

**FEDERAL STATE BUDGETARY EDUCATIONAL INSTITUTION OF
HIGHER EDUCATION “NORTH-OSSETIA STATE MEDICAL ACADEMY”
OF THE MINISTRY OF HEALTHCARE OF THE RUSSIAN FEDERATION**

DEPARTMENT OF PHTHIZIOLOGY AND PULMONOLOGY

**METHODICAL RECOMMENDATION FOR THE STUDENT’S SELF WORK
DURING THE PREPARATION FOR PRACTICAL CLASS**

TUBERCULIN SKIN TEST

general medical practice (basics of practical training for the professional
activity of a general practitioner for the provision of primary health care)
“DETECTING TUBERCULOSIS IN THE GENERAL HEALTH NETWORK”

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Tuberculin diagnostics.

1. Study questions of the class:

1. Types of specific allergies. Methods for determining delayed-type hypersensitivity in tuberculosis.
2. Tuberculins - definitions, use.
3. Tuberculin tests - characteristics, indications, use in practice.
4. Risk groups for tuberculin tests, organization of chemoprophylaxis.

2. Place of the class - Regional clinical anti-tuberculosis dispensary, children's department of the dispensary.

Material and laboratory support: clinical and laboratory facilities. Medical and diagnostic equipment, dummies, phantoms, radiographs of the lungs, etc.

3. Relevance of the topic:

Tuberculin diagnostics is a diagnostic test for determining the specific sensitization of the body to MBT, both during mass surveys of the population and for individual examinations;

4. Educational and educational goals:

4.1 General purpose of the class:

- Study the goals and objectives of tuberculin diagnostics;
- To study the technique of conducting and evaluating tuberculin tests.

4.2 Private goals:

As a result of studying educational questions, YOU should

Know:

- general concepts of allergy, the importance of allergy in the tuberculosis clinic;
- goals of tuberculin diagnostics;
- types of tuberculin;
- the technique of setting the river. Mantoux;
- interpretation of tuberculin samples.

Be able to:

- perform the Mantoux test;
- evaluate tuberculin tests and interpret them;
- to carry out differential diagnostics between post-vaccination and infectious allergies.

Own:

- the technique of setting the Mantoux test with 2TE, Diaskintest.
- methods of assessment and interpretation of the results of tuberculin tests;
- methods of differential diagnosis of post-vaccination and post-infectious allergies;
- by the method of selection of persons with a high risk of tuberculosis disease, ways of prevention;

Possess a set of competencies:

- primary and secondary prevention of tuberculosis in people from risk groups;
- the ability to detect immunological changes in humans when infected with mycobacterium tuberculosis;
- the ability to assess the role of biomedical factors in the spread of tuberculosis infection, risk factors;
- the ability to detect immunological changes in humans when infected with mycobacterium tuberculosis;

Have an idea:

- about the types of tuberculin tests (Pirquet's test, graduated cutaneous test, Koch's test);
- about the contingents of children and adolescents to be counted according to the VI group of educational institutions

5. Scheme of integral connections:

| | |
|--|---|
| a) disciplines studied earlier | |
| Pathophysiology - | Types of allergies. Allergic reactions of the body to live vaccines |
| Microbiology - | Tuberculin as an antigen for diagnosing susceptibility to mycobacterium tuberculosis |
| Pathological anatomy - | Specific inflammation. The pathogenesis of tuberculosis. |
| б) дисциплины необходимые на данном занятии: | |
| Propedeutics of Childhood Diseases | Child health, examination, thermometry. Admission to the setting of tuberculin tests. |

6. YOUR PREPARATION STEPS AND DEVELOPMENT OF THE LESSON PROGRAM:

1. In preparation for this lesson

Work through the teaching material of the previously studied (basic) disciplines. This is very important because the entire program of this lesson is based on this material. Pay attention to the types of specific allergies.

Work through educational literature on our discipline. Pay attention to: types of tuberculins, Mantoux tests - indications and contraindications, Diaskintest - the purpose of the statement. If necessary, use the annotation (Appendix 1).

Answer the following questions. Solve tests 1 - 9 and situational tasks 1 - 2. Prepare the following pictures in your workbook: evaluation of the results of the Mantoux test. They will be useful to you when working in class.

This lesson has a special place in the work on the mastery of tuberculin tests, their assessment and use in the diagnosis of tuberculosis.

If possible, review your research and academic workspace prior to class. Remember the rules and safety measures when working with equipment and drugs (set out at the end of the methodological development).

Have your uniform ready in advance.

2. On the implementation of the program of the training session:

Check the workplace for everything you need for your job. If necessary, contact your teacher.

When working out the 1st educational question of the lesson, use the methodological development of the Department of Tuberculin Diagnostics, pay attention to the goals of the Mantoux and Diaskintest test, sketch, enter into the table, find the features, compare with theoretical calculations.

Control your actions. Present the teacher with a report on the completed assignment. Get a task to complete the next task.

When working out the 2nd study question, use the annotation and methodological guide

When working out the 3rd educational question, use the methodological development of the Department of Tuberculin Diagnostics

Use the annotation when working out the 4th study question.

After completing the lesson program, present to the teacher a progress report. Find out what you are having trouble with.

7. When conducting the final part of the training session:

Solve test tasks №№ 1 - 9 (Appendix 2) and solve situational tasks №№ 1 - 2 (Appendix 3).

Please comment on the results of your work on solving control tasks.

Listen to the teacher as he evaluates the performance of the study group and you personally.

Pay attention to the teacher's analysis of your upcoming work in the next lesson and the nuances when working with educational literature. Say goodbye to your teacher.

8. Questions for independent work of students outside the classroom:

- Types of tuberculins;
- Technique of setting tuberculin tests (Mantoux test, Koch test);
- Indications and contraindications;

Assess the features of a specific allergy:

- Compare and pay attention to the features of post-vaccination and post-infectious allergies;
- Draw up a scheme for differential diagnosis of post-vaccination allergy and post-infectious allergy;

9. Questions for self-control

1. Tuberculin diagnostics is divided into the following types: mass, individual, clinical, provocative;
2. The purpose of mass tuberculin diagnostics;
3. Types of tuberculins;
4. Specify the time of manifestation of the reaction to the intradermal injection of tuberculin in tuberculosis infected with Mycobacterium.
5. The Mantoux reaction with 2TE is considered positive if the size of the infiltrate is:
6. Criterion for differential diagnosis of post-vaccine and infectious allergy to tuberculin.
7. Reasons causing hyperergic sensitivity to tuberculin.
8. What is "bend", its main criteria.
9. The main method of detecting tuberculosis in children.
10. What sample is used on an outpatient basis.
11. Types of reactions to the introduction of tuberculin.

10. Література

The main one.

1. Perelman M.I. Phthiology: textbook / M.I. Perelman [and others]. - 3rd ed. - M.: Medicine, 2004.
2. Teaching about tuberculosis / ed. M.I. Perelman. - M.: GEOTAR - Media, 2011 (EBS).
3. Phthiopulmonology: textbook / V.Yu. Mishin [and others]. - M.: GEOTAR - Media, 2007.

Additional.

1. Tuberculosis in children and adolescents: textbook. manual / ed. V.A. Aksenova. - M.: GEOTAR - Media, 2007.
2. Phthiology: national hand. / ed. M.I. Perelman. - M.: GEOTAR - Media, 2007.

11. Questions for self-study:

1. Allergy with tuberculosis infection;
2. What are the allergic reactions according to the degree of their manifestation;
3. What is meant by negative and positive energy;
4. Purposes of tuberculin diagnostics;
5. What is tuberculin, its types;
6. Types of tuberculin tests;
7. Mantoux test setting technique;
8. Assessment of tuberculin tests.

12. Control of the results of mastering the topic:

Tests - initial and final level of knowledge - computer work;

Situational tasks - working on a computer;

Methodological instructions for students on the implementation of the self-study program:

1. To study the goals and objectives of tuberculin diagnostics, indications and contraindications for tuberculin tests;
2. To restore knowledge on the characteristics of specific allergies, the types obtained earlier in microbiology and pathophysiology;
3. To understand the algorithm of differential diagnosis - post-vaccination and post-infectious allergies;
4. Pay attention to possible errors when setting tuberculin samples and their interpretation;
5. Analyze the work done, complete control tasks

13. Tasks:

1. Select the contingent to be deployed p. Mantoux with a medical examination;
2. Perform intradermal administration of saline solution - the purpose of the technique;
3. Perform the river Manta - by intradermal injection of tuberculin into the forearm of the right hand;
4. Know the indications and contraindications for setting p. Mantoux
5. Be able to check tuberculin tests;
6. Know the set of measures necessary for identifying a positive and hyperergic river Mantu

Appendix 1.

Annotation

Allergy is a form of the body's immune response to exogenous substances of an antigenic or haptenic nature. This response is accompanied by damage to the structure and function of cells, tissues and organs.

From an immunological point of view, tuberculin is a hapten, it is not able to sensitize the body, to induce the production of specific antibodies in it, but causes an allergic response in a previously sensitized organism.

Tuberculin tests are delayed-type allergic reactions resulting from the interaction of tuberculin with antibodies fixed on lymphocytes and mononuclear cells.

In response to the introduction of tuberculin into the body of infected and patients with tuberculosis, pricking, general and focal reactions may develop.

The sensitivity of the human body to tuberculin can be different - from pronounced (hyperergia) to negative (anergy), when the body does not respond to tuberculin. The intensity of the reaction to tuberculin depends on the massiveness and virulence of the infection, the reactivity of the organism, the dose, method, frequency of tuberculin administration.

Lack of reaction to tuberculin (anergy) is divided into primary (absolute positive) - in persons not infected with mycobacterium tuberculosis, and secondary - a state accompanied by loss of tuberculin sensitivity in infected and patients with tuberculosis. Secondary anergy develops in severe forms of tuberculosis, lymphogranulomatosis, sarcoidosis, many acute infections (measles, rubella, scarlet fever), vitamin deficiencies, cachexia, cancer, hormone treatment, cytostatics.

An injection reaction is characterized by the appearance of papules (infiltration) at the injection site of tuberculin and hyperemia. With hyperergic reactions, the formation of vesicles, bullae, lymphangitis, necrosis is possible. Histologically, in this place, at the first stages, there is an expansion of capillaries, sweating of tissue fluid, an accumulation of neutrophils. Subsequently, mononuclear infiltration appears with the involvement of histiocytes in inflammation. In the long term, epithelioid and giant cells are found.

The general reaction of an infected organism to the effects of tuberculin is manifested by a deterioration in the general condition, headaches, arthralgias, an increase in temperature, and may be accompanied by a change in hemogram and proteinogram indices.

Focal reaction is characterized by increased perifocal inflammation around the tuberculous focus. In the pulmonary process, a focal reaction may manifest itself as an increase in chest pain, coughing; an increase in the amount of separated sputum, hemoptysis; increased catarrhal symptoms, listening in the lungs; radiographically - an increase in inflammatory changes in the area of a specific lesion.

The body's response to tuberculin depends on the dose and site of administration. So a local reaction occurs with intradermal administration (Mantoux test), and local, general and focal with subcutaneous administration (Koch test).

TUBERCULINODIAGNOSTICS - a diagnostic test to determine the specific sensitization of the body to the office. As a specific test, it is used in mass surveys of the population for tuberculosis (mass tuberculin diagnostics) and for individual examinations (individual tuberculin diagnostics).

Goals of mass tuberculin diagnostics:

1. identification of persons newly infected with MBT ("bend" tube test);
2. identification of persons with hyperergic and intensifying reactions to tuberculin;
3. selection of contingents for BCG revaccination;
4. early diagnosis of tuberculosis in children and adolescents.
5. For mass tuberculin diagnostics, only a single intradermal Mantoux tuberculin test with 2TE is used.
6. Purposes of individual tuberculin diagnostics:
7. differential diagnosis of post-vaccination and infectious allergy to tuberculin;
8. diagnostics and diff. diagnostics of tuberculosis and other diseases;
9. determination of the "threshold" of individual sensitivity to tuberculin;
10. determination of the active tuberculous process;
11. Evaluation of the effectiveness of anti-tuberculosis treatment.

For individual tuberculin diagnostics, in addition to the Mantoux test with 2TE, the Mantoux test with various doses of tuberculin, the Pirquet skin test, and the Koch test are used.

TYPES OF TUBERCULIN.

1. Old Koch tuberculin - along with specific active substances, waste products, mycobacterial toxins, they also contain many ballast substances (keptones, glycerin, salts) of the nutrient medium on which MBT was cultivated. The presence in the preparation of protein products of the environment is associated with the possibility of nonspecific reactions occurring during the preparation of skin tests, which may represent a certain hindrance in the diagnosis. 1 ml of ATK contains 100,000 tuberculin units.

2. Purified tuberculin (made in the USSR in 1939), PPD-L (Purified protein derivative) is made from a mixture of human and bovine species killed by heating MBT culture filtrates, purified by ultrafiltration, precipitated with trichloroacetic acid, treated with ethyl alcohol and ether.

2 types of purified tuberculin:

1) dry purified tuberculin (ampoules containing 50,000 TE) - used for the diagnosis of tuberculosis only in anti-tuberculosis dispensaries;

2) purified tuberculin in standard dilution - a purified liquid tuberculous allergen - these are ready-to-use solutions of tuberculin. Available in ampoules as a solution containing 2TE PPD-L in 0.1 ml. The release of 5TE, 10TE, in 0.1 ml, etc. is possible. It is used for mass tuberculin diagnostics.

Tuberculin unit - the national standard for domestic tuberculin PPD-L 1TE contains 0.00006 dry matter

TECHNIQUE OF CONDUCTING THE MANTOUX TEST WITH MASS TUBERCULIN DIAGNOSTICS

For the purpose of early detection of tuberculosis, the Mantoux test with 2TE is given to children and adolescents annually, starting from 12 months (up to one year of age - according to indications), regardless of the previous result. With a systematic formulation of this test, it is possible to reveal the transition of previously negative reactions to positive ("bend" of tuberculin tests), an increase in sensitivity to tuberculin and the development of hyperergia.

For the Mantoux test, one-gram tuberculin syringes are used.

- the sample is put by a specially trained nurse;
- the sample is placed in the area of the middle third of the inner surface of the forearm, which is pre-treated with alcohol. The syringe is filled with 0.2 ml of tuberculin. Strictly intravenous, 0.1 ml of tuberculin is injected with the needle cut upwards. An indicator of the correct injection technique is the formation of a lemon peel in the skin with a diameter of 6-7 mm.
- The result is assessed after 72 hours by transverse measurement of the infiltrate in mm.

The sample is considered negative - in the presence of only a prick reaction, doubtful - in the presence of an infiltrate of 2 - 4 mm or hyperemia of any size without an infiltrate, positive (normergic and hyperergic) - in the presence of an infiltrate of 5 mm and above and hyperergic - an infiltrate of 17 mm and above in children and adolescents and 21 mm and above in adults. Regardless of the size of the papules, samples with vesicular-necrotic reactions are considered hyperergic.

Contraindication to mass production of the Mantoux test: skin diseases that make it difficult to read the test, acute and chronic infections during an exacerbation, epilepsy.

It is recommended that the test be carried out at the same time of the year: for preschool children - in the spring, for schoolchildren - in the fall. In even years, the test is placed on the right hand, in odd years - on the left.

When evaluating the result of the Mantoux test, a positive result indicates:

1. about infection;
2. about post-vaccination allergy.

DIFFERENTIAL DIAGNOSTICS OF INFECTIOUS AND POSTVACCINAL ALLERGY

| | Anamnesis data and samples Post-vaccination | Anamnesis data and samples Post-vaccination | Anamnesis data and samples Post-vaccination |
|---|---|---|---|
| 1 | TST 2TE | Negative, dubious, positive up to 12 mm | in 70% of children, infiltration of 12 mm or more, hyperergic reactions |
| 2 | TST characteristic | The papule is flat, indistinctly outlined, poorly contoured, quickly fades away, decreases in size within 24 hours - after setting, does not leave behind long-lasting pigmentation | The papule is high, bright, clearly delineated, can grow 2-3 days after setting. Long-term pigmentation is preserved. |
| 3 | TST dynamics | The tendency to weakening reactions, one year or more after BCG. | After 2-3 years, negative |

SUBCUTANEOUS TUBERCULIN COCH TEST.

It is placed with a differential - diagnostic purpose, to determine the activity of the tuberculous process, to monitor the effectiveness of treatment. Applying certain skin tests, it is possible to some extent determine the nature of the specific sensitization of the body. These tests reflect the condition primarily of skin sensitivity. However, not all tissues respond equally and simultaneously to a specific stimulus. In this regard, there may be a dissociation between the sensitivity of the skin and internal organs. Skin tubes. samples are weak and even negative. For example, in patients with an infiltrative process, especially with caseous pneumonia, i.e. with those processes that are characterized by a violent hyperergic tissue reaction in the lungs.

The most commonly used dose is 20 TE (1 ml of purified tuberculin in standard dilution or 0.2 ml of dilution 3), without taking into account the preliminary study of the threshold of sensitivity to tuberculin. In children, as a rule, 20 TU sc is administered, if the Mantoux test with 2 TU is not hyperergic, otherwise it starts with 10 TU. If the result is negative for the Koch test with 20 TU, the dose is increased to 50 TU, and then to 100 TU.

When conducting a Koch test, prick, focal, and general reactions can occur.

Focal reaction is of the greatest importance in assessing the activity of the process. Formed at the site of the focus of the tuberculous process.

In patients with pulmonary tuberculosis, a focal reaction is manifested by an increase in sputum, wheezing, an increase in pleural friction noise, and the appearance of perifocal inflammation around the foci on radiographs.

In patients with extrapulmonary tuberculosis, increased inflammatory reactions directly at the site of localization of the process (joints, kidneys).

The general reaction is manifested by an increase in body temperature, headache, malaise, changes in blood and protein fractions.

An injection reaction is considered positive with an infiltration of 15 - 20 mm or more, apart from the general and focal reaction, it does not carry information.

Appendix 2.

Tests

01. Purified tuberculin (RRD) contains:

- 1) killed mycobacteria of human and bovine species
- 2) live weakened mycobacterium tuberculosis of human and bovine species
- 3) a mixture of human and bovine mycobacterium cultures killed by heating filtrates
- 4) waste products of mycobacterium tuberculosis of human and avian species
- 5) lyophilized mycobacterium BCG strain

02. To carry out mass tuberculin diagnostics, the following is used:

- 1) Pirquet test
- 2) Koch test
- 3) Mantoux test with 2 TE PPD-L
- 4) graduated skin test
- 5) Kveim test

03. Evaluation of the Mantoux tuberculin test with 2 TE PPD-L is carried out through:

- 1) 96 hours after tuberculin administration
- 2) 72 hours after tuberculin administration
- 3) 48 hours after tuberculin administration
- 4) 24 hours after tuberculin administration
- 5) 12 hours after tuberculin administration

04. The task of mass tuberculin diagnostics is not:
- 1) selection of persons primarily infected with mycobacterium tuberculosis
 - 2) selection of persons for vaccination and revaccination of BCG
 - 3) identifying a group of people with an increased risk of tuberculosis
 - 4) selection of contingents for inpatient treatment
 - 5) determination of the rate of infection and the annual risk of infection
05. Individual tuberculin diagnostics is carried out for:
- 1) differential diagnosis of post-vaccination and infectious allergy to tuberculin
 - 2) early detection of tuberculosis in children
 - 3) finding out the spread of tuberculosis infection among people
 - 4) selection of persons subject to revaccination
 - 5) determining the annual risk of MBT infection
06. A child with a "bend" of the tuberculin test should be carried out:
- 1) graduated Pirquet test
 - 2) BCG revaccination
 - 3) revaccination of BCG-M
 - 4) chemoprophylaxis for 3-6 months
 - 5) detoxification therapy for 2 weeks
07. BCG vaccine is:
- 1) toxins of mycobacterium tuberculosis
 - 2) killed mycobacteria of human and bovine species
 - 3) live weakened bovine mycobacteria
 - 4) a suspension consisting of "fragments" of mycobacterium tuberculosis, their metabolic products and remnants of the nutrient medium
 - 5) live mycobacteria of avian and mouse species
08. In Russia, the method for early detection of tuberculosis among children is:
- 1) enzyme immunoassay
 - 2) examination of sputum on the office
 - 3) fluorography
 - 4) tuberculin diagnostics
 - 5) polymerase chain reaction
09. Reaction to Mantoux test with 2 TE PPD-L in military tuberculosis more often:
- 1) positive
 - 2) hyperergic
 - 3) questionable
 - 4) weakly positive
 - 5) negative

Situational tasks.

001. Patient S., 8 years old, went to the clinic with complaints of weakness, increased fatigue, frequent ARVI. Revaccination against tuberculosis was carried out at the age of 7. On examination, the child has enlarged cervical lymph nodes, no signs of inflammation, painless.

In anamnesis, he had contact with a patient with tuberculosis (a distant relative came to visit). The Mantoux reaction with 2TE is positive - 20 mm.

X-ray - strengthening of the pulmonary pattern in the root areas.

In the blood - Hb - 130 g / l, watering can. - 6.8 ... 109 / l, ESR - 14 mm.hours.

1. What is the diagnosis?
2. What research methods are needed?
3. What are the methods of treatment?
4. What is the forecast?

002. Patient M., 11 years old, turned to the clinic with complaints of low-grade fever, weakness, poor appetite, weight loss, the Mantoux test became positive half a month ago. On examination - low nutrition, small dense cervical and axillary lymph nodes are palpated.

X-ray: increased pulmonary pattern in both lungs.

Blood test - Hb - 136 g / l, Z - 6.4 ... 109 / l, ESR - 18 mm. hour.

Mantoux test with 2TE - 18 mm, Diaskintest - 13 mm.

1. How to explain the increase in peripheral lymph nodes?
2. The diagnosis?
3. What to do next?