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DEPARTMENT OF INTERNAL DISEASES №2

Introduction to the clinic of professionaldiseases

METHODOLOGICAL MATERIALS

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Methodical materials intended for teaching 4th year students (7 semester) of the Faculty of Medicine of FGBOU VO SOGMA in the discipline "Occupational Diseases".

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CONTENT:

THEORETICAL PROVISIONS OF THE SUBJECT PROFESSIONAL PATHOLOGY

To reveal the topic of the theoretical provisions of the subject of occupational pathology, it is necessary to define occupational pathology as a science.

1. The concept of occupational pathology as a section clinical medicine

Occupational pathology is a section of general pathology. Occupational pathology as a science studies pathogenesis, clinical presentation, prevention, treatment and VTE. Occupational diseases arise in the course of a person's labor activity under the influence of unfavorable factors of the working environment or unfavorable factors of the labor process itself.

2. Occupational hazards leading to development occupational diseases

Studying occupational pathology as a science, one must be able to establish the relationship of occupational diseases with an etiological factor. This section is covered by the characteristics of occupational hazards. The factors of the working environment that directly or indirectly affect the health and working capacity of workers are defined as occupational hazards. Occupational hazards are closely related to the socio-economic structure of society.

Characteristics of occupational hazards in the production environment: dust, toxic substances, radioactive elements, noise, vibration, infrared and ultraviolet radiation, electromagnetic waves, high and low temperatures, increase and decrease in atmospheric pressure.

Occupational hazards of the labor process: tension of the nervous system, tension of vision, tension of hearing, frequent and uniform movements, tension of individual muscles, prolonged forced position of the body.

Occupational hazards of low intensity and features of their effect on the body. In connection with the introduction of sanitary and hygienic and preventive measures, so-called low-intensity hazard factors have appeared, leading to diseases with low-symptom clinics. Another feature of their action is the effect on the course of common diseases. Low-intensity hazard factors can lead to a decrease in the body's immunobiological reactivity. All this leads not only to an increase in such common diseases as tonsillitis, flu and others, but also causes their atypical course.

3. Classification of occupational hazards

Physical factors. Unfavorable meteorological conditions. Radiation: ultraviolet, ionizing (X-ray and radioactive), thermal. Electric and magnetic field (short and ultra-short waves). Change in atmospheric pressure: increased, decreased. Industrial noise, vibration, ultrasound.

Physicochemical factors. Industrial poisons, industrial dust.

Biological factors. Infections or infestations (brucellosis, anthrax, worms, ticks).

4. The concept of specific and non-specific occupational diseases

Occupational diseases are divided into two groups.

First group - these are true, specific or occupational diseases proper. In the etiology of true occupational diseases, the main role belongs to a certain occupational factor. True occupational diseases occur only in an industrial environment. True or proper occupational diseases include: silicosis, vibration sickness, intoxication with manganese, lead, benzene. However, it should be remembered that from a clinical point of view, the specificity of these diseases is relative. Only some occupational diseases have a specific symptom complex, on the basis of which a diagnosis can be made with more or less significant reliability (lead intoxication).

Second group Are nonspecific occupational diseases. This group includes general diseases that only in certain occupational_conditions can be regarded as occupational. Thus, pulmonary tuberculosis is a common disease. However, if pulmonary tuberculosis occurs in an employee of an anti-tuberculosis dispensary, then in this case the disease is regarded as occupational with a “clean” pulmonary history.

Bronchial asthma is a common disease, but arising in persons who, by the nature of their service, come into contact with ursol, penicillin, mother of pearl and other substances of irritating allergic action, it will be considered professional.

Emphysema of the lungs is a common disease. But in those cases where there is a systematic intense expiration during work, emphysema of the lungs is regarded as an occupational disease (for example, in glass blowers, musicians playing wind instruments).

Obliterating endarteritis is a common disease. However, in certain working conditions, i.e., in conditions of significant cooling, it can be considered professional (for example, for workers in refrigeration plants, fishing and whaling fleets, peat mining, miners in the permafrost zone).

5. Questions of the pathogenesis of occupational diseases.

One of the main links in the student's self-study in the theoretical section is the knowledge of the pathogenesis of occupational diseases. This topic is revealed by the characteristics of penetration, transformation and excretion of poison from the body.

Ways of penetration of a toxic substance into the body. There are three ways of penetration of poison into the body: inhalation, gastrointestinal, skin.

The most dangerous is the inhalation route of the poison's penetration into the body, since the mucous membrane of the respiratory system has a high absorption capacity.

Less dangerous and the most favorable is the way the poison enters the body through the gastrointestinal tract.

Fat-soluble substances (aromatic and fatty hydrocarbons, organometallic compounds) are well absorbed through the skin.

Distribution and transformation of poisons in the body. The further fate of the poison in the body. The metabolism of the poison after absorption depends on the physicochemical properties and on the degree of affinity for tissues. In addition, the effect on the body of the poison depends on their ability to dissolve in fats, on oxidative and synthetic processes.

Specific examples:

Thus, benzene (C6H6) - the ancestor of all aromatic hydrocarbons - is an aggressive poison that can lead to the development of aplastic anemia.

In the body, under the influence of oxidative processes, benzene is converted into phenol (C6H5OH). Conversion of benzene to phenol - there is a partial neutralization of the poison. Further, after the oxidative stage of the transformation of the poison, synthetic processes come into play. Phenol attaches sulfur, turns into a low-toxic compound and is excreted from the body.

Some poisons, entering the body, exhibit pronounced cumulative properties. In this case, the poisons quickly pass from the blood to the depot. For example, bones are the main storage site for lead. In 5-6 months after poisoning, almost all of the lead is redistributed, forming a persistent depot in the bones. Mercury mainly accumulates in the excretory organs: kidneys, large intestine. Manganese accumulates in the greatest amount in the liver. Under the influence of various provoking factors, such as overwork, intercurrent diseases, alcohol abuse, the poison deposited in the depot can again go into a soluble state, get into the bloodstream and cause an exacerbation of the disease.

Excretion of poison from the body. The main routes of excretion of poison from the body are the kidneys and intestines.

Through the kidneys, substances readily soluble in water are excreted, as well as products of the transformation of poisons in the body. The toxic substance can be found in gastric juice, bile, breast milk, and exhaled air. A fairly large amount of poison can be secreted by sweat and sebaceous glands.

6. Clinical features of the development of professional diseases depending on the chemical structure, physical state of the substance and its concentration

The course of an occupational disease is affected by the chemical structure of a substance. For example, benzene (C6H6) causes hypoplastic conditions in the bone marrow. If we introduce only one amido group MH2 into the benzene formula, then amidobenzene C6H5MH2 is formed. Amidobenzene (aniline) has a completely different effect on the body, namely: it leads to methemoglobin formation. When two amido groups are introduced into the formula of benzene, a substance is formed, the effect of which on the body differs both from the effect of benzene and from the effect of amidobenzene. Diamidobenzene C6 H4 (KH2) 2 - Ursol causes allergic reactions in the human body and the development of bronchial asthma. And if in the chemical structure of a substance there are two benzene nuclei (binuclear compounds),

Vapors of any metal can lead to the development of foundry fever, but not the metal itself in solid form. For example, zinc in solid and dusty state is non-toxic. When zinc vapor enters the respiratory tract (usually when melting copper alloys with a high zinc content), a characteristic clinical picture of casting fever occurs.

The possibility and degree of intoxication depends on both the toxicity of the poisons and their concentration.

The exception is allergic diseases, where there is no clear correlation between the clinical manifestation of the disease and the concentration of the toxic substance. Diseases such as beryllium disease and bronchial asthma are models of allergic occupational disease.

METHODOLOGICAL BASIS OF THE SUBJECT PROFESSIONAL PATHOLOGY

To master the methodological foundations of the subject of occupational pathology, it is necessary to master the sections of diagnostics, classification, treatment, prevention and medical labor expertise.

1. General principles and features of diagnostics occupational diseases

The disclosure of this provision is carried out by students by mastering the main criteria for the diagnosis of occupational diseases.

First of all, you need to familiarize yourself with a professional history in detail. Study the professional route from the beginning of employment. To study the presented sanitary and hygienic characteristics of the work performed at the present time. Assess the main occupational hazard. It is also necessary to know the main clinical symptom complex characteristic of the given occupational disease. For example: cardinal symptoms of lead intoxication, carboxyhemoglobinemia, methemoglobinemia, determination of Heinz-Ehrlich bodies when exposed to pigment blood poisons.

The diagnosis of occupational diseases is helped by the determination in urine and other biological media of the chemical agent that caused the intoxication, or the

products of its transformation in the body. (Determination of lead, mercury, manganese, in urine).

Knowledge of the general clinical signs that characterize a particular occupational disease contributes to the diagnosis of occupational diseases. (Aplastic anemia in benzene poisoning, hemolytic anemia in arsenous hydrogen poisoning).

In order to identify sensitization and allergic reactions of the body to a specific toxic agent (various chemicals), inhalation, intradermal, skin tests are carried out.

As in general pathology, dynamic monitoring of the development of an occupational disease and late processes is necessary.

To solve the diagnosis of an occupational disease, a certain role is played by the identification of group poisoning or single chronic diseases among certain occupational groups.

Finally, one of the important points in the final decision of the diagnosis of an occupational disease is the differential diagnosis.

Currently, with the increasing spread of the action of low-intensity factors on the body and in connection with this increase in atypical forms of diseases in conditions of professional contact, significant difficulties arise both in the diagnosis and in establishing the cause of the disease.

2. *Classification of occupational diseases*

It is necessary to learn that the main principle of the classification of occupational diseases is etiological. A classic example of the classification of occupational diseases according to the etiological principle is the classification of pneumoconiosis, where, depending on the industrial dust, they distinguish silicosis, silicosis, anthracosis, pneumoconiosis of electric welders, etc. Vibration sickness, radiation sickness, intoxication with manganese, mercury can also serve as an example of the classification of occupational diseases according to the etiological principle. , benzene, pesticides, etc.

In the process of studying the classification of occupational diseases, other principles should be known.

An example is the classification by systems and organs. Occupational respiratory diseases (pneumoconiosis, bronchial asthma, pneumosclerosis of toxic chemical etiology, dust bronchitis, toxic pulmonary edema).

Occupational diseases of the nervous system: neurotoxicosis (intoxication with manganese, mercury, tetraethyl lead, carbon disulfide, etc.), vibration disease.

Hepatitis, toxic-chemical etiology (intoxication with carbon tetrachloride, trinitrotoluene, phosphorus, lead, etc.).

Occupational diseases of the kidneys and urinary tract (sublimate kidney, hemolytic kidney, malignant tumors of the bladder).

Occupational dermatitis.

Occupational diseases of the organ of vision and hearing.

Another principle of classification of occupational diseases is the pathogenetic principle. An example of the classification of occupational diseases according to the

pathogenetic principle is the classification of occupational diseases of the blood system.

3. Principles of treatment of occupational diseases

In case of poisoning with industrial and agricultural poisons, in addition to general first aid measures, there are methods of etiological, pathogenetic, and other types of therapy.

General first aid measures. Depending on the poison and its pathways of entry, in the provision of first aid, a different set of therapeutic measures should be used: gastric lavage and induction of vomiting, the appointment of absorbent and enveloping agents, bowel emptying and increased urine output, replacement of the victim's blood with the blood of the donor, hemodialysis ("artificial kidney") Elimination of pain syndrome and severe respiratory disorders, blood circulation, seizures, allergic conditions, as well as measures that promote detoxification and increase the body's endurance (intravenous and subcutaneous administration of saline, glucose solution, vitamins).

Etiological therapy. A particularly important principle of treatment of occupational diseases is etiological.

Such widely known drugs of general therapeutic action as glucose, sodium hyposulfite, iron preparations, in the clinic of occupational diseases, acquire the value of a specific means of etiological, antidote therapy for certain intoxications (acute poisoning with cyanides, amido-nitro compounds of benzene, carbon monoxide).

Excretory therapy is another effective method of etiological therapy. It is necessary to draw the attention of students to the fact that this type of therapy is the privilege of the clinic for occupational diseases. Excretory therapy is based on the formation of reversible metal complexes. Examples of common and proven complexes are tetacin and pentacin. When the body is exposed to thiol poisons (arsenic, organic and inorganic mercury compounds, lead), which can block sulfhydryl reactive groups of enzyme proteins, antidotes containing sulfhydryl groups are used. These include BAL - British anti-Lewisite and the Russian drug Unithiol.

Pathogenetic therapy. Methods of pathogenetic therapy include oxygen, hormonal and vitamin therapy.

The use of oxygen as a method of pathogenetic therapy is justified in cases where diseases with various forms of hypoxemic syndrome and tissue hypoxia develop under the influence of an industrial toxic or dust factor.

Examples are diseases characterized by lesions of the bronchopulmonary apparatus of dusty and toxic-cochemical etiology, and blood diseases with the development of aplastic and hemolytic anemias, methemoglobnemia and carboxyhemoglobinemia. intoxication with a violation of oxidative mechanisms in tissues (cyanide poisoning).

Hormone therapy as a method of pathogenetic treatment should be recommended in cases of occupational disease when the main pathological process occurs in the connective tissue, hematopoietic organs. Examples of rum include diseases such as silicosis, beryllium disease, benzene intoxication.

Various occupational diseases and intoxication are accompanied by a violation of vitamin metabolism: vitamin C with CO intoxication and lead intoxication, vitamin B complex with neurotoxicosis (, vitamin K with toxic-chemical etiology hepatitis, vitamins P, B2, B12 with benzene intoxication. In this connection, vitamin therapy can be attributed to pathogenetic in the corresponding diseases.

Other types of therapy include nutritional therapy, balneotherapy, and various types of symptomatic treatment.

4. Prevention of occupational diseases

When studying the issues of prevention, it is necessary to distinguish three main directions: preventive measures of the legislative order, sanitary and hygienic measures, therapeutic and prophylactic methods of prevention.

Among the most important organizational measures for the prevention of occupational diseases are preliminary and periodic medical examinations of workers in occupational hazards, which are carried out in accordance with the order of the Ministry of Health of the Russian Federation No. 90 of March 14, 1996.

The main task of preliminary medical examinations of persons entering work associated with the impact of certain unfavorable moments is to identify painful conditions, the presence of which significantly increases the danger of working conditions.

The most important task of periodic medical examinations, that is, dynamic monitoring of the health of the relevant professional groups, is to identify the initial signs of occupational poisoning and diseases.

Identification of the first signs of an occupational disease makes it possible to timely apply various therapeutic and prophylactic measures and resolve issues of rational employment of workers.

Sanitary and hygienic measures for the prevention of occupational diseases are reduced to the mechanization and automation of production, equipment sealing, effective ventilation, air conditioning, the use of "air showers", hygienic regulation of occupational hazards and the establishment of MPCs and MPCs for toxic substances in the air of the working room, the introduction of wet drilling, individual protective equipment, etc.

When familiarizing with the treatment-and-prophylactic measures to prevent occupational diseases, students should pay attention to both general health-improving and special treatment-and-prophylactic measures. General health-improving measures include the rational use of natural, natural factors (aero-, heliohydrotherapy), physiotherapy procedures, physical culture with maximum outdoor exposure, day and night sleep in aeraria.

Special treatment and prophylactic measures are carried out taking into account the specific occupational hazard. Those working in contact with quartz-containing dust are recommended exercises aimed at the release of deposited dust by the method of respiratory gymnastics, the use of inhalations that contribute to the dilution of mucus in the respiratory tract, the use of electroaerosols. For persons working in contact with irritating substances, the use of oil inhalation is recommended. For those

working with blood poisons, hepatotropic and neurotropic poisons, therapeutic nutrition and extended vitamin therapy are recommended. For persons in contact with vibration, various hand procedures are prescribed: massage, gymnastic exercises, baths, UHF.

5. General principles of hygienic classification working conditions

1. Hygienic criteria are indicators characterizing the degree of deviations of the parameters of the factors of the working environment and the labor process from the current hygienic standards. The classification of working conditions is based on the principle of differentiation of these deviations, with the exception of work with pathogens of infectious diseases, with substances for which inhalation or contact with the skin should be excluded (anticancer drugs, estrogen hormones, narcotic analgesics), which give the right to classify working conditions as a certain hazard class for a potential hazard.

2. For the hygienic assessment of working conditions by employees of the Research Institute of Occupational Medicine of the Russian Academy of Medical Sciences under the guidance of Academician of the Russian Academy of Medical Sciences Professor N.F. Izmerov developed criteria according to which the following classes of working conditions are distinguished: optimal, permissible, harmful and hazardous.

Optimal working conditions (class 1) are conditions under which the health of the employee is preserved and the prerequisites are created for maintaining a high level of performance. Optimal standards for working environment factors are established for microclimatic parameters and workload factors. For other factors, the optimal conditions are conventionally taken to be such working conditions under which harmful factors are absent or do not exceed the levels accepted as safe for the population.

Permissible working conditions (class 2) are characterized by such levels of environmental factors and the labor process that do not exceed the established hygienic standards for workplaces, and possible changes in the functional state of the body are restored during a regulated rest or by the beginning of the next shift and do not have an adverse effect in the near and the remote period on the health status of workers and their offspring. Permissible working conditions are conventionally referred to as safe.

Harmful working conditions (class 3) are characterized by the presence of harmful factors, the levels of which exceed hygienic standards and have an adverse effect on the body of the worker and / or his offspring.

Harmful working conditions according to the degree of excess of hygienic standards and the severity of changes in the body of workers are conventionally divided into 4 degrees of harm:

1 degree 3 class (3.1) - working conditions are characterized by deviations of the levels of harmful factors from hygienic standards, which cause functional

changes, which are restored, as a rule, with a longer (than by the beginning of the next shift) interruption of contact with harmful factors and increase the risk of damage to health;

2 degree 3 class (3.2) - levels of harmful factors that cause persistent functional changes, leading in most cases to an increase in professionally determined morbidity (which can be manifested by an increase in the incidence of morbidity with temporary disability and, first of all, those diseases that reflect the state of the most vulnerable for these factors of organs and systems), the appearance of initial signs or mild forms of occupational diseases (without loss of occupational disability) arising after prolonged exposure (often after 15 or more years);

3 degree 3 class (3.3) - working conditions characterized by such levels of factors of the working environment, the impact of which leads to the development, as a rule, of occupational diseases of mild and moderate severity (with the loss of occupational ability to work) during the period of labor activity, the growth of chronic (occupationally determined) pathology;

4 degree 3 class (3.4) - working conditions under which severe forms of occupational diseases (with loss of general working capacity) can occur, there is a significant increase in the number of chronic diseases and high levels of morbidity with temporary disability.

Hazardous (extreme) working conditions (grade 4) are characterized by the levels of working environment factors, the impact of which during a work shift (or part of it) poses a threat to life, a high risk of developing acute occupational injuries, including severe forms.

6. General principles of medical and labor expertise in occupational diseases

The main provisions of medical and labor expertise in occupational diseases, temporary and permanent disability. At the same time, attention should be paid to the existing legislation that gives patients with occupational diseases the right to additional benefits for sick leave payments (100% of earnings, regardless of the continuity of work experience, including non-union members), pension benefits, directed to a sanatorium treatment. The concept of "surcharge" or "labor" sick leave, the peculiarities of the commissioning of patients with occupational diseases is given. Students familiarize themselves with Order No. 90 of March 14, 1996. They are also filled out with the criteria for determining the percentage of disability and disability groups due to occupational disease. Order No. 535 of August 22, 2005 Moscow.

The lesson ends with the acquaintance of students with the department of occupational diseases and the contingent of patients.

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