone of clear sound. Comparative percussion is aimed at identifying the presence of pathological changes in the symmetrical areas of the lungs, pleural cavities, and abdominal cavity. Comparative percussion is used to determine the nature of the percussion sound and its similarity in symmetrical areas of the chest. Next, percussion of the lungs, heart, liver, spleen, and kidneys is performed sequentially.

**Form of organization of the lecture:** explanatory, traditional.

**Teaching methods used in the lecture:** verbal, visual.

**Training tools:**

- didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector).

**Lecture № 5.**

**Topic:** Methods of patient research. Auscultation. History of development. General principles. Methodology. Auscultation of the lungs in normal and pathological conditions.

**Purpose:** To introduce the technique of auscultation of the lungs.

**Abstract of the lecture:** auscultation is a medical method of research. The method allows you to listen to sound phenomena that occur during the mechanical work of internal organs. As a research method, auscultation has been used in medicine for a very long time. In the works of Hippocrates, information is given about the noise of pleural friction, which is compared to the "creaking of a leather belt", about wet wheezes, reminiscent of the sounds of boiling vinegar. The merit in the development and introduction of auscultation into medical practice belongs to the French clinician R. Laennec, who in 1816 he first applied this method of research, and in 1819 published a work " On mediocre auscultation and the recognition of diseases of the lungs and heart, based mainly on this new method of research." Laennek also proposed the first stethoscope (stethos - chest, scopeo - look) - a device for listening. It was a hollow, with a channel of 6 mm, a wooden tube 33 cm long, separated for convenience in the middle. In the future, the stethoscope was subjected to multiple improvements and changes. Laenneck proved the clinical value of auscultation, checking the results of its sectional data, described and named almost all auscultative phenomena (vesicular and bronchial respiration, dry and wet wheezing, crepitation). In Russia, the method of auscultation was introduced in 1824. P. A. Charukovsky at the Medical and Surgical Academy. Further development of auscultation is associated with the improvement of the stethoscope (Piorri, F. G. Yanovsky), the invention of the binaural stethoscope (N. F. Filatov) and the phonendoscope. The development of the physical foundations of auscultation is devoted to the work of I. V. Skoda, A. A. Ostroumova, V. P. Obraztsova. At the end of the XIX century, a method of recording sound phenomena (phonography) was developed. The first graphic recording of heart sounds was made (Einthoven and Gelux, 1894). In practical medicine, mediocre and direct auscultation is used. With direct auscultation, the doctor's ear directly touches the surface of the subject's body, which is not always acceptable for hygienic reasons. With direct auscultation, the audibility of heart tones and quiet bronchial breathing is significantly improved, but it is difficult or impossible to listen to the supraclavicular pits and armpits. When auscultation with a stethoscope or phonendoscope (mediocre auscultation), there is a distortion of sounds due to resonance. However, here it is better to distinguish sounds of different origins in a small area, which makes it possible to perceive auscultative phenomena more clearly. A simple stethoscope is made of wood, plastic or metal, and consists of a tube with a funnel and a concave plate (for the ear of the examiner). Binaural stethoscopes consist of a funnel and two rubber tubes, the ends of which are inserted into the ears. A phonendoscope, unlike a stethoscope, has a membrane on the funnel or capsule. A stethoscope (phonendoscope) is a closed acoustic system. The conductor of sound in it is air. Because of this, when the pressure of the funnel increases on the skin, high sounds are better carried out, while low sounds are weakened. The length of a solid stethoscope usually does not exceed 12 cm. It is desirable that the phonendoscope tubes are as short as possible. At the same time, the amount of air in the system is reduced and the sound is less distorted. The human ear perceives vibration in the range from 16 to 20,000 hz. The ear has the greatest sensitivity to sounds at 2000 Hz. Sounds during auscultation of the heart and lungs in the frequency of vibrations are in the range from 20 to 600 hz. Sounds less than 20-30 hz are usually at the lower limit of our ear's audibility. However, it should be noted that low-frequency vibrations can be perceived palpationally (for example, "cat purring" in mitral and aortic stenosis). Sounds perceived during auscultation are characterized by strength, pitch, timbre, and duration. The nature of the sound perceived by the ear depends largely on the properties of the tissues that separate the human ear from the sounding organ, as well as on the sound conductivity and resonating ability. Dense, homogeneous tissues, such as compacted lung tissue, conduct sounds well. Soft, airy fabrics have poor sound permeability. Auscultation as a medical method is used to study the lungs, heart and blood vessels, to determine blood pressure according to the Korotkov method, to study the digestive organs and other systems. Rules and techniques of auscultation: to obtain reliable results during auscultation, silence is necessary in the room, so that no extraneous noises drown out the sounds heard by the doctor, and a comfortable air temperature so that the patient can be without a shirt; during auscultation, the patient stands or sits on a chair, in bed. Severe patients are listened to in a lying position. It is necessary to seal the system "patient's body-doctor's ear". During listening, the stethoscope should be pressed tightly, with the entire circumference, to the patient's skin, but not to exert very much pressure, otherwise there will be a weakening of the vibration of the tissue in the area of the stethoscope, as a result of which the sounds being listened to also become quieter. The doctor holds the stethoscope tightly with two fingers. With thick hair, the area of the skin where listening is performed can be moistened with water, which eliminates the appearance of additional sounds. In some cases, you should use such techniques as listening to respiratory and cardiac noises after coughing, physical exertion, when holding your breath, changing your body position, etc. In particular, after sputum discharge, the previously heard wheezes in the lungs may disappear or change their character. During the study, in accordance with the task, the doctor can change the position of the patient. For example, diastolic murmur of aortic insufficiency is better heard in the patient's sitting or standing position, and diastolic murmur of mitral stenosis-if the patient is lying, especially on the left side. It is also necessary to regulate the patient's breathing, and in some cases he is offered to cough. One of the basic rules of auscultation requires that the doctor always use the device to which he is accustomed. It is also necessary to have sufficient theoretical knowledge of the doctor so that he can correctly interpret the sounds being listened to, and constant training, the acquisition of listening skills. Only in this case, auscultation as a method of research reveals to the doctor all its possibilities. Auscultation of the lungs: the sound phenomena heard during auscultation of the lungs that occur in connection with the act of breathing are called respiratory noises (murmura espiratoria). There are main (vesicular and laryngotracheal respiration) and secondary (crepitation, wheezing, pleural friction noise) respiratory noises. Rules of auscultation of the lungs: the position of the patient may be different, but it is best to listen to a sedentary patient. The examinee's hands should be placed on his knees; auscultation of the lungs begins with the anterior surface of the chest. Listen to strictly symmetrical areas, starting with the supraclavicular pits, gradually moving the phonendoscope down and to the sides to the mid-axillary line; then listen to the posterior surface of the chest, starting with the supracapular areas, moving to the interscapular space and the subcapular area. In this case, the patient is asked to bring his hands together on his chest in order to "expose" the lung tissue in the interscapular space as much as possible; during auscultation of the lungs, the main respiratory noises are first evaluated. At the same time, the patient should breathe deeply and evenly, through the nose, not very forcibly; only after that, against the background of deep breathing through the mouth, determine the presence of additional noises - wheezing, crepitation, noise of pleural friction. For better differentiation of pathological noises, auscultation is repeated after coughing. Basic respiratory noises. Vesicular (alveolar) respiration. Normal pulmonary respiration, called vesicular (vesicula - inflated bubble) or alveolar, is formed as a result of fluctuations in the alveolar septa at the time of filling them with air. Inhaling is the active phase of breathing, so the intensity of the air wave penetration into the lungs exceeds the strength of the alveolar wall vibrations during exhalation (passive phase of breathing). Therefore, the vibrations of the membranes on the inhale will be stronger and longer than on the exhale. As a result of a decrease in the tension of the alveolar walls on exhalation, their vibrations quickly go out. In this regard, vesicular breathing has the following characteristic features: it is listened to throughout the entire phase of inspiration with a gradual increase towards the end of inspiration and the first third of exhalation. Vesicular lung breathing is a blowing noise that resembles the sound of pronouncing the letter " F " when drinking tea from a saucer and sucking the liquid with your lips. Under physiological conditions, vesicular respiration is better heard on the anterior surface of the chest below the II rib, laterally to the near-sternal line, in the axillary region and below the angle of the scapula. Above the right apex of the lung, bronchovesicular breathing is sometimes heard, since the right bronchus is shorter and wider than the left. The strength of vesicular respiration varies depending on a number of factors of extrapulmonary origin: the strength of respiratory movements; the thickness of the subcutaneous fat and muscle layer of the chest; the proximity of the adjacent areas of the lungs. Vesicular respiration can change both in the direction of weakening and strengthening. These changes are physiological and pathological. Physiological weakening of vesicular respiration is observed with thickening of the chest, with weakening of the force of respiratory movements. Physiological enhancement of vesicular respiration is observed in individuals with a thin chest. In children 12-14 years old, there is a pronounced vesicular breathing with a clearly audible exhalation - puerile breathing, due to the thinness of the chest and the small lumen of the bronchi. Saccaded breathing is characterized by intermittent inhalation (consisting of separate short intermittent breaths with minor pauses between them) and normal exhalation. Intermittent breathing is observed with an uneven contraction of the respiratory muscles (nervous muscle tremor). The physiological change in vesicular respiration is observed simultaneously on the right and on the left. Bronchial (laryngotracheal) breathing is formed in the larynx when air passes through the glottis at the time of inspiration and exhalation. The air, passing through the narrow glottis into the wider lumen, makes eddy, turbulent movements, but since the glottis is narrowed more in the exhalation phase than in the inhalation phase, the sound during exhalation becomes stronger, coarser and longer. Sound waves along the column of air propagate throughout the bronchial tree. Distinctive features of bronchial respiration from vesicular respiration: exhalation is louder, rougher and longer than inhalation: the timbre resembles the sound "X", the inhale and exhale are clearly audible. Normally, it can be heard over the larynx, trachea, and large bronchi. From the front to the level of attachment of the handle to the body of the sternum and near-chest lines. Posteriorly in the interscapular space to the level of the III-IV thoracic vertebrae and the parotid lines. In other areas of the lungs, bronchial breathing is not listened to, since the powerful alveolar layer of the lungs silences, like a pillow, bronchial breathing and prevents it from being carried to the surface of the chest. Description of the conditions of changes in vesicular o bronchial respiration in pathology. Adverse respiratory noises. The concept of bronchophonia.

**Form of organization of the lecture:** explanatory, traditional.

**Teaching methods used in the lecture:** verbal, visual.

**Training tools:**

- didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector).

**Lecture № 6.**

**Topic:** Methods of patient research. Auscultation. Auscultation of the heart. Methodology. Tones (the mechanism of formation, changes in pathology).

**Purpose:** To introduce the methodology of auscultation of the heart, to form the concept of the heart tone in normal and pathological conditions.

Lecture Summary: Listening to the heart is the most valuable of the physical research methods. In practice, they mainly use auscultation with a stethoscope or phonendoscope, as well as direct listening to the heart with the ear (according to V. P. Obraztsov).If the patient's condition allows, the heart should be listened to sequentially - in the supine position( on the back), standing and after physical exertion (10 squats). So that the breathing noises do not interfere with listening to the sounds coming from the heart, before listening to it, it is necessary to invite the patient to take a deep breath, a full exhalation and hold the breath in this position. You can not force too long not to breathe - this can cause a violation of the rhythm. For the correct assessment of auscultation data, it is necessary to know the best places to listen to sound phenomena associated with a particular valve. The projections of the valves on the anterior chest wall are located close to each other. The mitral valve is projected on the left at the sternum in the area of attachment of the IV-th rib, the tricuspid valve-in the middle of the distance between the place of attachment to the sternum of the cartilage of the III-th rib on the left and the cartilage of the V-th rib on the right. The valve of the pulmonary trunk is projected in the second intercostal space to the left of the sternum, the aortic valve-in the middle of the sternum at the level of the third thoracic cartilage. However, listening to the sounds of the heart depends not only on the place of occurrence of sound vibrations, but also on their conduct through the blood flow and adjacent to the chest wall of the heart department in which they are formed. This allows you to find the best listening areas on the chest wall for the sound phenomena associated with the operation of each valve. Listening to the sounds formed during the operation of the heart valves is carried out in a certain sequence: the mitral valve, the semilunar valve of the aorta, the semilunar valve of the pulmonary artery, the tricuspid valve. This sequence of auscultation is explained by the frequency of their damage and the possibility of comparing the sound pattern at different points. The first point of auscultation, the apex of the heart – the place of listening to the mitral valve. In the second intercostal space at the right edge of the sternum, the aortic valve (second point) is heard. At the symmetrical point in the second intercostal space at the left edge of the sternum - the valve of the pulmonary artery (the third point). At the base of the xiphoid process on the right, where the Y rib is attached to the sternum - the place of listening to the tricuspid valve (fourth point). The Botkin-Erb point (the third intercostal space at the left edge of the sternum) is an additional point. In the area of the Botkin-Erb point, noises are often carried out (the fifth point). During auscultation, the sounds that occur in the heart during its work (tones, noises) are evaluated. When listening to a healthy heart, two sounds are heard, periodically replacing each other. These sounds are called tones, although from the point of view of physics it is correct to call them noises. They differ from each other in height, duration, volume of sound over different areas of the heart, and most importantly-the silent pauses that separate them from each other: large (0.43 seconds) and small (0.2 seconds). When listening to the heart at the top, we hear the first tone (a short and strong sound), a short pause, a weaker and shorter second tone, and a long pause. In their origin, heart tones are the sum of various sound phenomena. The first tone of the heart is the most complex in terms of the mechanism of occurrence. It consists of four pairs of components: atrial (end of the atrial systole); valvular (closing (or straining) of the atrioventricular valves and opening of the semilunar valves of the aorta and pulmonary trunk); muscular (contraction of the ventricles); vascular (vibration of the walls of the initial part of the aorta and pulmonary artery under the influence of blood coming from the ventricles). The main components of the first tone are the second and third. The first and fourth components are low-frequency and practically do not listen. All these sounds occur almost simultaneously during ventricular systole and therefore merge into one sound, called the systolic tone. It lasts 0.11-0.16 seconds. It should also be noted that during auscultation at the apex of the heart, where the I tone normally has the maximum volume, we hear mainly vibrations associated with the closure of the mitral valve, which occurs due to its close location to this point. The second tone of the heart-is formed from two pairs of components of the closure of the semilunar valves of the aorta and the pulmonary artery( the main component); fluctuations of the vessels when blood moves through them. In the formation of the final part of the second tone, vibrations associated with the opening of the atrioventricular valves also take part, which, however, due to their low frequency, are practically not heard normally (in pathology, we hear the tone of the opening of the mitral valve, which will be discussed below). The sequence of" work " of the valves in the formation of tone II is as follows: closing of the aortic valves, closing of the pulmonary artery valves, opening of the tricuspid valve and then the mitral valve. It lasts 0.072 seconds and is called a diastolic tone, because it coincides with the beginning of diastole. In normal and pathological conditions, it is possible to listen to the third tone of the heart. The origin of the third tone is associated with the filling of the ventricles with blood in the diastole and is explained by fluctuations in the walls of the ventricle that occur suddenly, when the walls are stretched by blood flowing during the diastole (M. M. Gubergritz, 1933; A. L. Myasnikov, 1951). It is heard 0.12-0.18 seconds after the second tone in the protodiastole. It is formed due to the expansion of the walls of the ventricles, mainly the left, with the rapid entry of the first portion of blood from the atria into them. It is caught better in the supine position, especially when pressing on the liver area. The fourth tone of the heart-is practically captured only with the help of FKG. When auscultating heart tones, they are differentiated by volume (clarity, strength), frequency, rhythm, timbre color, and also note the appearance of additional tones. During auscultation of a healthy heart, the tones at all auscultative points are heard quite clearly and clearly. In pathology, the sonority of the heart tones may change, which makes it difficult to determine the I and II tones during auscultation. The strength of the heart tones can increase and decrease, and the changes can be heard both on the entire heart at the same time, and on individual valves. The reasons for the change in the strength of the tones may lie in the heart itself and in the surrounding organs and tissues. Weakening of both heart tones: Strengthening of both heart tones: The simultaneous change in the sonority of the tones is not essential for the diagnosis of damage to the heart itself. An isolated change in the strength of tone I or II is of greater diagnostic significance. In the diagnosis, this is given great semiological importance. The first tone is evaluated at the top of the heart in comparison with the second tone. The I tone is considered weakened if it is equal to or quieter than the II tone. The timbre of the heart tones. The change in the timbre of the heart tones is of great diagnostic importance. This is understood as a change in the character, color tone. The causes may be most often lesions of various layers of the heart, to a lesser extent-extracardial factors. The most important changes in the tone timbre are the following: the clapping first tone at the top of the heart in mitral stenosis. The first tone is not only amplified, but also takes on a special crackling tone, reminiscent of the sound of a flag flapping in the wind. A peculiar flapping shade, obtained from the vibrations of the sclerosed mitral valve flaps. The metallic hue of both heart tones, especially the first, occurs if there is a resonating cavity near the heart (with the tip) - a pneumothorax, a smooth-walled cavern, a stomach swollen with gases. The metallic shade of the second tone simultaneously with its accent occurs in atherosclerosis of the aorta. A dull first tone is noted in diffuse myocardial lesions (acute myocarditis, acute infections). At the same time, in some cases, deafness is not accompanied by a weakening of the tone, but even its strengthening is noted. This is called a dull-drum first tone (found in some myocarditis). "Velvety tone" occurs in current endo - and myocarditis. The velvety tone, mainly, has a rheumatic etiology and is particularly soft (L. F. Dmitrienko). The timbre of this tone resembles the sound of a drumstick hitting tightly stretched velvet.

The rattling first tone (according to M. M. Gubergritz) does not represent a single sound, but rather breaks down into separate components. The sound is similar to the rattling of a glass object. It is heard in functional myocardial lesions in persons suffering from neurasthenia, who have suffered acute infections. Bifurcation and splitting of tones. In auscultation, sometimes instead of one tone, two short tones are heard, quickly following each other, (bifurcation). The splitting of tones is not perceived auscultatively and a small interval between the components of the tone is detected on the FKG. The amplification of the third and fourth tones in combination with tachycardia (about 100 beats per minute) forms the rhythm of the gallop, as it resembles the trampling of a galloping horse. The rhythm of the gallop is better heard with direct auscultation by the ear. According to the time of the appearance of an additional tone in diastole, protodiastolic, mesodiastolic and presystolic gallop are distinguished. The protodiastolic rhythm of the gallop occurs with a significant decrease in the tone of the ventricular myocardium. At the same time, filling with blood at the beginning of the diastole is accompanied by a faster stretching of their walls and the appearance of sound vibrations, perceived as an additional third tone, which occurs after 0.12—0.20 seconds. The presystolic rhythm of the gallop is more often of atrial origin. It occurs when the fourth tone is amplified due to overflow and hypertrophy of the atria with its increased contraction. It is better detected when atrioventricular conduction slows down, when the atrial systole is separated from the ventricular systole with a long period of time. Sometimes in pathological conditions, both tones (the third and fourth) are significantly amplified, but in tachycardia they merge and are found in the middle of the diastole as a single gallop tone-the mesodiastolic (summed) rhythm of the gallop. The gallop rhythm is an important sign of myocardial weakness and has great diagnostic and prognostic value. It appears in patients with myocardial infarction, myocarditis, decompensated heart disease. A characteristic feature of gallop rhythms is the correct, three-part, two-quarter rhythm against the background of tachycardia. The "gallop rhythm" is found better at the top of the heart or in the III-IV intercostal space on the left side of the sternum. The three-membered rhythm is also the rhythm of the quail, which is heard at the top of the heart of patients with mitral stenosis. Auscultatively, the quail's rhythm is perceived as an apparent bifurcation of the second tone. From the true bifurcation of the second tone, it is distinguished by the presence of an additional tone in the protodiastole (the tone of the opening of the mitral valve). It appears after 0.07 -, 12 seconds from the beginning of the second tone. Under normal conditions, the mitral valve flaps open silently. In mitral stenosis, sclerosed valves that have fused at the edges of the leaflet cannot completely move away to the walls of the ventricle, so when a jet of blood flows from an overflowing atrium hits the valve, it causes additional sound vibrations. In contrast to true bifurcation of the second tone, the tone (click) of the opening of the mitral valve is better heard at the top of the heart, rather than at the base. It is characterized by constancy and is combined with other auscultative signs of stenosis. The tone of the opening of the mitral valve, heard together with the loud (clapping) first tone, characteristic of mitral stenosis, and the second tone, forms the rhythm of a quail, since it resembles the cry of a quail ("it's time to sleep"). You need to be able to clearly differentiate the physiological three-part rhythm (heart rate with a normal III tone) from the pathological rhythm of the gallop and from the bifurcation of the II tone or the tone of the opening of the mitral valve in mitral stenosis. Unlike the last sound phenomena, the three-part physiological rhythm is not characterized by the accent of the second tone on the pulmonary artery (I. A. Kassirsky, G. I. Kassirsky, 1964). When the mitral valve prolapses into the systole, an additional tone ("systolic click") can be heard, when its flaps "fall" into the cavity of the left atrium. Almost half of patients with constrictive pericarditis have a three-part heart rhythm due to an additional tone in the protodiastolic pause. Diagnostic significance has long been attached to this feature (Skoda, 1852; Friedreich, 1864). French authors have described it as bruit de galop postsystolique-the tone of a postsystolic gallop. In English-speaking countries, the tone of the throw is known as pericardial knock, which means "pericardial knock" or "short kick". In nature, the sound resembles a short click or a dry knock. It appears only in patients with severe compression of the heart or with gross extrapericardial splices (Z. M. Volynsky, E. E. Gogin, 1964).

**Form of organization of the lecture:** explanatory, traditional.

**Teaching methods used in the lecture:** verbal, visual.

**Training tools:**

- didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector).

**Lecture № 7**

**Topic:** Methods of patient research. Auscultation. Auscultation of the heart. Noise (mechanism of formation, diagnostic value).

**Purpose:** To introduce the technique of auscultation of the heart, listening to heart murmurs.

**Lecture Summary:** Noises are usually divided into: intracardial: organic (valvular, muscular) and functional (rapid, anemic, dystonic); extracardial: pericardial, pleurocardial. Organic noises occur with organic lesions of the heart, functional-with a violation of the function, i.e., not related to the defeat of the valves of the valves. Intracardial noises are more often caused by organic changes in the valves or the heart muscle. Organic changes in the heart valves are represented by two variants: narrowing of the hole with difficulty in passing blood through it (stenosis of the hole); inability of the valve apparatus to close the hole (valve insufficiency). With stenosis, the valve flaps are fused (the opening is reduced), which makes it difficult for blood to pass into the ventricle of the heart or blood vessels. Therefore, when the blood passes through the narrowed opening, its turbulent movement occurs, creating a noise of pushing (expulsion). In case of insufficiency, the shrunken and shortened flaps do not completely cover the opening, and the blood rushes past the damaged valves in the opposite direction – there is a noise of regurgitation (reverse current). Organic sounds include muscle noises. Muscle noise occurs when the papillary muscles are affected. When listening to noise, it is necessary to determine: its relation to the phases of the cardiac cycle (systole or diastole); its nature (strength, duration, timbre); the place of the best listening (punctum maximum); the direction of its conduction, irradiation (outside the heart area). Noises that occur during systole (between I and II tones) are called systolic, and between II and I tones - diastolic. Functional noises. Organic noise must be distinguished from functional noise. Their appearance is associated with a shortening of the blood flow in tachycardia, a decrease in blood viscosity in anemia, a violation of the function of the papillary muscles or a stretching of the mitral valve ring in the expansion of the left ventricle of any etiology. Most functional noises are systolic and are best heard at the apex of the heart and above the pulmonary artery. Functional noises are always soft, heard only in the initial part of the ventricular systole, which is especially clearly visible on the phonocardiogram. They are not permanent, they are not held anywhere. Functional noises after physical activity, most often, are amplified. The main differential sign is not combined with a change in heart tones (i.e., there is no "music of vice"). Extracardial noises: pericardial friction noise-occurs in the presence of inflammation of the pericardial leaves with the deposition of fibrin (dry pericarditis). It can be of different intensity (from gentle to very rough), can be heard in both systole and diastole, can change the localization. It is better heard in the zone of absolute dullness and at the base of the heart, is not carried out in other areas and is amplified when the trunk is tilted forward, pressed with a stethoscope, sometimes determined by palpation. The noise of the" working " breast during lactation. Pleurocardial noises in dry pleurisy in the area of the pleura adjacent to the heart. The contraction of the heart increases the contact of the pericardium and pleura, which contributes to the appearance of friction noise. It is distinguished from the noise of pericardial friction by its amplification during inspiration and localization along the left contour of the heart. Cardiopulmonary noises are observed in cases of an enlarged heart and a large amplitude of its contraction. They are heard along the anterior edge of the pulmonary fields – where the latter border on the heart. During the emptying of the heart, its volume decreases, as a result of which a negative pressure appears near the heart. This space is filled by the lungs; the air entering them from the bronchi produces a noise that is synchronous with the cardiac systole. The noise increases during inspiration, in contrast to intracardiac, which weakens during inspiration.

**Form of organization of the lecture:** explanatory, traditional.

**Teaching methods used in the lecture**: verbal, visual.

**Training tools:**

- didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector).

**Module № 2 Laboratory and instrumental research methods**

**Lecture № 1.**

**Topic:** Complete clinical examination of patients with diseases of the cardiovascular system. Methods of functional diagnostics of the circulatory system. Modern invasive and non-invasive methods of examination of the heart and blood vessels (catheterization of the heart and blood vessels, ultrasound, radionuclide, tomographic methods). Functional tests.

**Purpose:** To introduce modern functional methods of heart and vascular research.

**Lecture Summary:** The main methods of studying the functional state of the cardiovascular system can be divided into invasive and non-invasive. Invasive methods are associated with catheterization of the heart and blood vessels.The indication for catheterization is the need to recognize heart and vascular diseases when it is not possible to do this on the basis of other methods, as well as the need to determine the features and degree of hemodynamic disorders with a known diagnosis. Cardiac catheterization is performed in patients of any age. Contraindications for the study are: severe heart failure, infectious and colds, serious heart rhythm disorders.

After the catheter is inserted into the heart or large vessels, along with the measurement of pressure and other parameters, an X – ray contrast study of the heart and blood vessels-angiocardiography-is performed. In angiocardiography, the catheter should be installed in such a way that the contrast agent ejected in a short period of time immediately fills the area of interest of the heart and vessel. Coronarography provides an opportunity to assess the anatomy of the coronary vessels that feed the heart muscle during life. The method allows us to obtain a quantitative characteristic of the prevalence and severity of atherosclerotic lesions of the coronary arteries, the presence of signs of thrombosis, dynamic narrowing of the coronary arteries. Clinical use of coronary angiography involves pre-and postoperative examination of patients. This method allowed us to draw a conclusion about the relationship between morphological changes in the coronary arteries and their clinical manifestations. Thus, it was found that approximately 90% of patients suffering from typical angina attacks have a pronounced stenosis or occlusion of one of the main coronary arteries. In various publications, both in our country and abroad, more than 60 methods or basic modifications of methods of non-invasive studies of the heart and blood vessels are described. If you try to classify them, you can distinguish the following groups. Graphic methods for recording the electrical activity of the heart (electrocardiography, vector electrocardiography, variational heart rate monitoring). Graphic methods for recording the mechanical activity of the heart (phonocardiography, kinetocardiography, apexcardiography, determination of the heart rate, phase analysis of the cardiac cycle, etc.). Methods for studying the vascular system, blood pressure, blood flow time, and physical performance. In recent years, methods of direct visualization of the heart and blood vessels (echocardiography, radionuclide methods, tomographic methods) have been greatly developed. The method of echocardiography is based on ultrasound location of the structures of the heart and blood vessels. When performing echocardiography, the sensor is placed in the place of direct contact of the heart with the anterior chest. With the help of echocardiography, you can get an idea of the anatomical and functional changes of the heart and blood vessels. The advantages of the method are its availability, safety for the patient, the possibility of repeated use for dynamic monitoring, and the relative cheapness compared to other methods of visualization of the heart and blood vessels. The disadvantage is the limited depth of penetration of the ultrasonic beam, the impossibility of its passage through the air-containing structures. Radionuclide studies of the heart and blood vessels are carried out using gamma cameras with a resolution of up to 3-5 mm, which allows you to get an image of not only the heart, but also large vessels; radiopharmacological preparations, among which the leading place belongs to the isotopes of thallium and technetium; computers that provide the ability to record individual phases of the cardiac cycle with 20 frames per heart contraction. To study the blood supply to the myocardium, the method of choice is perfusion scintigraphy of the myocardium with thallium and technetium. Thallium, being a biological analogue of potassium, has the ability to quickly leave the vascular bed after intravenous administration and accumulate in cells, including the myocardium. In patients with myocardial infarction, a defect in the absorption of the indicator, corresponding to the localization of the infarction zone, is determined already on the first day of the disease. Another approach is based on the use of technetium, which is tropic to necrotically altered myocardium. It accumulates in the focus of myocardial infarction in a high concentration, which provides high-quality images of the affected tissue. To study the contractile function of the myocardium, the method of radionuclide ventriculography, based on intravenous administration of an isotope of iodine, is used. As a result, information is obtained about the volume of circulating blood, the shock, minute volume of blood ejection from the heart, the time of blood flow in the small circle of blood circulation and the volume of circulating blood in the lungs. The method can be used with physical activity. Positron emission tomography, based on the use of preparations labeled with positron ultrashort-lived radionuclides, is one of the most advanced methods. Positron emission tomography is a method of in vivo study of organ and tissue blood flow and metabolism of organs, including the heart. For this purpose, isotopes of oxygen, nitrogen, carbon, and fluorine are used. The distribution of the radiopharmacological drug is recorded by obtaining a series of tomographic sections in any projection, which makes it possible not only to determine the absolute value of the indicator concentration in the tissue, but also to assess the state of metabolism locally in different parts of the myocardium. The high cost of the equipment limits the use of the method. For a long time, X-ray computed tomography, widely used for the visualization of internal organs, was practically not used for the study of the heart and blood vessels, which was due to insufficient resolution, the need to synchronize the image with electrocardiography. Currently, X-ray computed tomography is widely used to assess morphological changes. Nuclear magnetic resonance imaging is based on the effect of magnetic fields on a person. The computer-generated image reflects parameters such as the density of hydrogen protons, relaxation time, and blood flow rate. The resolution of the method is very high. So, for example, the differences in the magnitude of the signal in the right and left ventricles are determined due to different blood oxygen saturation. You can get an image of moving blood and the vascular wall, especially when it is affected. Very well recorded atherosclerotic plaques in large vessels. The advantage is the image of a myocardial infarction without contrast agents. The disadvantages of the method are the relatively low time resolution associated with a long period of image processing; the influence of the tomography itself on the patient, especially with cardiac arrhythmias; the use of substances with paramagnetic properties, due to their pronounced toxicity. History of the development of invasive research methods. Indications and contraindications for cardiac and vascular catheterization. Methods of catheter access to different parts of the heart. Angiocardiography. Coronarography. Ventriculography. Daily monitoring of blood pressure and ECG.

**Form of organization of the lecture:** explanatory, traditional.

**Teaching methods used in the lecture:** verbal, visual.

**Training tools:**

- didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector).

**Lecture №2.**

**Topic:** Complete clinical examination of patients with diseases of the respiratory system. Methods of functional diagnostics, laboratory and instrumental methods of research.

**Purpose:** To introduce laboratory and instrumental methods of studying the respiratory system.

**Abstract of the lecture:** Instrumental methods of research of respiratory organs. X-ray examination. For the study of the respiratory organs, chest X-ray, X-ray, tomography, bronchography and fluorography are used.

Roentgenoscopy of the lungs is the most common method of investigation that allows you to determine the transparency of the pulmonary fields, detect foci of compaction (infiltrates, pneumosclerosis, neoplasms) and cavities in the lung tissue, foreign bodies of the trachea and bronchi, detect the presence of fluid or air in the pleural cavity, as well as gross pleural adhesions and mooring. Radiography is used for the purpose of diagnosing and registering on the X-ray film the pathological changes in the respiratory organs detected during radioscopy; some changes (blurred focal seals, bronchovascular pattern, etc.) are determined better on the radiograph than on radioscopy.

Tomography allows you to perform a layer-by-layer X-ray examination of the lungs. It is used for more accurate diagnosis of tumors, as well as small infiltrates, cavities and caverns. Bronchography is used to study the bronchi. The patient, after preliminary anesthesia of the respiratory tract, is injected into the lumen of the bronchi with a contrast agent (yodolipol), which delays X-rays. Then X-rays of the lungs are made, on which a clear image of the bronchial tree is obtained. This method allows you to detect bronchiectases, abscesses and cavities of the lungs, narrowing of the lumen of the bronchi by a tumor Fluorography is a type of X-ray examination of the lungs, in which a photograph is taken on a small-format reel film. It is used for mass preventive examination of the population.

Endoscopic examination. Endoscopic methods of examination include bronchoscopy and thoracoscopy. Bronchoscopy is used to examine the mucous membrane of the trachea and bronchi of the first, second and third order. Bronchoscopy is the most important method of diagnosing purulent and neoplastic diseases of the respiratory system.

It is produced by a special device-a bronchofibroscope. Special forceps are attached to the bronchoscope for biopsy, extraction of foreign bodies, removal of polyps, photo attachment, etc. Before the introduction of the bronchoscope, the upper respiratory tract mucosa is anesthetized with a 1% solution of dicaine. The bronchofibroscope is then inserted through the mouth and glottis into the trachea. The examiner examines the mucous membrane of the trachea and bronchi. With the help of special forceps on a long handle, you can take a piece of tissue from a suspicious area (biopsy) for histological and cytological examination, as well as photograph it.

Bronchoscopy is used to diagnose erosions and ulcers of the bronchial mucosa and tumors of the bronchial wall, extract foreign bodies, remove bronchial polyps, treat bronchiectatic disease and centrally located lung abscesses.

In these cases, through the bronchofibroscope, the purulent contents are first sucked out, and then antibiotics are injected into the lumen of the bronchi or the cavity.

Thoracoscopy is performed with a special device-a thoracoscope, which consists of a hollow metal tube and a special optical device with a light bulb; it is used to examine the visceral and parietal pleura and to separate the pleural adhesions that prevent the imposition of artificial pneumothorax (with cavernous pulmonary tuberculosis). Methods of functional diagnostics.

Methods of functional research of the external respiratory system are of great importance in the comprehensive examination of patients suffering from diseases of the lungs and bronchi.

All these methods do not allow you to diagnose the disease that led to respiratory failure, but they make it possible to identify its presence, often long before the first clinical symptoms appear, to establish the type, nature and severity of this insufficiency, to trace the dynamics of changes in the functions of the external respiratory system during the development of the disease and under the influence of treatment.

Determination of lung ventilation parameters. Indicators of pulmonary ventilation do not have strict constants: for the most part, they are not only determined by the pathology of the lungs and bronchi, but also depend to a large extent on the constitution and physical training, height, body weight, gender and age of a person. Therefore, the obtained data is evaluated in comparison with the so-called proper values, which take into account all these data and are the norm for the studied person. Proper values are calculated by nomograms and formulas, which are based on the determination of the proper basic exchange.

Measurement of lung volumes. The most common, although not sufficiently accurate, indicators of pulmonary ventilation are the so-called lung volumes. There are the following lung volumes. Respiratory volume (RV) — the volume of air inhaled and exhaled during normal breathing, equal to an average of 500 ml (with fluctuations from 300 to 900 ml). Of this, about 150 ml is the volume of the so-called functional dead space air (FDSA-functional dead space air) in the larynx, trachea, and bronchi, which does not participate in gas exchange. However, it should not be forgotten that in the FDSA, mixing with the inhaled air, moistens and warms it; this is the physiological role of the FDSA. Reserve volume of exhalation (RVE) —the volume of air equal to 1500-000 ml, which a person can exhale if he makes a maximum exhalation after a normal exhalation. Reserve volume of inspiration (RVI) —the volume of air equal to 1500-000 ml, which a person can inhale if he takes the maximum breath after a normal breath. The vital capacity of the lungs (VCL), equal to the sum of the reserve volumes of inspiration and exhalation and the respiratory volume (on average 3700 ml), is the volume of air that a person is able to exhale with the deepest exhalation after the maximum inhale. One of the ways to calculate the proper VCL is the Anthony method, according to which the value of the proper basic exchange (calculated from the tables) is multiplied by an empirically derived coefficient of 2.3. The deviation from the proper VCL calculated by this calculation should not exceed 15%. Residual volume (ResV), equal to 1000-500 ml, the volume of air remaining in the lungs after the maximum exhalation. The total (maximum) lung capacity (MLC) is the sum of the RV, RVE, RVI and ResV and is 5000-6000 ml. The study of lung volumes allows us to assess the possibility of compensating for respiratory failure by increasing the depth of breathing through the use of reserve and additional lung volumes. RV is normally about 15% of the VCL; RVI and RVE—2-3% (in this case, the RVI usually slightly exceeds the RVE); ResV accounts for approximately 33% of the VCL. In patients with obstructive ventilation insufficiency, the VCL decreases slightly, but the RVE and ResV increase due to a decrease in the RVI.

Thus, ResV (especially its relation to MLC) increases, reaching in some cases 50% of MLC, in emphysema, bronchial asthma, to a lesser extent—in old age.

In patients with restrictive ventilation insufficiency, the VCL also decreases due to a decrease in the RVI, the residual volume changes little.

 Spirography. The most reliable data are obtained by spirography. In addition to measuring lung volumes, a spirograph can be used to determine a number of additional ventilation indicators: respiratory and minute ventilation volumes, maximum lung ventilation, forced exhalation volume.

Using a spirograph, you can also determine all the indicators for each lung (using a bronchoscope, bringing air separately from the right and left main bronchi — "separate bronchospirography"). The presence of an absorber for carbon monoxide (IV) allows you to determine the absorption of oxygen by the lungs of the subject in a minute. Study of the intensity of pulmonary ventilation.

The minute volume of respiration (MOD) is determined by multiplying the respiratory volume by the respiratory rate; on average, it is equal to 5000 ml. More precisely, it can be determined using the Douglas bag and spirograms. Maximum ventilation of the lungs (MVL предел limit of respiration≫) — the amount of air that can be vented by the lungs at the maximum tension of the respiratory system. It is determined by spirometry with the deepest possible breathing at a frequency of about 50 per minute, normally equal to 80-100 l / min. The respiratory reserve (RR) is determined by the formula RR = MLC-MRV. Normally, the RR exceeds the MRV by at least 15times. In healthy individuals, the RR is equal to 85% of the MLC, with respiratory failure it decreases to 60-65% or lower. This value largely reflects the functional capabilities of the respiratory system of a healthy person with a significant load or a patient with a pathology of the respiratory system to compensate for significant respiratory failure by increasing the minute volume of breathing.

All these tests allow us to study the state of pulmonary ventilation and its reserves, the need for which may arise when performing heavy physical work or with respiratory diseases.

Study of the mechanics of the respiratory act. Allows you to determine the change in the ratio of inspiration and exhalation, respiratory effort in different phases of breathing, and other indicators. Expiratory forced vital capacity of the lungs (EFVCL) is investigated by the Votchal-Tiffno.

The measurement is carried out in the same way as when determining the VCL, but with the fastest, forced exhalation.

EFVCL in healthy individuals is 8-1% (100-00 ml) less than VCL, mainly due to increased resistance to air flow in small bronchi.

In the case of an increase in this resistance (in bronchitis, bronchospasm, emphysema, etc.), the difference between FVCL and VCL increases to 1500 ml or more. The volume of forced exhalation in 1 s (FVCL) is also determined, which in healthy individuals is on average 82.7% of the VCL, and the duration of forced exhalation until its sharp deceleration; this study is carried out only with the help of spirography.

The use of bronchodilators (for example, theophedrine) during the determination of EFVCL and various variants of this test allows us to assess the significance of bronchospasm in the occurrence of respiratory failure and a decrease in these indicators: if after taking theophedrine, the obtained sample data remain significantly lower than normal, then bronchospasm is not the reason for their decrease. Pneumotachometry is a method of measuring the "peak" air flow rates during forced inhalation and exhalation; it allows you to assess the state of bronchial patency.

Pneumotachography is a method of measuring the volume velocity and pressure that occur in different phases of breathing (calm and forced). It is carried out with the help of a universal pneumotachograph. The principle of the method is based on the registration of pressures changing in connection with the respiratory cycle at different points of the air jet movement. Pneumotachography allows you to determine the volume velocity of the air flow during inhalation and exhalation (normally with calm breathing it is 300-00 ml/s, with forced breathing-5000-000 ml / s), the duration of the phases of the respiratory cycle, Minute respiratory volume, intra-alveolar pressure, the resistance of the airways to the movement of the air jet, the extensibility of the lungs and chest wall, the work of breathing and some other indicators. The study of blood gases is carried out as follows. Blood is obtained from the wound from the injection of the skin of a heated finger (it is proved that the capillary blood obtained in such conditions is similar in its gas composition to arterial blood), collecting it immediately in a beaker under a layer of heated vaseline oil to avoid oxygen oxidation of the air.

Pleural puncture is used to determine the nature of the pleural fluid in order to clarify the diagnosis, as well as to remove the fluid from the pleural cavity and (if necessary) the subsequent administration of drugs into it.

During the puncture, the patient sits on a chair, facing the back, with his arms crossed on his chest. Before the puncture, treatment with an alcoholic solution of iodine and local anesthesia of the intended puncture site are performed. The puncture is made along the posterior axillary line in the zone of maximum dullness of the percussion sound, which is previously determined by percussion, usually in the seventh or eighth intercostal space along the upper edge of the underlying rib, since intercostal vessels pass along the lower edge. For a test puncture, use a 10 ml syringe with a fairly thick and long needle impaled on it, and for extracting a large amount of liquid, use a Poten device or an electric pump. When the needle enters the pleural cavity, there is a feeling of "free space"; sometimes an obstacle is felt during the puncture, which is usually associated with a thickening of the pleura. For diagnostic purposes, they take 50-50 ml of liquid and send it to physico-chemical, cytological and bacteriological studies.

In the case of accumulation of a significant amount of fluid in the pleural cavity, 800-200 ml is removed for therapeutic purposes. Removal of more fluid from the pleural cavity leads to a rapid displacement of the mediastinal organs in the affected side and may be accompanied by collapse. After removing the needle, the puncture site is lubricated with a 5% alcohol solution of iodine. Laboratory research methods

Examination of sputum.

Sputum is a pathological discharge of the respiratory system, ejected when coughing. The composition of sputum may include mucus, serous fluid, blood and respiratory tract cells, protozoa, rarely helminths and their eggs. The study of sputum helps to establish the nature of the pathological process in the respiratory organs, and in some cases to determine its etiology.

Sputum for the study should be taken in the morning, fresh, if possible before meals and after rinsing the mouth. Only for the detection of mycobacterium tuberculosis, sputum can be collected within 1 day (if the patient secretes little of it). In stale sputum, the saprophytic microflora multiplies, the shaped elements are destroyed. To collect sputum, use special jars (spittoons) with screw-down lids and dimensional divisions.

The study of sputum begins with its examination first in a transparent jar, and then in a Petri dish, which is placed alternately on a black and white background. Note the following signs. The nature, color and consistency of sputum.

Mucosal sputum is usually colorless, viscous, and occurs in acute bronchitis. Serous sputum is also colorless, liquid, foamy, observed with pulmonary edema. Mucopurulent sputum is yellow or greenish, viscous, occurs in chronic bronchitis, tuberculosis, etc. Purely purulent sputum is homogeneous, semi-liquid, greenish-yellow, characteristic of a lung abscess when it breaks.

Bloody sputum can be either pure blood with pulmonary bleeding (tuberculosis, cancer, bronchiectasis), or mixed, for example, mucopurulent with blood veins (with bronchiectasis), serous-bloody foamy (with pulmonary edema), mucopurulent (with a lung infarction or stagnation in the small circulatory system), purulent-bloody, semi-liquid, brownish-red gray (with gangrene and lung abscess). If the blood from the respiratory tract is not released immediately, but lingers in them for a long time, its hemoglobin turns into hemosiderin and gives the sputum a rusty color (characteristic of croup pneumonia). Microscopic examination of sputum. It is produced in both native and colored preparations. For the first, purulent, bloody, crumbly lumps, twisted white threads are selected from the material poured into the Petri dish and transferred to the slide in such an amount that a thin translucent preparation is formed when covered with a cover glass.It is viewed first at low magnification for the initial orientation and search for Kurschmann spirals, and then at high magnification to differentiate the shaped elements. Kurschmann spirals are strands of mucus consisting of a central dense axial thread and a spiral-like mantle enveloping it, which is interspersed with white blood cells (often eosinophilic) and Charcot—Leyden crystals. Kurshman spirals appear in sputum with bronchial spasm, most often with bronchial asthma, less often with pneumonia, lung cancer. With a large increase in the native preparation, white blood cells can be detected, a small number of which is present in any sputum, and a large number - in inflammatory and especially suppurative processes; eosinophils can be distinguished in the native preparation by a uniform large shiny grain, but it is easier to recognize them when coloring.

Red blood cells appear when lung tissue is destroyed, pneumonia, congestion in the small circle of blood circulation, lung infarction, etc. The squamous epithelium enters the sputum mainly from the oral cavity and has no diagnostic value. Cylindrical ciliated epithelium is present in a small amount in any sputum, in a large amount-in respiratory tract lesions (bronchitis, bronchial asthma). Alveolar macrophages are large cells (2 times larger than white blood cells) of reticulohistiocytic origin. Their cytoplasm contains abundant inclusions. They can be colorless (myelin grains), black from coal particles (dust cells) or yellow-brown from hemosiderin (heart defect cells, siderophages). Alveolar macrophages are present in small amounts in any sputum, their content increases in inflammatory diseases. Cells of heart defects occur when red blood cells enter the alveolar cavity (with stagnation in the small circle of blood circulation, especially with mitral stenosis, lung infarction, as well as with croup pneumonia and hemosiderosis). For a more reliable determination, they put the so— called reaction to Prussian blue: a little sputum is placed on a slide, 1 — drops of a 5% solution of yellow blood salt are poured, after 2 minutes —the same amount of a 2% solution of hydrochloric acid, mixed and covered with a cover glass. After a few minutes, the hemosiderin grains turn blue.

**Form of organization of the lecture:** explanatory, traditional.

**Teaching methods used in the lecture:** verbal, visual.

**Training tools:**

- didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector).

**Module No. 3 Clinical syndromes in therapeutic practice**

**Lecture №. 1.**

**Topic:** Pulmonary syndromes: bronchial obstruction and inflammatory infiltration, respiratory failure, pulmonary heart, lung cavity, fluid and gas in the pleural cavity, atelectasis. Pneumonia is focal and lobar. Abscess and lung cancer.

Purpose: To introduce the syndromes in the pathology of the respiratory system and their example with the symptomatology of the most common diseases that occur in a typical classical form.

Abstract of the lecture: The main symptoms of lung pathology are shortness of breath, cough, hemoptysis, chest pain, and attacks of suffocation. Shortness of breath can be a subjective sensation or confirmed objectively (changes in the frequency, rhythm, depth of breathing, duration of the phases of inspiration and exhalation). By nature, it can be inspiratory (difficult to inhale), expiratory (difficult to exhale) and mixed, associated with any cause (for example, with physical exertion). There are pathological shortness of breath associated with diseases of the respiratory system, cardiovascular system, central nervous system, etc.; and physiological-with nervous overstrain, physical exertion. Extreme shortness of breath, sometimes to the point of asphyxia (inability to breathe), is suffocation. Suffocation, which occurs in the form of a sudden attack, is called asthma. It is necessary to find out how the patient relieves this attack, its duration, connection with cough, sputum discharge. In the presence of cough, it is necessary to specify the time of its appearance (day, night, etc.), the nature (constant or paroxysmal), intensity (strong, light, coughing), productivity (dry or with sputum), the amount of sputum and its nature (mucous, purulent, bloody, etc.), color, smell, taste, as well as some features (for example, sputum discharge "full mouth", in a certain position of the body, etc.); causes that cause or increase cough (unpleasant smell, physical activity, etc.), which is accompanied by a cough (choking, nausea, vomiting), which reduces or disappears cough (clean air, taking medications). Hemoptysis is the discharge of blood with sputum during coughing. It is necessary to find out its cause, the connection with physical exertion, cough, etc.; the amount of blood released, its color, the uniformity of sputum staining. In case of chest pain, it is necessary to clarify the localization, nature, intensity, irradiation, connection with the act of breathing, coughing, and movements of the trunk. In diseases of the respiratory system, chest pain, as a rule, depends on the irritation of the pleura, especially the costal and diaphragmatic, increases with deep breathing, coughing; accurately localized by the patient. But there are also superficial pains, in the recognition of which palpation helps. The main clinical manifestations of bronchial obstruction. Obstructive respiratory failure associated with upper respiratory tract obstruction (foreign body of the upper respiratory tract), persistent generalized obstruction (bronchitis), and periodic generalized obstruction (bronchial asthma). Types of infiltration of lung tissue (inflammatory, tumor, eosinophilic). Clinical manifestations of the lung cavity syndrome on the example of a lung abscess. Options for changing the clinical picture depending on the location, size of the abscess, the possibility of its drainage. The syndrome of the presence of fluid in the pleural cavity. The syndrome of the presence of gas in the pleural cavity, types of pneumothorax (closed, open, valvular). Changes in the clinical picture depending on the type of pneumothorax. Obturation atelectasis syndrome (complete and incomplete). Features of physical research methods and emergency care for pulmonary syndromes.

Form of organization of the lecture: explanatory, traditional.

Teaching methods used in the lecture: verbal, visual.

Training tools:

- didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector).

**Lecture №2**

**Topic:** Cardiac syndromes. Cardiac arrhythmias, blockages. Acute and chronic heart failure syndrome. Pulmonary heart.

**Purpose:** To introduce the syndromes in the pathology of the circulatory system and their example with the symptomatology of the most common diseases that occur in a typical classical form.

**Abstract of the lecture:** The history of the development of the doctrine of heart failure, the role of G. F. Lang, R. G. Mezhebovsky and the Orenburg School of Cardiology. Etiology and classification of heart failure. Pathogenesis of systolic and diastolic heart failure.Clinical picture of chronic heart failure with typical multi-organ changes. Classification of chronic heart failure according to the OSS (2010) with the allocation of stages and functional classes according to diagnostic criteria. Acute left ventricular heart failure. Etiology, pathogenesis, main clinical manifestations, emergency care (principles of provision). Acute right ventricular heart failure as an example of pulmonary artery branch thromboembolism, emergency care. The main clinical features of chronic pulmonary heart disease. The main complaints are shortness of breath, attacks of suffocation, palpitations, a feeling of "heart failure", pain in the heart, cough, swelling. Common complaints include weakness, fatigue, headache, tinnitus or in the head, a tendency to dizziness when blood pressure rises, and an increase in body temperature.In the presence of shortness of breath, it is necessary to clarify its relationship with physical exertion or mental stress, the nature (paroxysmal or constant), at what time of day it occurs more often, what the patient takes to improve well-being. From shortness of breath, it is necessary to distinguish an attack of suffocation – cardiac asthma-which usually occurs suddenly at rest, often at night, during sleep, sometimes against the background of existing shortness of breath. Under the heartbeat, we understand the increased and rapid contractions of the heart and find out their connection with physical exertion, psychoemotional stress, which happens in healthy people; or with the appearance at rest, when the heartbeat characterizes the defeat of the heart muscle in myocarditis, heart defects, etc. Palpitations can occur with hyperthyroidism, anemia,fever, and certain medications. With pain in the heart area, it is necessary to find out the causal relationship with physical exertion or mental stress, the amount of exercise performed without pain, the localization, nature and duration of pain, their irradiation, concomitant sensations (weakness, sweating), what the patient takes to stop the attack, whether there was an aggravation of the attack against the background of taking a constant dose of painkillers. You should pay attention to the localization of pain (behind the sternum with angina, throughout the heart area with pericarditis), the intensity of pain-the difference between an attack of angina and a myocardial infarction. The cause of coughing in heart diseases is most often stagnation of blood in the small circle of blood circulation. Usually the cough is dry, but there may be hemoptysis. Edema occurs with severe heart damage. Find out the time of the appearance of edema (in the evening or in the morning), localization (on the ankles, back of the feet, on the shins), what diuretics the patient uses. Acute heart failure (cardiac asthma or pulmonary edema) develops with a sharp decrease in the contractility of the myocardium and an increase in the load on the left ventricle and is accompanied by a decrease in the release of blood into the large circulatory circle and stagnation of blood in the small circulatory circle. The main causes of acute left ventricular heart failure are myocardial infarction, hypertension, myocarditis, and heart defects. Cardiac asthma often develops acutely, can be provoked by physical exertion, often occurs at night, as in the horizontal position of the body, the volume of blood in the small circle of blood circulation increases, which contributes to stagnation.

There are complaints of general weakness, a feeling of lack of air, suffocation, cough, at the beginning of dry, and as the transition of cardiac asthma to alveolar pulmonary edema, with foamy, pink sputum. The condition is serious. There is anxiety, fear of death. Consciousness becomes confused. The skin is pale, bluish, covered with large drops of sweat. The number of breaths is 30-40 or more per minute, shortness of breath, the wings of the nose are inflated. The veins of the neck swell. The pulse is rapid, weak filling or thready. As heart asthma progresses, blood pressure decreases. I can hear my breath bubbling in the lungs. During the examination, X-ray examination, electrocardiography is used.

Emergency care consists of an urgent hospitalization in the cardioremuscitation unit. Apply oxygen inhalation, enhance the contractile function of the heart, affect vascular permeability and reduce blood flow to the small circle of blood circulation. Chronic heart failure can be the outcome of almost any disease of the cardiovascular system. This is a syndrome that has a clearly defined clinical picture and requires special treatment, regardless of the pathology that leads to a violation of the pumping function of one or both ventricles of the heart. The reasons for the violation of the pumping function can be associated with the defeat of the heart muscle by a pathological process (myocardial infarction, inflammatory lesions – myocarditis, metabolic disorders in the heart muscle - myocardial dystrophy, etc.). It is possible to overload the heart muscle with pressure (arterial hypertension) or increased blood volume filling the heart (congenital and acquired heart defects). Heart failure can occur when there is a violation of the filling of the ventricles of the heart. Heart failure is usually manifested by the expansion of its departments, atria and ventricles. As a result, the release of blood from the heart is reduced and the blood supply of all organs and systems is disrupted. The heart compensates for the decrease in output by increasing the heart rate. The blood flow rate slows down. Increased venous pressure is characteristic of heart failure. The direct manifestation of this increase and stagnation in the veins of the great circle should be considered a characteristic swelling of the veins close to the heart. This swelling is especially noticeable on the veins of the neck. Simultaneously with the swelling, their increased pulsation often becomes visible. After changes in the circulatory system, the earliest and most pronounced manifestations of heart failure are observed from the respiratory system. The most characteristic manifestation of stagnation of blood in the lungs is shortness of breath. It is necessary to distinguish between shortness of breath as a subjective and objective phenomenon. Shortness of breath in heart failure is caused by difficulty in alveolar-capillary gas exchange due to stagnation in the small circle. Shortness of breath during physical movements is usually the first manifestation of heart failure. In fact, it is identical to shortness of breath in healthy people with significant physical effort, with the difference that in patients it manifests itself under those loads at which it was not previously observed. Then shortness of breath appears at rest, manifests itself in a supine position in the afternoon and at night. In the future, suffocation attacks develop more often at night. The organ whose dysfunction in heart failure after the heart and lungs attracts the most attention is the liver. With the insufficiency of the right heart, it first develops stagnation of blood. But stagnation in the liver should not be imagined as an accumulation of immobile blood in it. Through the stagnant liver there is a sharply increased volume, but very slow blood flow. The liver function deteriorates in relation to all types of metabolism. Often, patients have parenchymal jaundice. On the part of the nervous system, the earliest sensations are increased fatigue, a decrease in physical, and later mental performance, sleep is disturbed. In relatively rare cases, long-term heart failure leads to the development of mental disorders. The most common common manifestations of heart failure include cyanosis, caused primarily by the accumulation in the blood of an absolute amount of reduced hemoglobin, which, unlike light red oxyhemoglobin, has a dark blue-red color. Cyanosis has the character of acrocyanosis, i.e. the distal parts of the body, fingertips, lips, earlobes turn blue and it is cold. Edema in heart failure appears, strictly following the law of severity, i.e. in those places that are lowest in relation to the heart. Edema gradually rises from the legs up and in the final stage of the disease, the entire body swells (anasarca), including the serous membranes. The fluid accumulates in the pleural, abdominal cavities, in the cardiac shirt. The diagnosis of heart failure is based on clinical manifestations and is classified by stage, as well as by functional classes based on the tolerance of physical activity.

**Form of organization of the lecture:** explanatory, traditional.

**Teaching methods used in the lecture:** verbal, visual.

**Training tools:**

- didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector).

- demonstration of a thematic patient.

**Lecture № 3**

**Topic:** Cardiac syndromes. Syndromes of acute and chronic coronary insufficiency, acute vascular insufficiency (fainting, collapse, shock). Ischemic heart disease. Angina. Myocardial infarction. Arterial hypertension syndrome. Hypertension. Secondary, symptomatic arterial hypertension.

**Purpose:** To introduce the syndromes in the pathology of the circulatory system and their example with the symptomatology of the most common diseases that occur in a typical classical form.

**Abstract of the lecture:** The concept of coronary heart disease, classification and pathogenesis. Atherosclerosis, modifiable and unmodified risk factors for the development of atherosclerosis. Chronic forms of coronary heart disease. Angina (stable, unstable, variant-vasospastic). Clinic, diagnostic criteria, sequence of instrumental examination. The role of coronary angiography in the diagnosis of coronary heart disease. Emergency care for an angina attack. Myocardial infarction, pathogenesis. Diagnostic criteria: clinic, ECG diagnostics, laboratory changes. Clinical variants of the debut of myocardial infarction. ECG-changes in myocardial infarction of various stages and localizations. Modern laboratory methods for the diagnosis of cardiac muscle necrosis. Complications of myocardial infarction. Acute vascular insufficiency (fainting, collapse, shock). Cardiogenic shock (reflex, arrhythmic, true cardiogenic). Emergency care for cardiogenic shock.

Arterial hypertension syndrome. Stages according to the WHO classification/MOAG. Diagnostic algorithm of arterial hypertension. Hypertension: etiology, pathogenesis, clinic, diagnostic criteria, classification. Secondary, sipmtomatic arterial hypertension (renal, renovascular, cerebral, hemodynamic, endocrine). Hypertensive crisis. Emergency care for a hypertensive crisis. The boundary between normal and elevated blood pressure was determined empirically. It turned out that with a blood pressure above 90 mm Hg. it is possible to significantly reduce the mortality rate and the number of complications with the help of treatment. Therefore, this level should be considered arterial hypertension. According to the current WHO classification, arterial hypertension is considered a pressure above 140 mm Hg for systolic and 90 mm Hg for diastolic pressure. The optimal pressure for a person is considered to be 120 mm Hg of systolic and 80 mm Hg of diastolic blood pressure. There is a difference between systolic hypertension, caused by an increase in minute blood volume or arterial rigidity, and diastolic hypertension, which occurs due to increased resistance to blood flow at the level of arterioles. Systolic and diastolic hypertension are usually combined, but can also exist separately. When the cause of arterial hypertension can be found out, hypertension is called symptomatic. When it is not possible to establish it, it is customary to talk about essential (ideopathic) hypertension. For some time, arterial hypertension can occur without a subjective feeling of ill health and without objective signs of a violation of the structure and function of individual organs. To detect the disease in such cases, you can only measure the height of blood pressure. At the same time, it should be taken into account that a moderate increase in it is also observed in healthy people, which is usually assessed as a response of the patient to an unusual situation, which, undoubtedly, is the first measurement of blood pressure in life. Only the results of more or less long-term follow-up of the patient allow us to distinguish stable arterial hypertension from these short-term situational increases in blood pressure in healthy people. The long-term existence of arterial hypertension leads to characteristic changes in the blood vessels of the brain, heart and kidneys. A correct assessment of these changes sometimes makes it possible to distinguish arterial hypertension from situational increases in blood pressure at the first examination of the patient. Headaches are one of the most characteristic symptoms of arterial hypertension. Often they are its only sign. Usually, the pain is pulsating and localized in the back of the head. They can occur even with small increases in blood pressure. In addition to headaches, there are dizziness, rapid fatigue, both physical and mental, increased mental excitability, hot flashes to the head, poor sleep, palpitations, prolonged pain in the heart, in the left arm, noise, pulsating in the ears or head, etc. With hypertensive crises, i.e. sharp increases in blood pressure, there may be severe headache, dizziness, palpitations, and, sometimes, shortness of breath, up to the development of an asthmatic condition. Often there is vomiting and nausea of brain origin. Later manifestations of arterial hypertension include subjective sensations caused by heart failure. The earliest of them – shortness of breath during exercise. Later, there are attacks of cardiac asthma. The death of patients with arterial hypertension often occurs from heart failure, myocardial infarction, brain hemorrhages, and kidney failure. Usually, hypotonic complaints occur only when the systolic pressure is below 80 mm Hg, but a sudden drop in blood pressure can cause complaints in the patient and in the case when it is above 80 mm Hg. True hypotension can be transient, symptomatic (any type of collapse), permanent (adrenal insufficiency) , or manifest as systematic seizures under certain conditions (orthostatic hypotension). We can talk about primary or constitutional hypotension (which in most cases is asymptomatic) and secondary hypotension, which causes certain symptoms. Secondary hypotension can be transient, occur in the form of seizures, but can continue for a long time. If a decrease in blood pressure occurs only when the patient's body is in an upright position, they talk about orthostatic hypotension. The most severe orthostatic decrease in blood pressure is observed in the morning, when the patient gets up after a night's sleep, it can even cause loss of consciousness. However, a decrease in blood pressure can also be observed with prolonged standing in one place or with any other position of the body. An acute, paroxysmal decrease in blood pressure is characteristic of states of collapse and shock. The reason is the discrepancy between the amount of circulating blood and the vascular bed: either there is a decrease in the amount of circulating blood (with bleeding, etc.), or there is an expansion of the vascular bed (with infection, allergies, poisoning, etc.). Both pathogenetic factors can be combined with each other. Hypotension is accompanied by general poor health, a decrease in body temperature, increased sweating, weakness, pallor, blueness of the limbs, and an increase in heart rate. With a significant or prolonged decrease in blood pressure due to deterioration of cerebral circulation, there is a loss of consciousness. Prolonged hypotension is primarily characteristic of endocrine diseases, especially when the activity of the adrenal cortex decreases or ceases. Ischemic heart disease develops due to a mismatch between the supply of oxygen to the myocardium and its oxygen needs. The efficiency of the heart is mainly due to the formation of energy due to the oxidation of substrates. In a normal heart, the amount of blood flow in the coronary vessels is closely related to the oxygen consumption of the myocardium. The oxygen content in the venous blood after its consumption by the myocardium is only 25%. The main factor that causes coronary heart disease is atherosclerosis of the coronary vessels. Other factors include nervous (stress), humoral causes, violations of metabolic control (for example, with physical overstrain), extravascular compressive factors (with lesions of the pericardial sac, tumors). The clinical forms of coronary heart disease include various types of angina (stable, unstable, vasospastic), myocardial infarction, sudden cardiac death, pain-free (asymptomatic) myocardial ischemia. In recent years, significant advances have been made in the diagnosis of rhythm disorders due to the use of new methods of long-term ECG recording, programmed cardiac stimulation, and electrophysiological studies of the conducting system of the heart. These methods have obtained new data on the anatomy and electrophysiology of the cardiac conduction system, on the pathogenetic mechanisms of rhythm and conduction disorders. All classifications of arrhythmias take into account their division on an anatomical basis into atrial and ventricular. The most convenient division for practical work is the division of arrhythmias into disorders of pulse formation, disorders of its conduction (blockades) and combined arrhythmias in which there are disturbances of excitation and conduction. The most dangerous from a clinical point of view are paroxysmal (suddenly occurring) arrhythmias. As a rule, they suddenly accelerate the number of heartbeats, accompanied by a decrease in the release of blood from the heart due to reduced diastolic filling of the ventricles. This leads to a deterioration of blood circulation in the organs that need constant blood flow: the brain, heart, and kidneys. Decreases blood pressure, filling of the arterial pulse. Signs of heart failure appear and increase: shortness of breath, edema, cyanosis of the skin. Heart blockages occur when the pulse is slowed down or unable to travel through the heart's pathways. At the same time, there is more often a tendency to reduce the heart rate and asynchronous, inconsistent work of the heart departments. A decrease in the output from the heart also leads to the occurrence of heart failure with a deterioration in the blood circulation of organs and systems. The diagnosis of arrhythmias is based on the registration of the electrical activity of the heart using electrocardiography, electrophysiological studies, atrial electrical stimulation of the heart, long-term (daily) registration of an electrocardiogram (Holter monitoring), etc.

**Form of organization of the lecture**: explanatory, traditional.

**Teaching methods used in the lecture:** verbal, visual.

**Training tools:**

- didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector).

- demonstration of a thematic patient.

**Lecture № 4**

**Topic:** Cardiac syndromes. Syndromes of valvular heart lesions, cardiomegaly (hypertrophy and dilatation of the heart), hypertension of the small circle of blood circulation. Rheumatism. Acquired heart defects: mitral and aortic valve insufficiency and stenosis.

**Purpose:** To introduce the syndromes in the pathology of the circulatory system and their example with the symptomatology of the most common diseases that occur in a typical classical form.

**Abstract of the lecture:** General ideas about the etiology and pathogenesis of rheumatism. Diagnostic criteria for rheumatism. Rheumatic carditis. Rheumatic polyarthritis. Etiology, disorders of hemodynamics, mechanism of compensation and decompensation, clinic for acquired heart defects: mitral valve insufficiency, left atrioventricular foramen stenosis, aortic valve insufficiency, aortic mouth stenosis, tricuspid valve insufficiency. There are two main forms of acquired heart defects: valve insufficiency and narrowing (stenosis) of the valve opening. In the development of defects, regardless of their etiology and form, there are general patterns. Morphological changes in the valve cause a violation of its function: in particular, the reverse flow of blood (regurgitation) through an incompletely closed valve in case of its insufficiency or difficulty in expelling blood through a narrowed opening. Violations of intracardiac hemodynamics cause compensatory hyperfunction of the corresponding chamber of the heart, followed by its hypertrophy, and then-dilation. With the progression of the valvular lesion, the contractile function of the hypertrophied and dilated myocardium weakens, which leads to circulatory disorders in the corresponding circulatory circle. Mitral stenosis: this defect occurs in 44-68 % of cases of mitral defects. Almost all cases of stenosis are the result of rheumatism. Cases of congenital mitral stenosis, but in combination with an atrial septal defect (Lutambache syndrome), are described. Mitral stenosis is usually formed at a young age and is more common in women (84%). The area of the mitral opening normally ranges from 4-6 cm2. The area of the mitral foramen 1-1. 5 cm2 is a critical area at which there are distinct violations of intracardiac hemodynamics. With a hole with an area of 0.5-1 cm2, an operation is required. Compensation for this defect lies on the weak left atrium and is very short. Mitral stenosis quickly leads to stagnation in the small circle of blood circulation and hypertrophy of the right ventricle. The compensation period. Complaints of shortness of breath and pain of the type of angina pectoris with minor physical exertion. On examination, mitral nanism is noted (small stature, small limbs, painful youthfulness). Cyanotic blush on the upper zygomatic arches. The skin is pale. On palpation, the apical push is in the usual place (5-intercostal space, 1.5-2 cm inside from the left mid-clavicular line), localized, weakened. With percussion, there is an extension of the left border up and to the left in the 2 and 3 intercostal spaces. During auscultation at the apex of I, the tone is amplified (clapping), the rhythm of "quail", diastolic noise with presystolic amplification at the apex of the heart. Decompensation period. Complaints of shortness of breath, cough, hemoptysis, attacks of suffocation by the type of cardiac asthma and pulmonary edema, hoarseness of the voice due to compression by the enlarged left atrium n. Laringeus reccurens, heart rhythm disturbance by the type of atrial fibrillation, swelling on the legs, heaviness in the right hypochondrium due to an enlarged liver, ascites. On examination, the patient's face is characterized by pronounced cyanosis of the lips, cyanotic blush on the cheeks in the form of the so-called “mitral butterfly” (facies mitralis). Paleness of the skin, a heart hump (if the defect is formed in childhood), with hypertrophy of the right ventricle-a heart attack, swelling on the legs, ascites, orthopnea. When palpated, diastolic "cat purr" in the area of the top of the heart and the lower third of the sternum (it is better palpated in the position on the left side when holding breath or after physical exertion). With severe hypertrophy of the left atrium on the left hand, the pulse may be weakened (Popov's symptom) due to compression of the left subclavian artery by the hypertrophied left atrium, which can hold up to 2 liters of blood. In percussion, the left border of relative cardiac dullness is shifted up and to the left, and the right border of relative cardiac dullness is shifted to the right. During auscultation of the lungs, weakened vesicular respiration is heard, in the lower parts of the back on both sides of the crepitation of a stagnant nature. With the development of pulmonary edema, wet wheezes appear. During auscultation of the heart at the apex of the I, the clapping tone, the "quail" rhythm, diastolic noise with presystolic amplification at the apex of the heart. On the basis of the heart, the accent and bifurcation of the II tone on the pulmonary artery, the functional diastolic Graham-Still noise (relative insufficiency of the valves of the pulmonary trunk due to the expansion of the mouth of the pulmonary artery) can be heard. Above the tricuspid valve, a weakening of the I tone due to functional insufficiency and a short, gentle, non-conducting, systolic noise are heard. With the development of atrial fibrillation, there is an alternation of the I tone (constantly changing volume), noises may disappear, the "quail rhythm" disappears, that is, the defect may become mute. It is worth paying attention to the symptom of Nesterov – the symptom of two hammers. One hammer – I clapping tone, the second-the emphasis on the pulmonary artery. Blood pressure is usually low. Complications: hypertension of the small circle of blood circulation with pulmonary edema, atrial fibrillation, vascular thrombosis of vital organs, heart failure. Mitral valve insufficiency: this heart defect in its pure form occurs in no more than 10-15% of cases. Causes: rheumatism, subacute septic endocarditis, atherosclerosis, diffuse connective tissue damage (lupus erythematosus, rheumatoid arthritis), heart injuries. With mitral valve insufficiency, the valves do not completely close, so during left ventricular systole, blood regurgitation occurs in the left atrium. Compensation for this defect lies on the left ventricle and is quite long. With decompensation, there is stagnation in the small circle, but hypertension is less pronounced than with stenosis, since there is no difficulty in emptying the left atrium. The defect is quite often complicated by atrial fibrillation, but without thrombosis, since the blood clots are washed away by the vortex movements of regurgitation. In the compensation stage, there are no specific complaints in patients. On examination, signs of mitral insufficiency are not detected. When palpation is determined by the left-shifted apical push, strong enough, localized. With percussion, there is an extension to the left of the boundaries of relative cardiac dullness in the IV and V intercostals due to left ventricular hypertrophy. With auscultation at the top of the heart, a weakening of the I tone is heard due to the non-closing of the valve flaps, the III tone may appear (a hemodynamic shock of a large amount of blood from the atrium against the wall of the left ventricle), a systolic noise of regurgitation, merging with the I tone, decreasing and being conducted to the Botkin point and the armpit along the blood flow. Decompensation period: complaints (due to heart failure) of shortness of breath, cough, hemoptysis, palpitations, swelling on the legs, heaviness in the right hypochondrium, ascites. On examination, the type of patient with heart failure: acrocyanosis, swelling of the legs, orthopnea, visible pulsation of the heart area due to hypertrophy of the right ventricle. On palpation, there is a cardiac push in the area of absolute dullness and "in the pit of the stomach", the apical push is shifted to the left and down, spilled. With percussion, the entire border of the left relative dullness (mitral configuration with a smoothed heart waist) is shifted, and then the right border of relative dullness. With auscultation at the apex, the weakening of the I tone, up to its disappearance, an additional III tone, systolic noise (the more pronounced the insufficiency, the coarser the noise). The noise is decreasing, it is carried to the Botkin point and the armpit along the blood flow. Above the pulmonary trunk, there is an accent and a split of the second tone (increased pressure in the small circle of blood circulation). Above the tricuspid valve I, the tone is weakened, a gentle and short, non-conducting systolic noise may appear (relative insufficiency of the valve due to dilation of the right ventricle and expansion of the valve ring). Aortic insufficiency: this defect occurs when the aortic valves are affected by rheumatism, subacute septic endocarditis, atherosclerosis, syphilis. Deformed and destroyed valves cease to close in the diastole, and from 5 to 50% of the systolic volume returns to the left ventricle. Compensation lies on the left ventricle, which increases dramatically due to dilation and hypertrophy. The heart with this defect can weigh up to 1 kg ("bull heart"). In its pure form, this defect occurs in 14 % of cases of aortic valve damage. Complaints of headaches, dizziness. Fainting occurs already with a long-existing defect, as well as heart pain of the type of angina (a small filling of the coronary vessels with blood in the diastole and a large mass of the myocardium with an unchanged coronary bed). There may be sweating due to high pulse pressure due to irritation of peripheral cholinergic receptors. Patients are concerned about shortness of breath, which is of a reflex nature due to a violation of cerebral circulation, but not due to stagnation in the small circle of blood circulation. Often patients feel a pronounced heartbeat, which is the result of blows of the dilated left ventricle on the chest wall. The examination reveals a large number of peripheral symptoms. Pallor of the skin is the result of spasm of the skin vessels (deterioration of blood supply to vital organs). There are symptoms associated with a pendulum-like flow of blood into the aorta and back to the left ventricle. There is a symptom - "dance of carotids" (swelling in the systole and falling in the diastole of the carotid arteries). "Capillary pulse" - synchronous with the pulse pulsation of a white spot that occurs when pressing on the nail plate. Systolic-diastolic shaking of the head is a symptom of Musset or "Chinese dummy". The symptom of the diaphragm or pupil (Landolfi's symptom) is the dilation and narrowing of the pupil according to the phases of the heart's activity. Muller's symptom is an alternation of hyperemia and paleness of the soft palate and uvula. When throwing the leg over the leg – systolic-diastolic tremor of the foot of the upper located leg. A patient with such a defect is called a "pulse person", since it rises slightly in the systole and falls in the diastole. This is especially noticeable if the patient is lying on something like a cot. When examining the heart area, there is an apical push visible to the eye, shifted to the left and down. When palpated, the apical push is shifted to the left and down, up to the VII intercostal space and the mid-axillary line, spilled, "domed", raising the phonendoscope. The pulse on the radial artery is large, high, and jumping. It is often called pulsus magnum et celer. With percussion, there is an expansion of the boundaries of relative cardiac dullness to the left and down, up to the VII intercostal space and the mid-axillary line. With auscultation at the top of the heart, the I tone is weakened, as the left ventricle contracts around a larger volume of blood. On the aorta II, the tone is not heard, a decreasing diastolic noise is heard, which is conducted to the Botkin point. With the progression of the defect, "mitral aortic malformation" develops, according to the type of mitral valve insufficiency, due to dilation of the left ventricle and expansion of the mitral ring. In this case, a soft, gentle, short and non-conducting systolic murmur appears at the tip. It is possible to "mitralize the aortic defect" by the type of relative mitral stenosis. In this case, a powerful flow of blood returning from the aorta to the left ventricle hits the mitral valve from the inside, covering it, thereby narrowing its opening. In the case of relative mitral stenosis, a functional, diastolic Flint noise is heard (rarely heard by the ear, FKG is detected). On the peripheral large vessels, when they are squeezed with a phonendoscope and thus create artificial stenosis, you can hear a double Traube tone and a double Durosier-Vinogradov systolic diastolic noise. Blood pressure is changed: systolic increases, diastolic decreases, pulse pressure is high (for example, 130/40 mm Hg). The period of compensation due to a powerful left ventricle is very long. Decompensation develops according to the usual scenario: stagnation in the small, then in the large circle of blood circulation. Complications: cardiac asthma, myocardial infarction, thromboembolic complications. Aortic stenosis is an acquired or congenital malformation with obstruction of the outflow pathway from the left ventricle. Reasons: 1) congenital bicuspid aortic valve with a sclerotic outcome (38% of cases); 2)senile calcinosis in patients over 65 years of age with valve wear and coarse calcareous deposits; develops more often in men and progresses rapidly; occurs in 33% of cases; 3) rheumatism – 24% of cases; 4) atherosclerosis, syphilis and rare causes in other cases. Normally, the aortic opening is up to 3 cm2. Violation of hemodynamics begins when it narrows to 0.5 cm2. Compensation lies on the left ventricle, so it lasts a long time. Decompensation develops slowly according to the type of left ventricular failure (attacks of cardiac asthma and pulmonary edema). Patients do not complain for many years, even when doing hard work and playing sports. Later, they begin to complain of palpitations, pain in the heart area of the type of angina, dizziness and fainting. The appearance of pain is caused by insufficient coronary circulation due to low pressure in the aorta of the hypertrophied myocardium of the left ventricle. The occurrence of dizziness and fainting occurs due to periodic ischemia of the brain. On examination, there is a pronounced pallor ("aortic pallor"), due to reflex spasm of the skin vessels. The apical shock is visible in the V-VI intercostal spaces outside of the mid-clavicular line. On palpation, a "lifting" push of the hypertrophied left ventricle is felt. In the upper third of the sternum, the chest vibrates during systole ("a symptom of systolic cat purring"). The pulse in this defect is slow, small and rare (pulsus tardus, parvus et rarus). Percussion reveals an outward shift of the left border of the relative cardiac dullness of the heart due to left ventricular hypertrophy. With auscultation of the heart at the apex, there is a weakening of the I tone and a short, gentle systolic murmur due to gradually forming relative mitral insufficiency (mitral aortic malformation). On the aorta, a weakening of the second tone is heard, due to a decrease in blood pressure in the aorta and a decrease in the amplitude of movement of the altered valves. Strong, rough systolic noise, the intensity of which increases to the middle of the diastole, and then decreases to the second tone (on the FKG, this noise has the shape of a rhombus or oval). The noise is carried out on the carotid and subclavian arteries, in the interscapular space. Systolic pressure decreases, and diastolic pressure tends to increase, pulse pressure is low (for example, 90/75 mm Hg). Complications: acute left ventricular failure, myocardial infarction, thromboembolic complications. The main method for diagnosing all heart defects is ultrasound of the heart (echocardiography). Other methods are rarely used. Treatment of heart disease is surgical: commissurotomy or artificial heart valve. Conservative treatment is aimed at reducing the signs of heart failure and preventing other complications.

Form of organization of the lecture: explanatory, traditional.

Teaching methods used in the lecture: verbal, visual.

Training tools:

- didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector);

- demonstration of a thematic patient.

Lecture № 5.

**Subject:** Inquiry, examination of patients with diseases of the digestive system. Laboratory and instrumental methods for the study of the gastrointestinal tract, liver and biliary tract. The main syndromes in diseases of the gastrointestinal tract, the main syndromes in liver diseases.

**Purpose:** To introduce the principles of a complete clinical examination of patients with liver and gastrointestinal tract pathology, to introduce the main symptoms and syndromes in diseases of the liver and gastrointestinal tract.

**Lecture Summary:** Radiological methods of examination of the gastrointestinal tract (general principles and significance). The concept of an overview X-ray of the abdominal cavity, a study with artificial contrast of the esophagus, stomach, intestines, irrigoscopy and other methods. Their diagnostic value. Preparation for X-ray examination. Endoscopic methods of research. The concept of esophagoscopy, gastroduodenoscopy, colonoscopy, rectoromanoscopy. Indications, contraindications and preparation for the study. The importance of biopsy in the diagnosis of gastrointestinal tract lesions. General concepts of cytological and histological diagnostics. Laparoscopy (general views).

Study of gastric secretion. The method of fractional gastric probing. The concept of basal and stimulated gastric secretion (histamine and pentagastrin parenteral stimuli). Study of the physical properties of gastric contents (quantity, color, smell, impurities). Chemical analysis: determination of total acidity, free and bound hydrochloric acid by titration. Evaluation of the acid-forming function of the stomach in the production of hydrochloric acid: the concept of the flow rate of HCI basal, submaximal and maximum secretion and its calculation, peak acid production. Diagnostic value. The concept of determining intragastric pH (pH-metric). Long-term monitoring of the pH of the gastric enzyme. Study of the enzyme-forming function of the stomach. Determination of pepsin. Reaction to lactic acid and blood. A general idea of non-probe methods for the study of gastric secretion.

Methods for the detection of Helicobacter pylori (cytological, histological and immunological methods, urease test). Diagnostic value.

Coprological research. Collecting feces for research. Physical properties of feces (daily amount, consistency, shape, color, smell of feces, impurities, determination of the pH of feces). Chemical analysis: determination of occult blood (benzidine and guaiac samples), stercobilin and bilirubin in the feces. Microscopic examination: elements of food origin (muscle fibers, connective tissue, fat, its breakdown products, vegetable fiber and starch). Cellular elements: epithelium, white blood cells, red blood cells, macrophages, tumor cells, the presence of protozoa and helminths. Diagnostic value of coprological examination. Methods of studying the absorption of fats, proteins, and carbohydrates in the small intestine (general views).

Study of external and intersecretory function of the pancreas (study of enzymes in the duodenal contents, blood and urine), study of carbohydrate metabolism. Diagnostic value of the croprological study.

The concept of the importance of X-ray, radionuclide and ultrasound methods in the diagnosis of pancreatic diseases.

Laboratory methods for the study of liver function, reflecting its participation in the pigment, carbohydrate, protein, fat and mineral metabolism. Research of enzymes (aminotransferase, aldolase, gamma-glutamyltranspeptidase, alkaline phosphatase, lactate dehydrogenase, cholinesterase). Study of the neutralization and excretory function of the liver (test with bromosulfalein). Diagnosis of major biochemical syndromes (cytolytic, mesenchymal-inflammatory, cholestatic, and molar hepatic-cell insufficiency syndrome).

Immunological methods of research. The concept of markers of hepatitis viruses.

X-ray examination: the concept of cholecystography, intravenous cholegraphy, cholangiography, splenoportography, pneumoperitoneum. Preparation of the patient for X-ray examination of the biliary tract. The concept of endoscopic retrograde cholangiopancreatography (ERCP). Angiography, diagnostic capabilities, indications and contraindications. Computed tomography (general concepts of the method). The concept of radionuclide methods of liver research (hepatography, radionuclide scanning of the liver).

Ultrasound examination of the liver, spleen and biliary tract. General ideas about the diagnostic capabilities of the method. Preparation for the study. Duodenal probing. Probing techniques. Physical properties of the duodenal contents, chemical, microscopic, and bacteriological studies. Modern modifications of the method: multi-stage and chromatodiagnostic sounding.

General views and puncture biopsy of the liver. Laparoscopy (indications and contraindications).

The main symptom of a violation of the function of the esophagus in various diseases is the difficulty of passing food through it when swallowing – dysphagia. In diseases of the stomach, the most common symptoms are pain, changes in taste, belching, heartburn, nausea, vomiting. With intestinal pathology-pain, flatulence, changes in the stool (diarrhea, constipation, unstable stool). The most common syndrome in the pathology of the gastric tract is dyspepsia. Dyspepsia, or "indigestion", is a term often used by patients themselves to describe the unpleasant sensations in the upper abdomen, usually associated with eating. For some patients, dyspepsia is pain or a feeling of fullness in the stomach after eating, rapid satiety and nausea. It is these complaints that are most often referred to as dyspepsia. Other patients, complaining of indigestion, can describe unclear sensations. Still others note belching, bloating and increased gas formation. With pain syndrome, it is very important to find out the nature of the pain. Pain from the abdominal organs is transmitted through the sensitive fibers that go as part of the sympathetic nerves. Therefore, the pain from these organs (visceral pain) is dull, aching, sometimes perceived as a feeling of bursting or pressure. It does not have a clear localization, although it usually corresponds to the zone of segmental vegetative innervation of the affected organ. In the diagnosis of liver pathology, the syndrome of "small hepatic signs"is of great importance. This is a crimson-red color of the skin of the palms and feet, vascular "stars" - the expansion of the vessels of the skin," hepatic " breath, a change in secondary sexual characteristics. Of the other numerous syndromes of gastrointestinal tract damage in the clinic of internal diseases, the most common are syndromes of increased and decreased gastric secretion, biliary dyskinesia, external secretory pancreatic insufficiency, jaundice, liver failure with the development of hepatic encephalopathy, gastrointestinal bleeding. Jaundice syndrome. Normal pigment metabolism. Functional changes of the liver in parenchymal (hepatic), mechanical (subhepatic), hemolytic (suprahepatic) jaundice.Portal hypertension syndrome. Expansion of port-caval anastomoses. Ascites. Diagnosis of free fluid in the abdominal cavity.Hepatolienal syndrome. Splenomegaly. Hypersplenism syndrome. Liver failure syndrome. Portal-hepatic, hepatic-cellular insufficiency. Features of the course and clinic. Metabolic disorders in hepatic-cellular insufficiency. Hepatic encephalopathy syndrome. Hepatic coma.Symptomatology of chronic hepatitis (infectious, autoimmune, alcoholic, medicinal). Cirrhosis of the liver, etiology, clinic, diagnosis.

One of the characteristic symptoms of diseases of the liver and bile ducts is jaundice – the staining of the skin and visible mucous membranes in yellow. It depends on the increase in the content of bilirubin in the blood and its penetration into the skin and mucous membranes. The color of the skin with jaundice can be of various shades – pale with a yellowish tinge, lemon-yellow, golden, yellow-green and dark brown. The most intense color of the skin is in mechanical (obturation) jaundice, associated with an obstacle to the outflow of bile in the bile ducts. In this case, the formation of bile is normal, but its release through the bile ducts into the intestine is delayed. As a result, bilirubin, like other components of bile, is absorbed and accumulates in the blood in a very large amount. Complete obstruction of the bile ducts is most often observed with a blockage of the common bile duct and cancer of the head of the pancreas. It causes the appearance of completely discolored clay feces that do not contain bile pigments. At the same time, jaundice reaches its maximum intensity. In fresh cases, the skin color is golden-yellow, later it becomes yellow-green, with a long-existing obstruction, the skin darkens and becomes brown-green, almost black. Parenchymal jaundice is caused by damage to the liver itself. At the same time, the liver's activity of converting bilirubin, releasing it into the bile ducts, is disrupted, and when the liver cell is destroyed, bilirubin enters the blood. The most common causes of parenchymal jaundice are viral hepatitis and toxic hepatitis. The intensity of jaundice varies – from a slight jaundice of the sclera to a significant color of the skin and visible mucous membranes in the midst of acute viral hepatitis, cirrhosis of the liver. Hemolytic jaundice occurs with excessive bilirubin formation due to the increased breakdown of red blood cells (hemolysis). At the same time, the functional capacity of even a healthy liver may not be sufficient to convert all the bilirubin formed. Therefore, hemolytic jaundice is observed in diseases that are not directly related to liver damage (with transfusions of incompatible blood, rhesus conflict of newborns, the action of hemolytic poisons). Hemolytic jaundice is usually not very intense and is combined with pallor of the skin. Hepatic encephalopathy is a complex of often reversible in the initial and irreversible in the final stage of mental and neuromuscular disorders caused by severe liver failure. This syndrome can develop in patients with chronic hepatic insufficiency, characteristic of late stages of cirrhosis of the liver and chronic hepatitis, and in acute hepatic insufficiency caused by massive hepatic necrosis in patients with lightning-fast forms of acute viral hepatitis, severe alcoholic hepatitis, acute toxic hepatitis caused by medications, food or industrial poisons. The combination of jaundice with severe mental disorders was observed by Galen.

Encephalopathy is the result of the toxic effect on the central nervous system of the products of protein metabolism, normally neutralized by the liver. The role of toxic products is played by ammonia and aromatic amino acids, as well as methionine, mercaptans, phenol and indole derivatives. The neuropsychiatric status of the patient should be the object of close attention of the attending physician. The slightest changes in the patient's behavior, consciousness, speech, ability to concentrate attention, violation of the rhythm of sleep and wakefulness, coordination of movements, unmotivated fluctuations in the emotional status in the direction of euphoria, agitation, or, conversely, depression and loss of interest in the environment can be the initial clinical manifestations of hepatic encephalopathy. The severity of the patients ' condition often does not correlate with the degree of changes in the biochemical functional tests of the liver. Biochemical tests that reveal a violation of the metabolism of nitrogenous compounds in the liver and allow us to distinguish disorders of consciousness in hepatic encephalopathy from mental disorders of other origins are the determination of the level of ammonia, total nitrogen, phenols and indican, and the concentration of amino acids. There are 4 stages of hepatic encephalopathy (YII International Association for the Study of the Liver, 1977). Stage I (prodromal). Behavioral disorders that vary from day to day, and emotional status that does not correspond to the situation. Decreased activity and ability to concentrate, apathy. Slowing of mental reactions and speech, periods of stupor with fixed gaze or, conversely, euphoria with psychomotor agitation, less often aggressiveness with negativism, but maintaining orientation and criticism. There is a decrease in mental ability (violation of arithmetic counting). Very often sleep disorders: insomnia at night and drowsiness during the day. Stage II. Deeper neurological and mental disorders. The patient makes stereotypical movements, purposeless and meaningless actions. Some patients become untidy, familiar, or aggressive to the medical staff. Deafness is noted. A large tremor (trembling) of the entire body is characteristic. Stage III. A complex of general cerebral, pyramidal and extrapyramidal disorders is characteristic. Pronounced disturbances of consciousness (stupor) are sometimes interrupted by short-term arousal. You can observe urinary incontinence, impaired pupillary reflexes, creaking teeth, twitching and muscle cramps, sensitivity disorders or hyperreflexia, motor weakness. Stage IY. Actually a hepatic coma. In the initial phase, it is shallow, often with periods of retained consciousness or arousal. Deep tendon reflexes are suppressed. Muscle rigidity and tremor disappear. As the coma increases, there is a decrease in blood pressure, an increase in the frequency and depth of breathing (Kussmaul's breathing), and the absence of a reaction of the pupils to light. In the final phase of a deep and irreversible coma, reflexes, pain sensitivity, and periods of arousal disappear. Death occurs from irreversible changes in the median structures of the brain.

**Form of organization of the lecture**: explanatory, traditional.

**Teaching methods used in the lecture:** verbal, visual.

**Training tools:**

- didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector);

- demonstration of a thematic patient.

**Lecture № 6.**

**Topic:** Interview, examination of patients with urinary pathology. Laboratory and instrumental methods of studying the urinary system. The main syndromes in kidney diseases. Acute and chronic glomerulonephritis, pyelonephritis, urolithiasis.

**Purpose:** To introduce the principles of a complete clinical examination of patients with diseases of the urinary system. To introduce the main syndromes in kidney pathology and, by their example, to the symptomatology of the most common diseases that occur in a typical classical form.

**Lecture Summary:** Laboratory tests. General urinalysis. The relative density of urine, the reaction of urine, transparency, color, smell, etc. Proteinuria, glucosuria, bilirubinuria, acetonuria, their diagnostic value. Microscopic examination of the urinary sediment and its diagnostic value. Urinalysis according to Nechiporenko and Addis-Kakovsky. Biological examination of urine. The significance of the study of urine density for assessing the functional state of the kidneys. The Zimnitsky test. Hypostenuria. Isostenuria. Nicturia. Diagnostic value. The concept of methods for determining partial renal function. The Rehberg test and its diagnostic value. Determination of urea, creatinine, residual nitrogen, protein and protein fractions, lipids, electrolytes in blood serum. Their diagnostic value.

X-ray examination. Overview of the kidneys. Intravenous and retrograde pyelography, nephroangiography. Computed tomography in the diagnosis of kidney diseases.

The concept of bladder catheterization and cystoscopy.

Ultrasound examination of the kidneys and bladder.

Radioisotope renography and kidney scanning.

The concept of kidney biopsy, its diagnostic value. Features of changes in the fundus of the eye in kidney diseases. Nephritic syndrome. General concepts of acute and clinical forms of chronic glomerulonephritis. The importance of functional methods of kidney research in the diagnosis of the latent course of chronic glomerulonephritis. Nephrotic syndrome. Features of edematous syndrome in kidney diseases. Clinical differences in renal and cardiac edema. The syndrome of renal arterial hypertension. Features of the course of hypertension, hemodynamic changes, changes in the heart, blood vessels (fundus) in renal arterial hypertension. Renal eclampsia syndrome. Chronic pyelonephritis. Diagnostic examination of urine to determine inflammatory changes in the kidneys and urinary tract.

Renal colic syndrome. Urolithiasis, causes of development, types of urolithiasis.

The syndrome of renal failure (acute and chronic). Stages. Clinical, functional, and metabolic disorders in renal failure. Lesions of other organs and systems. Features of the clinical picture in uremia. Uremic coma. In nephrological practice, a number of syndromes are distinguished: urinary, nephrotic, hypertensive, nephritic, acute and chronic renal failure, tubular dysfunction syndrome. Some syndromes (for example, nephrotic or hypertensive) represent a detailed clinical picture of the disease, when, as a rule, patients have certain complaints and numerous manifestations of the disease. For the diagnosis of other syndromes, it is necessary to use special research methods. One of the main syndromes is uric, which is associated with changes in the quality and quality of urine. Sometimes it is the only manifestation of kidney disease. The most common forms of it are the presence of blood cells in the urine: red blood cells (hematuria), white blood cells (leukocyturia), and protein (proteinuria). In the presence of red blood cells in the urine (hematuria) - a frequent, often the first sign of kidney and urinary tract diseases, as well as diseases and conditions not associated with kidney damage (acute leukemia, thrombocytopenia, heavy physical activity, etc.). By intensity, micro - and macrohematuria are distinguished. Microhematuria is detected only by microscopy of the urinary sediment. With heavy bleeding, the color of the urine changes to the characteristic appearance of "meat slops", there may be a scarlet urine. The most serious cause of hematuria is tumors of the genitourinary tract. One of the most common causes of hematuria is urolithiasis. The characteristic clinical picture includes sharp pain in the lower back, in the groin area, followed by macrohematuria. Hematuria in combination with leukocyturia and proteinuria is often found in non-specific kidney diseases (pyelonephritis, glomerulonephritis). Proteinuria – the excretion of protein in the urine in an amount exceeding normal values (50 mg/day). This is the most common sign of kidney damage, although it can sometimes be observed in healthy individuals. In the urine of kidney diseases, various proteins can be detected - both low-molecular and high-molecular. In kidney pathology, proteinuria is most often associated with increased filtration of plasma proteins through glomerular capillaries. Glomerular proteinuria is observed in most kidney diseases – inflammatory (glomerulonephritis, pyelonephritis), kidney damage in diabetes, arterial hypertension, atherosclerosis. Pronounced leukocyturia (the presence of white blood cells in the urine) develops with any inflammatory kidney damage, more often with nephritis and pyelonephritis. Acute renal failure is a syndrome characterized by rapidly occurring disorders of the main, primarily excretory (excretory) functions of the kidneys. These changes are the result of acute severe damage to the renal blood flow, glomerular filtration, and tubular reabsorption, usually occurring simultaneously. A large number of causes can lead to the development of acute renal failure, primarily not related to kidney pathology: toxic effects, infection, obstruction of the kidney vessels, blockage of the urinary tract most often with a stone, damage to the kidney tissue (trauma) , etc. From a clinical point of view, there are four periods of acute renal failure: the period of action of the etiological factor, the oligoanuric period (cessation or reduction of urinary excretion), the period of restoration of the volume of urination, recovery.

In the first period, the symptoms of the condition that leads to acute renal failure prevail. For example, there is fever, chills, low blood pressure, anemia, etc. The second period is characterized by a sharp decrease in the amount of urine excreted, up to complete cessation. There is nausea, vomiting, confusion, due to poisoning of the body with substances that should have been excreted in the urine. In the third period, the recovery of the volume of excreted urine begins. The amount of urine usually increases gradually, exceeding the normal daily volume. This period is dangerous for the loss of fluid and electrolytes. The recovery period is usually long (up to 6-12 months). There is a gradual recovery of kidney function or a transition to chronic renal failure. The clinical picture of acute renal failure is determined by disorders of the heart, intoxication, mental disorders, anemia. Often, the severity of the condition is aggravated by pericarditis, respiratory disorders, pulmonary edema, gastrointestinal bleeding and other dangerous complications. The diagnosis of acute renal failure is confirmed by measuring glomerular filtration, changes in blood biochemical parameters, and changes in the volume of urine excreted. Treatment of acute renal failure is associated with the correction of hemodynamic changes, the elimination of urinary tract obstruction, and the elimination of damaging factors. Treatment and prevention of possible complications are carried out. Effective use of hemodialysis with the help of the device "artificial kidney". Chronic kidney failure is a concept that includes a gradual and permanent deterioration of kidney function. The kidneys cannot maintain the normal composition of the internal environment of the body. The combination of clinical and laboratory symptoms that develop in chronic renal failure is called uremia (urolithiasis). The causes of chronic kidney failure are associated with primary damage to the glomeruli, tubules and interstitium of the kidneys, the presence of difficulties in the outflow of urine due to urolithiasis, kidney tumors, bladder, kidney vascular damage in hypertension, diabetes, metabolic diseases (gout) , etc. During chronic renal failure, there is a latent period, periods of compensation and decompensation. In the latent period, patients do not complain. Functional insufficiency of the kidneys is detected only during exercise tests. In the compensation stage, there is a change in diuresis. The volume of urine excreted and the rhythm increases, with the greatest volume in the night period (polyuria, nocturia). In the stage of decompensation, the volume of excreted urine decreases, until it is completely stopped (oliguria, anuria). In chronic renal failure, changes in homeostasis gradually increase due to a decrease in the release of metabolic products, intoxication, violations of water-electrolyte metabolism, and metabolism. The clinic is dominated by general symptoms: weakness, drowsiness, fatigue, apathy, itching, nausea, bleeding gums, joint pain. The syndrome is associated with the defeat of all organs and systems. The cardiovascular system is characterized by the development of pericarditis (inflammation of the pericardial sac), arterial hypertension, and cardiac arrhythmias. Lesions of the respiratory system are associated with pneumonia, bronchitis, pleurisy. Patients develop uremic gastritis, colitis, hepatitis with the development of liver failure. Blood changes progress with the development of severe anemia. Changes in the neuropsychiatric sphere appear early and increase up to uremic coma. Treatment of the actual chronic renal failure is reduced to the relief of its manifestations, prevention of complications and slowing its progression; such treatment is started as early as possible. Limit the consumption of table salt and protein with food. An important role is played by the normalization of blood pressure. Infusion therapy is performed to correct water-electrolyte disorders. In the decompensation stage, hemodialysis and kidney transplantation are used.

**Form of organization of the lecture:** explanatory, traditional.

**Teaching methods used in the lecture**: verbal, visual.

**Training tools:**

- didactic (presentation);

- material and technical (chalk, blackboard, multimedia projector).

**2. Methodological recommendations for conducting practical classes**

**Module 1.** Direct research methods in propaedeutic practice

**1. Topic 1.** Introduction to the clinic. The main domestic therapeutic schools. Questions of medical ethics and deontology. The order and ways of hospitalization. The structure of the therapeutic department. Patient care. Mode of the day. Chart of the medical history. The subject and tasks of propaedeutics of internal diseases. Interview with a lung patient, the main complaints and their pathogenesis: cough, sputum separation, chest pain, shortness of breath, suffocation, hemoptysis, voice change.

**Type of training session:** practical training.

**Purpose:** To acquaint students with the requirements and tasks of the department, the clinic of propaedeutical therapy, to systematize knowledge about medical ethics and deontology, to form the concept of the method of questioning the patient.

**Training session plan**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey and testing). Questions for the written survey and testing are presented in the FEF. |
| 3 | **The main part of the training session.**-Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.-Working out practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.* Practical training on a clinical basis: familiarizing students with the clinical base, the work of the therapeutic department, and basic medical documentation. A conversation about ethics, deontology. Indicative curation of the patient in the therapeutic department. In the presence of students, the teacher performs a demonstrative questioning of the patient: collecting passport data, complaints, anamnesis of the disease and the patient's life. The patient is questioned in accordance with the norms of medical ethics and deontology. The algorithm of the questioning, the features of the questioning of the pulmonary patient are explained. Students participate in the survey, the teacher gives the opportunity to conduct part of the survey to 1-2 students of the group.
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| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the fund of evaluation funds (FEF). |

**Training tools:**

- didactic (scheme of the method of questioning);

- material and technical (chalk, blackboard).

**Topic 2.** Questioning a heart patient. The main complaints and their pathogenesis: pain in the heart, shortness of breath, cardiac asthma, palpitations, cough, hemoptysis. General examination of the patient. Private inspection of systems and organs.

**Type of training session:** practical training.

**Purpose:** To teach the method of general and private examination of the patient.

**The plan of the training session**

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| № s\n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FOS.* Practical training on a clinical basis: the teacher conducts a thematic examination of one patient, in the future, the examination is carried out in the form of a walk-around with a demonstration of various features and their diagnostic significance. Then students independently examine and interview thematic patients (questioning of patients with diseases of the respiratory and cardiovascular systems). The teacher controls the student's work.
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (scheme of the inspection procedure);

- material and technical (chalk, blackboard).

**Topic 3.** Methods of examination of the patient: palpation of pulmonary, cardiac, renal, endocrine patients, patients with diseases of the gastrointestinal tract. Palpation of the lymph nodes, thyroid gland, chest (rigidity, soreness, voice tremor), apical, cardiac tremors, pulse, abdomen, liver, kidneys, spleen. Blood pressure measurement.

**Type of training session:** practical training.

**Purpose:** To teach the method of palpation of the lymph nodes, thyroid gland, chest, pulse, heart, abdomen, liver, kidneys, spleen.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.****-** Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Practice of practical skills: general rules and methods of palpation of the patient are presented in the FEF.* - Practical training on a clinical basis: the teacher conducts palpation of the lymph nodes, thyroid gland, muscles, bones, chest, heart, blood vessels, abdomen, liver, kidneys and spleen of one patient, in the future, palpation is carried out in the form of a bypass with a demonstration of various features and their diagnostic significance. Practicing practical skills in the study room by training (the student is used as a model for practicing the skill). The teacher monitors the development of the skill by students. Students independently conduct palpation of thematic patients. The teacher controls the student's work.
 |
| 4 | **The final part of the lesson:****-** summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (posters on the method of palpation);

- material and technical (chalk, blackboard).

**Topic 4.** Methods of research of the patient: methods and techniques of percussion. Classification of percussion sounds. Lung percussion (comparative, topographic).

**Type of training session:** practical training.

**Purpose:** To teach the technique of lung percussion, interpretation of the results obtained in normal lung percussion and in pulmonary pathology.

**Training session plan**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Practice of practical skills: general rules and methods of performing lung percussion, presented in the FEF.- Practical training on a clinical basis: the teacher demonstrates the technique of lung percussion on the patient, during the demonstration of the skill, explanations are given, the results obtained are explained. Students in the study rooms independently practice percussion skills by training, using the student as a model. The teacher monitors the work of students, explains mistakes.* - Control of practical skills (by palpation) the list of skills is presented in the FEF.
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (posters on the method of percussion of the lungs, heart, liver and spleen);

- material and technical (chalk, blackboard)

- educational film: examination of a lung patient (on CD-ROM).

**Topic 5.** Methods of research of the patient: percussion of the heart: the boundaries of relative and absolute dullness, the diameter of the heart, the width of the vascular bundle. Percussion of the liver by Kurlov. Percussion of the size of the spleen.

**Type of training session:** practical training.

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Practice of practical skills: general rules and methods of performing lung percussion, presented in the FEF.- Practical training on a clinical basis: the teacher demonstrates the method of percussion of the heart, liver, and spleen on the patient, explains his actions and the result obtained, then the students are assigned two to one patient and independently perform percussion of the lungs, heart, and liver. Then the teacher together with the whole group checks the received data. The student reports the received percussion data and demonstrates the presence of the pathology detected during percussion. Attention is paid to the technique and compliance with the rules of percussion. The teacher controls the student's work.* Control of practical skills in lung percussion (the list of skills is presented in the FEF).
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (posters on the method of percussion of the lungs, heart, liver and spleen);

- material and technical (chalk, blackboard)

- educational film: methods of research of the cardiovascular system of the patient (on CD-disk).

**Topic 6.** Methods of research of the patient: methods and techniques of auscultation of the lungs. Lung auscultation (background, mediocre, immediate), comparative lung auscultation. The main and additional respiratory noises are normal and abnormal. The concept of bronchophonia.

**Type of training session:** practical training.

**Purpose:** To teach the method of auscultation of the lungs.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.****-** Consolidation of theoretical material: questions and tasks for consideration are presented in the FOS.- Practice of practical skills: general rules and methods of auscultation of the lungs are presented in the FEF.- Practical training on a clinical basis: students are assigned two to one patient and perform auscultation of the lungs independently. Then the teacher together with the whole group checks the received data.* - Control of practical skills in percussion of the heart, liver, and spleen (the list of skills is presented in the FEF).
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (posters on the method of auscultation of the lungs);

- material and technical (chalk, blackboard).

- educational film: examination of a lung patient (on CD-ROM).

**Topic 7.** Methods of research of the patient: auscultation of the heart. The heart tones are basic and additional. The main properties of tones: strength, timbre, splitting, bifurcation, their change in pathology.

**Type of training session:** practical training.

**Purpose:** To teach the technique of auscultation of the heart.

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.****-** Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Practice of practical skills: general rules and methods of auscultation of the heart are presented in the FEF.- Practical training on a clinical basis: students are assigned two by two to one patient and perform heart auscultation independently. Then the teacher together with the whole group checks the received data.* - Control work on auscultation of the heart (the list of questions is presented in the FEF).
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;* - the task for self-training of students is presented in the FEF.
 |

**Training tools:**

- didactic (posters on the method of auscultation of the heart);

- material and technical (chalk, blackboard).

**Topic 8.** Methods of research of the patient: auscultation of the heart. Classification of noise, the mechanism of their formation, diagnostic value. Testing.

**Type of training session:** practical training.

**Purpose:** To teach the technique of auscultation of the heart, the interpretation of the obtained auscultative data.

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**-Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.-Practice of practical skills: general rules and methods of auscultation of the heart are presented in the FEF.Practical training on a clinical basis: students are assigned two to one patient and perform heart auscultation on their own. Then the teacher together with the whole group checks the received data.-Testing. Test tasks for the control of knowledge in module 1 are presented in the FEF.* Final delivery of practical skills (the list of practical skills is presented in the FEF).
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;* - the task for self-training of students is presented in the FEF.
 |

**Training tools:**

- didactic (posters on the method of auscultation of the heart);

- material and technical (chalk, blackboard).

**Module 2. Laboratory and instrumental research methods.**

**Topic 1.** ECG (principle of the method, normal ECG, heart axis, ventricular and atrial hypertrophy).

**Type of training session:** practical training.

**Purpose:** To teach the technique of ECG removal and analysis.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.****-** Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Demonstration of the ECG removal technique. Mastering the skill of taking an ECG (the student serves as a model). Demonstration of the ECG analysis technique, the teacher demonstrates ECG films (normal and with signs of hypertrophy of the heart), ECG albums.* - Development of practical skills: mastering the algorithm of ECG decoding (normally, with ECG-signs of myocardial hypertrophy). Tasks for ECG films are presented in the FOS. Students work independently, analyzing ECG films on the topic of the lesson. The teacher controls the correctness of the ECG decoding.
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (ECG films, ECG albums, situational tasks on ECG);

- material and technical (chalk, blackboard, electrocardiograph).

**Topic 2. ECG (arrhythmias: sinus, extrasystole, paroxysmal tachycardia, flutter and flicker of the atria and ventricles).**

**Type of training session:** practical training.

**Purpose:** To teach the method of decoding ECG with cardiac arrhythmias.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.* Development of practical skills: practical tasks for the evaluation of electrocardiograms are presented in the FOS. Demonstration of ECG analysis techniques for rhythm disorders, the teacher demonstrates ECG films with arrhythmias, ECG albums. Development of practical skills: mastering the algorithm of ECG decoding (in case of rhythm disorders). Tasks for ECG films are presented in the FOS. Students work independently, analyzing ECG films on the topic of the lesson. The teacher controls the correctness of the ECG decoding.
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (ECG films, ECG albums, situational tasks on ECG);

- material and technical (chalk, blackboard).

**Topic 3. ECG (blockades: sinoauricular, atrioventricular, bundle legs of Gis, violation of intraventricular conduction).**

**Type of training session:** practical training.

**Purpose:** To teach the method of decoding ECG with conduction disorders.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.* - Development of practical skills: practical tasks for the evaluation of electrocardiograms are presented in the FEF. Demonstration of ECG analysis techniques for conduction disorders, the teacher demonstrates ECG films with blockages, ECG albums. Development of practical skills: mastering the algorithm of ECG decoding (in case of conduction disorders). Tasks for ECG films are presented in the FEF. Students work independently, analyzing ECG films on the topic of the lesson. The teacher controls the correctness of the ECG decoding.
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (ECG films, ECG albums, situational tasks on ECG);

- material and technical (chalk, blackboard).

**Topic 4. ECG in myocardial infarction (stage, localization, depth of spread).**

**Type of training session: practical training.**

**Purpose:** To teach the method of decoding ECG with conduction disorders.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.****-** Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: practical tasks for the evaluation of electrocardiograms are presented in the FEF. Demonstration of ECG analysis techniques for conduction disorders, the teacher demonstrates ECG films with blockages, ECG albums. Development of practical skills: mastering the algorithm of ECG decoding (in case of conduction disorders).* - Control work on ECG (students are presented with ECG films for analysis on all the studied topics-1-4 classes of 2 modules)
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (ECG films, ECG albums, situational tasks on ECG);

- material and technical (chalk, blackboard).

**Topic 5.** Questioning and examination of patients with pathology of the circulatory system. Instrumental research methods.

**Type of training session:** practical training.

**Purpose:** To teach the method of questioning and examination of patients with circulatory system pathology, analysis of the results of instrumental research methods.

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.-- Development of practical skills: practical tasks for the evaluation of the electrocardiogram are presented in the FEF.* - Practical training on a clinical basis: curating a thematic patient in the therapeutic department, writing a fragment of the educational medical history (the scheme of the medical history is presented in the FEF).
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (chart of the medical history, ECG films);

- material and technical (chalk, blackboard).

**Topic 6.** Questioning, examination of a lung patient. Determination of the function of external respiration. Spirometry. Spirography. Pneumotachometry. Radiological, endoscopic methods of research. Computed tomography. Analysis of sputum and pleural fluid.

**Type of training session:** practical training.

**Purpose:** To teach the method of questioning and examination of a lung patient, analysis of the results of laboratory, functional, and instrumental methods of research of patients with respiratory system pathology.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks for evaluating sputum and pleural fluid tests are presented in the FEF.* - Practical training on a clinical basis: curating a thematic patient in the therapeutic department, writing a fragment of the educational medical history (the scheme of the medical history is presented in the FEF).
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

**-** didactic (situational tasks with analysis of sputum and pleural fluid analyses, chart of the medical history);

- material and technical (chalk, blackboard).

**Topic 7.** Questioning and examination of patients with diseases of the digestive system. Laboratory-instrumental and radiological methods of research.

**Type of training session:** practical training.

**Purpose:** To teach the method of questioning and examination of a patient with diseases of the digestive system, analysis of the results of laboratory and instrumental research methods.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.****-** Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: practical tasks for evaluating the analysis of gastric and duodenal contents are presented in the FEF.* - Practical training on a clinical basis: curating a thematic patient in the therapeutic department, writing a fragment of the educational history of the disease.
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

**-** didactic (situational tasks with analysis of gastric and duodenal contents, chart of the medical history);

- material and technical (chalk, blackboard).

**Topic 8.** Questioning and examination of patients with pathology of the urinary system. Laboratory-instrumental and radiological methods of research. Final lesson on laboratory and instrumental methods of research.

**Type of training session: practical training.**

**Purpose:** To teach the method of questioning and examination of a patient with a pathology of the urinary system, analysis of the results of laboratory and instrumental research methods. To generalize and systematize knowledge about laboratory and instrumental research methods in therapeutic practice.

**Training session plan**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.****-** Consolidation of theoretical material: questions and tasks for consideration are presented in the FOS.-- Development of practical skills: practical tasks on the assessment of the general urinalysis, the Zimnitsky test, for dilution and concentration are presented in the FEF.- Practical training on a clinical basis: patient supervision in the therapeutic department.* - Final testing for module 2 (test tasks are presented in the FEF).
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;* - the task for independent training of students is presented in the FEF.
 |

**Training tools:**

- didactic (situational tasks with analysis of urine tests, a chart of the medical history);

- material and technical (chalk, blackboard).

**Module 3. Clinical syndromes in therapeutic practice.**

**Topic 1.** The main pulmonary syndromes: the syndrome of bronchial patency disorders, compaction of the lung tissue, air cavity in the lung, increased airiness of the lung tissue.

**Type of training session:** practical training.

**Purpose:** To teach the method of detection of the main pulmonary syndromes: bronchial obstruction, compaction of the lung tissue, air cavity in the lung, emphysema of the lungs.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.****-** Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.- Practical training on a clinical basis: curating a thematic patient in the therapeutic department, writing a fragment of the educational history of the disease. |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (radiographs, chart of the medical history, pulmonary syndromes);

- material and technical (chalk, blackboard).

**Topic 2.** The main pulmonary syndromes: obturation and compression atelectasis, accumulation of fluid and air in the pleural cavity, respiratory failure.

Type of training session: practical training.

**Purpose:** To teach the method of identifying the main pulmonary syndromes: atelectasis, accumulation of fluid and air in the pleural cavity, respiratory failure.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.- Practical training on a clinical basis: patient supervision in the therapeutic department. |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF |

**Training tools:**

**-** didactic (radiographs, chart of the medical history, pulmonary syndromes);

- material and technical (chalk, blackboard).

**Topic 3.** Symptomatology of the most common respiratory diseases: acute and chronic bronchitis, bronchial asthma, focal and croup pneumonia, pleurisy, bronchiectatic disease, lung abscess, lung cancer.

**Type of training session:** practical training.

**Purpose:** To teach the method of detection of the most common respiratory diseases: acute and chronic bronchitis, bronchial asthma, focal and croup pneumonia, pleurisy, bronchiectatic disease, lung abscess, lung cancer.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.* - Practical training on a clinical basis: curating a thematic patient in the therapeutic department, writing a fragment of the medical history (the scheme of the medical history is presented in the FEF).
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (radiographs, chart of the medical history, situational tasks);

- material and technical (chalk, blackboard).

**Topic 4.** Major cardiac syndromes: cardiac arrhythmias, blockades. Electrocardiography. Registration, analysis.

**Type of training session:** practical training.

**Purpose:** To teach the method of identifying the main cardiac syndromes: cardiac arrhythmias, blockages.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills (**written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.****-** Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks, ECG on the topic of practical training are presented in the FEF.- Practical training on a clinical basis: patient supervision in the therapeutic department. |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for self-training of students is presented in the FEF. |

**Training tools:**

- didactic (tables, chart of medical history, cardiac syndromes, ECG films);

- material and technical (chalk, blackboard).

**Topic 5.** Major cardiac syndromes: acute left ventricular failure, chronic heart failure. Hypertension of the small circle of blood circulation, pulmonary heart.

**Type of training session:** practical training.

**Purpose:** To teach the method of identifying the main cardiac syndromes: acute left ventricular failure.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.* - Practical training on a clinical basis: curating a thematic patient in the therapeutic department, writing a fragment of the medical history (the scheme of the medical history is presented in the FEF).
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (tables, chart of medical history, cardiac syndromes);

- material and technical (chalk, blackboard).

**Topic 6.** Major cardiac syndromes. Arterial hypertension syndrome. Hypertension. Secondary, symptomatic arterial hypertension. Arterial hypotension syndrome. Acute vascular insufficiency syndrome (syncope, collapse, shock). Emergency care.

**Type of training session:** practical training.

**Purpose:** To teach the method of identifying the main cardiac syndromes: arterial hypertension and hypotension, acute vascular insufficiency syndrome.

**Training session plan**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.* - Practical training on a clinical basis: curation of a thematic patient in the therapeutic department.
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for self-training of students is presented in the FEF. |

**Training tools:**

- didactic (tables, chart of medical history, cardiac syndromes);

- material and technical (chalk, blackboard).

**Topic 7.** Atherosclerosis. CHD. Angina, classification, pathogenesis. Myocardial infarction.

Type of training session: practical training.

**Purpose:** to teach the method of detection of atherosclerosis, CHD, angina, myocardial infarction.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.* - Practical training on a clinical basis: curation of a thematic patient in the therapeutic department.
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (tables, chart of medical history, cardiac syndromes);

- material and technical (chalk, blackboard).

**Topic 8.** Acquired heart defects: mitral stenosis and insufficiency.

Type of training session: practical training.

**Purpose:** to teach the method of detecting acquired mitral heart defects.

**Training session plan**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**-Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.-Working out practical skills: situational tasks on the topic of the practical lesson are presented in the FEF. |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (tables, cardiac syndromes);

- material and technical (chalk, blackboard).

**Topic 9.** Acquired heart defects: stenosis and aortic valve insufficiency.

Type of training session: practical training.

**Purpose:** to teach the method of detecting acquired aortic heart defects.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.****-** Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.* - Written control work on heart defects (questions are presented in the FEF).
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for self-training of students is presented in the FEF. |

**Training tools:**

**-** didactic (tables, cardiac syndromes);

- material and technical (chalk, blackboard).

**Topic 10.** Major gastric syndromes. Symptomatology of gastritis, gastric ulcer and duodenal ulcer, stomach cancer.

**Type of training session:** practical training.

**Purpose:** To teach the method of identifying the main gastric syndromes, diseases of the stomach.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.- Practical training on a clinical basis: patient supervision in the therapeutic department. |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (tables, chart of the medical history, the main syndromes in gastroenterology);

- material and technical (chalk, blackboard).

**Topic 11.** The main hepatic syndromes: jaundice (parenchymal, mechanical, hemolytic), portal hypertension, hepatolienal syndrome, hepatic insufficiency (hepatic coma).

**Type of training session:** practical training.

**Purpose:** To teach the method of identifying the main liver syndromes.

**Training session plan**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.- Practical training on a clinical basis: curation of a thematic patient in the therapeutic department, a fragment of the medical history. |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

**-** didactic (tables, chart of the medical history, the main syndromes in gastroenterology, biochemical blood tests for jaundice);

- material and technical (chalk, blackboard).

**Topic 12.** Symptomatology of hepatitis, cirrhosis of the liver, cholelithiasis, cholecystitis.

Type of training session: practical training.

**Purpose:** To teach the method of detection of hepatitis, cirrhosis of the liver, cholelithiasis, cholecystitis.

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.- Practical training on a clinical basis: patient supervision in the therapeutic department.  |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

**-** didactic (tables, chart of the medical history, the main syndromes in gastroenterology, biochemical blood tests for jaundice);

- material and technical (chalk, blackboard).

**Topic 13.** The main renal syndromes: urinary, nephrotic, nephritic, acute and chronic renal failure, renal hypertension, renal eclampsia.

**Type of training session:** practical training.

**Purpose:** To teach the method of identifying the main renal syndromes.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.- Practical training on a clinical basis: patient supervision in the therapeutic department. |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (tables, chart of the medical history, blood tests, urine tests, dilution test, concentration test, urine analysis according to Nechiporenko, according to Zimnitsky);

- material and technical (chalk, blackboard).

**Topic 14.** Symptomatology of acute and chronic glomerulonephritis, pyelonephritis,urolithiasis.

**Type of training session:** practical training.

**Purpose:** To teach the method of identifying the main renal syndromes.

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.- Practical training on a clinical basis: patient supervision in the therapeutic department. |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

**-** didactic (tables, chart of the medical history, blood tests, urine tests, dilution test, concentration test, urine analysis according to Nechiporenko, according to Zimnitsky);

- material and technical (chalk, blackboard).

**Topic 15.** Symptomatology and methods of diagnosis of major syndromes in anemia.

**Type of training session:** practical training.

**Purpose:** To teach the method of identifying the main syndromes in anemia.

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.****-** Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.- Practical training on a clinical basis: patient supervision in the therapeutic department. |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (tables, chart of medical history, blood tests);

- material and technical (chalk, blackboard).

**Topic 16.** Symptomatology and methods of diagnosis of major syndromes in hemoblastosis (leukemia). Hemorrhagic syndrome.

**Type of training session: practical training.**

**Purpose:** To teach the method of identifying the main syndromes in hemoblastosis (leukemia). Hemorrhagic syndrome.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**-Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.-Working out practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.-Practical training on a clinical basis: patient supervision in the therapeutic department. |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (tables, chart of medical history, blood tests, situational tasks);

- material and technical (chalk, blackboard).

**Topic 17.** Symptomatology and methods of diagnosis of major syndromes in endocrine diseases (diabetes mellitus, thyrotoxicosis). Emergency care for diabetic (ketoacidotic), hypoglycemic and thyrotoxic coma.

**Type of training session:** practical training.

**Purpose:** To teach the method of identifying the main syndromes in patients with diabetes mellitus, thyrotoxicosis, to systematize knowledge about emergency care for comas in these groups of patients.

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.* - Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF.
 |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (stands, chart of the medical history, situational tasks);

- material and technical (chalk, blackboard).

**Topic 18.** Final medical history.

**Type of training session:** practical training.

**Purpose:** To generalize and systematize knowledge about direct methods of research, laboratory and instrumental methods of research in therapeutic practice, writing an educational history of the disease.

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Development of practical skills: a list of practical skills, practical tasks for evaluating laboratory and instrumental research methods are presented in the FEF.- Practical training on a clinical basis: the final supervision of the patient in the therapeutic department, writing an educational history of the disease. |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal.- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (chart of the medical history);

- material and technical (chalk, blackboard).

**Topic 19.** Symptomatology and methods of diagnosis of acute allergoses (urticaria, Quincke's edema, anaphylactic shock). Emergency care for anaphylactic shock.

**Type of training session: practical training.**

**Purpose:** To teach the method of identifying the main syndromes in acute allergoses and to systematize knowledge about the provision of emergency care to these groups of patients.

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**- Consolidation of theoretical material: questions and tasks for consideration are presented in the FEF.- Development of practical skills: situational tasks on the topic of the practical lesson are presented in the FEF. |
| 4 | **The final part of the lesson:**- summing up the results of the lesson;- submission of current grades to the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (stands, situational tasks);

- material and technical (chalk, blackboard).

**Topic 20.** Final lesson. Testing. Reception of practical skills in physical research methods and emergency conditions.

**Type of training session:** practical training.

**Purpose:** control of the development of practical skills, theoretical knowledge of the discipline (final testing), summing up the results

**The plan of the training session**

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| № s/n | Stages and content of the lesson |
| 1 | **Organizational moment.**Announcement of the topic, the purpose of the lesson.Motivational moment (the relevance of studying the topic of the lesson). |
| 2 | **Input control, updating of reference knowledge, skills, skills** (written survey). Questions for the written survey are presented in the FEF. |
| 3 | **The main part of the training session.**-Control of the development of theoretical material: questions and test tasks for consideration are presented in the FEF.-Practice of practical skills: a list of questions on practical skills are presented in the FEF.-Protection of the abstract (the topics of the abstracts are presented in the FEF)* Final testing (test tasks are presented in the FEF)
 |
| 4 | **The final part of the lesson:**-- summing up the results of the class, academic performance and BRS in the discipline for the year;- grading in the training journal;- the task for independent training of students is presented in the FEF. |

**Training tools:**

- didactic (stands, list of questions on practical skills, topics of abstracts);

- material and technical (chalk, blackboard).