MINISTRY OF HEALTH OF UKRAINE

ODESA NATIONAL MEDICAL UNIVERSITY

Faculty: international

Department of occupational pathology and functional diagnostics and phthisiopulmonology

CONFIRMED by

Vice-rector for scientific and pedagogical work

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September 04, 2023

METHODOLOGICAL DEVELOPMENT TO THE LECTURES ON THE EDUCATIONAL DISCIPLINE

Faculty: international, 5th year
Educational discipline: phthisiology

Approved:
Meeting of the Department of occupational pathology and functional diagnostics and phthisiopulmonology of Odesa National Medical University

Minutes No. 1 dated 04.09.2023

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Lecture No. 1

Topic: Determination of tuberculosis as a scientific and practical problems. The history of the development of phthisiology. Epidemiology of tuberculosis. Etiology, pathogenesis of tuberculosis. Immunity in tuberculosis. Detection and diagnosis of tuberculosis.

Actuality of theme.

Worldwide, tuberculosis is one of the 10 leading causes of death from any single infectious agent (ahead of HIV/AIDS). An estimated 10 million people worldwide contracted tuberculosis in 2019, including 5.6 million men, 3.2 million women and 1.2 million children. Diagnosing and treating tuberculosis in children and adolescents can be difficult, and the disease often goes unrecognized by health care workers at this age.

In 2019, the 30 countries with a heavy burden of tuberculosis accounted for 87% of new cases of tuberculosis, of which two-thirds of the cases were in eight countries, among which India took the first place, followed by Indonesia, China, the Philippines, Pakistan, Nigeria , Bangladesh and South Africa.

Multidrug-resistant tuberculosis (MDR-TB) is a crisis situation and a threat to health security. Between 2000 and 2019, 60 million lives were saved thanks to the diagnosis and treatment of tuberculosis.

One of the goals in the field of health care within the framework of the Sustainable Development Goals (SDGs) is to put an end to the tuberculosis epidemic by 2030.

Purpose: To acquaint applicants with tuberculosis as a scientific and practical problem, its development history and epidemiological component, the basics of etiopathogenesis, pathomorphology, the importance of immune status and the role of genetic factors in the development of tuberculosis.

Main tasks:

- Acquaint applicants with the main stages of educational development aboutpulmonary tuberculosis; highlight the contribution of domestic scientists.
- To acquaint applicants with the characteristics of the causative agent of tuberculosis, which are important for the clinic.
- To form among the applicants an idea about the epidemiology of tuberculosis in the present time.
- Familiarize miners with modern detection methods pathogentuberculosis in the discharge of the patient.
- to form gainers of understanding features of the disease, which is characterized by a wide variety of forms and clinical manifestations.
- To educate the applicants in a modern clinical worldview.
- To inculcate in the applicants responsibility before the patient and the state for fulfilling the professional and official duty of the doctor for the early detection of tuberculosis.
- Emphasize the need to follow the principles of hospital ethics deontology during the clinical examination of a patient with suspected tuberculosis.

Basic concepts:tuberculosis, phthisiology, epidemiology of tuberculosis, etiology and pathogenesis of tuberculosis, immunity in tuberculosis.

Plan and organizational structure of the lecture.

No n/n	The main stages of the lecture and their content	Objectives in levels abstractions	Type of lecture, methods and means of activation miners, equipment	Distribution of time
1.	2.	3.	4.	5.
	Preparatory stage			
1.	Setting educational goals		The type of lecture is a	2%
2.	Software positivemotivation		thematic lecture. Equipment	3%
3.	**The main stage** Presentation lecturematerial	II	lectures:negatoscope, microscope. Sosobita methodsactivation of students:	88%
	Plan: 1. Introduction, rationale andActuality of theme.	III	Educational tasks Questions Problem situations Means of visibility: tables, sputum preparations from MBT, X-rayssick,	
	2. The history of the development of phthisiology. 3. Epidemiology of tuberculosis. 4. The causative agent of tuberculosis, typesKoch bacteria, properties, color, variability,external resistance environment	III	which were demonstrated on lectures	
	5. Ways of penetration of the causative agent of tuberculosis into the body. Changesinfiltration Lubeck tragedy.	IV		
	6. Classificationtuberculosis 7. Demonstration of patients. 8. Socio-class nature of tuberculosis. Tuberculosis in Ukraine.			
	The final stage.			
4.	Summary of the lecture, general	III		3%
5.	conclusions. The lecturer's answers	II		2%
6.	to possible questions.	III		2%
	Tasks for self-training acquirers		List literature,question, task.	

Content of the lecture material.

Tuberculosisis a chronic infectious disease, the causative agent of which is mycobacteria; it is characterized by the formation of foci of specific granulomatous inflammation in the affected tissues, as well as a general non-specific reaction of the organism of toxic-allergic origin.

Today, it is safe to say that tuberculosis has existed since the beginning of human history and in modern conditions, as before, is a very relevant social problem.

History. The oldest archaeological find of a tuberculous lesion of the spinal column of a person was found on the territory of Germany and dates back to the 8th millennium BC. e. Tuberculosis changes were also found in Egyptian mummies dated to 2 thousand BC. e., and the

oldest known description of the clinical manifestations of this disease belongs to the "father of medicine" - Hippocrates (460-370 BC). IN

XV-XIX centuries. tuberculosis became widespread, especially among the poor strata of the population, which was facilitated by unsanitary conditions, overcrowding, unsatisfactory nutrition, frequent wars and migration, and a low level of medical care. Up to 20-30 percent of all deaths in the 17th century. accounted for tuberculosis, which exceeded mortality during epidemics of cholera, typhus and military operations. For example, in Lviv in 1895, 935 people died of tuberculosis, which was 22.4% of the total number of deaths, and in 1904 - 1093 (23.3% of all deaths). In the 20th century, especially after the Second World War, when effective methods of prevention and modern anti-tuberculosis drugs were put into practice, the epidemiological situation with tuberculosis improved significantly. Optimistic forecasts were made regarding the possibility of rapid eradication of this disease, which, however, did not come true in any of the countries of the world. And since the beginning of the 90s (when the maximum positive effect was achieved), tuberculosis has returned to the world arena as a serious health care problem. Medical advances in industrialized countries with high national income and strong social programs over the past 20 years have reduced tuberculosis from a widespread disease to a relatively minor public health problem. However, the main reservoir of infection remained in underdeveloped countries with high birth rates or countries with limited economic opportunities

The tuberculosis epidemic in our country was declared in 1995 according to WHO criteria. According to WHO criteria, Ukraine is currently classified as a group of countries with a high burden of tuberculosis. After a 15-year period of worsening of the tuberculosis epidemic situation, when the morbidity and mortality rate increased by more than 2.5 times, finally, from 2006, positive dynamics of these indicators began to be noted. In Ukraine, an anti-tuberculosis service has been built and is working effectively, which is headed by the Committee on Combating HIV/AIDS and other socially dangerous diseases within the Ministry of Health of Ukraine. The main scientific and methodical institution in the field of phthisiology is the State University

National Institute of Phthisiology and Pulmonology named after F.G. Yanovsky National Academy of Sciences of Ukraine", on the basis of which the reference laboratory for microbiological diagnosis of tuberculosis is located. It was she who was entrusted with the functions of the Central Reference Laboratory of the Ministry of Health of Ukraine by the joint order of the Ministry of Health and the Ministry of Health of Ukraine No. 337/42 dated May 20, 2009.

Adoption of a number of important regulatory and legal acts in the field of state policy against tuberculosis contributed to positive developments regarding the epidemic situation. In 2010, four important normative and regulatory acts were approved, including the Order of the Ministry of Health dated 16.08.2010 No. 684 "On approval of the Standard for tuberculosis infection control in treatment and prevention facilities, places of long-term stay of people and residence of tuberculosis patients". In order to provide citizens of Ukraine with high-quality medical care in case of this disease, an industry standard was created. Order of the Ministry of Health of Ukraine dated September 4, 2014, No. 620

"Unified clinical protocol of primary, secondary (specialized) and tertiary (highly specialized) medical care. Tuberculosis" and other orders.

Thus, the issue of combating tuberculosis has been raised to the level of priority national tasks.

Tuberculosis should be known by doctors of all fields due to the fact that this disease affects the entire human body and can be localized in all organs and systems of the macroorganism. If a person begins to cough, has a temperature or other symptoms, he does not go to the tube dispensary, but first of all he turns to his district therapist, who depends on the accuracy of the diagnosis, the timeliness of certain examination methods, so as not to miss tuberculosis. The same applies to surgeons, gynecologists, laryngologists, ophthalmologists, dermatologists, pediatricians, infectious disease specialists, and others.

Ancient doctors knew tuberculosis very well. The doctors of ancient Greece, led by Hippocrates (4th - 5th centuries BC), skillfully described the picture of pulmonary

tuberculosis Aristotle claimed that tuberculosis (so called tuberculosis) is contagious. For several centuries, the teachings of the Roman physician Galen (131 – 201 BC) were infallible and dominated in medicine. The name of the outstanding scientist Avicenna (980 - 1037) is also known to the whole world. The famous Italian doctor Girolamo Fracastoro (11th century) wrote that dry mouth spreads through the air and by contact. Actual progress in the study of tuberculosis is associated with the name of the French doctor Sylvia (1614-1672), as well as the famous René Théophile Laennec (1781-1826). After Laennec came the era of searching for the causes of tubercular process. Some claimed that tuberculosis develops as a result of a metabolic disorder, others claimed that tuberculosis is a purulent process in the lungs, and others claimed that tuberculosis is an infectious disease.

The honor of finally elucidating the etiology of tuberculosis as an infectious disease fell to the fate of Robert Koch, who established that the causative agent of tuberculosis is the bacteria named Koch bacteria in honor of their discoverer. Robert Koch in 1882 provided comprehensive evidence in favor of the fact that "without the tubercle bacterium there is no tuberculosis."

Koch's triad. Robert Koch isolated a pure culture of MBT from the organs of persons who died of tuberculosis. With this culture, he infected animals that had a tubercular process. He isolated a pure culture of bacteria from the organs of killed animals and proved the identity of this culture and the original one. In this way, it was finally established that tuberculosis is an infectious disease, that all forms of tuberculosis are caused by a single pathogen.

At the meeting of the Physiological Society in Berlin on March 24, 1882, Koch gave a report "Etiology of tuberculosis", in which he presented convincing data on his discovery of the causative agent of tuberculosis. For this discovery, Koch was recognized as worthy of the Nobel Prize in 1905. Among the reasons contributing to the emergence and development of tuberculosis, Koch emphasized the role of social factors. "Readiness for disease," he wrote, "is especially high in weakened organisms that are in poor conditions." As long as there are slums on earth where the sun's rays do not penetrate, drought will continue to exist."

In 1982, by decision of the World Health Organization, the 100th anniversary of Koch's discovery of the causative agent of tuberculosis was widely celebrated.

Epidemiology. This is a science that studies where the infection comes from and its sources, by which ways the infection is transmitted, as well as what methods of prevention of infectious diseases should be carried out.

The leading statistical indicators used in the assessment of the epidemiological situation in phthisiology are as follows.

Morbidity- the number of persons who first became ill with tuberculosis during the calendar year, calculated per 100,000 population.

Morbidity(prevalence) - the number of all persons suffering from tuberculosis (diagnosed for the first time and patients from previous years), identified and registered at the end of the year, calculated per 100,000 population.

Mortality- the number of deaths from tuberculosis during the year, calculated per 100,000 population.

Infectivity- the share of persons who have a positive reaction to tuberculin from the number of those covered by tuberculin diagnostics, expressed as a percentage.

Etiology. The causative agent of tuberculosis belongs to the genus Mycobacterium of the family Mycobacteriaceae, order Actinomycetalis. It is known that there are several types of mycobacteria that cause tuberculosis in humans and animals: Mycobacterium tuberculosis (human species), Mycobacterium bovis (bovine species), Mycobacterium africanum (intermediate species). At 92
% of cases of tuberculosis in humans is caused by M. tuberculosis, in 5% by M. bovis, in 3% by M. africanum.

It should be noted that not only these mycobacteria cause diseases in humans. Yes, mycobacteria of the MAIS complex (M.avium, M.intracellularae, M. scrofulaceum)

cause diseases similar to tuberculosis in humans and animals. These diseases are still diagnosed only in rare cases. The problem of mycobacteriosis (MAIS) became especially relevant after it turned out that this pathology often develops in AIDS patients and in a significant number of cases is the cause of their death.

Tuberculosis mycobacteria are thin or straight slightly curved rods with a length of 1 – 10 (more often 1 – 4) μm, 0.2 – 0.6 μm wide, homogeneous or granular with slightly rounded ends. They are immobile, will not form endospores, conidia and capsules.

Tuberculosis bacilli are acid-alcohol- and alkali-resistant. These qualities are used in painting. They perceive dyeing very difficult, but after being dyed, they do not discolor even under the influence of alcohols and acids. The most common staining method is the Ziel-Nielsen method.

Since the time of Koch, our ideas about both the morphology and the biology and biochemistry of tuberculous mycobacteria have changed significantly. Great merit in the study of these issues belongs to our domestic scientists - I. I. Mechnikov, Petrov, Togunova, and others. The morphological structure of tuberculosis mycobacteria, described by Robert Koch, is now studied and detailed using new methods of cytological research - luminescent phase-contrast electron microscopy.

The morphology and size of bacterial cells vary significantly, which depends on the age of the cells and especially on the conditions of existence and composition of the nutrient medium. With the help of electron microscopy, the main structural elements of tuberculosis mycobacteria were identified: cell wall, cytoplasmic membrane and its derivative - mesosome, cytoplasm, nuclear substance - nucleotide.

The cell wall limits the cell from the outside, providing mechanical and osmotic protection. Microscopically, three layers with a thickness of 10 nm can be distinguished in the cell wall: outer - dense electron-optical, osmiophobic - less dense, inner layer. Peptidoglycolipids, lipopolysaccharides, and mycolic acid are determined in the cell wall. The surface of the cell wall is covered with densely packed fibrils consisting of lipopolysaccharides. These fibrils also contain mycolic acid. Peptidoglycan molecules have high mechanical strength, which is important for preserving the viability of the cell and its shape. Violation of peptidoglycan synthesis leads to a loss of elasticity and causes the death of MBT. The cell wall contains species-specific antigens. Vaccines made from the cell walls of mycobacterium tuberculosis have different virulence and immunogenicity.

According to modern ideas, the composition of the cytoplasmic membrane, located under the cell wall, includes lipoprotein complexes. Various enzyme systems are connected with it, in particular redox systems. The processes responsible for the specificity of the reactions of the mycobacterial cell to the environment are carried out in the cytoplasmic membrane.

The cytoplasmic membrane of mycobacterium tuberculosis by invagination into the cytoplasm forms an internal cytoplasmic membrane system, or mesosome. Mesosomes are multifunctional. The localization of many enzyme systems is connected with them, they participate in the synthesis of the cell wall material, they act as an intermediary between the nucleus and the cytoplasm. Weak development or absence of mesosomes was noted in avirulent strains of Mycobacterium tuberculosis.

The cytoplasm of mycobacterium tuberculosis consists of granules and vacuoles of different sizes.

The nuclear substance of mycobacterium tuberculosis (nuclear nucleotide) determines the specific properties of the cell, the most important of which are protein synthesis and the transmission of hereditary traits to offspring. It was established that the main method of reproduction of these bacteria is the division of mother cells into two daughter cells.

Numerous morphological variants of mycobacteria are described: giant forms with bulbous thickened branches, filamentous, mycelium-like and mace-like,

diphtheroid and actinomycotic forms. Tuberculosis mycobacteria can be longer or shorter, thicker or thinner than usual, homogeneous or granular.

The phenomenon of variability of mycobacterium tuberculosis was discovered soon after their discovery. Already in 1888, I.I. Mechnikov reported that, in addition to typical Koch rods, polymorphic forms of these microorganisms are found in cultures. The first report on the possibility of the existence of filtering forms in Mycobacterium tuberculosis dates back to 1910. During chemotherapy of experimental destructive tuberculosis, as well as after its termination, very small simplified structure of pathogen forms called ultrafine. Then it was shown that these forms can revert to the classical rod-shaped form through repeated biological passages.

One of the types of variability of many bacteria is the formation of L-forms. The essence of L-transformation is that under the influence of adverse factors, the microbial cell loses its cell wall structure partially or completely. In the first case, the microorganism becomes defective in the cell wall, in the second case, it changes into the form of a spheroplast or protoplast, loses the ability to reproduce and dies. The ability to form L-forms has also been proven in mycobacterium tuberculosis. At the same time, it was found that the transformation of mycobacteria into L-forms is enhanced under the influence of anti-tuberculosis drugs. In the sputum of "abacilar" patients with destructive forms of tuberculosis, L-forms of mycobacteria can be found, which are able to stay in the body for a long time and in the future, under appropriate conditions, revert to the rod-shaped version.

Tuberculosis mycobacteria are very resistant to environmental factors. In natural conditions, in the absence of sunlight, their viability can be preserved for several months, with diffused light, pathogens die in 1-1.5 months. In street dust, MBTs are stored for up to 10 days, on the pages of books - up to 3 months. in water - up to 5 months. Mycobacteria die in the sunlight, so infection with tuberculosis outside the premises during the day is unlikely. Direct sunlight kills M. tuberculosis within 5 minutes. It is constantly used in tropical countries, and in Russia - in the summer to disinfect blankets and other objects. A 1% solution of sodium hypochlorite dissolves sputum and quickly kills mycobacteria in it, while in a 5% solution of phenol, this pathogen remains viable for several hours. At 60°C, mycobacteria survive for 20 minutes, at 70°C for 5 minutes.

Mycobacterium tuberculosis are considered aerobes, although there is information that some of their species can be considered as facultative anaerobes. These mycobacteria multiply very slowly (one cell division occurs in 14-18 hours). Microscopically visible growth of microcolonies that are cultivated on liquid media at a temperature of 37 0 C is detected on 5-7 days, visible growth of colonies on dense media - on 14-20 days.

Ways of infection. Tuberculosis mycobacteria can enter the body in different ways: aerogenously, enterally (through the gastrointestinal tract), through damaged skin and mucous membranes, through the placenta during fetal development. However, the main route of infection is aerogenous.

Each patient with active bacillary tuberculosis infects an average of 10-15 people during the illness. Drops of sputum and sprays of saliva scattered around when the patient coughs spread to a distance of up to two meters from the patient and remain in a suspended state for 30-60 minutes, after which they settle on surrounding objects, dry up and again fall into the air in the form of dust. These particles remain suspended for a long time and easily reach the alveoli when inhaled. Settled particles mix with dust and become less dangerous because they settle in the respiratory tract and are evacuated by mucociliary transport. Although tuberculosis is not classified as highly contagious

diseases, with long-term contact with bacteria isolates, 25-50% of people become infected. This also means that getting infected with tuberculosis does not always mean getting sick. Only 5-15% of infected people get sick, others develop non-sterile immunity, which we will talk about separately. It is known that mycobacteria that get on healthy, intact mucous membranes or skin do not penetrate the tissue. The spread of mycobacteria is also possible during manipulations carried out in clinical and scientific laboratories with affected tissue, punctate, or secretory material obtained during biopsy.

In addition to the aerogenous route of penetration of tuberculosis infection into the human body, the intestinal route is also proven. In case of enteral infection, the absorptive function of the intestines can be of some importance.

In 1994, Dr. Nazarov (Propaedeutic Clinic of ODMU) experimentally proved the possibility of penetration of tuberculosis infection through the intestine. Dr. Nazarov fed guinea pigs porridge, to which he added sputum from a patient with an open form of pulmonary tuberculosis. Pigs died from generalized tuberculosis.

Behring even asserted that infection occurs exclusively in the alimentary way. However, subsequent experimental data did not confirm this.

The intestinal route of infection occurs in cases of using dishes of a tuberculosis patient or in cases of transmission of tuberculosis from animals to humans.

Of the animals, cows are more often sick. In cows, the udder is often affected by the tuberculous process. Inflammatory nodules the size of a large pearl form on the udder, which is why the disease is called "pearlitis". MBT from the udder affected by "pearlitis" gets into milk, and if such milk is consumed raw, it can become a source of tuberculosis infection, especially for young children.

Tuberculosis often occurs in poultry, pigs, sometimes in goats, rarely in sheep, cats and dogs. Flies can also be carriers of tuberculosis infection, sitting on tuberculosis sputum and other secretions of patients, and then using their contaminated paws to transfer microbes to products.

Tonsils, the umbilical cord of babies, damaged skin, etc. can also be entrance gates for tuberculosis infection.

Whatever the entrance gate of the causative agent of tuberculosis, in most cases the formation of a primary focus occurs at the point of penetration of the bacilli. This is clearly evidenced by the results of a clinical and sectional study of children infected with tuberculosis bacteria in Lübeck, Germany. In 1930, as a result of a laboratory error, 252 babies in Lübeck were given a virulent culture of MBT instead of the BCG vaccine. Soon, 68 children died, and during the pathomorphological examination of the corpses, the primary focus was found in the intestines and mesenteric lymph nodes in 85% of cases, and in only 15% - in the lungs, oral cavity, and pharynx. During the clinical examination of 131 children who fell ill but remained alive and were observed for a long time, the same pattern of foci distribution was revealed: in most children, the primary focus was found in the lymph nodes, and only in 11 children - in the pulmonary and bronchial lymph nodes. 53 babies did not get sick.

In some cases, intrauterine infection of the fetus is also possible, mainly as a result of the fact that MBTs get from the blood of a sick mother. It has been established that in women with severe hematogenously disseminated tuberculosis, the impression of the placenta is not very rare (according to various authors, from 25 to 65% of cases). When the placenta is damaged, mycobacteria can enter the body of the fetus by swallowing amniotic fluid, as well as by hematogenous route (umbilical vessel). Intrauterine infection can lead to the development of tuberculosis lesions of different severity in the body of the fetus. Of course, such children die of generalized tuberculosis after birth, and at autopsy they find damage to the liver and periportal lymph nodes, sometimes to the lungs. In rare cases, children live up to 4-6 months. Some cases are described

survival of such children. But, as a rule, children born to tuberculosis mothers are healthy. And if such children are isolated from a sick mother immediately after birth, they will not, as a rule, get tuberculosis in the future. This, in particular, is evidenced by the data of Debre, who observed 1369 such children for 15 years (from 1920 to 1935). It turned out that only 12 children later became ill, and all children had an external source.

Transmission of tuberculosis through germ cells in humans has not been proven.

Pathogenesis. For a person to get tuberculosis, the causative agent of the disease must enter the human body. However, a person gets sick only when his body is somehow weakened and cannot properly resist the infection. An unfavorable external environment, poor housing and communal conditions, insufficient and improper nutrition, infectious diseases, bad habits (alcohol abuse, drug addiction, drug addiction, etc.) reduce the body's resistance, which contributes to the increase in morbidity and mortality from tuberculosis.

Local changes at the site of MBT penetration are caused primarily by the reaction of polynuclear cells, which is replaced by a more advanced form of protective reaction involving macrophages, which carry out phagocytosis and destruction of mycobacteria. The result of the interaction between macrophages and mycobacteria is determined by the state of immunity, the level of PCST that develops in the process of tuberculosis infection, as well as a number of other factors, including those that determine the ability of macrophages to digest.

Phagocytosis consists of three phases: the collision phase, when macrophages fix mycobacteria with the help of receptors on the cell membrane; phases of penetration of mycobacteria into the macrophage by invagination of the macrophage wall and "wrapping" of the mycobacterium; the digestion phase, when macrophage lysosomes fuse with phagosomes containing mycobacteria. Enzymes released from phagolysosomes destroy mycobacteria. Peroxide oxidation mechanisms also play an important role in the process of phagocytosis.

Tuberculosis mycobacteria, like some other microorganisms, entering macrophages, can persist and even continue to multiply. When the digestion process of mycobacteria is blocked, macrophages are destroyed and mycobacteria are released from them.

Macrophages that have phagocytosed mycobacteria and digest them release into the extracellular space fragments of destroyed MBT, proteolytic enzymes, mediators (including interleukin-1) that activate T-lymphocytes, in particular T-helpers. Activated T-helpers secrete mediators - lymphokines (including interleukin-2), under the influence of which new macrophages migrate to the location of mycobacteria. At the same time, the synthesis of the migration inhibition factor is suppressed, the enzymatic activity of macrophages under the influence of the macrophage activation factor increases.

With the intensive reproduction of mycobacteria in the human body due to inefficient phagocytosis, a large number of toxic substances are released, a pronounced PCST is induced, which contributes to the appearance of the exudative component of inflammation with the development of caseous necrosis and its thinning. During this period, the number of T-suppressors increases, the number of T-helpers decreases, which leads to the suppression of PCST. This determines the progression of the tubercular process.

With a relatively small bacterial population under the conditions of PCST and effective phagocytosis, the morphological substrate of tuberculosis is formed - tuberculous granulomas.

Pathomorphology. Tuberculosis is classified as a granulomatous process. Chronic granulomatous inflammation is evaluated as a long-term reaction to a pathogenic stimulus, which is gradually destroyed by the cells of the macrophage-phagocytic system.

Tuberculous granuloma is attributed to infectious etiology, and from pathogenesis to infectious immunopathological inflammation.

The morphology of tuberculous inflammation depends on the reactivity of the organism and the virulence of the pathogen. In a tuberculous focus, the phenomena of exudation, necrosis, or proliferation may prevail, and the focus, accordingly, may be predominantly exudative, necrotic, or productive.

In the area of inflammation, a reaction that does not have signs typical of tuberculosis first develops. In it, the phenomena of alteration and exudation are expressed to varying degrees. Disturbances in the microcirculatory channel come first. They touch the thin structure of the alveolar wall. Neutrophils and macrophages migrate to the focus. Cellular immune responses include the transformation of macrophages into epithelioid cells. As a result of their fusion, giant Pirogov-Langhans cells are formed. Lymphocytes and fibroblasts are located on the periphery of the granuloma. A kind of homogeneous caseous (curd) necrosis is formed in the center.

There is often a perifocal zone of nonspecific inflammatory reaction around the focus of inflammation. As the process progresses, there is an increase in caseous necrosis, increased infiltration of granulation tissue by mononuclear and lymphoid cells, as well as neutrophils, and an expansion of the perifocal inflammation zone. The specific process spreads through contact and lymphatic ways.

During the healing of a tubercular focus, the masses of caseous necrosis are condensed, in the latter, the deposition of small grains of calcium salts is noted. In the granulation tissue, the number of fibroblasts and collagen fibrils increases, which combine into collagen fibers that form a connective tissue capsule around the tubercular focus. In the following, specific granulation tissue is increasingly replaced by fibrous tissue. The number of cellular elements between collagen fibers decreases, sometimes collagen fibers undergo hyalinosis. In such foci and post-tuberculosis foci, altered forms of MBT, in particular L-forms, were detected.

In addition to granulomatous inflammation, paraspecific reactions in various organs and tissues often occur in tuberculosis: the nervous and cardiovascular systems, hematopoietic organs, joints, serous membranes, etc. In the cardiovascular system and parenchymal organs, these reactions are manifested in the form of focal or diffuse histiocytic and lymphocytic infiltration, in lymph nodes - proliferation of reticular and endothelial cells, in the lungs - the formation of lymphoid nodules. O. I. Strukov (1959) believes that these reactions have a toxic-allergic nature.

The use of the most effective chemotherapy drugs leads to a complete cure from tuberculosis. The crucial importance belongs to the macroorganism, the state of its protective mechanisms, the ability to resist the action of an antigenic stimulus, as well as the development of full-fledged reparative processes.

Genetic factors. In the last decade, data appeared on the role of specific genetic systems in susceptibility to tuberculosis. At the same time, naturally, first of all, attention was paid to the main human histocompatibility complex - the HLA system, in which (in its DR locus) the genes of the immune response are localized. In all examined populations (among the population of the CIS), the disease of tuberculosis is associated with the same antigen of the HLA DR-locus system - DR2.

In addition, it has been shown that the HLA- (primarily DR)- phenotype differs in patients with various forms of tuberculosis (limited, with a favorable course, on the one hand, and widespread, chronic, on the other).

The number of studies devoted to the study of the relationship between genetic markers in tuberculosis and immunological parameters is still small.

Dependence of the frequency of tuberculosis on the gender of the patient. The results of a study conducted in France in 1998 deserve attention. In general, the prevalence of M. tuberculosis lesions among boys and girls is the same until the puberty period, then there is a preference for males. In the industrial countries of the middle of the century (1930-1950), tuberculosis was more common among women aged 15-34 than among

men Currently, in these countries, against the background of a decrease in the incidence of tuberculosis, the frequency of the disease among men older than 15 years has become higher than among women. In most developing countries, the current incidence of tuberculosis is similar to that in developed countries in the 1930s and 1950s, while the age group over 15 years has also become more male-dominated.

In recent decades, a number of new approaches to studying the mechanisms of anti-tuberculosis immunity have emerged. This is hybridoma technology, genetic engineering and T-cell cloning. Thus, with the help of hybridoma technology, a large set of monoclonal antibodies to various antigens of mycobacteria was obtained. These antibodies are being used with more or less success to solve the following problems.

1. Evaluation of the influence of in vivo and in vitro antibodies to various components of mycobacteria on the course of tuberculosis infection. Such studies have not yet produced real results.
2. Detection of mycobacteria (for example, in sputum) and their species identification.
3. Detection of antigens of mycobacteria (for example,cerebrospinal fluid or in blood serum as part of immune complexes).

T-cell cloning (production of "descendants" of one T-lymphocyte) is used to study: 1) the spectrum of T-cells that react to various antigenic determinants in tuberculosis and BCG vaccination (such work is just beginning); 2) the role of T-cell subpopulations and clones responding to certain determinants in protective immunity and immunosuppression; 3) use of T-clones to search for protective antigens for the purpose of designing a future anti-tuberculosis vaccine.

To diagnose tuberculosis During the 19th and 20th centuries, a significant number of methods were proposed. Pathological anatomy, microbiology, immunology, genetics, molecular biology, physics and mathematics added their achievements to the rich clinical experience. Today, the doctor uses an extremely wide range of methods for diagnosing tuberculosis, which differ significantly in their sensitivity and specificity.

All diagnostic methods can be divided into two main groups. The first, common to all diseases, includes methods that are based on the determination of changes in the body characteristic of a given disease. In the case of tuberculosis, the direct methods of this group are morphological (histological diagnosis of changes in tissues) and radiation (radiological diagnosis of changes in organs) methods. Indirect classic methods are a direct examination of the patient (anamnesis and physical examination), laboratory studies (clinical, biochemical, immunological, and others), methods of functional diagnostics.

The second group of diagnostic methods, which are used only for infectious diseases, consists of methods aimed at finding and identifying the causative agent of the disease. These can be either direct methods: material microscopy, selection of a culture of microorganisms, molecular diagnostics, or indirect methods that allow detecting the presence of the pathogen in the body: tuberculin diagnostics, detection of M. tuberculosis antigens, specific anti-tuberculosis antibodies.

Clinical methods. The first were methods based on obtaining data on disease manifestations. The art of collecting anamnesis and direct examination of the patient, brought to perfection by the work of many generations of doctors, made it possible to form the very concept of phthisis as a long-term debilitating disease with predominant damage to the respiratory organs.

The anamnesis of the disease begins with the clarification of the patient's complaints. The variety of manifestations of tuberculosis depends on the phase and spread of the process, as well as on the localization of specific changes in the lungs. The onset of the disease in tuberculosis is more often gradual and rarely acute.

The earliest and most frequent complaints of tuberculosis patients are weakness, rapid fatigue and reduced work capacity. In addition, the patient often notices

the presence of elevated body temperature, night sweats, sleep disturbances and deterioration of appetite and weight loss. The cause of these phenomena is tuberculosis intoxication, which occurs as a result of the vital activity of mycobacterium tuberculosis, as well as the products of protein breakdown in the affected organ.

An increase in body temperature is especially diverse. In most patients with pulmonary tuberculosis, in the initial period of the disease, it is normal, or subfebrile for several weeks. In the case of progression of the process or its acute onset, the body temperature rises to 380 - 390 C. Only in cases of miliary tuberculosis, acute pleurisy, the body temperature sometimes reaches 400 C. The temperature curve has an irregular character: mostly, the body temperature rises briefly in the evening, and then normalizes. Less often, the patient's elevated temperature can last the whole day and decrease only after sleep. Patients often do not feel elevated body temperature, they continue to work as usual.

Local manifestations of the disease are associated with damage to the respiratory system: cough, shortness of breath, expectoration, chest pain, hemoptysis.

Cough is the most common symptom in patients with pulmonary tuberculosis, from a mild cough at the beginning of the disease to a significant spread of the lesion in the lungs. The patient does not pay attention to coughing or associates it with smoking or a cold. Paroxysmal dry cough can be a manifestation of tuberculosis of the intrathoracic lymph nodes or tuberculous endobronchitis.

With limited processes in the lungs, sputum may not be released or it may be very little. With the appearance of destruction, the amount of sputum increases and in chronic forms can reach 100-200 ml per day. It is mucoid or muco-purulent in nature, almost never has an unpleasant smell.

Hemoptysis and bleeding usually complicate destructive forms of tuberculosis. Their cause may be: increased permeability of blood vessels caused by the toxic effect of microorganisms and tissue decay products; rupture or erosion of blood vessels in the area of lung tissue destruction; high blood pressure in the bronchial arteries; disorders in the blood coagulation system, activation of fibrinolysis. Hemoptysis and bleeding are most often observed with pronounced morphological changes in the lungs, as well as in cases of basal sclerosis of the lungs and bronchiectasis. With hemoptysis and pulmonary bleeding, the blood is bright red, foamy (see "Complications of pulmonary tuberculosis").

Shortness of breath is not characteristic of the initial manifestations of tuberculosis and appears only during physical exertion. It can be observed as an early symptom only in miliary tuberculosis and tuberculous pleurisy. Shortness of breath is determined by the prevalence of the process and the development of pulmonary heart failure, is a symptom of spontaneous pneumothorax and atelectasis.

Chest pain is caused by the transition of the process to the pleura, intensifies during deep breathing, coughing. The pain has a stabbing character and is usually not intense. Dull or aching pain in the chest occurs in chronic processes and is caused by shrinkage of the lungs and narrowing of the chest. Acute, sudden pain occurs with spontaneous pneumothorax.

In the anamnesis of the disease, first of all, we find out the duration and features of its course. In most cases, tuberculosis begins gradually, that is, with a slow increase in malaise, the appearance of subfebrile body temperature, cough, and weight loss. Tuberculosis can begin imperceptibly for the patient (unaperceptively). Sometimes the onset of the disease can be acute, as a rule, with miliary tuberculosis and caseous pneumonia.

Clinical manifestations of tuberculosis are characterized by extreme polymorphism, the forms of the course and variants of localization of the process are so diverse that they can

resemble other diseases, the so-called "masks" of tuberculosis (influenza, pneumonia, bronchitis, typhoid fever, rheumatism, whooping cough, etc.).

When interviewing the patient, it is necessary to find out the epidemiological anamnesis (contact with a tuberculosis patient, especially family). In addition, information about past illnesses (frequent pneumonia, pleurisy, etc.), accompanying illnesses that increase the risk of endogenous reactivation of tuberculosis (diabetes, gastric and duodenal ulcers, alcoholism, HIV infection, mental illnesses, chronic obstructive pulmonary disease) are also important. recent pregnancy, childbirth. It is important to work in harmful conditions, excessive smoking, unfavorable sanitary and household living conditions.

It is important to find out the date and results of the previous fluorographic examination in adults, and for children - information about BCG vaccination, results of tuberculin diagnostics. The task of clinical examination is to identify not only bright, but also subtle symptoms of the disease. In other words, the search for microsymptomatics is underway. And quite often, this kind of research allows you to identify certain symptoms that can be used to clarify the diagnosis.

An external examination involves the detection of manifestations of tuberculous intoxication. In some patients, there is a shine in the eyes, a blush on the cheeks against the background of pale facial skin. Persistent, red dermographism is noted, red spots (Troussot spots) may appear on the skin of the neck and front of the chest. These manifestations develop as a result of irritation of the sympathetic nervous system.

At the beginning of the disease, the examination of the patient does not reveal any visible deviations from the norm. During the chronic course of tuberculosis, characteristic changes in appearance are formed due to the duration of tuberculosis intoxication, morphological changes in the lungs, the development of complications, the so-called habitus phthisicus (see the topic "Fibrous-cavernous tuberculosis"). Paraspecific manifestations of a toxic-allergic nature (erythema nodosa, keratoconjunctivitis, phlykten) are found in children with tuberculosis.

During the examination, the symmetry and participation of both halves of the chest in breathing, the prominence of the supraclavicular and subclavian fossae are compared. With significant cirrhotic changes, the chest is deformed (its corresponding half narrows), so the affected side lags behind during breathing.

Palpation determines skin turgor and moisture, muscle tone, and the thickness of the subcutaneous fat layer. In children, micropolyadenitis is detected (an increase in peripheral lymph nodes is greater than in 5 groups). Over areas of infiltration or cirrhosis, the voice tremor is increased, and in case of exudative pleurisy, pneumothorax, it is weakened. Palpation of the upper edge of the trapezius muscle causes a feeling of pain (Potenger-Vorobiov symptom). During palpation of the abdomen, the size of the liver and spleen is determined, an increase in mesenteric lymph nodes is possible.

Percussion is performed according to the generally accepted method: first comparative, then topographic. Over a healthy lung, the percussion sound is clear pulmonary, which is caused by its elasticity and airiness.

A box percussion sound is determined over areas of compensatory emphysema (more often in the lower parts of the lungs). A tympanic sound occurs during percussion over large caverns, the diameter of which is more than 4 cm, over a tense spontaneous pneumothorax. If the lung tissue around the cavity is compacted due to the development of fibrosis in it or there are massive infiltrative changes above the cavity, a shortening of the percussion tone can be determined. A shortened and dull percussion sound is determined over the areas of reduced pneumatization of lung tissue with infiltrates, focal-fibrous changes, as well as with atelectasis over an airless lung, in cases of exudative pleurisy. It should be borne in mind that with widespread disseminated forms of the lungs or limited infiltrates, areas of compaction alternate with areas that are well filled with air, so it is difficult to detect changes in the percussion sound.

Topographic percussion allows you to determine the limits of the lungs: the upper or standing height of the apices, their width (the width of the Krenig fields), the size and location of the mediastinum, as well as the localization and size of the pathological process in the lungs.

In most cases, pathological changes in secondary forms of tuberculosis are localized in the upper parts of the lungs. With a long process, the tops shrivel due to their replacement by fibrous tissue, therefore, their standing height above the collarbones may be lower than normal (3-4 cm). At the same time, the width of the Krenig fields, which are determined by percussion of the upper edge of the trapezius muscle, also decreases.

By percussively determining the lower limit of the lungs and exhalation, it is possible to measure the active excursion of the lungs and diaphragm.

Auscultation is performed sequentially over symmetrical areas of the lungs. The patient should breathe calmly and deeply through a half-open mouth and, at the request of the doctor, cough quietly at the end of exhalation. Attention is paid to the type of breathing (vesicular, bronchial, hard) and additional noises (wet or dry wheezing, crepitation). Auscultation should be performed especially carefully in the supraclavicular and subclavian areas, taking into account the frequent localization of the tubercular process in the upper parts of the lungs. Listening to changed breathing and wet wheezing in the so-called "alarm zones" (above the upper corner of the scapula, as well as under the collarbone), as a rule, indicates the presence of a destructive process. In addition to the tops of the lungs, the areas located in the 4th intercostal space in front, in the 2nd, 5th, 6th intercostal spaces of the axillary area, behind near the lower corner of the scapula, and in the paravertebral area at the level of the middle of the scapula are carefully listened to.

Over areas of emphysema, with exudative pleurisy, thickened pleura, and a developed subcutaneous fat layer, weak breathing is heard. Increased breathing is heard in cases of infiltrative process in the lungs. With the development of fibrotic changes in the lungs, breathing becomes difficult. Above the large caverns, which have a fibrous capsule and a connection with the bronchus, you can listen to bronchial or amphoric breathing. Wet rales of various caliber are heard over the pathologically changed lung over areas of caseous necrosis and perifocal inflammation. Dry wheezes are more often heard when the bronchi are damaged and in areas of fibrosis. In case of fibrinous pleurisy, during auscultation, the noise of friction of pleural sheets is determined.

In most patients with pulmonary tuberculosis, the borders of the heart are within the normal range, but in acute or chronic forms of tuberculosis, the borders of the heart may increase, during auscultation, the splitting of the second tone, sometimes the first tone, the accent of the second tone over the pulmonary trunk, a faint systolic murmur and tachycardia are heard. that is, signs of hypertension in the small circle of blood circulation and chronic pulmonary heart disease. The pulse is accelerated, labile.

With extrapulmonary forms of tuberculosis, along with the general symptoms caused by tuberculosis intoxication, patients also have local manifestations of the disease on the side of the affected organ.

Laboratory methods.

Identification of the causative agent. Detection of MBT in various pathological material from patients is of crucial importance for the diagnosis of tuberculosis infection. The detection of the causative agent of tuberculosis is the main and indisputable criterion that indicates the specific nature of the disease.

Traditional methods of detecting MBT in pathological material are bacterioscopic, molecular genetic, bacteriological and biological methods. In addition to sputum, objects of research on MBT can also be urine, feces, cerebrospinal fluid, exudate from cavities, pus, secretions from wounds, biopsies of various tissues.

The diagnostic significance of laboratory methods is determined by the quality of the biological material delivered for analysis. WHO has adopted uniform rules for taking biological fluids for the study of the causative agent of tuberculosis. The main requirements are double take

material from the patient before the start of specific therapy, in compliance with the rules of delivery and processing of the material before the study.

One of the main methods of detecting MBT is bacterioscopic. The essence of the method is the ability of mycobacteria stained with fuchsin to retain the dye after long-term decolorization in hydrochloric acid. In many countries, it is widely used not only for diagnosis, but also for the detection of tuberculosis patients during mass surveys of the population.

During direct bacterioscopy, the preparation is stained according to the Ziel-Nielsen method. To do this, prepare a thin smear on a glass slide, then dry it at room temperature and fix it over the flame of an alcohol still. A strip of filter paper is placed on the fixed preparation, which is filled with Zil's carbolic fuchsin. The smear is heated over a flame until steam appears (2-3 times). Next, the filter paper is removed, the drug is washed with distilled water, immersed in a solution of hydrochloric acid alcohol or a 5% solution of sulfuric acid for 3 minutes. At the same time, all bacteria and morphological elements of sputum, except mycobacterium tuberculosis, are discolored. After that, the drug is thoroughly washed with water and stained with a 0.5-1% solution of methylene blue for 1-2 minutes. Then the drug is washed with water, dried in air. Stained preparations are microscoped with an immersion system. MBTs are colored red, and the surrounding background and non-acid-fast microorganisms are colored blue.

In order to detect MBT in the preparation by the bacterioscopic method, it is necessary that 1 ml of sputum contains at least 50,000 - 100,000 microbial bodies. With a smaller number of mycobacteria, the test may give a false negative result.

The ability of the bacterioscopic method to detect MBT increases by 14 - 20% when using fluorescent microscopy. For coloring the drug, fluorochromes are used - organic dyes that fluoresce when illuminated with ultraviolet, violet or blue rays. Such dyes are auramine 00, rhodamine C. A sputum smear is stained with a mixture of 0.05 g of auramine and 1000 ml of distilled water, heated slightly, washed with water, decolorized with 3% hydrochloric acid alcohol, washed again and methylene blue is applied for 1-2 minutes. The drug is examined with the help of a fluorescent microscope. MBTs glow golden-yellow on a dark background.

Flotation and sedimentation methods are used to increase the number of MBT in a unit of the studied volume of sputum.

Modern clinics use the flotation method. The method is based on the fact that when two liquids with different relative densities are shaken, the lighter liquid floats to the top together with mycobacterium tuberculosis in suspension.

For research using the flotation method, 10-15 ml of sputum is placed in a flask with a capacity of 200-250 ml, 2-3 ml of 0.5% alkali solution is added and shaken for 10-15 minutes until the sputum becomes homogeneous. To achieve complete homogenization, the sputum flask is heated for 20–30 min in a water bath at a temperature of 560 C. Next, about 100 ml of distilled water and 0.5 ml of xylene or benzene are poured into the flask and shaken again for 10 min. After that, distilled water is added to the neck of the bottle and left to stand at room temperature for about 30 minutes. A creamy foam floats on the surface of the liquid, which is sucked off with a pipette and applied to a glass slide. The layer of foam on the slide is dried and a new layer of foam from the flask is applied. In this way, the foam is layered 5-6 times, after which the smear is fixed and colored according to Ziel-Nielsen.

Molecular genetic diagnosis of tuberculosis using the GeneXpert system. It should be noted that, since the GeneXpert device is a closed system and works only with Xpert cartridges, in which all stages of PCR research take place automatically without the intervention of personnel, there is no need to place it in a separate room. All manipulations with the researched material from DNA isolation of microorganisms to

detection of amplification results takes place in a closed cartridge unique to each sample. The developer of GeneXpert MTB/RIF guarantees the adequate and correct operation of the system when examining material from persons who did not receive PTP. Thus, the method can be used as a screening method for the detection of mycobacteria of the tuberculosis complex and mutations in the rpoB gene, which is associated with the resistance of mycobacteria to rifampicin (R). Such laboratory information will allow, at the early stages of diagnosis, to identify the causative agent of tuberculosis infection in the relevant material and alert the phthisiologist to the presence of M. tuberculosis resistance to first-line PTP. However, it should be remembered that the test results in Xpert MTB/RIF cartridges are preliminary and cannot replace further bacteriological examination.

The bacteriological method of detecting MBT consists in inoculating sputum on nutrient media. Liquid and solid nutrients are used. Before seeding, sputum is processed to suppress the growth of non-specific microflora. The gold standard for the microbiological diagnosis of tuberculosis is culture of sputum on Levenstein-Jensen solid medium. Detection of mycobacteria when inoculated on Levenstein-Jensen medium is possible when 20-100 individuals are present in 1 milliliter of the researched material. The growth of mycobacteria is noted after 4-8 weeks. The fastest culture method is BACTEC, a liquid culture system that allows you to obtain the growth of mycobacteria after 10-18 days. It is based on the detection of MBT, the growth of which is still invisible to the eye, by color or fluorescence due to the formation of CO2 or consumption of O2 in the process of vital activity of mycobacteria - Mycobacteria Growth Indicator Tube (MGIT). This method of culturing MBT is less sensitive than on solid nutrient media, so it is used in parallel with inoculation of sputum on solid Levestein-Jensen medium to achieve optimal sensitivity.

The biological method consists in infection with the sputum of guinea pigs, which have a high sensitivity to MBT. This method is widely used in diagnostics since the discovery of the causative agent of this infection. It has not lost its value even now. Moreover, this method is now successfully used in the laboratories of scientific research institutes to detect not only typical unchanged, but also various biologically modified forms of the pathogen, in particular L-transformed and filter forms. In addition, this method is the main one in determining the species belonging to MBT, their virulence, studying the pathogenicity of atypical cultures.

Before infecting a guinea pig, sputum is treated with sulfuric acid to destroy non-specific microflora and centrifuged. Sediment in an isotonic solution of sodium chloride is injected subcutaneously into the inguinal area, intraperitoneally, or into the testicle. About a month after infection, the lymph nodes in mumps increase and generalized tuberculosis develops.

Among the traditional methods of detecting MBT and diagnosing tuberculosis, the biological method was considered the most sensitive until recently, because tuberculosis in guinea pigs can be caused by the introduction of sputum containing less than 5 microbial bodies in 1 ml. Today, the possibility of loss of MBT virulence has been proven. Such mycobacteria are viable, can grow on nutrient media, but do not cause disease in experimental animals. Therefore, it is necessary to use different methods of microbiological research to detect MBT in pathological material.

Blood test. Usually, pronounced changes are not detected in the blood of tuberculosis patients. Hypochromic anemia is observed only in patients with a widespread process and severe intoxication or with repeated pulmonary bleeding. Changes in the number of leukocytes and the leukocyte formula of the blood occur mainly in acute processes and the breakdown of lung tissue. Can be observed: moderate leukocytosis, shift of the leukocyte formula to the left, lymphopenia, monocytosis. ESR increases during an active tuberculosis process.

Biochemical methods make it possible to assess the state of humoral regulation systems and individual links of metabolic processes, the functional state of endocrine and parenchymal organs. Biochemical studies are carried out in different periods of monitoring patients and have different tasks.

To assess the presence and severity of the inflammatory process, it is advisable to include the determination of the amount of haptoglobin, ceruloplasmin, and C-reactive protein in the minimum set of studies. In order to detect the hidden reactivity of the tubercular process, a tuberculin protein test is performed. In the presence of hidden activity under the influence of tuberculin, the inflammation in the foci "comes to life", which is reflected in an increase in the amount of the alpha 2-globulin fraction; the test is considered positive when alpha 2-globulins increase by more than 10% from the initial level. Since in recent years there has been a tendency to increase the frequency of the combination of tuberculosis and diabetes, it is necessary to determine the glucose content in the blood of all patients who come to the hospital.

Urine examination. In patients with pulmonary tuberculosis, urine analysis usually does not provide significant diagnostic information, but sometimes reveals serious complications of the underlying disease (for example, kidney amyloidosis). With tuberculosis of the kidneys, protein, leukocytes, and often erythrocytes, as well as MBT, are detected in the urine.

Examination of urine for MBT is carried out in those cases when at least 15 leukocytes are detected in each field of view during the examination of the sediment. To detect MBT, urine is repeatedly centrifuged, layering each time new portions from the urine sediment on a glass slide. The smear is stained according to the Ziel-Nielsen method. At the same time, decolorization of the drug should be carried out in 3% hydrochloric acid alcohol, since acid-resistant saprophytes (smegma microorganisms) are often found in urine, which are discolored in alcohol. The absence of MBT in purulent urine does not deny the presence of kidney tuberculosis. In such cases, the urine is examined bacteriologically or using molecular genetic methods.

X-ray examination of chest organs(FG, X-ray of the chest organs, X-ray tomography, computer tomography of the affected areas of the lungs). There is no specific X-ray picture for tuberculosis, neither by the nature of X-ray changes nor by localization. In recent years, in addition to upper lobe localization, lower lobe localization is common. With a long course of tuberculosis, the X-ray picture can also be supplemented with signs of pneumofibrosis, emphysema, and bronchiectasis. Important for diagnosis is the presence of residual changes of transferred tuberculosis: calcified foci in the lungs or intrathoracic lymph nodes. An analysis of the x-ray fluorography archive can provide great help in the correct treatment of the disease, the search for which should not be neglected. In the presence of focal, infiltrative, destructive changes, rounded formations, regardless of localization, pleural effusion, asymmetric enlargement of the lung roots, tuberculosis should be suspected and the following patient management tactics should be followed. Tuberculosis X-ray diagnosis is the recognition of the disease using X-rays. X-rays (X-rays)
– short-wave electromagnetic radiation from 0.0001 to 450 Aº (1 Aº - 10 m). When describing an X-ray picture, you should use algorithms (sequence of signs): localization: by segments, lobes, relative to ribs, clavicle, diaphragm, cortical zone, basal zone, paratracheal, etc.; number of shadows: single, solitary, multiple; shape: oval, round, triangular, shapeless shadows or foci, etc.; size in diameter - foci, and foci - small, medium, large, or polymorphic (different); contours - blurred, limited, clear, fuzzy, jagged, etc. Qualitative features: intensity: low, medium, high; pattern: mesh, reinforced, deformed.

In tuberculosis, the main radiological syndromes are distinguished: shadowing, illumination, focal shadow (up to 1 cm in diameter), focal dissemination,

ring-shaped shadow (cavernous), rounded shadow or spherical shadow (tuberculoma), deformation of the root of the lung.

Tuberculin diagnosis. At present, there is no doubt that the state of immunological reactivity largely determines the course of many diseases. The term "Immunological reactivity" often has a different meaning, but most authors understand the state of the body's defense forces, the ability of the body to protect itself from infectious and non-infectious pathogenic environmental factors.

During the last 40-50 years, there was an idea of immunity as immunity to an infectious agent (from the Latin immunitas - release from duties) - microorganisms and their toxins.

R. V. Petrov considers immunity as a means of protecting the body from living bodies and substances that carry signs of genetically alien information. Therefore, immunity is protection against the foreign, that is, the ability to recognize the foreign in order to preserve the homeostasis of the body.

The tuberculin reaction is referred to the phenomenon of hypersensitivity of the delayed type (HST), because it begins to manifest no earlier than 6 hours after the introduction of tuberculin. The decisive factor of an allergic reaction can be microbial antibodies (BCG test) and tuberculin. Tuberculin diagnostics is based on the determination of tuberculin allergy - the increased sensitivity of a person to tuberculin, which occurs as a result of infection with virulent tuberculosis mycobacteria or BCG vaccination. The tuberculosis or vaccine process is accompanied by increased sensitivity to tuberculin, which is especially clearly manifested on the skin at the place of its introduction in the form of positive tuberculin reactions.

The use of tuberculin samples for the purpose of diagnosis and differential diagnosis, determination of infection and primary infection with tuberculosis, as well as selection of persons for BCG revaccination, has found wide application in practice.

The basis of the development of the tuberculin reaction is the interaction of tuberculin and antibodies fixed on T lymphocytes.

The "antigen-antibody" complex activates lymphocytes that secrete lymphokines. The latter cause damage to the cells of the macroorganism with the release of biologically active substances, which cause the development of an infiltrate in the skin. Pathomorphologically, the tuberculin reaction is characterized in the first 24 hours by tissue swelling at the site of tuberculin injection, and later (72 hours) by a mononuclear reaction with a larger number of histiocytes. In case of hyperergic reactions with the presence of tissue necrosis, even elements of specific inflammation - epithelioid cells - are found in the cellular composition.

Tuberculin was first obtained by the prominent German scientist R. Koch in 1890. This tuberculin was called Koch's old tuberculin or ATK (ALT Tuberculinum Koch). This is a filtrate from a 6-8-week culture of mycobacteria of human and bovine tuberculosis, which grew on meat in peptonoglycerine broth, sterilized with running steam for 1 hour and thickened to 1/10 of the volume at a temperature of 90. An isotonic solution is used as a preservative sodium chloride with 0.25% carbolic acid. Chemically, tuberculin consists of protein, polysaccharide, lipoid fractions, nucleic acids of mycobacteria, as well as peptones of the broth on which mycobacteria grew. Peptones can cause non-specific reactions. Tuberculin belongs to the class of haptens. The main requirements for tuberculin are specificity and standardization of its activity. The specifically active beginning of ATK is only 1% of the entire mixture, the last 99% are inert substances. A more specific preparation is dry tuberculin PPD-L (PPD-L), purified from medium proteins, (S
), (Protein Purified Derivative). This type of drug was first obtained in 1934 in the USA under the name RRD-5. In 1940, Seibert and Lillen produced a large series of purified

tuberculin PPD-5, which in 1952 was approved by the World Health Organization as the international standard for dry purified tuberculin. In the USSR in 1939, dry purified tuberculin was obtained by M.O. Linnikova at the Leningrad Institute of Vaccines and Serums. In 1954, this institute began mass production of the drug PPD-L.

In the former Soviet Union, the standard tuberculin is standardized in relation to the international one, taking into account the intensifying tween - 80, in contrast to the tuberculin produced by the Copenhagen Institute of Vaccines and Serums, PPD-GT - 23 by order of the WHO, which is widely used by all countries of the world.

PPD-L with an indication of its activity in international tuberculin units "TO" with the addition of 0.005% tween-80 as a stabilizer, 0.01% quinozol solution as a preservative is a transparent colorless liquid, which is made by diluting the powder in a standardizing solvent.

In 1954, the WHO approved the international unit (TO) for PPD-L (1 TO contains 0.00002 mg of the pure drug and 0.000008 mg of buffer salts as impurities). In the USSR, in 1963, the national standard of purified tuberculin with an international activity unit of 0.00006 mg was approved.

The use of ready solutions of tuberculin in ampoules is important for the uniformity and accuracy of tuberculin diagnostics. In 1965, purified tuberculin was obtained in the USSR in a solution standardized in relation to the international standard.

The international unit (IU) is the amount of tuberculin that can be administered without fear of very strong reactions in the research contingent, and which is able to detect 80-90% of positive reactions in spontaneously infected persons with tuberculosis. The shelf life of the drug is 12 months at a storage temperature of 0 to 4 C.

The above shows that tuberculin diagnostics is a biological test based on the specific ability of tuberculin to cause in the body of animals and humans sensitized by mycobacterium tuberculosis inflammatory-allergic reactions of a delayed type, which are quantitatively and qualitatively manifested individually.

With tuberculosis infection, the following allergic reactions are recognized: hyperergy - increased reaction to tuberculin; normergy - a moderate reaction to tuberculin; hypoergy - weak reaction and anergy - lack of reaction. Anergy is positive when the infected organism has a higher immunological reactivity. As a result, previously positive tuberculin samples become negative. And negative, when previously positive tuberculin tests turn negative due to a sharp decrease in immunity (meningitis, miliary tuberculosis).

The intensity of tuberculin reactions depends on many factors. These include the virulence and massiveness of the infection, the degree of natural resistance, the functional state of the neuro-endocrine system, household conditions, etc.

Mass tuberculin diagnostics. For mass tuberculin diagnostics, the intradermal Mantoux test with 2 TO PPD - L is used. It is performed: for the timely detection of tuberculosis patients; to identify persons infected with tuberculosis mycobacteria with an increased risk of the disease (primary infection with hypereric reactions to tuberculin); for the selection of contingents to be revaccinated with the BCG vaccine.

Mass tuberculin diagnostics is carried out in the following sequence: 1. Selection of contingents for examination taking into account contraindications.

2. Preparation of tools. 3. Technical execution of the test. 4. Evaluation of Mantoux test results.

5. Implementationmedical preventive measures based on the conducted research.

In organized teams, mass tuberculin diagnosis is carried out by a special team (a doctor and 2 nurses), the formation of which is entrusted to polyclinics. In order to exclude the influence of seasonal and other factors on sensitivity to tuberculin, tuberculin diagnostics should be carried out at the same time of the year, preferably in autumn.

Practically healthy children who have no contraindications, starting from 1 year of age and up to 14 years of age (depending on the epidemic situation in the region), are subject to annual examination for the purpose of early detection of tuberculosis. Contraindications to performing a tuberculin Mantoux test are acute infectious diseases, chronic infectious and allergic diseases (rheumatism, bronchial asthma), idiosyncrasy, skin diseases, epilepsy.

72 hours after setting the sample, measure the transverse diameter of the infiltrate relative to the axis of the hand using a transparent ruler.

The reaction is evaluated by quantitative and qualitative indicators. Quantitative evaluation is characterized by the size of the infiltrate in millimeters, qualitative – by the color of the infiltrate, the presence of vesicles, lymphangitis, necrosis, daughter rashes. According to the quantitative assessment of samples, reactions are distinguished:

- negative - at the place of tuberculin injection there are no other traces except post-injection signs;
- doubtful - hyperemia of any size, or an infiltrate up to 4 mm in diameter;
- positive - an infiltrate with a diameter of 5 mm or more.

A hyperergic reaction is considered: in children and adolescents, the size of the infiltrate is 17 mm or more; in adults - 21 mm or more, as well as any size of the infiltrate, but with the presence of vesicles - necrotic reactions, lymphangitis, daughter rashes. When evaluating tuberculin reactions, factors affecting its intensity should be taken into account. Decreased sensitivity to tuberculin is noted in measles, whooping cough, scarlet fever, malaria, cancer, lymphogranulomatosis, sarcoidosis, and myxedema. Increase - with bronchial asthma, rheumatism, base disease, flu, with exacerbation of chronic diseases.

Post-vaccination allergy usually develops in the first year after vaccination (BCG revaccination). Most children and adolescents have a positive Mantoux reaction with an infiltrate of 5-11 mm. The infiltrate in these cases is flat, does not rise above the skin, is vaguely defined, fades quickly, and does not leave a pigment spot. There are no clinical manifestations of intoxication symptoms. A characteristic tendency to weaken the Mantoux reaction a year or more after vaccination. An indication in the anamnesis of contact with a tuberculosis patient is an important circumstance that confirms infection. For a much later period of the appearance of a positive Mantoux test, its more pronounced character (infiltrate 11 mm in diameter with the presence of clinical signs of the disease) is more indicative of the growth of the primary infection. It should be remembered that in the absence of a trace of BCG vaccination or a scar size of 1-2 mm, the post-vaccination allergy in most children is very weak and quickly fades away. If difficulties arise in differential diagnosis, such children should be taken under the supervision of a dispensary.

Materials for activating students during lectures: Questions:

- What is tuberculosis as a disease? Give a definition.
- What is the social essence of tuberculosis?
- The role of R. Koch in phthisiology. List his main scientific discoveries.
- Describe the causative agent of tuberculosis.
- Epidemiology of tuberculosis.
- Pathogenesis of tuberculosis.

General material and methodical provision of the lecture.

- Educational premises - lecture hall of the department.
- Equipment - negatoscope, microscope.
- Illustrative materials - tables, diagrams, sputum preparations containing MBT, radiographs of patients and their medical history.

Questions for self-control:

1. What is tuberculosis as a disease? Give a definition.
2. What are the negative trends in the epidemiological situation of tuberculosis in Ukraine?
3. What is the merit of R. Koch in studying the epidemiology of tuberculosis as an infectious disease?
4. List the types of MBT that cause diseases in humans and animals.
5. What are the main properties of MBT?
6. What are the main ways of infecting a person with tuberculosis?
7. What morphological changes occur in the focus of tuberculous inflammation?
8. What factors reduce the body's resistance to tube infection?
9. What is the L-transformation of MBT?
10. What are mycobacteria?
11. What are the symptoms of pulmonary tuberculosis?
12. What methods of physical examination of a patient do you know?
13. What are the changes in the general blood test during the tuberculosis process?
14. What are the methods of detecting tuberculosis mycobacteria in pathological material?
15. What are the main scientific directions of the Department of Phthisiopulmonology?

List of used sources Main:

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Additional:

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of infection control for health care facilities that provide assistance to tuberculosis patients". URL: https://zakon.rada.gov.ua/laws/show/z0408-19#Text

- Order of the Ministry of Health of Ukraine dated February 1, 2019 No. 287 "Infection control standard for health care institutions that provide care to tuberculosis patients"

- order in the specialty "Physiology" "On the approval of health care standards for tuberculosis dated February 25, 2020 No. 530 (as amended by the order of the Ministry of Health of Ukraine dated October 6, 2021 No. 2161),

- Order of the Ministry of Health of Ukraine No. 406 dated 09.03.2021 on "Anti-tuberculosis measures in epidemic foci of tuberculosis infection".

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Lecture No. 2

Topic. General principles and methods of treatment of tuberculosis patients. Prevention of tuberculosis.

1. Relevance of the topic.

One of the most important sections of phthisiology is the treatment and prevention of tuberculosis patients. The introduction of modern anti-tuberculosis drugs and prevention methods into clinical practice fundamentally changed the prognosis for tuberculosis, and had a positive effect on the main epidemiological indicators.

Chemotherapy is the main method of treatment for tuberculosis patients. However, the use of only chemotherapy drugs in treatment does not always lead to a quick and stable cure with the formation of minimal residual changes in the lungs. Therefore, when treating patients, the principle of complex treatment is followed, including pathogenetic and symptomatic means. However, in some cases, when complex conservative therapy of the appropriate duration is ineffective, in the absence of contraindications, collapsotherapy and surgical methods of treatment are used.

Correct assessment of the clinical course, adequate selection of the chemotherapy regimen, timely referral of the patient for surgical treatment, when tuberculosis is accompanied by irreversible morphological changes in the lung or other affected tissue, allow to increase the effectiveness of treatment and prolong the life of patients with chronic forms of tuberculosis.

The presented issues of the organization of anti-tuberculosis work indicate the most characteristic feature of tuberculosis - its social character both in the past and in the present. The increase in the incidence of tuberculosis in recent years is due to economic and social factors. Early detection of tuberculosis in all population groups and timely prevention make this topic quite relevant. The presented topic will contribute to providing the most complete picture of the organization of the fight against tuberculosis in Ukraine.

The goal is to acquaint applicants with the modern classification of anti-tuberculosis drugs, methods of their administration, principles of chemotherapy and prevention of tuberculosis.

Main tasks:

- Acquaint applicants with the basic principles of treatment of patients with pulmonary tuberculosis (long-term, complex, staged therapy).
- To form among the applicants the understanding and skills of rational anti-tuberculosis treatment, understanding of the purpose of the regime and rational nutrition.
- Acquaint applicants with anti-tuberculosis drugs, methods of their administration, and the modern classification of drugs.
- To form among the recipients an understanding of the need and the ability to use means of pathogenetic action in the complex treatment of patients with pulmonary tuberculosis.
- Acquaint applicants with the new treatment strategy of the WHO in the treatment of tuberculosis patients (DOTS - short-term chemotherapy under direct medical supervision).
- Acquaint applicants with the tuberculosis control system in Ukraine and the types of anti-tuberculosis facilities;
- To create an idea among applicants about the work of anti-tuberculosis dispensaries with a general medical network for the early detection of tuberculosis in children, adolescents, adults, the elderly, as well as in groups at increased risk of the disease;

- Acquaint applicants with the essence of social, sanitary and specific prevention of tuberculosis.

Basic concepts:
Tuberculosis, antimycobacterial therapy, principles, prevention

Plan and organizational structure of the lecture.

No	The main onesstages of the lecture and theircontent	Goals in the levellet's go abs actions	Lectures, methods andmeans activation miners, equipment	Distributi ontime
1.	**Preparatory stage**Setting learning goals Ensuring		The type of lecture is a	2%
2.	positive motivation		thematic lecture.	3%
3.	**The main stage**Presentation of lecture material. Plan:		Lecture equipment: negatoscope, tables, set of radiographs.	88%
	1. Introduction, justification and relevance of the topic.	II	Means and methods of student activation:	
	2. The main principles of therapy for patients with pulmonary tuberculosis: duration, complexity and stages.	III	Educational tasks Questions Problematic situations Means of	
	3. Mode, rational nutrition.	III	visibility: tables,	
	4. Antituberculosis drugs, their classification. Antimycobacterial therapy. Adverse reactions.	III	Histories of diseases with demonstration of patients of 4 cohorts, anti-tuberculosis drugs, pathogenetic	
	5. Distribution of patients into 4 categories and features of treatment of each category.	III	drugs.	
	6. The system of accounting and supervision in the anti-tuberculosis dispensary.	IV		
	Dispensary supervision groups.	III		
	7. Preventiontuberculosis: social, sanitary, specific and chemoprophylaxis. The final stage.	III III		
4.	Summary of the lecture, general conclusions.			3%
5.	The lecturer's answers to possible questions.			2%
6.	Tasks for self-training of applicants.		Listliterature, questions, assignments.	2%

Content of the lecture material.

One of the most important sections of phthisiology is the treatment of tuberculosis patients. The history of treatment of tuberculosis patients is closely intertwined with the level of knowledge in different periods of the development of medicine and related sciences. In the past, doctors prescribed drugs containing gold and silver, arsenic and iodine, phosphorus and strychnine, copper and lead, mercury and sulfur to patients with dry lungs. Many plants and herbs were widely used. Patients were treated with fish oil, donkey milk, dog fat, deer blood, pig lungs, and lime. Some of these drugs, when used rationally, had a positive effect on the body of patients due to their symptomatic effect, as they contributed to the normalization of metabolic processes to a certain extent.

The history of tuberculosis therapy is divided into two periods: pre-antibacterial and anti-bacterial. The latter begins with the discovery of streptomycin in 1943 by Schatz, Bougie and Wixman. In 1946, Lehmann proposed to use para-aminosalicylic acids for therapeutic purposes, which would significantly expand the therapeutic possibilities for tuberculosis. The introduction into medical practice of GINK derivatives (isonicotinic acid hydride) - synthesized in 1951-1952 by employees of VNDHMI M.N. Shchukina, G. N. Pershin, O. D. Sazonova, and O. O. Makeeva - made it possible to successfully treat and cure hopeless forms of tuberculosis.

Chemotherapy is the main method of treatment for tuberculosis patients. However, the use of only chemotherapy drugs in treatment does not always lead to a quick and stable cure with the formation of minimal residual changes in the lungs. Therefore, in the treatment of patients, the principle of complex treatment with the inclusion of pathogenetic and symptomatic agents is followed. But when complex conservative therapy of the appropriate duration is ineffective, in the absence of contraindications, collapsotherapy and surgical methods of treatment are used.

Correct evaluation of the clinical course, adequate selection of the chemotherapy regimen, timely referral of patients for surgical treatment, correct selection of the volume of operative treatment allows to increase the effectiveness of treatment of tuberculosis patients and prolong the life of patients with chronic forms of tuberculosis.

In order to achieve a clinical and anatomical cure, a complex of methods should be used, and at the same time it is important to observe the basic principles of treatment in order to use them most rationally.

Basic principles of treatmentpatients with tuberculosis are:

1. The treatment of a patient with tuberculosis should be long-term, since until now it has not been possible to develop such methods that would allow to achieve a cure in a short period of time. With successful treatment of sensitive forms of tuberculosis, the duration of treatment is 6 months, with monoresistant forms of TB at least 1 year, with multiresistant and forms of TB with extended resistance up to 2 years after the start of therapy.
2. The treatment of a patient with tuberculosis should be complex, that is, it should involve the use of a combination of various methods necessary to achieve a cure. The complex of treatment methods primarily includes chemotherapy - the main method of treatment for patients with tuberculosis. In second place are pathogenetic medicinal methods used to normalize the disturbed functions of the macroorganism: reducing the degree of sensitivity of inflammatory reactions, stimulating healing processes, eliminating metabolic disorders.

Various means are used for pathogenetic therapy. Leading among them are anti-inflammatory drugs that help reduce the inflammatory process and eliminate the exudative phase of inflammation. Anti-inflammatory drugs include corticosteroids and a number of other drugs that reduce inflammation. The second group is drugs that stimulate reparation processes.

The third group of means is aimed at eliminating metabolic disorders: vitamin therapy, which eliminates vitamin balance disorders that are aggravated under the influence of chemotherapy drugs. In addition to vitamins, microelements, anabolic hormones and other drugs that help normalize metabolic processes are widely used. The fourth group consists of immunomodulators (T-activin, timalin, etc.), which eliminate immunological disorders and stimulate the function of macrophages. Other pathogenetic agents are also used, which eliminate various functional disorders of breathing, heart, kidneys, liver and other organs and systems. They lead to the cessation of hemoptysis and other manifestations of tuberculosis.

3. Treatment of a patient with tuberculosis should be staged. Each stage corresponds to an individual program and at all stages: in a hospital, a sanatorium and a dispensary - it must be carried out according to a certain plan, observing continuity, bacteria secretors usually begin treatment in hospital conditions before the cessation of bacterial secretion. This sequence of treatment allows to achieve clinical cure in most patients with less anatomical and functional damage, which prevents the reactivation of the tuberculosis process in the next one.

It is very important to prevent patients from prematurely stopping treatment, as this can lead to exacerbation and progression of the tuberculosis process.

For the application of rational organizational forms of treatment, it is necessary to have a network of anti-tuberculosis facilities, the modern level of their material and technical support and medical and diagnostic equipment, the staffing of these facilities with well-trained medical personnel, the implementation of the entire complex of treatment measures in accordance with the basic principles of treatment. The general principles of treatment are universal. They can and should be used in the treatment of every tuberculosis patient, but specific treatment tactics should be used differently.

The basis of treatment at the first stage (in a specialized or basic hospital) is chemotherapy with etiotropic antibacterial antituberculosis drugs. It should be carried out against the background of a properly organized hygiene-dietary and medical and protective regime. This type of therapeutic effect is understood as a set of measures that eliminate negative irritations and emotions, as well as increase the body's resistance to tuberculosis infection and strengthen the patient's confidence in recovery. A mandatory condition is the individualization of the treatment regimen in relation to the form and phase of the disease.

The following types of modes are distinguished:

1. Mode of complete rest (bed mode).
2. Indulgent mode.
3. Training mode.

With complete rest, negative irritant effects on the cerebral cortex and the autonomic nervous system are eliminated, the function of breathing and blood circulation improves, energy expenditure decreases, the oxygen balance is restored, cough decreases, and the temperature decreases. It is prescribed during pulmonary bleeding, in case of spontaneous pneumothorax, acute period of pleurisy, as well as in severe manifestations of tuberculosis intoxication.

The sparing regimen is prescribed for patients with active tuberculosis without pronounced manifestations of intoxication. It includes a 2-hour rest in the afternoon. Patients are allowed short walks, lying on the veranda. As the process subsides and the signs of intoxication decrease, the mode of sparing the neuro-psychic sphere should give way to "training".

The training regime involves longer walks, a certain set of physical exercises, sports games and labor processes that are carried out in the air, in relation to the condition and skills of each patient under systematic medical control. Trainee

the regime and various types of physical culture, which are correctly carried out in a medical institution, are a transitional stage to the patient's normal labor activity.

Proper nutrition of the patient is a mandatory element of the modern complex therapy of tuberculosis. When making a food ration, it is necessary to take into account the total energy expenditure of the patient in accordance with the prescription of the regimen for him.

In bed mode, the number of calories absorbed should not exceed 30-35 per 1 kg of weight, in sparing mode - 35-40, in training mode - 40-45. So, the energy value of the daily diet is on average 2500-4000 calories.

When building food rations, a rational combination of proteins, fats, carbohydrates, vitamins and mineral salts should be provided.

Protein serves as a plastic substance and a stimulator of oxidizing processes, promotes the assimilation of vitamins by the body, and plays a major role in the mechanism of anti-tuberculosis immunity. Lack of it in food has a negative effect on the metabolism, namely it worsens the assimilation of fats. Limiting protein in the diet contributes to the exacerbation of tuberculosis and its progression. Proteins, especially of animal origin, are well absorbed. The norm of protein is 1-2 g per 1 kg of the patient's weight, and proteins of animal origin should make up 50-60% of the total amount of protein in the diet. The more difficult the process, the more complete the food protein should be. In these cases, meat, fish, cheese, dairy - acidic products should be prescribed. Proteins make up 15% of daily calories.

Chemotherapy of tuberculosis patients takes a leading place in the treatment. This provision is generally accepted and does not require special evidence. Extensive experience in the use of chemotherapeutic drugs has been accumulated. Their therapeutic effect is due to their antibacterial effect on mycobacterium tuberculosis. The degree of therapeutic effect depends primarily on the tuberculostatic activity of chemotherapeutic agents, as well as on the state of the bacterial population and its sensitivity to chemopreparations. At the same time, it should be emphasized that when chemotherapy is administered to tuberculosis patients, the drug affects not only mycobacterium tuberculosis, but also various organs and systems of the patient.

The classification of anti-tuberculosis measures, which was used until recently, provided for their division into main (I series), which are proposed for preferential use in newly diagnosed patients regardless of the form of the disease, and reserve (II series), which includes all the latest anti-tuberculosis drugs - for therapy , mainly of previously treated patients, ceased to meet the principles of building chemotherapeutic regimes.

The clinical effectiveness of individual anti-tuberculosis agents is determined by the following main factors: the bacteriostatic activity of the blood, interaction with other drugs, permeability to the affected areas, the ability to act intracellularly (on phagocytosed tuberculosis mycobacteria), the ability to induce drug resistance of the pathogen, as well as transfer by patients.

Based on the combination of these properties, in 1975, the International Antituberculosis Union suggested classifying antituberculosis drugs into three groups, which may also include drugs developed in recent years.

Group A - the most effective drugs; isoniazid, rifampicin, mycobutin.

Group B - drugs of medium effectiveness: ethambutol, pyrazinamide, morphazinamide, streptomycin, protionamide, ethionamide, cycloserine, kanamycin, florimycin, ofloxacin, capreomycin.

Group C - the least effective drugs: PASK sodium, thioacetazone.

Depending on the sensitivity of mycobacterium tuberculosis, anti-tuberculosis drugs are also divided into first- and second-line drugs.

The first row includes isoniazid, rifampicin, streptomycin, ethambutol, pyrazinamide. They are prescribed to patients of category I, who emit sensitive MBT, and patients of category III.

The II series includes the latest antituberculosis drugs. They are used only in individual chemotherapy regimens for category IV patients (with resistant strains of MBT).

Isoniazid(isonicotinic acid hydrazide). Synonyms: GINK, tubazid, rimifon, nikazid, neoteben, etc.

White crystalline powder, easily soluble in water. Release form: powder and tablets of 0.1; 0, 2; 0.3 g., in ampoules - 10% solution of 5 ml.

Pharmacological features: isoniazid exhibits a pronounced, strictly specific bactericidal effect on mycobacterium tuberculosis (MBT), it does not affect other microorganisms. Under the influence of isoniazid, the synthesis of endogenous catalase in the MBT and the accumulation of hydrogen peroxide are reduced, which leads to the cessation of growth and reproduction of mycobacteria. It enhances phagocytosis in the focus of specific inflammation, which contributes to its resolution. After ingestion, it is quickly and completely absorbed from the gastrointestinal tract and reaches all organs and tissues, forming a high concentration in areas of exudative inflammation. The maximum level of activity in the blood occurs after 1.5-2 hours. A small amount penetrates into the caseous encapsulated foci, into the wall of the cavern and ITS contents. It is inactivated by acetylation in the liver and excreted by the kidneys after 24 hours, depending on the degree of inactivation. Patients whose content of the active fraction of isoniazid in daily urine is 10% or less of the accepted test dose are considered strong inactivators. When the level is more than 10, 1% of patients are classified as weak inactivators.

Under the influence of isoniazid, peripheral and coronary vessels dilate, blood pressure decreases, the secretory function of the stomach increases, appetite improves, bile secretion and cholelithiasis increase.

Isoniazid is prescribed in the treatment of all clinical forms and localizations of tuberculosis; for the prevention of tuberculosis and prevention of relapses.

Dosage 5-15 mg per 1 kg of body weight. The maximum dose is 0.3-0.6 g per day ror os, i/m, i/v, ror rectum.

Increasing the dose of isoniazid by more than 15 mg per 1 kg of body weight is prohibited by the Pharmaceutical Committee and methodological guidelines for chemotherapy.

Pregnant women, if possible, are treated with isoniazid, rifampicin and pyrazinamide.

Contraindications: with individual hypersensitivity to isoniazid in the anamnesis, active forms of liver disease, damage to the optic nerve and polyneuritis.

Adverse reactions are caused by a violation of the metabolism of vitamins B6 and PP (ZD syndrome), which can provoke epileptiform seizures.

Derivatives of isonicotinic acid hydrozide are ftivazide, metazide, and saluzide.

Rifampicin(synonyms: rifadin, benamycin, rimactan, rifa, tubocin, etc.). A semi-synthetic broad-spectrum antibiotic, a derivative of rifampicin. It inhibits the synthesis of ribonucleic acid of microorganisms. It has a bactericidal and highly sterilizing effect on mycobacterium tuberculosis (MBT) in their intracellular and extracellular locations. It is very active against many microorganisms, especially gram-positive ones. Staphylococci and MBT are most sensitive to it. Delays the growth of both sensitive and resistant to other MBT drugs. Does not have cross-resistance with any anti-tuberculosis drug. It has a pronounced bactericidal effect on persistent forms of MBT and certain types of atypical mycobacteria. When taking it, peaks of bacteriostatic concentration are formed for 2-4 hours in the blood serum and longer in the areas of lung tissue damage.

After ingestion, it is quickly and completely absorbed from the gastrointestinal tract, enters the blood, liquid media and organs, is excreted from the liver with bile to the intestines. Then the drug is again reabsorbed into the intestines, continues to circulate mainly through the system of portal vessels and is excreted from the body with feces and urine, coloring them in red.

Release form; capsules or tablets of 0.05; 0.15 and 0.3 and ampoules of 1.5; 3.0 and 10.0 ml containing respectively 0.125; 0.25 and 0.5 of the drug.

It is prescribed for all clinical forms and localizations of tuberculosis and for its prevention. It is taken orally in 30 minutes. to food, intravenously, intravenously and locally at the rate of

10 ml per 1 kg of body weight (maximum daily dose 0.6 g) daily or 3 times a week. Children no more than 0.45 g per day.

Warning: monitor the level of bilirubin and transaminases in the blood serum, especially in the elderly and alcoholics, in patients who repeatedly resume treatment with rifampicin. After a long break, serious immunological disorders may develop.

Contraindications: hypersensitivity to rifampicin, impaired liver function. There is no presence of chronic liver disease in remission. an absolute contraindication, although it requires caution. It can be given to patients with moderately reduced excretory function of the kidneys, because it is excreted from the body mainly with bile through the intestines.

Adverse reactions and complications:

Hyperthermia, rhinitis, flu-like syndrome, myalgia, arthralgia, abdominal pain, nausea, vomiting, loss of appetite; obstructive respiratory disorders, skin rashes, hematological disorders (thrombocytopenia, hemorrhage, anemia), anaphylactic reactions, hepatitis, staining of contact lenses.

With long-term use, drug-induced hepatitis may develop at dosages exceeding 0.6 g per day. Combinations that include rifampicin and isoniazid are particularly effective; rifampicin, streptomycin, ethionamide (prothionamide) and ethambutol.

Rifampicin is contraindicated in liver diseases with pronounced functional impairment.

Pyrazinamide- (synonyms: tizamide, Pi-cox, zinamide, etc.). Release form: 0.5 tablets. Pyrazinamide is a synthetic analog of nicotinamide. It has a strong sterilizing effect on human mycobacteria, especially those that reproduce slowly and persist in microphages, creating areas of acidosis around phagocytosed individuals. Its maximum effect is established in acidic environments; in foci of caseosis, tuberculosis, caseous-pneumonic processes, where the drug easily penetrates. The drug is highly effective during the first two months of treatment of tuberculosis patients.

The peak concentration is reached 2 hours after intake. The half-life is about 10 hours. It is prescribed for all forms and localizations of tuberculosis.

It is taken orally after meals. The daily dose for adults is 1.5-2 g (1 g 2 times, sometimes 0.5 3-4 times). Children are prescribed at the rate of 20-30 mg/kg per day, but no more than 1.5 g.

Contraindications: increased individual sensitivity to the drug, liver disease with dysfunction, gout.

In the course of treatment, it is necessary to monitor the condition of patients with accompanying diabetes, because it increases the level of blood glucose.

Streptomycin. In medical practice, streptomycin and dihydrostreptomycin salts are used. Streptomycin chlorcalcium complex is a double salt of calcium chloride and streptomycin hydrochloride. Dihydrostreptomycin sulfate is a reduced form of streptomycin, in which the aldehyde group is replaced by an oxymental one; dihydrostreptomycin

dihydrostreptomycin pantothenate-pantothenic acid. In recent years, streptomycin sulfate (synonyms: ustrep, diplostrep, strycin, strizolin, etc.) has been used mainly. Available in bottles of 0.25; 0.5 and 1.0 g.

Streptomycin is a broad-spectrum antibiotic. Active against most gram-negative and some gram-positive bacteria, including human and bovine mycobacteria. Avian MBTs are less sensitive to it. It is most active in the population of MBT, which reproduces rapidly, and has little effect on the phagocytosed MBT, which reproduces slowly. Its action is sharply weakened in an acidic environment (caseosis foci), in the cavern it is quickly inactivated by the products of tissue decay.

After intramuscular administration of 1 g of streptomycin, its maximum level in the blood is created after 1 hour and is excreted from the body with urine after 10-12 hours. At the same time, its effect on freely circulating MBT is maintained for 72 hours.

Streptomycin is administered intravenously to adults at 1 g per day once, every other day or twice a week. In the first days for better adaptation - 0.5 2 times a day. With poor tolerance for patients over 60 years of age and patients with a body weight of less than 50 kg, the daily dose is 0.5 - 0.75 g. Streptomycin is not recommended for children.

Streptomycin is also used in aerosols, in the form of instillations into the pleural and abdominal cavities, cavern, bronchi, fistulas, etc. With late-onset tuberculous meningitis, there is sometimes a need for endolumbar administration of the chlorcalcium complex of streptomycin. Its simultaneous administration with antibiotics of the same type (kanamycin, florimycin, monomycin, neomycin, etc.) is strictly prohibited.

Streptomycin is prescribed at the rate of 0.015 g/kg of body weight per day. The drug can cause a large number of side reactions of both allergic and toxic origin, and mixed toxico-allergic reactions (Angioedema, dermatitis, hematuria, albuminuria, decrease and loss of hearing, impaired function of the vestibular apparatus, headaches, sleep disorders, cardioalgia, peripheral neuritis, increased BP, anaphylactic shock, etc.).

Ethambutol -(synonyms: kombutol, ambutol, tubetol, ethambine, etc.). White crystalline powder, easily soluble in water, synthetic analogue of 1, 2-diamine. Available in tablets of 0.1; 0, 2; 0.4 g. It has only bacteriostatic activity on MBT of human and bovine species, to a lesser extent - on bird species. Predominantly affects populations of rapidly proliferating MBTs that are located both intracellularly and extracellularly. There is no cross-resistance to it of MBTs that are resistant to other antituberculosis drugs. The activity of the drug is higher in an alkaline environment, lower in an acidic environment.

Peak concentrations occur 2-4 hours after ingestion, it accumulates in erythrocytes, where its depot is created.

The half-life is 3-4 hours. Excreted from the body with urine and bile.

It is used for all forms and localizations of tuberculosis, especially when primary resistance to other drugs is suspected.

Ethambutol is taken orally once after breakfast. The optimal daily dose for adults is 25 mg/kg at one time. This dose should be taken without reducing it during the entire course of chemotherapy. The average daily dose for adults is 1.4-1.8 g. Children are prescribed at the rate of 15 mg/kg per day, but no more than 1 g.

With intermittent treatment (2-3 times a week), ethambutol is given to adults at the rate of 30 mg/kg once.

Contraindications: increased individual sensitivity, optic neuritis, impaired excretory function of the kidneys (creatinine clearance less than 50 ml/min), pregnant women, children of preschool age.

Adverse reactions: retrobulbar neuritis with decreased visual acuity and narrowing of the field of vision to red and green, peripheral neuritis.

It often causes dizziness, insomnia, dyspeptic phenomena, allergic reactions, damage to the liver, kidneys, hematopoietic system.

The prescription of complex drugs is very convenient in the treatment of patients outside the hospital (in outpatient settings), thus facilitating medical supervision of taking anti-tuberculosis drugs.

In connection with the different state of the bacterial population at different stages of the course of the disease in the course of chemotherapy, recently it has been customary to divide the entire period of chemotherapy treatment into 2 phases or stages.

The first stage is characterized by intensive intensive chemotherapy; its appointment will suppress the reproduction of the bacterial population and achieve its quantitative reduction. The second stage of less intensive chemotherapy, the phase of additional treatment and its purpose - influence

on the remaining bacterial population, which is mostly intracellular in the form of persistent forms of MBT.

As you know, the phenomenon of drug resistance of mycobacteria, which has great clinical significance, is closely related to the state of the bacterial population. There is a close relationship between quantitative changes in the bacterial population and changes in a number of biological properties of mycobacteria. One of which is drug resistance. In a large bacterial population that reproduces, there is always a small number of drug-resistant mutants that are of no practical importance, but the gradual reduction of the bacterial population changes the ratio between the number of drug-sensitive and resistant mycobacteria. In these conditions, mainly resistant mycobacteria multiply, the number of which increases, reaching a critical proportion and may even exceed it.

Therefore, in clinical practice, it is necessary to investigate the drug sensitivity of MBT, and the results of this study should be compared with the dynamics of the tuberculosis process, as well as with the data of the examination of sputum or other material for the presence of MBT. Cancellation of a chemotherapy drug to which drug resistance of mycobacteria has been detected is carried out based on the availability of data indicating the ineffectiveness of chemotherapy or a decrease in its effect during treatment, in particular, in the case of the isolation of mycobacteria, which is still ongoing.

Drug resistance of mycobacteria in the course of chemotherapy is more often revealed in the case of long-lasting bacterial excretion (more than 6 months) and the syndrome of "falling and rising" of the bacterial population. Therefore, the choice of chemopreparations for treatment, in particular, in the process of its implementation, is determined not only by their tuberculostatic activity and the degree of antibacterial action on extracellular and intracellular MBTs, but also by the medicinal sensitivity of the pathogen to them, the massiveness of bacterial excretion and its dynamics, in combination with intimate data , which reflect the effectiveness of the treatment during its implementation.

The choice of chemotherapy drugs and their replacement largely depends on their patient tolerance (tolerance). Having a toxic and sensitizing effect on the patient's body, chemotherapy drugs can cause side effects, manifested by various clinical symptoms or syndromes (allergic, toxic and toxic-allergic syndrome). Especially often they arise due to the presence of concomitant diseases of the liver, stomach, kidneys, cardiovascular system, etc. Therefore, when choosing chemopreparations, if possible, you should avoid prescribing such agents, which, given the existing state of various organs and systems of the patient, may cause side reactions or are simply contraindicated. It should be borne in mind that the side effect is more likely to be detected when using maximum therapeutic doses.

When starting treatment with chemotherapy drugs, it is recommended to prescribe small doses in the first days, constantly increasing them to optimal therapeutic doses. The use of various pathogenetic agents at the same time can prevent or eliminate the side effects of chemotherapy drugs. Their cancellation is carried out only in case of complete intolerance or

there is a danger of causing severe manifestations of medical complications that can cause serious harm to the patient's health.

Anti-tuberculosis therapy is carried out differently and depends on the clinical form of tuberculosis, the tolerance of drugs and the sensitivity of the MBT to them. According to the world literature, the schemes recommended by the WHO should be considered the most effective, which have proven themselves for seriously ill patients in different countries of the world. This was confirmed by domestic researchers.

All patients who are prescribed antituberculosis therapy are divided into 4 categories: I, II, 111 and IU, depending on the presence of lung tissue decay, the severity and duration of the tubercular process and bacterial excretion.

To the 1st categoryinclude new cases: patients with newly diagnosed susceptible tuberculosis of various localizations with bacterial release (VDTB MBT+), as well as patients with other (severe and widespread) forms of the disease of various localizations without bacterial release (VDTB MBT–): miliary, disseminated tuberculosis, meningitis, caseous pneumonia, pleurisy (with a severe course), tuberculous pericarditis, peritonitis, intestinal tuberculosis, spinal tuberculosis with neurological complications, urogenital tuberculosis. The observation period is 2 years.

The widespread form should be understood as the spread of the process to 2 or more lung segments or 2 or more organs. Severe tuberculosis processes (in the absence of bacterial excretion) include the following course when there is pronounced tuberculous intoxication, which is accompanied by a febrile body temperature, destruction in the lungs is determined, and there is a threat to the patient's life.

To the 2nd categoryinclude any cases of susceptible pulmonary and extrapulmonary tuberculosis registered for re-treatment (patients were previously treated for more than 1 month): relapse of tuberculosis of various localization with bacterial release (RTB MBT+) and without bacterial release (RTB MBT–); treatment after a break with bacterial release (VDTB LPP MBT+) and without bacterial release (VDTB LPP MBT–), treatment failure, other. The observation period is 2 years

To the 3rd categoryinclude patients with new cases (diagnosed for the first time) of sensitive tuberculosis without bacterial isolation (VDTB MBT–), with a limited process in the lungs (with lesions of no more than 2 segments) and extrapulmonary tuberculosis, which is not assigned to the 1st category; as well as children with tuberculosis intoxication (TI) and tuberculosis of the intrathoracic lymph nodes or primary tuberculosis complex in the calcification phase in case of preserved activity of the process. In statistical accounting, data on children with tuberculosis intoxication are entered under the rubric "tuberculosis of unspecified localization". The observation period is 2 years.

To the 4th categoryinclude patients with chemoresistant tuberculosis, new and repeated cases of different localization with and without bacterial secretion. The observation period is not limited.

A combination of chemotherapy drugs for different categories of tuberculosis patients.

Category of patients	Stages (phase)	
	1st	2nd
The first	2HRZS(E)	4HR 4H3 R3
The second	2HRZE/1HE	5H3 R3E3 5HRE
The third	2RHZ 2H2R2Z2	2 HR 2H3R3 6HE
Fourth	Individualized therapy taking into account the sensitivity of the causative agent	

Conventional designations: H - isoniazid, R - rifampicin, Z - pyrazinamide, S - streptomycin, E - ethambutol. The numbers at the beginning of the formulas indicate the duration of the stage in months; subscripts indicate the frequency of taking drugs during the week.

Long-term research conducted at the department allowed to develop a method of treatment of newly identified patients with subsequent inclusion in the treatment complex of desensitizing and tissue preparations.

At the first stage, on the background of antibacterial therapy, if there are no contraindications, corticosteroids (more often prednisolone) are prescribed according to a 5-7-10 day scheme, starting with 20 mg with a gradual decrease of the drug by 5 mg every 5-7-10 days; potassium preparations; antihistamines, calcium chloride according to the scheme of V.A. Vorobyov (5% solution of calcium chloride on 1 tbsp. spoon 3 days after meals and 0.25% solution of calcium chloride subcutaneously, gradually increasing the dose every day, starting with 0.1 ml to 1 ml, then 1 ml for 10 days and further reducing the dose by 0.1 ml); increasing the dose of vitamin C (500-1000 mg per day); vitamin B/ 5% at 1 ml daily No. 30, vitamin RR at 0.05-0.075 g per day.

The desensitizing complex reduces the allergic mood of the body, which develops as a result of specific sensitization under the influence of the infectious agent and the used antibacterial drugs, and prevents side reactions to antituberculosis drugs.

After a month of taking the specified drugs, tissue therapy is prescribed with one of the drugs: placenta tissue suspension, placenta extract, vitreous body, FiBS, peat, aloe, peloid distillate, plasmol, biosed, pyridoxofot, marepolimiel, or in the form of double tissue therapy (preparation of animal and plant origin every other day subcutaneously or intramuscularly). Basically, one, two or three courses are prescribed with a monthly break. Under the influence of tissue preparations, a pronounced stimulating, immunomodulating and resorptive effect is noted.

Aerosol therapy, various methods of physiotherapy (organ electrophoresis, ultrasound, magnetic therapy, laser therapy, etc.) are also used in the complex treatment of tuberculosis patients at the department.

Treatment methods for tuberculosis patients continue to be improved and supplemented by new scientific developments.

Pathogenetic supplements, developed at the department and adopted for implementation in anti-tuberculosis institutions, significantly increase the effectiveness of treatment of tuberculosis patients with good tolerance of anti-tuberculosis drugs, shorten the duration of treatment in a hospital and the formation of small residual changes during treatment, which contributes to a better functional outcome and a more stable cure (reactivations of tuberculosis are rarer).

With such a full-fledged complex therapy already at the first stage of treatment, a significant improvement is achieved (healing of decay cavities, permanent cessation of bacterial excretion and elimination of manifestations of tuberculosis intoxication) in most patients. Only in some patients, the treatment does not give results or worsens (early termination of treatment).

On January 19, 2023, by order of the Ministry of Health of Ukraine No. 102, the standards of medical care "Tuberculosis" were approved.

If complex therapy does not lead to healing of destructive changes in the lungs, surgical interventions are used: segmental, bisegmental and partial lung resection.

Surgical methods of treating patients with pulmonary tuberculosis are divided into radical, collapsosurgical and intermediate operations.

Radical operations include various types of lung resection:

pneumonectomy, lobectomy, segmentectomy, combined resection.

Collapsosurgical operations include artificial pneumothorax, pneumoperitoneum, and thoracoplasty.

In the past, extrapleural pneumolysis followed by extrapleural pneumothorax or oleothorax and operations on the phrenic nerve were used.

The intermediate group of operations includes cavernotomy and cavernoplasty, drainage of the cavern, ligation of the bronchus, ligation of the pulmonary artery.

Indications for surgical treatment of tuberculosis patients can be urgent, urgent (forced) and planned.

Urgent indications are for patients suffering from the cavernous form of tuberculosis, which has been complicated by pulmonary bleeding, which cannot be stopped by hemostatic means. Urgent indications may arise with spontaneous pneumothorax, if gas aspiration does not give the desired effect, the patient is drained and a permanent air aspirator is applied.

Forced indications are in patients suffering from caseous pneumonia, progressive chronic polycavernous tuberculosis of the lungs, as well as pleural empyema or the presence of a bronchial postoperative fistula. Due to forced (urgent) indications, they seek to alleviate the suffering of patients.

All recent surgical interventions for tuberculosis are carried out as planned, taking into account direct (absolute) and relative indicators.

If during the treatment only the disappearance of symptoms of intoxication and slight resolution of infiltrative changes is noted, and the cavern or tuberculoma does not decrease, the issue of surgical treatment should be decided after 5-8 months.

Surgical treatment is indicated for patients in whom, after long-term antibacterial therapy (1 year or more), cavernous tuberculosis or tuberculoma is determined in the lungs.

Indications for pulmonectomy are a unilateral cirrhotic or polycavernous tuberculosis process, if there are no active specific changes in the other lung, as well as caseous pneumonia, giant cavernous or polycavernous changes in one lobe, emphysema, focal lesions of the other lobe of the lung, and a combination of tuberculosis with lung suppuration disease.

Thoracoplasty is performed when lung resection is not indicated in connection with low indicators of respiratory function and cardiac activity or due to the spread of the tubercular process. The goal of thoracoplasty (partial or total) is to collapse the lung lesion or the affected part of the lung.

Cavernotomy is indicated for patients with large giant caverns without significant focal insemination, when lung resection is not recommended due to the poor general condition of the patient.

Sanatorium-climatic treatment is the second stage in the treatment of tuberculosis patients and is used to restore impaired body functions and restore working capacity (rehabilitation) of patients. Sanatorium treatment can also be prescribed to patients with chronic tuberculosis in the absence of contraindications and to persons with subsiding tuberculosis who are under supervision in anti-tuberculosis dispensaries (second or third registration group).

After completing the main course of treatment, we cannot talk about a clinical cure, but only about the clinical effectiveness of the treatment:

- complete clinical effect (absence of MBT and healing of the decay cavity);
- partial clinical effect (absence of MBT, presence of decay cavity);
- lack of clinical effect (bacteremia and cavern remained).

Clinical cure is a stable healing of the tuberculosis process, which is confirmed by clinical and radiological and laboratory methods and differentiated periods of supervision, which are established depending on the magnitude of the residual changes and the presence of serious concomitant diseases.

In recent years, as a result of studies carried out in many countries, the new TB control strategy DOTS may lead to a halt in the rising tide of the TB epidemic. The DOTS (Directly Observed Threat Shortcourse) strategy - short-term chemotherapy under direct medical supervision, according to the WHO, will reduce the incidence of tuberculosis in the coming decades and prevent the threat of the development of resistance of the pathogen to specific chemotherapy drugs. According to this strategy, each patient should take no less than 4 of the strongest anti-tuberculosis drugs for 6-8 months under the supervision of medical personnel, which will ensure the complete recovery of most tuberculosis patients.

General approaches to the prevention of tuberculosis

Prevention of tuberculosis occupies an important place in the complex of measures aimed at combating tuberculosis.

Prevention of tuberculosis includes:

- social prevention;
- infection control;
- sanitary prevention;
- primaryprevention;
- secondaryprevention

Social prevention is aimed at:

- improvement of environmental conditions;
- improving the material well-being of the population;
- strengthening the health of the population;
- improvement of nutrition and living conditions;
- development of physical culture and sports;
- carrying out measures to combat alcoholism, drug addiction, smoking and other bad habits.

Infection control

Prevention of transmission of tuberculosis infection and infection of healthy persons and superinfection of tuberculosis patients is achieved by:

- Administrative control (rational placement of departments in an anti-tuberculosis institution, isolation of infectious patients until the end of bacterial isolation by microscopy, regulation of patient flows)
- Engineering control (ventilation system, ultraviolet lamps)
- Personal protection (cough hygiene for sick patients, surgical masks for sick bacteriolators, respirators with hepa filters for medical personnel who work with patients who have a positive smear).

Sanitary preventionpursues the goals of preventing TB infection of healthy people, protecting and making safe contact with a tuberculosis patient in an active form (especially with bacterial excretion) of the people around him at home and at work. An important component of sanitary prevention is the implementation of social, anti-epidemic and medical measures in the focus of tuberculosis infection (in the family and home of a tuberculosis patient who emits MBT).

The criteria for epidemic safety of a focus of tuberculosis infection are:

- massive and constant discharge of MBT patients;
- family living conditions of the patient;
- the patient's behavior;
- general culture and sanitary literacy of the patient and the people around him.

Sanitary preventionincludes the planned organization and implementation of a complex system of preventive measures - hygienic measures aimed at preventing infection and tuberculosis disease among healthy people of all

age groups. From certain positions, it can be considered as a part of social prevention, but the practice of its implementation requires separate consideration. The main direction of the system of sanitary and preventive anti-tuberculosis measures is the implementation of various social, anti-epidemic, medical and organizational actions in the focus of tuberculosis infection. Apparently, it is not entirely correct to consider only the housing of a tuberculosis patient - a mycobacterium isolate - as a focus of tuberculosis infection. First, the composition of the outbreak should include all residents who live there permanently, that is, contact persons (or "contacts"), who can be family, family, apartment (those who live in the same communal apartment with the patient). Secondly, the housing and surroundings of a patient with active pulmonary or genitourinary tuberculosis are also considered foci, regardless of the presence of mycobacterial secretion, provided that there are children or adolescents among the contacts. In addition, the immediate place of work and the closest working environment ("production contacts") of the working mycobacterial separator should be considered as foci.

Bacterial isolatesshould be considered patients who have manifestations of active pulmonary tuberculosis, with or without decay, and, by one or another method, in sputum or in bronchial lavage waters, tuberculosis mycobacteria have been detected at least once. Patients with active forms of extrapulmonary tuberculosis should also be classified as bacterial isolates, if MBT are detected in the corresponding secretions. In cases where patients have inactive or doubtfully active tubercular changes, only at least two detections of mycobacteria give reason to recognize them as mycobacterial isolates and take them to epidoblic. Such cases may be the result of the presence of bronchial tuberculosis in patients, a caseous lymph node rupture in the bronchus, or a very small focus of lung tissue decay, which is not amenable to X-ray determination and will definitely require further in-depth clinical, X-ray and laboratory study. Even with a one-time detection of mycobacteria, not confirmed by subsequent studies (smear and seeding on a nutrient medium), a patient for 9-12 months is considered to be a carrier of bacteria in the case when there are children and adolescents in the family, when cases of "fresh" infection have been recorded in the immediate environment ("virage"), or contact diseases, or when he works in children's, food, communal facilities, etc. The focus of tuberculosis infection is identified and treated accordingly.

From the above, it is easy to find out how important, a key element of anti-tuberculosis work is a careful, repeated examination of sputum and other secretions of a patient with tuberculosis by all available methods, both when detecting a newly diagnosed case, exacerbation or relapse, and in the dynamics during treatment and on at all stages of further dispensary observation of the patient. Before starting the treatment, it is necessary to carry out at least two examinations by direct bacterioscopy of the smear and flotation, as well as at least three times inoculation of the material on the nutrient medium. In the future, repeated serial studies of the same composition should be carried out at least every 2-3 months. It is very important for every bacteriological examination to determine the sensitivity of mycobacteria to anti-tuberculosis drugs in order to timely diagnose primary (when detected) or secondary (that arose during treatment) drug resistance, which has not only prognostic, but also epidemiological significance.

Epidemic record and surveillancebacterial isolates is carried out not only by anti-tuberculosis dispensary institutions, but also by sanitary and anti-epidemic regional bodies (SES region), to which an "emergency message" is sent from the dispensary in the first 24 hours after the detection of such a case in the form No. 058/o.

There is no doubt that intensive and simultaneous preventive actions should be directed at all links of the infectious process, namely: at the source of mycobacterial secretion, at the conditions under which infection is possible, at healthy persons who surround the patient and are exposed

danger of infection, i.e. represent a group of special risk of tuberculosis.

Work in the hearthbegins in the first days after the establishment of bacterial excretion. The complex of actions that it contains was called "patronage" and is the most important function of the anti-tuberculosis dispensary. The outbreak is visited by a district phthisiologist together with a district (patronage) nurse and an epidemiologist of the SES district. They carefully examine sanitation - epidemic conditions and draw up a plan for the recovery of the outbreak, which includes mandatory hospitalization of the patient (the purpose of which is not only to treat the patient, but also to isolate him from the immediate environment), conduct the final, and in the future - ongoing disinfection, the involvement of all contact persons for examination at the dispensary, as well as all necessary preventive measures: BCG vaccination and revaccination, chemoprophylaxis, isolation of children in special preschool or school institutions, improvement of sanitary literacy of the patient and his family members.

– According to the degree of epidemic danger (the nature and spread of the process in the patient, the massiveness of mycobacterial excretion, the state of living conditions, the composition of the family, and mainly - the presence of children and adolescents in it, cultural level, etc.) outbreaks are divided into three categories.

According to the group, the volume and content of preventive measures in the outbreak are determined.

I group— the most unfavorable foci: 1) a patient with existing bacterial excretion who lives in a communal apartment or dormitory; 2) there are children, teenagers, and pregnant women in the patient's family; 3) the family has poor living conditions, the patient and those around him do not follow hygienic rules of behavior.

II group— relatively unfavorable foci: 1) the patient has scanty bacterial excretion, a persistent tubercular process; 2) there are adults in the patient's family, there are no aggravating factors; 3) the patient is a conditional bacterial isolate, but there are children in his family and there are aggravating factors

III group— potentially dangerous foci: 1) a diseased conditional bacteriostatic agent (bacterial isolation has stopped, but 2 years have not yet passed); 2) there are only adults in the patient's family; 3) the patient and those around him perform all the necessary sanitary and hygienic measures for the prevention of tuberculosis.

A few remarks on disinfection measures in the focus of tuberculosis infection. The final disinfection is carried out by the disinfection units of sanitary sub-facilities after the patient's hospitalization, departure to the sanatorium, his death, and also at least 1-2 times a year, if the patient has not been eliminated from the outbreak. It includes treatment of the entire room, as well as the bed and clothes of the patient using the chamber method. Current disinfection in the case of the presence of a patient in an outbreak (which is extremely undesirable and requires at least internal isolation of the outbreak) is carried out by the patient himself or by one of the adult family members after careful instruction and under the supervision of the district phthisiologist and visiting nurse. Current disinfection includes decontamination of the patient's secretions, his personal dishes, leftover food, collection and isolated storage of dirty linen for disinfection and subsequent disinfection, as well as systematic wet cleaning of the room in which the patient lives and the objects he uses. The most important task is the disinfection of sputum - the main source of the spread of infection. The patient must have two individual spittoons, one of which he uses, while the other is disinfected. The simplest method of destroying mycobacteria is boiling a spittoon with sputum for 15 minutes in a 2% soda solution. If boiling is not possible, add 10 g of dry lime to the spittoon and leave for 1 hour, or pour a double amount of 2.5% activated chloramine solution or other disinfectants for 2 hours. In the presence of heating with an open flame, it is advisable to burn sputum in stoves. Experience shows that recommendations to fill spittoons before use with even a weak solution of chloramine are ignored by patients for completely understandable reasons. Therefore, they should be recommended

filling one quarter with a 2% soda solution. After disinfection, decontaminated sputum and food residues are poured into the sewer.

There are clear special rules for decontamination of other objects, developed taking into account the inadmissibility of their destruction, or even damage.

It is clear that mycobacterial isolates are not allowed to work in certain conditions and professions (children's, food, communal facilities), which also belongs to sanitary prevention measures.

Perhaps one of the most important objects of sanitary prevention are anti-tuberculosis medical institutions, especially inpatient units, where measures should be taken to reduce the risk of infection and tuberculosis among employees of these institutions. This includes, in particular, the collection and disinfection of sputum, secretions, spittoons, dishes, linen, patient care items, as well as the appropriate mode of cleaning and disinfection of the above-mentioned objects, premises, furniture and other items, as well as the destruction of flies. Final disinfection in such institutions is carried out at least once a year, preferably during repairs. The staff must strictly observe the rules of personal hygiene, undergo systematic monitoring of their health, and the administration must provide favorable working conditions (separate dining rooms, wardrobes, toilets, showers, etc.) and regular dispensary supervision, including chemoprophylaxis among them. It is undesirable to employ young persons not infected with tuberculosis, and persons who have some factors of increased risk of tuberculosis.

Special attention should be paid to issues of sanitary and educational work related to the prevention of tuberculosis, because the effectiveness of preventive measures cannot be achieved without the constant cooperation of the population with medical workers.

Timely diagnosis of tuberculosisrespiratory system is an important joint task of phthisis doctors and doctors of many other specialties, on the successful performance of which the health and well-being of our society largely depend. At the same time, the competent use of modern diagnostic capabilities in conditions of general and fully justified phthisiatric vigilance will contribute to the reduction of cases of overdiagnosis of tuberculosis and possible iatrogenic consequences of unjustified antituberculosis therapy.

In order to timely detect tuberculosis among children and adolescents, mass tuberculin diagnostics (Mantoux test) are used. The Mantoux test is carried out annually from 12 months. up to 14 years old among children and adolescents from risk groups, and in the case of a threatening epidemic situation - to all children from 4 to 14 years old who do not have contraindications.

The results of the Mantoux test with 2 TO are evaluated after 48–72 hours. after intradermal administration of tuberculin. They primarily carry information about infection and the state of anti-tuberculosis immunity. Negative and questionable test results (when the size of the papule is less than 5 mm) may indicate the absence of tuberculosis infection, or severe suppression of the patient's immunity with or without tuberculosis. A positive result is considered the presence of a papule of more than 5 mm. Tuberculin hyperergy (with a papule size of 21 mm or more in adults, 17 mm or more in children, the presence of a vesicle, necrosis, regional lymphangitis), as well as a pronounced positive reaction (with a papule size of more than 14 mm) are characteristic of patients with active tuberculosis. Tuberculin diagnostics as a method of diagnosing tuberculosis is important in HIV-infected persons, who often suffer from extrapulmonary forms of tuberculosis. However, a negative result of the Mantoux test with significant suppression of immunity (CD4<200 cells in mm3) does not exclude the presence of tuberculosis.

Conducting the Mantoux test is contraindicated in the presence of skin diseases, acute and chronic infections during the exacerbation period, including convalescence (within 2 months after the disappearance of all clinical manifestations), allergic conditions, rheumatism in the acute and subacute phases, bronchial asthma, idiosyncrasies with skin signs, epilepsy .

The interval after taking some other bio-tests or vaccinations before the Mat test should be at least 1 month.

Population categories with increased risk of TB disease

Contacts with patients on TV	Social risk groups	Medical risk groups
Family and household	Persons without a fixed place of residence	Patients with COPD. Patients with occupational lung diseases
Professional	Migrants, refugees, displaced persons	Patients with diabetes
Nosocomial	Alcoholics, drug addicts, unemployed	Patients who constantly take systemic glucocorticoids, cytostatics
Penitentiaries,S IZO	Persons who are or released from penitentiary institutions	HIV-infected

Categories of the population with an increased risk of tuberculosis are subject to annual fluorographic examination from the age of 15.

The physical essence of fluorography is that the image from the X-ray screen is photographed on film measuring 70 x 70 or 100 x 100 mm. Recently, supporters of the DOTS strategy (about it - below), which does not involve the use of fluorography, cite considerations regarding the radiation hazard as confirmation of the appropriateness of their position. It should be noted that the persons who undergo the examination receive a certain dose of radiation, but for many decades of studying the consequences of fluorography, almost no case of pathology that could be associated with the examination has been found (in the former GDR, a contingent of 100,000 was observed. persons who have undergone FG every year for 40 years). In addition, digital computerized models of fluorographic equipment ("Siemens", "Pulmodiagnost", "Sibrentgen") have now been invented, which gives a radiation load an order of magnitude lower than existing devices. This is the way to go

Primary prevention (specific prevention)

Vaccination with BCG vaccine is carried out after birth. Revaccinations have not been carried out since 2018.

For the purpose of immunization against tuberculosis, the BCG vaccine is used, which was first used by its authors Calmet and Guérin back in 1921 (France). It has been used in Ukraine since 1929, and during the war, in 1942, vaccination and revaccination became mandatory throughout the territory of the former USSR. The vaccine contains a strain of live mycobacteria grown in unfavorable conditions (320 transplants on potato - glycerin broth with the addition of beef bile). As a result, mycobacteria lose their virulence and toxicity, but retain their immunogenic properties. In Ukraine, a dry, freeze-dried in a 1.5% sodium glutamate solution BCZh-1 strain vaccine is used, which has the appearance of a dry white mass. The injection of the vaccine in a dose of 0.05 mg in a volume of 0.1 ml is carried out strictly intradermally (to prevent complications!) at the border of the upper and middle third of the left shoulder, after treatment

70-degree alcohol. Primary vaccination is carried out by specially trained personnel in the maternity hospital to healthy full-term children on the 3rd - 5th day after birth. Contraindications to vaccination: premature infant weighing less than 2500 g, severe hemolytic jaundice of newborns, fever of any etiology, birth trauma, skin rashes, HIV-infected mother. If the child is not vaccinated in the maternity hospital or within 2 months, a Mantoux test is performed and the child is vaccinated if the result of the Mantoux test is strictly negative. With effective immunization, a small infiltrate of 5-10 mm in diameter appears at the site of vaccine administration, in its center is formed

a crust that falls off and a scar with a diameter of 2-10 mm appears on its place in 2-4 months. Effectiveness is also evidenced by the occurrence of a positive reaction to the Mantoux test (post-vaccination allergy), but weaker and less persistent than in the case of an infectious allergy. All numerous, but very important details related to vaccination, its contraindications, possible complications, etc., are elaborated in detail in the instructions approved by the order of the Ministry of Health of Ukraine No. 233-96, the requirements of which must be strictly followed. In global phthisiology, there is an ongoing discussion about the feasibility of continuing vaccine prophylaxis, new options for active immunization are being searched for, but we are dominated by the point of view about its ability to prevent the disease or, at least, to complicate its progressive course.

Secondary prevention (chemoprophylaxis)

Secondary prevention is carried out for persons who have had contact with tuberculosis-infected bacteria isolates and when latent tuberculosis infection is established in medical and social risk groups in which tuberculin diagnostics are performed. Chemoprophylaxis is carried out for 6 months with isoniazid (in some countries, a two-component regimen of chemotherapy for 3 months).

Chemoprophylaxis with anti-tuberculosis drugs is carried out to prevent tuberculosis in the following population groups:

- persons who are in constant contact with tuberculosis patients with bacterial excretion;
- HIV-infected with a curve of tuberculin samples, with hyperergic reactions or an increase in tuberculin sensitivity.

Chemoprophylaxis uses:

- isoniazid in a dose of 0.3-0.45 g daily for at least 6 months to persons who have not suffered from tuberculosis and are in contact with a patient who secretes MBT in foci of tuberculosis infection.
- or a two-component regimen of chemoprophylaxis, the duration of which is reduced by 2 times: 3HE or 3HZ.

Chemoprophylaxis is not given to persons with foci of tuberculosis infection, where patients secrete chemoresistant MBT.

Materials on the activation of students of higher education during the lecture: questions, situational tasks.

Question:

- Classification of adverse reactions.
- Interaction of antituberculosis drugs with other drugs.
- Main contraindications when prescribing corticosteroids.
- Tissue preparations in the treatment of tuberculosis patients.
- List the main tasks of the regional tuberculosis dispensary.
- List the population groups subject to annual fluorographic examination for tuberculosis.
- Name the criteria for "timely detection" of forms of tuberculosis.
- Name the indicators characterizing the epidemiological situation tuberculosis
- Decipher the concepts: "current disinfection", "final disinfection".
- Specify the main methods of disinfection of sputum, dishes, clothes of tuberculosis patients.

Task:

1. A patient with disseminated pulmonary tuberculosis developed tinnitus, dizziness, and hearing loss 3 weeks after the start of treatment. What drug can cause such phenomena?

2. The patient has been treated in a hospital for a long time for destructive pulmonary tuberculosis. After how many months after the start of treatment, it is necessary to ask the question about surgical treatment?
3. A 30-year-old patient with active pulmonary tuberculosis was found in the family. Is it necessary or not to examine all contacts with this patient?
4. A 40-year-old patient with active pulmonary tuberculosis is being treated in the anti-tuberculosis department. Should current disinfection be carried out in the focus of tuberculosis infection and by whom?

General material and bulk-methodical provision of the lecture.

→ Educational premises - lecture hall of the department.
→ Equipment – negatoscope, slidescope.
→ Illustrative materials - slides, tables, models, X-rays, tomograms, patients with disseminated forms of tuberculosis and their histories, groups of dispensary records, BCG vaccine administration technique and Mantoux test, BCG vaccine, X-rays and tomograms, tuberculins.

Questions for self-control.

1.What are the common approaches to treating tuberculosis?
2.What are the main principles of antituberculosis chemotherapy? 3. What are the main courses of chemotherapy?
4. What are the categories and treatment regimens for tuberculosis patients? 5. Classification of antituberculosis drugs.
6. Mechanism of action, doses, ways of introducing anti-tuberculosis drugs into the body. 7. What are the side effects of anti-tuberculosis drugs, their diagnosis and prevention?
8. Criteria for curing tuberculosis.
9 What measures are taken to prevent tuberculosis.
10. Specific prevention of tuberculosis.
11. Characteristics of foci of tuberculosis infection. Anti-tuberculosis measures in foci of tuberculosis infection.
12. Risk factors for tuberculosis. Anti-tuberculosis interventions among people with risk factors.

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of infection control for health care facilities that provide assistance to tuberculosis patients". URL: https://zakon.rada.gov.ua/laws/show/z0408-19#Text

7. On January 19, 2023, by order of the Ministry of Health of Ukraine No. 102, the standards of medical care "Tuberculosis" were approved.

Lecture No. 3

Topic. Clinical forms of primary and secondary tuberculosis.

Actuality of theme.

Tuberculosis is a severe infectious disease that most often begins in the lungs (about 80%), but can spread and involve other organs and systems in the pathological process, cause a complicated course, and a fatal outcome.

An analysis of the epidemiological situation in the world over the last decade showed that predictions about the elimination of tuberculosis as a widespread disease did not come true. Mycobacterium tuberculosis kills more people than any other infectious agent. The total number of tuberculosis patients in the world today reaches 60 million, infected - about a third of the population of the entire planet.

WHO recognized tuberculosis as a global threat to humanity. The epidemic situation in Ukraine also remains unfavorable. WHO assigned Ukraine to the third category of countries with a high incidence of tuberculosis. "Ukraine ranks 7th in Europe according to this indicator." Therefore, tuberculosis is considered one of the most acute public health problems in our country.

Today, the main problem in the fight against tuberculosis in Ukraine is the multidrug-resistant form (DR-TB). Out of 100 patients, 15 have a stable form. This is a very high level of indicators. Among all new cases, it ranges from 5% in the western regions to 15% in the eastern regions. Another threat of the last 15-20 years is HIV infection. Thus, it was established that in Ukraine in 2020, 10,792 patients fell ill with TB, among which up to 50% of new TB cases occurred in HIV-infected persons with significantly reduced immune protection. The number of registered patients with drug-resistant TB/HIV (DR-TB/HIV) in 2019 in Ukraine was 1,655, mainly due to forms of multidrug-resistant tuberculosis (MDR-TB)/HIV (1,406) and cases with extended resistance (RRTB) in combination with HIV (249). Profound immunosuppression was determined in all HIV-infected patients with drug-TB [Statistical data of the Medical Statistics Center of the Ministry of Health of Ukraine, electronic resourcehttps://phc.org.ua/kontrol-zakhvoryuvan/ tuberculosis/ statistics- ztb/analytichno-statistichni-materiali-z-tb,2020].

Doctors of various profiles need knowledge on early recognition of this disease in order to prevent the spread of tuberculosis and unify approaches to providing phthisio-pulmonological care to patients and prevention of this disease.

Purpose: to teach applicants the method of clinical examination of patients with pulmonary tuberculosis and the correct interpretation of the obtained data; elements of deontology when communicating with patients; develop skills in recognizing clinical and radiological forms of pulmonary tuberculosis in accordance with modern classification.

Main tasks

- 0 to acquaint applicants with modern ideas about the pathogenesis of primary and secondary forms of tuberculosis.
- To form students' ideas about the main clinical forms of primary and secondary tuberculosis (undetermined localization, primary tuberculosis complex, tuberculosis of intrathoracic lymph nodes, disseminated, focal, infiltrative, caseous pneumonia, tuberculosis, fibro-cavernous, cirrhotic).
- To create imagination and understanding of features of the clinical course of primary and secondary forms of tuberculosis in the applicants.

- 0 to acquaint applicants with modern methods of diagnosis and differential diagnosis of primary and secondary forms of pulmonary tuberculosis (tuberculosis of undetermined localization, primary tuberculosis complex, tuberculosis of intrathoracic lymph nodes, disseminated, focal, infiltrative, caseous pneumonia, tuberculosis, fibrous-cavernous, cirrhotic).

Basic concepts: Primary and secondary tuberculosis

Plan and organizational structure of the lecture.

No	The main stages of the lecture and their content	Goals in levels of abstraction	Type of lecture, methods and means of activation of collectors, equipment	Distributiontime
1.	2.	3.	4.	5.
1. 2. 3.	**Preparatory stage**Setting learning goals Ensuring positive motivation **The main stage**Presentation of lecture material. **Plan:** 1.Introduction, justification and relevance of the topic. 2.Pathogenesis of primary and secondary tuberculosis. Features of the course. 3.Sublocal manifestations of primary tuberculosis: a). The early period of primary tuberculosis infection. b). Tub. bend. c). Tuberculosis of unspecified localization. 4.Local forms of primary tuberculosis: a). Primary pulmonary tuberculosis complex. Complication. b). Tuberculosis of intrathoracic lymph nodes. Complication. 5. Features of the pathogenesis and course of disseminated pulmonary tuberculosis: and). Subacute disseminated pulmonary tuberculosis. b). Chronic disseminated pulmonary tuberculosis. Differential diagnosis, course, consequences. 6.Focal, infiltrative tuberculosis of the lungs. Caseous	I II III III-IV III-IV IV	The type of lecture is a thematic lecture. Lecture equipment: negatoscope, tables, fluoroscope. Means and methods of student activation: Educational tasks Questions Problem situations. Means of visibility: tables, slides, radiographs. Histories of diseases, analysis of clinical situations, models.	2% 3% 88%

	pneumonia. Tuberculoma lungs Clinic, diagnostics, diff. diagnosis, consequences. 7. Destructive forms of secondary tuberculosis: fibrous-cavernous, cirrhotic tuberculosis of the lungs. Clinic, diagnostics, diff. diagnosis, consequences. **The final stage.** Summary of the lecture, general conclusions. The lecturer's answers to possible questions. Tasks for self-training of students.	III		
4.	**The final stage.**Summary of the lecture, general conclusions.			3%
5.	The lecturer's answers to possible questions.			2%
6.	Tasks for self-training acquirers		Listliterature, questions, assignments.	2%

Content of the lecture material.

For the first time, a person usually encounters the causative agent of tuberculosis in childhood. Tuberculosis affects the body as a whole from the very beginning, and its localization in organs is only part of this process.

Primary tuberculosis- is a disease that develops when a tubercular infection first enters the human body and is characterized by bacteremia, general and specific hyperergy with the involvement of the lymphatic system in the process.

Primary tuberculosis is a disease mainly of childhood and adolescence. When making a diagnosis of "virage", it should be remembered that the development of tuberculosis may coincide with the appearance of a positive tuberculin reaction for the first time. Therefore, when establishing a primary infection with tuberculosis, the child should be carefully examined by a phthisiopediatrician to rule out the presence of active local tuberculosis.

In some children infected with tuberculosis, in addition to the tuberculin curve, functional disorders in the form of intoxication phenomena are observed. The identified symptom complex in children with abnormal tuberculin tests is called tuberculosis of undetermined localization and is a clinical syndrome consisting of a number of functional disorders of the body (paleness, lethargy, drowsiness, irritability, lacrimation, anorexia, low-grade fever). With a thorough clinical and X-ray examination, it is not possible to detect local changes in the organs. Changed specific reactivity is sometimes accompanied by paraspecific reactions (erythema nodosum, phlyktenulosis keratoconjunctivitis, micropolyadenitis). During X-ray examination of chest organs, changes of a specific nature are not noted. Tuberculosis intoxication in children requires complex chemotherapy (isoniazid, ethambutol, pyrazinamide, etc.) for at least 4-6 months. The course of tube intoxication with timely recognition and treatment is generally favorable.

In some cases, the focus can break into the bloodstream and lead to the dissemination of the tuberculosis process (generally acute, hematogenously disseminated or miliary tuberculosis).

Local clinical forms of primary tuberculosis include: primary tuberculosis complex and tuberculosis of intrathoracic lymph nodes.

Primary tuberculosis complex. As already noted earlier, a person encounters the causative agent of tuberculosis for the first time in childhood. Having penetrated into the lungs, usually by an aerogenic route, the causative agent of tuberculosis at the point of penetration, under appropriate conditions, causes the formation of a larger or smaller focus with pronounced perifocal inflammation. This focus is called a primary focus (affect).

Very early, the tuberculous process spreads from the primary focus along the lymphatic channels from inflammation of the walls of the lymphatic vessels (lymphangoitis) in the direction from the focus to the gates of the lungs. Here, in the regional lymph nodes, a specific inflammation develops - lymphadenitis. This group of changes - primary tuberculosis focus, lymphangitis and regional lymphadenitis are united under the name of primary tuberculosis complex.

Clinical course. Usually, the disease begins with a high temperature that lasts 10-14 days, school or more. At the same time, the general condition suffers little. In the first days of the disease, typhoid, flu, and malaria are common.

Review. The child's condition, despite the high temperature, is quite satisfactory.

Palpation. Increased vocal tremor. Above the inflamed focus, an increase in available lymph nodes.

Percussion. Over the affected area of the lung, a fairly intense dulling of lung sounds is noted.

Auscultation. Over the affected area of the lung, breathing with a bronchial tone is heard, very often dry wheezes are heard.

Laboratory data. Studies of gastric lavage, which are taken in the morning better, allow finding tuberculosis mycobacteria. Not all fresh primary forms of tuberculosis should be considered facultatively open.

Changes on the part of the blood are quite characteristic. In the acute period, the ESR is elevated, shifted to the left, lymphopenia.

Radiologicallyin the projection of the affected part of the lung, there is a dimming of a homogeneous nature, associated with the shadow of the root of the lung, which is expanded and inflammatoryly changed. K.V. Pomeltsov distinguishes several stages in the X-ray picture of the primary complex:

1. Pneumonic.
2. Stage of organization. Bipolarity is clearly visible.
3. Compaction stage.
4. The calcification stage.

The latter begins 10-12 months after the onset of the disease. The formation of the Gon focus takes place within 2-2.5 years, and sometimes later.

According to the importance of the flow, M.P. Pokhitonova divides the primary complex into 2 large groups:

1. With a smooth flow.
2. Complicated.

With its smooth course, which continues for 2-3 Sundays, the temperature drops to subfebrile and remains so for a long time. At this time, the gradual resorption of infiltrative phenomena in the lungs and around the lymph nodes begins, and then the compaction of both components. With timely treatment, the blood picture quickly improves, the ESR decreases, leukocytosis disappears, and the shift of the leukocyte formula to the left disappears. The number of lymphocytes increases. The healing process follows 3 common types: resorption, compaction, calcification.

Complicated primary complex. At one or the other stages of the involution of the primary complex, various complications may arise, and then the course is delayed and in some cases acquires a wave-like character.

Complications from the primary affect:

1. Disintegration and formation of the primary cavern with all the consequences for the patient. (Its feature is an increase in the regional lymph node).

2. Involvement of the pleura in the zone of perifocal inflammation around the primary focus. Usually, costal and interlobular pleuritis occur at the same time.

According to V.A. Sukkenikov, there are:

1. Right and left paratracheal lymph nodes.
2. Right, left and lower tracheobronchial (the last group is called bifurcation).
3. Right and left bronchopulmonary.
4. Bifurcation.

This scheme was supplemented by Engel, Zhdanov and Yesipov.

One of the most numerous complications from the glandular component is:

I. Atelectasis. The cause of atelectasis is compression of the adduct bronchus by an enlarged lymph node or breakthrough of caseous masses from lymph nodes into the lumen of the bronchus, often with damage to the walls of the latter.

2. Hematogenous or lymphohematogenous dissemination, which comes from the lymph nodes of the root, is now observed relatively often, although this possibility is always present.

3. Asphyxiation by caseosis, which broke into the bronchi and then closed the trachea (small, weakened children), is very rarely observed.

4. A lymph node affected by tuberculosis may be accompanied by interlobular (retrograde lymph flow) or mediastinal pleurisy

5. A lymph node affected by tuberculosis can metastasize to the apical segment (described by Abrykosov in 1904)

Course and completion of the primary complex. The term of certain healing of the primary complex is 1.5 - 2.5 years. With a complicated course, it can be delayed.

In the pre-pubertal and pubertal period, it is from the complicated primary complex, especially complicated by dissemination, that secondary forms of tuberculosis arise. Therefore, children who have suffered a complicated primary complex require future monitoring and long-term treatment until full recovery.

Differential diagnosis. The primary complex in the infiltrative phase in the acute period must be differentiated from acute infectious diseases. Pathological changes in the lungs are weakly expressed, and a high temperature suggests typhoid or paratyphoid. The absence of an enlarged spleen, leukopenia, a relatively satisfactory condition of the child, and in the future, a negative reaction of Vidal allows us to reject this diagnosis.

In milder cases, a diagnosis of catarrh of the upper respiratory tract or influenza is often made, especially since in the initial period of the complex, catarrhal phenomena (paraspecific reactions) are often found. Sometimes there is a basis for making a diagnosis of pneumonia, most often a granular one (temperature, dulling of the percussion sound). But the long period of absence, the poor dynamics of physical symptoms, the lack of therapeutic effect when using drugs specific for pneumonia make the diagnosis of pneumonia to be rejected.

The diagnosis is clarified on the basis of: a) anamnesis;
b) tuberculin samples; c) pictures of blood;
d) characteristic X-ray picture.

In the later period of the course of the primary complex, there are complications in the differential diagnosis with chronic interstitial pneumonias.

Radiologically, in pneumonia, reticular-interstitial changes are more coarse, and in tuberculosis, mainly inflammatory-parenchymatous. The correct diagnosis is important now and because it dictates the possibility of earlier specific treatment.

Tuberculosis of intrathoracic lymph nodes. This form of primary tuberculosis is the most common. First of all, young children are sick.

It should be emphasized that getting into the lymph nodes of the root of the lungs, the infection can further spread along the chain of lymph nodes from the bronchopulmonary and other intratracheal groups to the cervical in one direction (descending) and intra-abdominal - in the other (descending).

A provocative factor can be more acute infectious diseases that reduce the body's resistance, especially measles, whooping cough, a severe form of influenza, as well as poor hygienic conditions, insufficient and irrational nutrition.

There are three clinical forms of bronchoadenitis: small, infiltrative and tumorous.

1. "Small" variants of tuberculosis of the intrathoracic lymph nodes are characterized by a slight increase (5-12 mm) and are detected during TG of the lung roots.

2. Infiltrative bronchoadenitis is characterized by a small increase in lymph nodes and pronounced perifocal inflammation around the lesion of the lymph nodes. Perifocal inflammation rarely extends beyond the basal zone.

3. Tumorous bronchoadenitis is a more severe form of tuberculosis both morphologically and clinically. The extent of lymph node damage ranges from a cherry to a pigeon egg and even more.

When bronchoadenitis occurs, the onset can be acute with a large number of manifestations of tuberculosis intoxication, subacute - with moderate manifestations of intoxication, and few - and even asymptomatic.

In addition to complaints caused by tuberculosis intoxication, with bronchiadenitis, symptoms caused by compression of enlarged lymph nodes on nearby organs may be observed.

During examination of the patient, dilated subcutaneous veins in front and skin veins behind are quite often and clearly defined (c. Wiederhofer and Franko). Not infrequently, there are paraspecific reactions - conjunctivitis, keratoconjunctivitis, phlycten, scrofula, erythema nodosum, as a rule - micropolyadenitis.

Percussion - shortening of the sound in the paravertebral zone, and with a large lesion - and in the interscapular space. Koranya's symptom - shortening of the sound when percussing the spinous processes of the thoracic vertebrae, starting from the 3rd and below (percussion is direct in the direction from the 10th and going up). Filatov's symptom - shortening of the sound near the edge of the sternum in the first and second intercostal space and paravertebrally at the level of 1-3 thoracic vertebrae.

Among the auscultatory symptoms, one should note S. Despine - bronchophonia in the area of the spinous processes of the vertebrae.

The role of x-ray tomographic studies, which allow to detect an increase in the shadow and a change in the configuration of the root of the lungs, is extremely important. Normally, the root has the form of a coma, 1.5 cm wide, with a concave edge directed outward. At the same time, the external contour is usually blurred with infiltrative and more clearly with tumorous bronchoadenitis.

It is also important to remember that a number of pathological processes in the root of the lungs can simulate an increase in lymph nodes - mediastinal neoplasm, retrosternal goiter, lymphogranulomatosis, etc.

Disseminated pulmonary tuberculosis— a clinical form characterized by the formation of numerous tuberculous nodules of various genesis. According to the pathogenesis, hematogenous disseminated tuberculosis and disseminated tuberculosis, which develops as a result of lympho-bronchogenic spread of mycobacteria, are distinguished. With hematogenously disseminated tuberculosis, foci are formed as a result of the spread of mycobacteria with the bloodstream (bacteremia). Bacteremia most often occurs with primary tuberculosis, that is, with reduced immunity and a sharply increased sensitivity of the body. Thus, hematogenous and lymphogenous tuberculosis by their genesis occupy an intermediate place between primary and secondary tuberculosis.

Most often, the source of bacteremia is an active process in the intrathoracic lymph nodes. In the emergence of disseminated tuberculosis, in addition to bacteremia, the massiveness and virulence of the infection, as well as the state of the defense forces of the macroorganism, play an important role. Bronchogenic dissemination rarely exists as an independent form. As a rule, it complicates other forms of tuberculosis that progress:
cavernous, fibrous-cavernous, etc. The whole group of disseminated tuberculosis, although united by a common pathogenesis, is extremely diverse both in terms of its clinical course and prognosis.

There are three main clinical variants of disseminated tuberculosis: acute or miliary, subacute and chronic. Nowadays, disseminated tuberculosis occurs in 10-12% of all newly diagnosed patients.

Sharp shapeit is rare, it occurs in a weakened body, in people of old age, occasionally in women during pregnancy or after childbirth, sometimes as a complication of primary tuberculosis in children living in the family of a sick bacteriologist in conditions of massive infection.

Pathological anatomy.Multiple small foci the size of a millet grain (milae - millet) are formed in the lungs. Hence the name of this form - miliary tuberculosis. The appearance of foci is preceded by damage to the capillaries of the lungs, which is manifested by a hyperergic reaction with disorganization of the collagen of the capillary wall, fibrinoid necrosis, which leads to an increase in its permeability. In the wall of small vessels, interstitium and alveolar septa, small tuberculous foci of 1-2 mm in size are formed. They arise within a short time and therefore are monomorphic: all foci are mainly exudative or productive in nature, in rare cases - necrotic. With miliary tuberculosis, the infection also enters the large circle of blood circulation, and similar small foci are formed in other organs - the liver, spleen, kidneys. Its entry into the brain and its membranes is possible. Then one of the most severe forms of tuberculosis develops - tuberculous meningoencephalitis.

Under the influence of treatment, there is complete resorption of foci or the formation of star-shaped connective tissue scars in their place, coarsening of the lung stroma, and the development of emphysema.

Clinic. Conventionally, typhoid, septic, pulmonary and meningeal types of acute disseminated tuberculosis are distinguished. In the typhoid variant, the disease begins acutely, with a high body temperature that reaches 39-40°C, severe weakness, headache, and chills. Occasionally, there are prodromal phenomena: general weakness, lethargy, unstable subfebrile. There may be no pulmonary symptoms in the initial stages, and patients are suspected of infectious diseases, in particular, typhoid fever. Due to the fact that foci in the lungs are small in size, located mainly in the interstitium, there are no percussive and auscultative changes over the lungs at the beginning of the disease, which complicates early diagnosis. An enlarged liver can be palpated.

With the pulmonary form, in addition to the phenomena of intoxication, shortness of breath, a dry cough, and cyanosis appear. The breathing rate reaches 40-60 per minute, which is due to total dissemination in the lungs, toxic effect on the respiratory center. Pronounced tachycardia. Percussion, in connection with acute emphysema of the lungs, reveals a lung sound with a tympanic overtone. Breathing may be weak or rough, dry or small-bubble moist rales are heard.

The appearance of a headache, vomiting should warn about the possibility of tuberculous meningitis (meningeal on the form). Then the patient has relative bradycardia, neurological meningeal symptoms are revealed. The diagnosis is confirmed by examination of cerebrospinal fluid.

Laboratory and other research methods.In the hemogram of patients with acute miliary tuberculosis, the number of leukocytes is usually normal or slightly increased, as the process progresses, leukopenia may develop. Number of rods

leukocytes are increased, lymphopenia is expressed. ESR can be normal or slightly increased. The reaction to tuberculin at the beginning of the disease is positive, as the patient's condition worsens, it becomes negative. Tuberculosis mycobacteria are rarely found in sputum or bronchial lavage, which makes it difficult to establish a diagnosis.

X-ray examination plays a decisive role in establishing the diagnosis, however, changes in the lungs are detected only from the 7-10th day of the disease. Roentgenoscopy and fluorography may not be sufficiently informative, so a well-executed radiograph is required, which reveals bilateral total screening of the lungs. Focal shadows are small, of relatively low intensity, weakly outlined. In connection with the larger volume of the middle and lower parts of the lungs, the impression is created that the dissemination is denser in these areas, but the tops are necessarily affected. Roots can be non-structural, sometimes they reveal compacted lymph nodes with elements of calcification (Fig. 43).

Differential diagnosis. Symptoms of acute disseminated tuberculosis resemble typhoid fever, but miliary tuberculosis begins acutely, while typhoid fever begins gradually. The temperature curve in typhus is more stable, in tuberculosis it is remitting. Relative bradycardia, which is characteristic of typhoid fever, occurs with tuberculosis only in the case of meningitis. Typhus is accompanied by leukopenia with relative lymphocytosis, miliary tuberculosis - with a slightly increased or normal number of leukocytes and pronounced lymphopenia. With typhus, Vidal's reaction is positive. The detection of small focal dissemination on an X-ray confirms the diagnosis of tuberculosis.

At the beginning of the disease, miliary tuberculosis is difficult to distinguish from sepsis, in which focal changes in the lungs are also observed, sometimes with abscessation. In case of sepsis, they usually find a connection with purulent processes in other organs, the general condition is very severe, temperature with large amplitudes, chills. Leukocytosis exceeds 20·109/l with a significant shift of the formula to the left. To confirm the diagnosis of sepsis, it is necessary to culture blood for sterility.

Subacute disseminated tuberculosis.It starts and runs differently. In some patients, after some period of general malaise, the temperature rises and functional disorders appear, which resemble the picture of an acute infectious disease. In other processes, it is initially asymptomatic or with mild symptoms. Patients usually experience weakness, loss of appetite, rapid weight loss, reduced work capacity, profuse night sweats, temperature instability with a rise in the evening (37.5°). Against this background, approximately half of patients have a cough, usually dry, less often with sputum. During the physical examination, a decrease in the percussion sound is determined mainly in the upper parts of the lungs, here also against the background of hard breathing, dry whistling, less often moist fine-bubble rales are heard.

On the radiograph of the lungs, the foci are located relatively symmetrically, are larger in size, of low and medium intensity, often merge with each other and tend to disintegrate. Pronounced perifocal infiltration may be absent around such cavities, therefore such cavities are called "stamped caverns".

In subacute disseminated tuberculosis, in addition to the lungs, the larynx, bronchi, kidneys, bones, joints are often affected, the comparison of clinical and X-ray data is essential for the diagnosis of this form of tuberculosis. Tuberculin tests are often positive, in some patients - hyperergic. Tuberculosis mycobacteria, especially in the presence of decay, are often found in the sputum of these patients. During bronchoscopy, various manifestations of bronchial tuberculosis are sometimes revealed, up to the very formation of fistula forms. Subacute disseminated pulmonary tuberculosis should be differentiated from influenza, pneumonia, bronchitis, pneumoconiosis, sarcoidosis, miliary carcinomatosis, congestive lungs, pulmonary lymphogranulomatosis, small-cell syphilis, scattered mycoses, fibrosing alveolitis, etc.

Chronic disseminated tuberculosis. This form of pulmonary tuberculosis lasts for years, and sometimes tens of years, is characterized by mild symptoms, a wave-like course with changing periods of exacerbations and the intervals between them. Such patients may have an increase in temperature, fatigue, weakness, shortness of breath during physical exertion. Over time, pulmonary or pulmonary heart failure develops. The above-mentioned symptoms are usually mild and patients do not pay attention to them until such symptoms as pain when swallowing, hoarseness or hemoptysis appear. The appearance of such symptoms forces patients to consult a doctor.

In the anamnesis of patients, there are often indications of transferred diseases of tuberculous or non-tuberculous etiology, dry or exudative pleurisy, lymphadenitis, recurrent influenza, pneumonia, bronchitis.

During objective examination, the following changes are determined: deformation of the chest on the more affected side, reduction of its volume, delay in the act of breathing, increased vocal tremor, reduction or dulling of the percussion sound, depending on the phase of the development of the process. With symmetrical damage to both lungs, the specified changes are noted on both sides, mainly in the upper and middle sections; in the lower parts, a percussive sound with a box tone - rough, hard or bronchial breathing; when disintegrating, wet rales are heard, which do not disappear after coughing. When the pleural membranes are involved in the process, a gentle pleural friction noise is heard.

In the hemogram, depending on the phase of the disease, there is a shift to the left, lymphopenia, monocytosis, moderately increased ESR, small changes in the proteinogram. Changes in the urine are typical for tuberculosis intoxication. Bacterial excretion in the absence of decay is rarely observed. Tuberculin reactions are normergic, rarely - hyperergic.

Radiologically, in chronic disseminated tuberculosis, foci of various density and size are a symptom of the "starry sky", the pulmonary pattern is enhanced, the roots of the lungs are compacted and pulled upwards. Pathological shadows are located symmetrically; the lesion is often localized in the upper and middle parts. There is an increase in the transparency of certain areas of the lung, mainly the lower ones, due to emphysema, as well as the presence of heavy shadows due to interstitial sclerosis.

With timely detection of disseminated tuberculosis and complex treatment, the end is favorable - resolution of foci and inflammatory changes with the formation of more or less pronounced residual changes.

In case of untimely detection, improper and ineffective treatment, disseminated pulmonary tuberculosis turns into fibro-cavernous and cirrhotic.

Focal tuberculosis of the lungsrefers to small forms of tuberculosis. It is characterized by the presence of few foci, mostly of a productive nature. The clinical course of focal tuberculosis is asymptomatic or mildly symptomatic, therefore this form of tuberculosis is detected mainly during X-ray fluorography studies.

Recent data indicate that the percentage of focal tuberculosis is decreasing to 10-15% and the percentage of other clinical forms is increasing.

In pathogenesis, it is believed that despite the fact that an exogenous mechanism of focal tuberculosis is possible, it is currently rare. Most often, focal tuberculosis occurs not as a result of superinfection, but as a result of reactivation of residual changes of tuberculosis infection in the human body.

The most frequent source of focal pulmonary tuberculosis is residual foci (seeding foci) that formed during the period of primary tuberculosis infection.

ON. Shmelov and co-authors in 1973 showed that persistent MBT can be preserved in old foci (calcifications), despite the absence of signs of tuberculosis activity.

Often, one of the forms of persistence is the L-transformation of mycobacterium tuberculosis. Under certain favorable conditions, their reversion to normal occurs

viable mycobacteria multiplying and causing the tuberculous inflammatory process.

Timely detection and early treatment of the focal form of pulmonary tuberculosis is of great importance, because focal tuberculosis with an unfavorable course and untimely detection can become the basis of progressive forms of pulmonary tuberculosis.

Focal tuberculosis refers to processes of various genesis and duration of the course with the size of the focus no more than 1 cm in diameter. Such monomorphic or polymorphic foci are located in the upper parts of the lungs. The prevalence is limited to one, two segments in unilateral and one segment on each side in bilateral lung damage.

It should be noted that focal tuberculosis is not always the beginning of a pulmonary process, it can be the result of other clinical forms of pulmonary tuberculosis after successful therapy. In such people, focal changes are the result of involution, healing of infiltrative or decimated pulmonary tuberculosis.

There are two main forms of focal tuberculosis: soft-focus and fibro-focal. The selection of these forms is due to their different genesis, different pathomorphological picture and potential activity, unequal tendency to reverse development.

The clinic of soft focus tuberculosis is mildly symptomatic. All detected clinical manifestations of focal tuberculosis can be divided into two groups: general intoxication syndrome and "chest" symptoms caused by damage to the respiratory organs. The increase in temperature is short-lived - 10-14 days, only some patients have a long subfebrile state. In addition to an increase in temperature, intoxication is manifested by symptoms of vegetative-vascular dystonia, increased sweating, sometimes tachycardia is noted. Decreased work capacity and fatigue are subjectively noted.

"Chest" symptoms are rarely noted, more often they do not attract the attention of the patient. There may be gagging, coughing without sputum or with a small amount of sputum. In 4-8% of patients there is a phase of disintegration of focal tuberculosis, in which case one-time hemoptysis may occur. In this group of patients, during auscultation, moist rales can be heard in a limited area, which are heard for a short time. In most patients with focal tuberculosis, the stetoacoustic picture is characterized by poor symptoms. When the apical pleura is involved in the process, soreness and stiffness of the muscles of the shoulder girdle on the side of the lesion can be observed during palpation (Potenzher-Vorobyov symptom).

The leukocyte formula in most patients with focal tuberculosis remains normal. In some patients, minimal changes are observed in the form of a slight shift of the leukocyte formula to the left, a slight acceleration of ESR. An increase in the absolute number of monocytes and lymphocytes indicates the stress of the immune system and is observed during a favorable course of the process.

Focal tuberculosis of the lungs is characterized by oligobacillary activity. However, repeated microscopic examination of sputum, bronchial lavage, cultures allow to detect MBT in some patients.

X-ray examination is the most informative method in the diagnosis of focal tuberculosis. In x-ray and tomography, mainly in the apical segments of the lungs, polymorphic focal shadows are noted: fresh foci of weak and medium intensity, not sharply limited, which often merge with each other due to perifocal infiltration; subacute forms with pronounced productive changes are more intense and sharply delineated foci; fibro-indurative foci - intense with a predominance of linear strands over focal shadows.

If X-ray intensity and clear borders are detected, but the clinical symptoms are not expressed, then we are talking about fibrotic - focal tuberculosis. In this

in this case, it becomes difficult to resolve the issue of the activity of the tuberculosis process. Persons in whom it is difficult to determine the activity of the tuberculosis process and there is no history of pulmonary tuberculosis are included in the zero group of dispensary records. If all possible diagnostic methods do not help establish the activity of the tubercular process, resort to the so-called test treatment for 2 months with chemotherapy drugs and study X-ray dynamics taking into account the subjective state of the patient.

Pulmonary tuberculosis is differentiated mainly from focal bronchopneumonia. The diagnosis of focal tuberculosis of the lungs usually does not cause difficulties in X-ray detection. At the same time, they take into account a mild or asymptomatic clinical picture, the presence of dense (old) foci, fibrosis, upper lobe (apical) localization of the lesion.

Nonspecific pneumonia begins and proceeds with the clinical picture of a more acute disease, with elevated temperature, cough, sputum production, shortness of breath. In the lungs of patients with pneumonia, a lot of catarrhal phenomena can be heard, while in patients with active focal tuberculosis, wheezing and shortness of breath are very rare. The characteristic localization of pneumonic foci is mainly in the lower lobes. Focal shadows with pneumonia are not dense, clearly contoured, they disappear after 2-3 weeks of non-specific

Infiltrative pulmonary tuberculosis- secondary form of tuberculosis. It is characterized by the formation of foci with a diameter of more than 1 cm in the lungs. Infiltrates can occur in an intact, that is, a lung free from tuberculosis, but more often they occur against the background of old foci, around which confluent perifocal inflammation will form. Infiltrative tuberculosis can occur as a result of the progression of fresh tuberculosis foci. It is possible that it is formed as a result of lymphogenic spread of mycobacteria from caseous mediastinal lymph nodes.

Tuberculous infiltrate is a tuberculous focus with perifocal inflammation. The focus has a specific structure, perifocal inflammation is serous, devoid of specificity. At the same time, there is exudate in the alveoli, sometimes with a large number of alveolar macrophages, sometimes with an admixture of leukocytes, lymphocytes, and fibrin. In the zone of perifocal inflammation there are foci of caseous necrosis. Infiltrative tuberculosis is characterized by a tendency to decay. Sometimes (with high virulence of the infection and reduced reactivity of the body), the formation of a cavern from the infiltrate occurs quickly - within 2-3 weeks. However, it should be emphasized that these cavities also heal quickly under the influence of rational tuberculostatic therapy.

The onset of infiltrative pulmonary tuberculosis can be acute, subacute, mildly symptomatic and asymptomatic. Subacute onset is most often noted. Often, the disease begins under the guise of flu or pneumonia, unlike the latter, an outbreak of tuberculosis drags on for a long time. Sometimes with infiltrative pulmonary tuberculosis, the disease begins with a small hemoptysis that lasts for several days. Early manifestations of the infiltrate can be expressed in tachycardia, nervousness, unexplained sweating and other symptoms of dysfunction of the autonomic nervous system, which occur without clinical manifestations, sometimes can be detected only during X-ray examination. The satisfactory condition of patients with infiltrative tuberculosis is observed not only with asymptomatic development of the disease, it can remain so, despite subfebrile temperature.

One of the initial signs is the lagging of the affected side of the chest in the act of breathing. In some cases, tension and pain are noted during palpation of the chest and back muscles. Shortening or dulling of the sound is determined percussively, depending not only on the magnitude, but also on the localization of the process. Breathing when fresh

infiltrates can be weakened, hard or bronchial. In the presence of a cavern, small, medium, and large bubbling rales are often heard.

During the acute course of infiltrative tuberculosis, a small leukocytosis, an increase in the number of rod-shaped neutrophils, lymphopenia, and acceleration of ESR are determined in the hemogram. Characteristic is the release of MBT, and in the case of decay - elastic fibers in a small amount of sputum. With infiltrative pulmonary tuberculosis, sensitivity to tuberculin is often expressed.

X-ray infiltrateit is defined as a diffuse, not sharply delineated and not very dense shadow of low or medium intensity. In case of cheesy degeneration of the infiltrate with subsequent release of caseous-necrotic masses through the adjacent bronchus, a cavern will be formed.

According to the distribution and configuration, the following clinical and radiological variants of infiltrative pulmonary tuberculosis are distinguished: lobular, round, cloud-like, periscissuritis, lobit, basal, oval, subclavian Asman.

Radiologically, the cloud-like infiltrate is an eclipse with indistinct, blurred edges of weak or medium intensity. Round infiltrates are darkening with fairly clear contours. Such infiltrates less often than cloud-like infiltrates end with the disintegration of lung tissue. If the infiltrate is located along the interlobular gap, it is called tuberculous periscissuritis. On the radiograph, in the case of a lobar lesion, one can see intense inhomogeneous darkening, occupying the entire lobe. Areas of enlightenment on the background of darkening, indicating the decay of the lung, have an irregular shape. With lobular infiltrate, multiple large areas of intense darkening are visible on the X-ray in both lungs.

The course and consequences of infiltrative tuberculosis depend on the type of infiltrate, the virulence and massiveness of the tuberculosis infection, the natural resistance of the macroorganism, acquired immunity and concomitant diseases.

There are two main variants of infiltrative pulmonary tuberculosis.

1.Involutive, favorable course, which takes place in conditions of rational treatment. It is characterized by a gradual decrease in the clinical manifestations of the disease, earlier disappearance of pulmonary symptoms, symptoms of intoxication, cessation of bacterial excretion within, as a rule, 3 months, resolution of inflammatory changes and closure of destruction, if it had time to form.

2. Progressive course. It is characterized by rapid formation of destruction. At the same time, attention is drawn to the dissociation between the clinical manifestations of the disease and the dynamics of morphological changes in the lungs. An increase in temperature is characteristic of the onset of infiltrative tuberculosis, it gradually decreases 10-15 days after the onset of the disease. By this time, the expressiveness of pulmonary symptoms decreases or they disappear completely (cough, sputum production, wheezing). V.A. Ravych-Shcherbo called this improvement in the patient's condition an imaginary recovery, because destruction is forming in the patient at this time. In the absence of treatment, after some time, the symptoms of intoxication appear again in patients, that is, there is an exacerbation of the process. Its subsidence is naturally replaced by another exacerbation, and this whole wave-like process is accompanied by the formation of a cavity and the continuation of bacterial excretion.

It should be noted the features of the course of periscissuritis. With this form of infiltrative tuberculosis, attention is drawn to the longer constancy of the X-ray picture, relatively rare tendency to dissemination and pain syndrome.

The result of infiltrative tuberculosis in most cases is favorable, it is largely determined both by the timeliness of identifying patients and the effectiveness of the applied treatment. In good circumstances, infiltrative changes can completely resolve without visible residual changes. More often, focal and fibrous changes remain at the site of the infiltrate, expressed to varying degrees depending on the type of infiltrate. In some patients (with high virulence of MBT and high resistance of the macroorganism)

formed by tuberculosis. This variant of involution, as well as the formation of pronounced metatuberculous changes in the form of cirrhosis or a portion of the segment, cannot be considered a successful result.

With late detection, incorrect or ineffective treatment, the process may progress. It goes either to the side of transformation into caseous pneumonia, or to the side of disintegration and formation of a cavern. Cavern formation is a new stage of the disease, which is primarily associated with the bronchogenic spread of the process. In the final result, fibrous - cavernous tuberculosis of the lungs may form.

Clinical and radiological manifestations of infiltrative tuberculosis are diverse. There are a number of diseases from which it is necessary to differentiate this form of tuberculosis: lung cancer, nonspecific pneumonia, eosinophilic lung infiltrate, pneumomycosis, etc.

In the differential diagnosis of tuberculous infiltrates in the lungs and neoplasms, significant difficulties often arise. When diagnosing lung cancer, attention is paid to the presence of such factors as smoking, occupational hazards, recurrent bronchitis and pneumonia. The onset of the disease in both cancer and tuberculosis is gradual. Clinical symptoms are also similar: weakness, cough, sometimes hemoptysis, shortness of breath, chest pain. However, unlike tuberculosis, the pain syndrome is pronounced, the cough is often painful, shortness of breath occurs relatively early and steadily increases, hemoptysis is frequent (from slight to profuse), dilation of the subcutaneous veins of the chest, paralysis of the vocal cords, and phrenic nerve may be observed.

In the X-ray picture of central lung cancer, the signs of hypoventilation or atelectasis of a segment or lobe come to the fore. The shadow of the tumor often has polycyclic, heavy contours, the regional intrathoracic lymph nodes are enlarged. Sometimes the shadow of a tumor node inside the lumen of the bronchus or a stenosis (stump) of the bronchus can be detected on tomograms. Bronchoscopy with biopsy is of great help in establishing a diagnosis.

Lobar-pneumonic forms of tuberculosis, which capture a large part of a part or a whole part of the lung, in the initial phases of the disease do not differ from ordinary croup pneumonia. The clinic of the latter is characterized by the same symptoms as tuberculosis: the onset is acute, the patient's condition is severe, the temperature is high, sweating, shortness of breath, hemoptysis. The difficulties of differential diagnosis increase due to the complete identity of radiological data. However, a complex clinical and laboratory examination of the patient, as well as dynamic monitoring of the course of the process, makes it possible to establish the correct diagnosis. With lobar pneumonia, chills, herpes are often observed, the patient's face is red, the skin is hot, dry, and cyanosis is noted. In the anamnesis of a patient with pneumonia, there are indications of hypothermia, chronic diseases of the respiratory tract. Dry and moist rales are heard in the lungs, more abundant than in tuberculosis. In the hemogram, more pronounced changes of an inflammatory nature are noted. The X-ray picture of croup pneumonia is characterized by the presence of intense homogeneous darkening of several segments or lobes of the lung with a pronounced reaction of the pleura. When examining sputum in patients with nonspecific pneumonia, nonspecific bacterial microflora can be detected. When treated with broad-spectrum antibiotics, patients with pneumonia have positive X-ray dynamics parallel to the disappearance of clinical symptoms of the disease.

Eosinophilic pulmonary infiltrate, which occurs under the influence of various allergens, differs from infiltrative tuberculosis by a number of clinical and radiological signs. The disease proceeds subacutely, acutely, and sometimes has no clinical signs and is detected accidentally during an X-ray examination. Intoxication is moderately pronounced, patients are bothered by a cough that is dry or with the release of a small amount of sputum, which contains eosinophils. In the lungs, a slight shortening of the pulmonary sound can be determined by percussion, and by auscultation – a few dry or small moist rales. In the hemogram, there is an increase in the number of eosinophils to 30-90%.

Radiologically, an eosinophilic infiltrate is defined as a low-intensity focal shadow with unclear contours of various shapes and sizes. The shadow of the eosinophilic infiltrate can be located in any part of the lungs. The lung tissue around it is not changed. Sometimes the expansion of the roots of the lungs and a small pleural effusion are observed.

Eosinophilic infiltrate is characterized by a positive skin test with the relevant allergen and rapid disappearance of clinical and radiological signs of the disease within several days, even without treatment.

Infiltrative tuberculosis sometimes has to be differentiated from atelectasis and lung infarction complicated by pneumonia. Atelectasis is caused by a violation of bronchial patency with a decrease in lung tissue distal to the blockage of the bronchus. This happens due to obstruction of the bronchus or squeezing it from the outside. Violations of lung ventilation and the development of atelectasis in tuberculosis occur with complicated course of bronchoadenitis. In other forms of tuberculosis, atelectasis rarely occurs.

Segmental, subsegmental and smaller atelectasis usually do not cause breathing disorders and are diagnosed radiologically in connection with the appearance of symptoms of the inflammatory process in the lungs. Atelectasis of a lobe and the entire lung is accompanied by sudden shortness of breath, cyanosis, and cardiovascular system dysfunction.

Radiologically, with atelectasis, a decrease in the size of the affected segment, part or the entire lung, uniform and intense darkening is noted. Other parts of the lung and the opposite lung and mediastinum are displaced to the side of atelectasis. On radiographs in direct and lateral projections, the shadow of atelectasis is homogeneous, with clear contours, and on computer tomograms, you can see bronchial lumens.

For the final diagnosis of atelectasis, a bronchoscopic examination is necessary, which will allow to establish the cause of the blockage of the bronchus and carry out treatment to restore its patency.

Caseous pneumonia- is a tuberculous pneumonia with a predominantly exudative-alterative tissue reaction, characterized by an acute progressive course, early disintegration with the formation of pneumoniogenic cavities.

This is the most severe form of infiltrative tuberculosis. Recently, it has become more and more common, and since 1993 it has been included in the classification of clinical forms of tuberculosis as an independent form.

Caseous pneumonia is characterized by the superiority of caseous changes over perifocal inflammation. At the same time, acinous lobular or lobar pneumonia is observed. A protein-rich exudate with a large number of phagocytes, leukocytes and fibrin sweats out in the alveoli. The same process occurs in the bronchioles. Areas of the lung containing exudate are subject to rapid curdled necrosis. Caseous pneumonia can occur with any form of tuberculosis in people with insufficient immune protection. So, for example, acinous caseous pneumonia occurs with disseminated tuberculosis or as aspiration pneumonia with pulmonary bleeding, partial caseous pneumonia can be a complication of fibrous-cavernous tuberculosis. Finally, it is worth taking into account the possibility of the occurrence of acinous-caseous pneumonia when caseous masses from the lymph nodes of the root of the lung break into the bronchus in case of primary tuberculosis. The progression of the tubercular process and its transition to caseous pneumonia is accompanied by a sharp deterioration of the patient's condition, a rise in body temperature to high numbers, the appearance of a cough with a large amount of sputum, abundant bacterial excretion, pulmonary and heart failure.

Caseous pneumonia proceeds acutely, resembling lobar pneumonia, typhoid fever, malaria, sepsis. In the first hours of the disease, there is a high temperature, profuse sweat, which makes the patient tired. Patients complain of shortness of breath, chest pain, strong cough with a lot of sputum, hemoptysis. During objective research, it is revealed

symptoms of respiratory failure, cyanosis of the lips, acrocyanosis. Over the affected part, the percussion sound is sharply muffled, multiple sonorous small and medium bubbling moist rales are heard. Bacterial discharge is massive. Shifts in the hemogram are more significant than in other forms, pathological granularity of neutrophils can be noted. Caseous pneumonia is often accompanied by negative energy. On the X-ray there is an intense darkening with areas of lightening, indicating the decay of the lung. In the future, small cavities can merge to form giant caverns.

Diagnosis of caseous pneumonia is difficult, especially in the first days. Usually, the diagnosis is established when there is rapid liquefaction of caseous masses and the formation of a giant cavity or multiple caverns of small sizes. In this case, the diagnosis is confirmed both by the dynamics of the process and by the appearance of abundant bacterial excretion.

In the pre-antibacterial period, caseous pneumonia usually ended in death as a result of severe intoxication (quick-flow dry skin). With the advent of anti-tuberculosis drugs, a successful outcome became possible, provided that specific therapy was started in time.

Tuberculoma of the lungsis a form of tuberculosis in which there are encapsulated foci of caseosis larger than 1 cm in diameter in the lungs. The pathogenesis of tuberculosis is diverse and complex. They can arise from infiltrative tuberculosis as a result of encapsulation of their central caseous-pneumonic focus. Often, a tuberculoma is a cavity filled with caseous masses that lacks drainage (pseudotuberculoma). Tuberculomas can arise from large foci. Relatively high resistance of the body is important for the emergence of tuberculosis, which is expressed in the rapid separation of the pathological process in the lungs from healthy tissues by the formation of a fibrous capsule.

The complexity of the pathogenesis is determined by the variety of morphological types of tuberculosis. There are 5 types of tuberculosis: homogeneous, layered, conglomerate, infiltrative-pneumonic, pseudotuberculoma.

Homogeneous is a product of involution of the infiltrative form of tuberculosis, when the perifocal inflammation resolves and a capsule forms around the focus, consisting of caseous necrosis and granulation tissue.

Infiltrative-pneumonic type - a product of the involution of a tubercular infiltrate and is a rounded focus of specific pneumonia with limited areas of caseosis and a tendency to a productive reaction.

The formation of a conglomerate tuberculoma occurs by merging several foci and a tubercle.

Layered tuberculoma will be formed as a result of exacerbation of old tuberculous foci and their gradual reaching the size of tuberculoma or as a result of single or multiple exacerbation of homogeneous tuberculoma with subsequent stabilization of the process.

There are small (up to 2 cm in diameter), medium (2-4 cm) and large (more than 4 cm) tuberculomas.

Tuberculomas contain structures of alveolar partitions represented by collagenous, elastic, argyrophilic fibers of the lung stroma, and caseous necrosis. Bronchial and vascular structures are absent in tuberculosis. Its capsule is vascularized, the bronchus that drains it is usually obliterated, and the surrounding lung tissue is sclerosed.

There are 3 clinical variants of the course of tuberculosis: progressive, stable and regressive. During the progression of tuberculosis, there is a predominance of an exudative-necrotic reaction with frequent formation of cavities as a result of the melting of caseous necrosis and its rejection through the draining bronchus, infiltration of the capsule, perifocal inflammation, focal dissemination, lymphangitis and specific endobronchitis. The stable course is characterized by the absence of radiological changes during the observation of

patients or rare exacerbations without signs of progression of tuberculosis. The regressive course is characterized by a slow reduction of the tuberculoma followed by the formation of a focus or a group of foci, an induration field or a combination of these changes in its place.

Cavity changes in tuberculomas are more often determined eccentrically, near the mouth of the draining bronchus, have an irregular shape in the form of sickle-shaped or bay-shaped areas of lightening.

The formation of tubercles often occurs without clinical manifestations, they are detected in such cases during preventive examinations. Some patients have mild symptoms of intoxication in the form of malaise, loss of appetite, low-grade fever, sometimes chest pain, hemoptysis.

Physical examination methods almost do not detect pathology if the tuberculoma is small and does not decay. MBT in sputum and bronchial lavage waters are rarely found in these cases. A characteristic feature is the hyperergic nature of tuberculin samples.

The progression of the process and the formation of destruction in tuberculosis is accompanied by pronounced signs of the disease. A cough with sputum appears, MBT is detected in the sputum, hemoptysis is possible. Above the tuberculoma, a shortening of the percussion sound, a change in breathing and moist rales are determined. In the hemogram, there is a slight shift of the leukocyte formula to the left, acceleration of the ESR In patients with tuberculoma, specific endobronchitis is often noted.

Radiologically, in most cases, isolated foci with clear contours more than 1 cm in diameter are found. They are localized, mainly, in the I, II, VI segments of the lungs, located cortically, near the interlobular and intersegmental borders. The shape of the tuberculoma is round or oval. At the time of exacerbation, the X-ray picture becomes less clear as a result of changes in the surrounding tissue and the tuberculoma itself. An eccentrically located decay may form in it. With complete rejection of the caseose from the tuberculoma, a cavity can form. Focal changes almost always appear in the lung tissue around the tuberculoma.

The course of tuberculosis is cyclical. In the course of a long time, they can remain stable, without manifesting themselves. Various factors (intercurrent diseases, injuries, etc.) can lead to the activation of tuberculosis. At the same time, the size of the tubercles and their structure are important. Large tuberculomas are more likely to disintegrate. Tuberculomas of smaller sizes tend to transform into small fibrous focal shadows.

The diagnosis of tuberculoma, which was formed in a patient with tuberculosis during the period of observation and specific treatment, usually does not cause difficulties. When a tuberculoma is detected for the first time, there are significant difficulties in clarifying the etiology of a rounded focus. Most often, tuberculomas have to be differentiated from lung cancer, benign tumors and tumor metastases, parasitic and non-parasitic cysts, pneumomycosis.

The presence on an X-ray of tuberculous changes around a rounded focus in the lungs or in other organs, the detection of MBT in multiple sputum examinations, a positive and even more pronounced reaction to tuberculin, the absence of diseases of other organs that can metastasize to the lungs, indicate a tuberculous etiology of the disease.

Peripheral cancer is more common among round lung tumors. Tuberculoma and cancer in the early stages of development usually do not show any clinical symptoms and can be discovered accidentally during preventive fluorographic examinations or when consulting a doctor about other diseases. Then, in contrast to tuberculosis, cancer patients develop persistent dry cough, increasing pain in the chest, and shortness of breath.

X-ray examination is of great differential diagnostic value. The shadow of a cancerous tumor is more intense, its contours are less sharp, wavy, hilly, heavy, sometimes the so-called cut is defined - a deepening in the region of entry of the vascular-bronchial bundle into the tumor. In a tuberculoma, you can see dense clogged inclusions. Cavities in a cancerous node are irregular in shape with a thick wall. In tuberculoma, the cavity is usually located eccentrically, sometimes in the form of a half-echo. Tumor metastases may be found in the root of the lung in a cancer patient, and calcified lymph nodes in a tuberculosis patient. Bronchoscopy in both diseases is not very informative, especially when the size of the focus is small. If it is performed in conjunction with a biopsy, it is quite often possible to morphologically confirm the diagnosis of cancer. For differential diagnosis, it is also advisable to use immunotuberculin tests.

Difficulties in the diagnosis of tuberculosis and cancer metastases arise with a single tumor in the lung. During the clinical examination of the patients, the signs characteristic of these diseases are not revealed. The diagnosis is facilitated if the localization of the primary tumor and possible options for its metastasis in the lungs are known. A metastatic tumor differs from a tuberculoma in that it is located in unchanged lung tissue, its shadow is uniform and less intense, with even and regular borders. The absence of a "track" to the root of the lung is characteristic. Metastasis is extremely rarely subject to disintegration with the formation of a cavity. With multiple tumor metastases, it is not difficult to differentiate it from a tuberculoma, since multiple tuberculomas are rare.

With two or more tuberculomas, tuberculous foci, post tuberculous sclerosis are constantly found in the surrounding lung tissue.

It is often necessary to differentiate tuberculosis from benign tumors (hamartochondroma, lipoma, angioma, etc.). The clinical course of the latter is characterized by either the absence of symptoms or mild symptoms associated with compression of nearby organs and tissues. Radiologically, just like tuberculoma, benign tumors have sharp outlines, sometimes dense bone inclusions can be found in them (for example, in chondroma). Most benign tumors are represented by uniform shadows, they progress extremely slowly by expansive growth, they almost never have decay cavities, especially marginal localization.

Tuberculomas should be differentiated from a filled lung cyst, more often echinococcal. There are no specific signs in the symptomatology of pulmonary echinococcus. In the initial stage, just like tuberculosis, it is asymptomatic. Later, as the echinococcal cyst grows, the patient develops weakness, shortness of breath, chest pain, cough, hemoptysis, that is, the same symptoms as those of a tuberculosis patient. Diagnosis is aided by an X-ray examination, which reveals an intense rounded shadow without changes in the surrounding lung tissue and "tracks" to the root of the lung. When the bronchi are filled with contrast, the absence of any connection of the echinococcal bubble with the bronchial tree is revealed. If the parasite bubble is located in the peripheral parts of the lung, then the presence of a fluid-filled cyst is diagnosed using an ultrasound scan. Detection of an echinococcal cyst in the liver, blood eosinophilia, computer tomography, which can be used to differentiate a cyst from a tuberculoma, serological and immunological studies can help in diagnosis.

Fibrous-cavernous tuberculosis- the final stage in the progressive course of the destructive tubercular process.

The name "fibrous-cavernous tuberculosis of the lungs" reflects the pathomorphological changes observed in this form of tuberculosis. It is characterized by the presence of a fibrous cavern, the development of fibrous changes in the lung tissue around the cavern. Characteristic foci of bronchogenic screening of various ages both around the cavern and in

the opposite lung. As a rule, the bronchi that drain the cavern are affected. Other morphological changes develop in the lungs: pneumosclerosis, emphysema, bronchiectasis. Fibrous-cavernous tuberculosis is formed from the infiltrative or decimated process during the progressive course of the disease. The prevalence of changes in the lungs can be different: the process is unilateral or bilateral with the presence of one or multiple caverns.

Cavern in fibrous-cavernous tuberculosis is a cavity, the wall of which consists of three layers. The inner layer is pyogenic, contains masses of caseous necrosis, pus, mucus, a large amount of MBT. Breaking off together with the caseous masses, the pyogenic membrane mixes with sputum and can cause MBT to drift into healthy areas of the lung and the formation of foci of bronchogenic insemination. The middle layer consists of specific granulation tissue. With an unfavorable course of the tubercular process, the death of granulations, their transformation into a pyogenic layer is observed. Granulations can also turn into fibrous, i.e., fibrous tissue. The outer layer is fibrous, gradually passing into a healthy lung. During the exacerbation of the tubercular process, a zone of perifocal inflammation appears around the cavern. The thickness of the cavern wall is due to the fibrous capsule and perifocal inflammation. The cavern connects with a bronchus through which sputum leaves.

Clinical manifestations of fibrous-cavernous tuberculosis are diverse, they are caused not only by tuberculosis itself, but also by changes in the lung tissue around the cavern, as well as complications.

There are 3 clinical variants of the course of fibro-cavernous tuberculosis of the lungs: limited and relatively stable fibro-cavernous tuberculosis, when thanks to chemotherapy the process stabilizes and there is no exacerbation for several years; progressive fibrous-cavernous tuberculosis, characterized by changes in exacerbations and remissions, and the periods between them can be different - short and long, in the period of exacerbation, new areas of inflammation appear with the formation of "daughter" caverns, sometimes the lung can be completely destroyed, in some patients with ineffective treatment, the progressive course of the process ends with the development of caseous pneumonia; fibrous-cavernous tuberculosis with the presence of various complications - most often this option is also characterized by a progressive course. Most often, such patients develop pulmonary heart failure, amyloidosis, frequent repeated hemoptysis and pulmonary bleeding, and a nonspecific infection worsens.

The clinical diagnosis of fibrous-cavernous tuberculosis in most cases does not cause difficulties, because a number of symptoms characteristic of this form of tuberculosis are observed, but in some cases these symptoms are poorly expressed or misinterpreted.

Clinical manifestations and variety of symptoms depend on the prevalence of the process, its localization, complications and accompanying diseases. Symptoms of fibrocavernous tuberculosis are cough, sputum discharge, chest pain, weakness, weight loss, poor sleep and appetite, hemoptysis, increased body temperature, sweating during sleep at night. Each patient may have one or another of the listed symptoms, and the severity of the symptoms may vary in different periods of the disease.

When examining patients suffering from fibro-cavernous tuberculosis of the lungs, it is sometimes possible to note a normal appearance, the correct configuration of the chest, satisfactory development of the subcutaneous fat layer, but more often the patient's appearance still has characteristic features of a chronic tuberculosis process.

The duration and prevalence of the pathological process in the lungs and pleura, the presence of chronic intoxication lead to a change in the appearance of the patient. A significant loss of body weight, a wrinkled face, a dull look, dry, flaky skin, weak muscles are characteristic of a patient who has been suffering from large pulmonary tuberculosis for a long time. Sunken supraclavicular and subclavian spaces, retracted intercostals, flattened and elongated chest, lag during breathing of one half of it, and sometimes sharp

flattening of the same side indicates major changes in the lungs and pleura on the affected side. This is the so-called Habitus phthisicus - the appearance of a patient suffering from a chronic form of tuberculosis.

During percussion, a shortening of the sound is determined in the places of thickening of the pleura and large development of fibrosis in the lungs, as well as over massive infiltrative and pneumonic foci.

In areas of fibrous compaction of the lung and pleural thickenings, weakened breathing is heard, over massive infiltrative-pneumonic foci - vesico-bronchial, over a large cavern with a wide draining bronchus - bronchial, and with a smooth-walled giant (more than 6 cm in diameter) cavern - amphoric. Large bubbling wet wheezes are also heard above the cavern. With a thick consistency of the contents of the cavern, wheezing can be heard only at the height of inhalation. A zone of infiltrative changes in the lung tissue may appear in the patient directly around the cavern. Upon auscultation, fine bubbling wet rales are heard in these areas.

Hypochromic anemia is observed in the hemogram with exhaustion and repeated hemoptysis. In other cases, the content of erythrocytes and hemoglobin in the blood is normal. Fibrous-cavernous forms of tuberculosis are characterized by an increase in ESR and moderate leukocytosis, during exacerbation, a shift of the leukocyte formula to the left, lymphopenia is noted.

In patients with fibrous-cavernous tuberculosis, MBTs are found in the sputum in most cases, and elastic fibers are found in the period of prolonged decay.

On the radiograph, the cavern is represented by a ring-shaped shadow. Fibrous heaviness and focal insemination are determined around this shadow, and the foci are in a different phase of development: along with soft foci, there may be dense foci and dense tuberculous foci. Other changes are observed in the lungs: pneumosclerosis, emphysema, bronchiectasis.

Fibro-cavernous tuberculosis should be differentiated from a lung tumor, abscess, bronchiectasis, cyst.

Since 1969, in the classification of clinical forms of tuberculosis, pulmonary tuberculosis has been distinguished as an independent cavernous form. This form was characterized by the presence of a formed cavern around which there were no pronounced perifocal inflammation and fibrous changes. This form occupied an intermediate place between the decay phase of one or another clinical form of tuberculosis as the beginning of the destructive process and fibrous-cavernous tuberculosis - as its completion. The isolation of cavernous tuberculosis was substantiated by clinical and dispensary practice, in particular, it was important in the selection of patients for surgical intervention. By the decision of the II congress of phthisiologists and pulmonologists of Ukraine (October 20 - 23, 1998), this form of tuberculosis was removed from the classification because it is rare.

When determining the etiology of cavity changes in the lungs and differential diagnosis of a cavern and an abscess cavity, less often lung cancer, the most important role is played by the bacteriological examination of sputum, which allows the identification of an infectious agent (MBT, secondary flora), as well as cytological examination of a biopsy. X-ray contrast methods (selective bronchography) are of great importance, especially for congenital cysts and bronchiectasis, which can "simulate" a decay cavity during X-ray examination. The study of aspiration material, which is obtained by directed catheterization of the bronchi in the lesion area, increases the possibility of determining the etiology of the disease.

Currently, the clinical manifestations of lung abscess have become less pronounced, which makes it difficult to make a correct diagnosis. When collecting anamnestic data, it is worth remembering that lung abscess often occurs against the background of pneumonia, chest trauma, damage to the ribs, spine. The onset of the disease is more acute, with chills, high temperature, cough with purulent, foul-smelling sputum. Patients often indicate pain in

a certain place on the chest. In the hemogram, there is a sharply accelerated ESR, pronounced leukocytosis. The abscess is localized more often in the lower parts of the lungs. A wide zone of perifocal inflammation of lung tissue is found around the abscess cavity. The outer contour of the cavity wall is unclear, the inner contour is uneven, "bay-shaped". These signs, as well as the presence of a horizontal level of fluid in the cavity, the absence of tubercular changes in the lungs, indicate the presence of an abscess.

Cirrhotic tuberculosis of the lungs. Cirrhosis is a massive growth of connective tissue in the lung parenchyma as a result of activation of proliferative processes. Cirrhosis most often develops as a result of long-term fibrous-cavernous or chronic decimated tuberculosis of the lungs. But processes such as widespread infiltrative tuberculosis (lobitis, caseous pneumonia) and pleurisy can be the initial form of lung cirrhosis. Cirrhosis can be unilateral and bilateral, limited or diffuse.

As a result of the cirrhotic process, the lung parenchyma is replaced by connective tissue, which dramatically changes the entire architecture of the lung.

The cirrhotic area of the lung decreases in volume, the pleura above it is thickened. Connective tissue compaction of lung tissue changes the position and structure of bronchi and lung vessels. The bronchi not only change their position, but are also deformed, as a result of which bronchiectasis may occur. Small vessels of the lungs in the affected area are partially obliterated, and in some places they expand.

A sharp change in blood vessels is the cause of frequent bleeding in the cirrhotic form of tuberculosis: blood capillaries in the cirrhotic tissue can be quickly destroyed in the places of aneurysmal expansions. Hemoptysis may recur often, but the blood output is usually small. Bullous emphysema is often noted in the lung tissue around cirrhosis. The position of the mediastinal organs with cirrhosis of the lungs changes dramatically: depending on the localization of cirrhosis, the mediastinal organs may be pulled up (with cirrhosis of the upper lobes of the lungs), displacement of large vessels and the heart to the side of cirrhosis.

The clinic of the cirrhotic form of tuberculosis is determined primarily by the symptoms of impaired function of external breathing and the cardiovascular system. Patients complain of shortness of breath, palpitations, which noticeably increase during physical exertion.

When examining patients, the deformation of the chest draws attention. On the side of the lesion, there is a sinking of the chest, narrowing of the intercostal space, drooping of the shoulder, atrophy of the muscles of the shoulder girdle. A dulling of the percussion sound is determined above the area of cirrhosis, and a box tone is noted below it. Mobility of the lung on the affected side is sharply limited. Vesico-bronchial or bronchial breathing is determined by auscultation over the cirrhotic area of the lung. Dry and wet wheezing is due to both bronchiectasis and bronchitis, which is often associated with it.

The allocation of MBT is not characteristic. The radiological picture of the cirrhotic form of tuberculosis depends on the localization, prevalence and nature of the lesion. Darkening with cirrhosis of the lungs is of high intensity, but not always homogeneous: against the background of the shadow, rounded cup-like lumina can be seen, caused by bronchiectasis and areas of bullous emphysema. The lung field on the side of the lesion is sharply narrowed. The root of the lung is pulled up and may not be detected against the background of the massive shadow of cirrhosis. The trachea and mediastinal organs are displaced to the side of the lesion.

The clinic of lung cirrhosis is determined by the stability of pathomorphological changes. The condition of patients may remain almost unchanged for a number of years. Periodic small increases in body temperature, increased coughing and increased sputum are most often caused by bronchiectasis. With cirrhosis, hemoptysis is observed more often than with other forms of pulmonary tuberculosis. Patients suffer mainly from pulmonary and heart failure.

Limited unilateral cirrhosis may have almost no effect on the patient's condition.

Cirrhosis of the lungs, which are post-tuberculosis changes without signs of activity, should be distinguished from cirrhotic tuberculosis.

Tuberculosis in HIV-infected persons:changes in the lungs depend on the degree of immunodeficiency — in the early stage of the disease, the changes are typical, but in the late stage of the lesion, the lower and middle parts of the lungs are occupied, and they have a disseminated character. Caverns are rarely formed. The tuberculin test is often negative, the result of the IGRA test
"indeterminate", and positive results of direct examination of sputum are rare (reliability increases with an increase in the number of examinations performed, and especially when the material is induced sputum or secretions collected during bronchoscopy). In these patients, in addition to sputum culture, it is necessary to perform a blood culture, as well as a biopsy of lymph nodes and bone marrow, to conduct immunological studies. Pathomorphological studies in severe immunodeficiency do not determine the granulomatous nature of the changes in the biopsy material. In HIV-infected patients, the frequency of drug-TB is high and the effectiveness of tuberculosis treatment is much lower.

Materials for activating students during lectures.

Question:

1. Highlight the issues of etiology, pathogenesis, pathology of primary tuberculosis.
2. List the clinical forms of primary tuberculosis.
3. List the differences between secondary and primary tuberculosis.
4. X-ray stages of the primary tuberculosis complex.
5. Complications of primary local forms of tuberculosis.
6. What diseases are most often differentiated from disseminated pulmonary tuberculosis?
7. Highlight the issues of etiology, pathogenesis, pathology of secondary tuberculosis.
8. List the clinical forms of secondary tuberculosis.
9. List the differences between secondary and primary tuberculosis.
10. What is the most common clinical form of pulmonary tuberculosis?

structureincidence of secondary tuberculosis?

Task:

1. A 5-year-old child has poor appetite, general weakness, rapid fatigue, low-grade fever in the evening. Mantoux reaction is positive for the first time - 14 mm infiltrate. Make a research plan for a sick child.
2. In a 30-year-old man, routine fluorography revealed numerous focal shadows of low and medium intensity in S1, S2, S6 of both lungs. Make an examination plan, formulate a diagnosis.
3. During routine fluorography, an 18-year-old student was found to have focal changes on the right in S^2. Make a plan for examining the patient.
4. In a 16-year-old teenager, a 3 cm round infiltrate on the right in S6 was found on the fluorograph during examination at the district military office. Make a plan for examining the teenager and formulate a diagnosis.

General material and methodical provision of the lecture.

- Educational premises - lecture hall of the department.
- The equipment is a negatoscope, a slidescope.
- Illustrative materials - slides, tables, models, radiographs, tomograms, patients with primary forms and disseminated tuberculosis and their medical histories, a tray with chemotherapy drugs.

Questions for self-control.

1. Definition of the term "Primary and secondary (disseminated) tuberculosis".
2. Pathogenesis of primary and secondary tuberculosis.
3. Peculiarities of the clinical course of primary forms of tuberculosis in contrast to secondary forms.

4. List the main clinical forms of primary tuberculosis.
5. Concept of turning, tactics of a pediatrician.
6. Primary tuberculosis complex: clinic, course, consequences.
7. X-ray stages of the primary tuberculosis complex.
8. Definition of "Disseminated pulmonary tuberculosis".
9. Subacute disseminated pulmonary tuberculosis,clinical, physical, laboratory, x-ray diagnostic methods.
10. Chronic disseminated pulmonary tuberculosis,clinical, physical, laboratory, x-ray diagnostic methods.
11. Differentialdiagnosis of disseminated pulmonary tuberculosis with pneumonia, sarcoidosis, carcinomatosis, pneumoconiosis.
12. What two main pathomorphological forms of focal tuberculosis do you know?
13. Listclinical and radiological types of infiltrates.
14. Whichchanges in hemogram most often occur in infiltrative pulmonary tuberculosis?
15. What diseases should differentiate infiltrative pulmonary tuberculosis?
16. Define caseous pneumonia.
17. What are the data of percussion and auscultation in caseous pneumonia?
18. What are the clinical variants of the course of tuberculosis?
19. Give the radiological characteristics of tuberculoma.
20. What is the clinical significance of the formation of a tuberculoma in the lungs for a patient?
21. Name the chronic forms of secondary pulmonary tuberculosis.
22. What is the structure of the wall of the cavern in fibro-cavernous tuberculosis of the lungs?
23. What complications affect the clinical course of fibro-cavernous pulmonary tuberculosis?
24. Draw the habitus phthisicus.
25. What are the causes of frequent bacterial discharge in fibrocavernous patients pulmonary tuberculosis?

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