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THE TECHNIQUE OF APPLYING MANTOUX ALLERGY IN CHILDREN AND ITS PRACTICAL SIGNIFICANCE

Abdullayeva D.A.

Andijan State Medical Institute,Uzbekistan

Annotation: Mantoux allergy (tuberculin allergy) is a hypersensitivity reaction to the components of tuberculin that is not associated with previous vaccination or infection with microbacteria. In a broad sense, the term is used to describe various skin and systemic adverse reactions to the Mantoux test. In addition to true allergies, these symptoms are caused by violations of the test technique, injury to the injection site, and concomitant immunological and somatic diseases. The diagnosis includes a complete list of tests for tuberculosis, an immunogram, and other immunological tests. Treatment tactics are determined by the cause and severity of the allergy.

Key words: Mantaux allergy, tuberculosis, immunomodulatory, immunological tests.

Over the past two decades, the situation with tuberculosis in children has significantly improved in Russia. The overall morbidity rate decreased by 2.4 times to 9 cases per 100 thousand of the population under 18 years of age. The prevalence of Mycobacterium tuberculosis (MBT) decreased by 2.7 times, and the mortality rate in pediatric phthisiology decreased by 7.3 times. The main reasons for the improvement in indicators are universal vaccination and screening diagnostics, which is implemented in children using the Mantoux test. However, when conducting the test, many parents report "Manta allergy" and try to avoid performing the test in subsequent years.

Reasons

Physiological factors

The Mantoux test is one of the variants of the allergotest, during which the body's response to tuberculin (allergen) is evaluated. Local changes on the skin in the area of the injection, which many parents regard as an allergy, are considered a natural consequence of the test. In this situation, the use of the term "Mantoux allergy" is incorrect. Symptoms are due to a specific T-cell hypersensitivity reaction and indicate contact with MBT.

There are two classic reasons for increasing Mantoux-vaccination and infection with Koch's bacillus. In both cases, Mycobacterium tuberculosis is present in the body. In the case of vaccination, these will be safe strains that have been treated, and in the case of tuberculosis infection, aggressive Koch sticks that can cause clinical manifestations under unfavorable conditions. Additional tests will be required to distinguish between these conditions.

Pathological conditions

Sometimes local cutaneous or systemic undesirable effects are observed during the test, which are not related to the presence of MBT or a recent vaccination. These cases are usually referred to as Mantoux allergy, although an allergic component is not always present in the pathogenesis. Adverse and abnormal reactions to tuberculin diagnostics occur under the influence of various etiological factors, such as:

- Intolerance to the components of the drug. Pathological tuberculin allergy is extremely rare. In modern pediatrics, several dozen cases of such a side effect have been described, which manifests itself in the form of an immediate systemic reaction. Occasionally, there is an intolerance to auxiliary components-phenol and other preservatives.
- Violations of the injection technique. If the dosage of tuberculin is incorrect or too deep (subcutaneous) administration, non-allergic side effects may occur. They are manifested by headache, malaise, sleep disorders, pain in the muscles and joints, increased body temperature.

- Vaccination. Recently conducted preventive vaccinations enhance the local immune response to tuberculin and provoke symptoms that resemble an allergy to Manta rays. Side effects occur with the introduction of DTP, ADS, and CPC vaccines. To avoid adverse reactions, turebkulinodiagnosis should be performed before vaccination.
- Injuring the injection site. Mechanical damage to the skin creates a clinical picture of an allergy to Manta rays. The cause of the problem is combing the skin, sticking the injection site with a plaster or wrapping it with a bandage, or rubbing your hands too intensively with a towel after bathing. At the same time, getting water on your hand is safe and will not cause any problems.
- Allergic diseases. Allergic children with atopic dermatitis, bronchial asthma, and seasonal rhinitis often have hyperergic skin reactions. However, they are not caused by an allergy to Manta rays (tuberculin or additional components), but by general sensitization of the body.
- Concomitant diseases. The Mantoux test may coincide with the onset of acute respiratory viral infections. In this case, the child's malaise is mistakenly perceived as a tuberculin allergy, but after 1-2 days other symptoms of the onset of the disease appear, which relieve the doctor and parents of doubts. Abnormal Mantoux reaction is also possible in helminthiasis, bronchopulmonary diseases, obesity, hyperthyroidism.

Pathophysiology

The Mantoux test is the most well-known method of tuberculin diagnostics, which determines the presence of immunity to Koch's bacillus. The essence of the test consists in intradermal administration of a purified tuberculosis allergen in a standard dose of 2 units (0.1 ml of solution). Tuberculin for the Mantoux test consists of antigens – protein components of Mycobacterium tuberculosis, which are recognized by the body and cause a specific immune response.

An intradermal allergic test is performed annually for all BCG-vaccinated children from 12 months to 7 years of age. If the child has absolute contraindications to the TB vaccination, the test is performed every 6 months. The Mantoux test twice a year is also indicated for patients at high risk of developing tuberculosis. This category includes patients with diabetes mellitus, chronic lung and kidney diseases, congenital immunodeficiency, and heart defects.

The tuberculin test is performed by a specially trained nurse in compliance with the clinical protocol. The test results are recorded after 72 hours. This interval is necessary because external changes at the injection site are caused by delayed-type cellular reactions and do not develop immediately after the injection. Possible variants of the Mantoux reaction:

- Negative: no infiltrate (papules) and redness (hyperemia), pinpoint mark from the injection with a diameter of up to 1 mm.
- Questionable: 2-4 mm infiltrate or redness of any diameter without skin swelling.
- Positive: infiltrate with a diameter of 5 mm or more. The size of the swelling determines the intensity of the immune response: weakly positive-5-9 mm, moderately positive-10-14 mm, pronounced-15-16 mm.
- Hyperergic: infiltrate with a diameter of more than 17 mm, the presence of vesicles (vesicles) or ulcerative-necrotic changes at the injection site, inflammation of the lymphatic vessels (lymphangitis).

Changes in the skin are determined by the time that has elapsed since the introduction of tuberculin. Immediately after the intradermal injection, a small white "button" appears, which resolves within half an hour. In the first hours after the injection, itching, slight redness and swelling around the puncture may occur. Specific immune responses are formed within 1-2 days after the Mantoux test and reach a maximum after 72 hours.

The timing of skin symptoms is very important. If a child develops an allergy to Manta rays or allergic reactions that are not associated with MBT infection, the maximum severity of symptoms will be in the first 24 hours. In this case, redness, itching, swelling, blisters or blisters may occur. If the changes are due to tuberculosis infection or vaccination, the signs increase gradually by the third day after the introduction of tuberculin.

Systemic manifestations

Severe forms of Mantoux allergy are extremely rare – about 1 case per 1 million administered doses of tuberculin. They appear in the first 30 minutes after the test. Skin signs are represented by urticaria, which is characterized by large blisters, redness and intense itching. These changes affect different parts of the body, not just the injection site. Occasionally, angioedema of the lips, tongue and respiratory tract (Quincke's edema), anaphylactic shock develops.

Diagnostics

If an immediate type of allergy occurs, the child is given emergency care in a medical facility. Specific diagnosis of the condition is not required due to the characteristic symptoms and their clear connection with the introduction of tuberculin. If there are suspicious local signs that resemble allergies, the patient needs to consult a phthisiatrician and an allergist-immunologist. To find out the causes of an atypical reaction to Mantoux, the following studies are conducted::

- Diagnosis of tuberculosis. The first step in a hyperergic reaction is to confirm or rule out tuberculosis. For this purpose, tests are prescribed: Diaskintest, T-SPOT, general blood and urine tests, PCR, sputum microbiological examination. To detect bronchopulmonary lesions, an X-ray or CT scan of the chest organs is mandatory.
- Immunological examination. When allergic to Manta rays and other variants of allergic reactions, an increase in the level of eosinophils in the hemogram, an increase in the concentration of immunoglobulins E and G. For a comprehensive assessment of the immune status, an extended immunogram is prescribed.
- Local reactions to the tuberculin test in most cases do not require treatment. Papules, redness and other symptoms gradually disappear, without causing any harm to the child and without leaving persistent traces on the skin. The exception is cases of true allergies, for the elimination of which antihistamines are prescribed in tablets or syrups, gels and ointments for the treatment of itchy elements on the skin.
- If you develop a systemic allergy to Manta rays, you will need urgent treatment. The drug of choice is an epinephrine solution, the dosage of which is calculated by the patient's weight. The emergency program includes checking the airway patency, taking Safar, intubation for critical pharyngeal and laryngeal edema. To restore the water-electrolyte balance, infusion therapy is performed.
- Prognosis and prevention
- Allergy to Manta rays does not pose a health threat, with the exception of isolated cases of systemic anaphylaxis. However, hyperergic and adverse reactions may indicate the presence of tuberculosis or other diseases that require in-depth diagnosis. Children who repeatedly experience allergic manifestations for no apparent reason are registered at the pediatrician's dispensary.
- To minimize the risk of undesirable consequences of the test, you must strictly follow the rules for conducting tuberculin diagnostics. The test is performed if the child feels well outside the period of exacerbation of autoimmune or chronic somatic diseases. If there is an outbreak of childhood infections in the team, testing is postponed until the quarantine is lifted. Children with allergic diseases may be prescribed antihistamines for 3 days before the test.

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