

Topic:“Co-infection tuberculosis / HIV patients. Clinical picture. Diagnostics. Treatment”.

1. Quantity of hours 6

2. Financial and methodical support of the topic: tables, results of patients examination and their case histories, X-ray pictures.

3. Currency of the topic.

The problem of co-infection tuberculosis / HIV is of international significance. The tuberculosis is one of the most frequent infectious causes of death in HIV-infected patients. According to some statistical data, there are more than 4.000.000 patients with co-infection tuberculosis / HIV infection in the world. About 8 percent of TB cases worldwide are attributable to HIV. This proportion is increasing as the HIV pandemic spreads. HIV infection increases both the likelihood that people will develop TB and the rate at which infections are acquired and disease develops. The impact of HIV has been greatest in countries of Southern and East Africa, where up to 40 percent of adults may be infected with HIV and the incidence of TB has increased by four to five times within 10 years.

Early treatment of tuberculosis in HIV-infected patients by antituberculosis drugs allows receiving encouraging results. Therefore it is important to know specified pathology and methods of its treatment.

4.General goal:

to create for students the conditions which provide opportunity to master of knowledge and skills, allowing to distinguish co-infection tuberculosis / HIV from other condition, to diagnose and treat patients suffering from co-infection tuberculosis / HIV.

The concrete aims:

4.1.

- 1.To sum up the results of examination of patients suffering from co-infection tuberculosis / HIV.
2. To identify the basic syndromes in the patients suffering from co-infection tuberculosis / HIV.
3. To diagnose co-infection tuberculosis / HIV.
4. To treat patients suffering from co-infection tuberculosis / HIV.

4.2. Practical skills:

To match the individual chemotherapy regimens for the treatment of patients with co-infection tuberculosis / HIV.

To estimate the result of chemotherapy of patients with co-infection tuberculosis / HIV.

To perform the adequate secondary prophylaxis of co-infection tuberculosis / HIV.

To perform the monitoring of the patient with co-infection tuberculosis / HIV.

To diagnose adverse reactions caused by antituberculosis drugs.

5. Graph- logical structure of the topic.

HIV-infection is the disease which develops as a result of long persistence of human immunodeficiency virus (HIV) in lymphocytes, macrophages and nervous system cells, and is characterized by progressing destruction of immune system.

AIDS – the final stage of HIV-infection, affected by immune and nervous systems defeat and displays the development of severe viral, bacterial, parasitic diseases and/or malignant neoplasms that may be fatal.

In the world, sexual way of transfer of HIV prevails. Transfer of HIV through blood occurs by transfusion of infected blood, through infected needles and syringes.

There are several stages of development HIV-infection: acute HIV-infection, asymptomatic carrying stage, persistence generalised lymphadenopathy stage, AIDS – the final stage of clinical course of HIV-infection.

About one third of all HIV-infected are infected MBT. In people infected by HIV, presence of any infection, including tuberculosis, provokes faster distribution HIV-infection.

The immune system will lose ability to warn growth and to localize the distribution of MBT. Therefore disseminated and extrapulmonary diseases are more common. But the pulmonary tuberculosis remains the most widespread form in HIV-infected people. Its manifestation depends on degree of immunosuppression. In 20 cases in HIV-infected in a year after the tuberculostatic therapies begins, there comes fatal outcome either from tuberculosis or from other HIV-dependent pathology (sepsis, diarrhea, pneumonia, Kaposhi's sarcoma, cryptococcal meningitis). Death rate of patients affected with HIV-infection and tuberculosis decreases if use standard modes of chemotherapy are used.

The HIV-infected persons with positive Mantoux test, contacts with open case of tuberculosis are prescribed chemoprophylaxis with isoniazid on 300 mg per day for adult with body weight no less than 50 kg during 12 months.

TB/HIV Co-infection

Undiagnosed and untreated TB is frequently found among persons living with HIV/AIDS. Survey data in high-burden settings show that up to 10 percent of people living with HIV may have undiagnosed TB at the time of undergoing voluntary counseling and testing (VCT). TB, the most common opportunistic infection in people living with HIV, is a leading cause of death in this group. Only 1 in 10 persons infected with TB who are HIV negative will develop TB in their lifetime. By contrast, among persons infected with both TB and HIV, 1 out of 10 will develop TB each year. In high-burdened TB settings, 30 to 40 percent of people living with HIV will develop TB in their lifetime, in the absence of isoniazid preventive therapy (IPT) or antiretroviral therapy (ART).¹⁵

The risk of developing TB is significantly higher in the first year after becoming HIV-infected and gets progressively higher over time (WHO stages 3 and 4). These patients may be a source of infection to others. TB outbreaks affecting HIV-infected prisoners and health care workers because of exposures in health care facilities have been reported in industrialized countries. Furthermore, the diagnosis of TB in the presence of HIV infection is complicated by increased numbers of patients with pulmonary TB who are acid-fast bacillus (AFB) smear negative or who suffer extrapulmonary forms of disease (i.e., lymphatic, pleural, renal, bone, skin, or central nervous system TB).

TB control programs in prisons, as in the general population, need to address the distinct characteristics of TB in HIV-infected patients, especially in settings with a high burden of TB and HIV, such as prisons. TB/HIV co-infection rates in prison have been found to be 10 to 20 percent higher than those found in the civilian population.¹⁵ Basic strategies include improving case detection of TB among people living with HIV, providing IPT for those without active TB, and providing diagnostic counseling and testing for HIV to patients diagnosed with TB. ART is also an important protective factor in co-infected individuals. The risk of TB is increased among patients who have underlying HIV, AIDS, or both. The magnitude of this risk varies according to the following:

- Prevalence of TB in the population (active and latent TB)
 - Degree of immunosuppression caused by HIV
 - Likelihood of exposure to infectious TB cases
 - Accessibility of TB prophylactic treatment to people living with HIV (i.e., treatment of latent TB infection [LTBI]).
- Some countries have low TB prevalence, but both TB and HIV are associated with distinct groups (e.g., prisoners, injection drug users) and minority ethnic populations, a fact that cannot be overlooked and warrants proper intervention.

Prevalence of and Mortality Due to HIV Infection among TB Patients

The WHO *Global Tuberculosis Control 2008* report estimates that 8 percent of all TB cases are co-infected with HIV. Yet, this figure varies by region and different countries, ranging from as low as 1 percent in the western Pacific region to 38 percent in Africa; this number increases to more than 60 percent in southern Africa where 20 percent of persons are infected with HIV. Fourteen percent of TB patients in most industrialized countries are co-infected with HIV.

TB mortality is higher in settings with high HIV prevalence. Overall, TB-case fatality rate among HIV-infected patients reaches 40 percent. Final treatment outcome depends on availability of antiretroviral drugs, early treatment, and proper clinical management and effective care of TB-HIV co-infected individuals.

Effects of HIV Infection on the Course of TB

The strongest risk factor for the development of TB is infection with HIV. In immunocompetent hosts who are infected with *M. tuberculosis*, the bacilli are contained in granulomas through cell-mediated mechanisms. This condition leads to LTBI. Persons with LTBI are not infectious and are asymptomatic due to a low bacillary load. When a person's immunity is severely compromised, as in HIV-positive individuals, TB bacilli multiply exponentially and TB develops, either by recently acquired TB infection or reactivation of LTBI. As mentioned above, the risk of disease after infection is 10 percent per year among people living with HIV without ART, compared to 10 percent per lifetime among those who are HIV negative. Evidence also shows that TB infection among HIV-infected patients progresses to TB more rapidly than those without HIV infection. Studies also suggest that HIV-infected individuals are more likely to become infected after exposure to *M. tuberculosis*. This likelihood is supported by the occurrence of TB outbreaks among groups of HIV-positive patients after exposure to an infectious TB re-infection (i.e., TB that is caused by infection with a different species after a previous, resolved episode) is a phenomenon associated with HIV infection. This threat is particularly pronounced in settings where TB is highly endemic.

6. Orientation card for student' work:

- a) To enumerate of clinical symptoms and results of objective investigations which are typical for co-infection TB/HIV;
- b) To make a choice of most informative tests, laboratory and instrumental investigation, which help to make a correct diagnosis.
- c) Perform the differential diagnosis with two concurrent diseases;
- d) To prescribe the treatment;
- e) To prescribe of pathogenesis treatment;
- f) To prescribe the measures for patient adherence to TB treatment, to prevent interruption of treatment;
- g) To prescribe the measures for secondary prophylaxis of TB relapse;

All listed above tasks student have to answer according to individual practical task. This is takes into consideration before assessing of mastering level of practical classes.

7. Tasks for self-students' work during preparation for the class

7.1. The list of main terms, parameters, characteristics which the student should acquire while preparing to the class.

1. HIV	Human Immunodeficiency Virus
2. AIDS	Acquired Immune Deficiency Syndrome
3. Co-infection TB/HIV	Co-infection tuberculosis/ Human Immunodeficiency Virus

7.2. Materials for the self-control:

1. To draw the scheme of pathological changes in the lungs with co-infection tuberculosis / HIV.

2. Tasks:

Task №1. To interpret the interrogatory with a patient with co-infection tuberculosis / HIV; to analyze the peculiarities of the disease running, clinical features of the disease, necessity of treatment.

Task №2. To put questions, which are supposed to be discussed at examination of patients: to analyze the complaints of a patient with of co-infection tuberculosis / HIV.

Task №3. To perform physical examination of a patient with co-infection tuberculosis / HIV, and to schedule the survey design.

Task №4. According to physical examination and results of investigations to diagnose the disease and to define every chapter of diagnosis formulation, including specified type of tuberculosis, site of the disease, the clinical form, presence of destruction, bacilli expelling, drug sensitivity of MBT, results of histological confirmation of the diagnosis, category, cohort, complications.

5.3. Practical work (tasks) which have to be done within the class:

Task # 1.

Which clinical form listed is characteristic for tuberculous process at the late stage of HIV-infection?

Probable answers:

- A. A significant long-lasting intoxication with negative reaction on Mantoux test;
- B. Diffuse infiltrates with localization in upper, middle and lower lobes of lungs;
- C. Mainly extrapulmonary lesions, enlargement of intrathoracic lymphatic nodes, generalized lymphadenopathy;
- D. In half of patients – absence MBT in sputum smears;
- E. All listed is characteristic.

Task # 2.

A patient, 25 year old, suffers from HVI and mycobacteriosis. What combination of antibacterial drugs is optimum for the patient?

Probable answers:

- A. Kanamycin+cycloserin+rifampicin;
- B. Rifampicin+ethambutol;
- C. Rifampicin +streptomycin+capreomycin;
- D. Pyrazinamide+ethambutol+ethionamide;
- E. Isoniazid + Rifampicin.

Task # 3.

In an HIV-infected patient x-ray examination was made. The infiltrates were found the lower lobes of both sides were revealed. Reaction to Mantoux test with 2 TU PPD -L was negative.

Which diagnosis is the most likely in the patient ?

Probable answers:

- A. Bilateral lower portion pneumonia;
- B. Disseminated tuberculosis;
- C. Carcinomatosis;
- D. Bronchiectatic disease;
- E. Mycobacteriosis.

Task # 4.

The patient, female, 43 years old, living with HIV infection, was x-rays examined. Massive infiltration is present in both lower lobes of lungs. Mantoux test result with 2 TU of PPD-L is negative.

What is not typical of tuberculosis?

Probable answers:

- A. Presence of infiltrate;
- B. Presence of the abnormality in the lower lobes;
- C. Negative Mantoux test;
- D. Female gender;
- E. The age of the patient.

Task # 5.

The patient at the age of 35 years living with HIV infection, has complaints: cough? Blood spitting, fever up to 38,0°C. Chest x-ray picture: a lot of fine lesions are equally distributed all over the lung fields on the background of increased lung markings. Thin-walled cavities are also present under the clavicles. The result of Mantoux test with 2TU of PPD-L – infiltrate with the diameter of 10 mm.

Which diagnosis is most probable?

Probable answers:

- A. Bilateral lower portion pneumonia;
- B. Disseminated tuberculosis;
- C. Carcinomatosis;
- D. Bronchiectatic disease;
- E. Mycobacteriosis.

Task # 6.

The patient, female, 31 years old, living with HIV, complains of the raised body temperature. The lymphatic node presenting under the right clavicle is enlarged. The fistula develops. Reaction to Mantoux test with 2 TU PPD -L was negative.

Which diagnosis is most probable?

Probable answers:

- A. Sarcoidosis;
- B. Hodgkin's disease;
- C. Carcinomatosis;
- D. Tuberculosis of superficial lymphatic node;
- E. Mycobacteriosis.

Task # 7.

Which reaction to Mantoux test with 2 TU PPD –L is typical for co-infection tuberculosis / HIV?

Probable answers:

- A. Negative;
- B. Doubtful;
- C. Slightly positive;
- D. Positive;
- E. Hyperergic.

Task # 8.

The patient, male, at the age of 47 years, suffers from co-infection tuberculosis / HIV. Tuberculosis disease is characterised by extensive involvement of lungs and bacilli expelling.

What is the criterion for the intensive phase of antituberculosis chemotherapy finishing?

Probable answers:

- A. Bacilli expelling stopping;
- B. Healing of cavitation;
- B. 80 doses of the treatment;
- C. Intoxication stopping;

- D. Coughing stopping;
- E. Improvement of the blood test.

Task # 9.

Which antituberculosis drug causes adverse reactions more often and is not recommended for the patients with co-infection tuberculosis / HIV?

Probable answers:

- A. Thioacetazone;
- E. Streptomycin;
- C. Isoniazid;
- D. Rifampicin;
- E. Fluoroquinolone;
- E. Hyperergic

Task # 10.

The patient, living with HIV, gave life to the healthy baby with normal premature body weight. The child has no clinical signs of inborn immunodeficiency. Test for HIV infection is negative. Open case of tuberculosis was found in her husband during x-ray examination.

Which measures must be undertaken in this TB infection reservoir?

Probable answers:

- A. Disinfection of the apartment, chemoprophylaxis for mother and new-born;
- B. Chest x-ray examination of the mother, father must be admitted at the hospital, BCG vaccination of the child, conclusive disinfection of the apartments;
- C. Chemoprophylaxis for mother and new-born with isoniazid and rifampicin during 12 months;
- D. Mother and child submit chemoprophylaxis with isoniazid 6 months;
- E. X-ray examination for mother, BCG vaccination of the child, conclusive disinfection of the apartments; conclusive disinfection of the apartments.

The patterns of answers (co-infection):

B.1.E. 2.B 3.E. 4.B. 5.B. 6.D. 7.A. 8.A. 9.A. 10.B.

Recommended reference

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