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A Comparative Evaluation of Immunological Tests' Accuracy in Detecting Tuberculosis in Children and Adolescents in the Samarkand Region

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Abstract: The use of the diagnostic drug diaskintest, which combines two antigens of virulent strains of Mycobacterium tuberculosis, is described in the article. In comparison to tuberculin, diaskintest has been shown to have a relatively high level of sensitivity and specificity. In the Samarkand region, the drug's high efficacy in the differential diagnosis of tuberculosis in children and adolescents was demonstrated.

Keywords: diaskintest, Mantoux test, tuberculin diagnostics.

The spread of different nosological forms of lung pathology, the reasons for their occurrence, the risk factors for the development of diseases in different parts of our country, and the improvement of diagnostic criteria remain relevant today [5,6,7,8,10] despite the advances made in the study of relapsing and chronic forms of respiratory system pathology. Due to the polymorphism of tuberculosis' clinical manifestations, its pathomorphological characteristics, its proximity to non-specific respiratory system diseases, and the fact that the majority of children do not distinguish Mycobacterium tuberculosis (MBT), among other factors, it is challenging to diagnose this pathology [1]. In this regard, improving preventive diagnostics and chemoprophylaxis of tuberculosis in children and adolescents is the urgent issue in psychiatry. [9,11].

The detection of delayed hypersensitivity reactions to MBT has long been done using various tuberculin tests. The PPD-L (purified protein derivative) antigen, which is made up of more than 200 antigen mixtures, is used in the Mantoux test, which is the most frequently performed test [4,13].

A positive tuberculin test indicates that the organism was initially sensitized to the entire antigen found in virulent or virulently attenuated MBT as well as other nontuberculous mycobacteria [12,14]. Due to overdiagnosis of TB infection, unwarranted preventive treatments are prescribed, and positive reactions are unnecessarily evaluated and treated as a sign of a post-vaccination allergy. [1,4,13].

The "Diaskin test" (DST), a new reagent for skin testing, was developed after many years of work by specialists at the biotechnology lab of the Research Institute of Molecular Medicine of the Russian Federation. This new reagent is a recombinant protein CFP-10-ESAT-6, produced by Escherichia coli. A positive DST test result indicates chemoprophylaxis and an active tuberculosis infection [4,13]. The number of children with tuberculosis has significantly decreased since the implementation of DST. The DST test's practical application makes it possible to distinguish clearly between the infection-state and the latent-infection-state of tuberculosis (LASI). The organism may be infectious in the form of L-forms of persistent, non-virulent MBT. The DST sample will be negative in this scenario while the tuberculin test will be positive.

The infectious state doesn't need to be clinically diagnosed or treated. The second instance is when virulent MBT is present in the body but there are no clinical or radiological signs of LASI. Tests for

tuberculin and DST will come back positive in this circumstance. LASI needs to be diagnosed and treated prophylactically. When the organism's reactivity changes, its overall resistance and specific immunity decline, the transformation of the infection state into the LASI state is permitted. [2,3].

As a result, the issue of early detection, monitoring the dynamics of the course of tuberculosis based on the unique characteristics of patients, and accurate assessment of the results of immunological examination is urgent given the current epidemiological situation.

Purpose of the study is to compare the outcomes of immunological tests (DST and Mantoux tests) in kids from Samarkand region groups with a high risk of tuberculosis.

Methodology. A retrospective analysis of the outpatient records of 2,431 children and adolescents examined by a psychiatrist in the Samarkand region between the ages of 1 and 16 was conducted.

Result and Discussion. There are 2431 children in the risk group overall, of whom 4% are in contact, 77.3% have chronic illnesses, 3% have mental illnesses, 3% have drug or alcohol addictions, and 3% have HIV. Other risk factors include children in specialized institutions, 4% are from asocial families, 8% are immigrants, and 2% have symptoms similar to tuberculosis.

When 640 kids in the risk group had their health checked, 35 (5.4%) of them had positive DST results, and 14 (2.3%) of them had hyperergic results. Children who responded positively to DST were examined, and it was discovered that 3.5% of them had tuberculosis infection, 36.7% had local forms of the disease, and 10.4% had both.

A Mantoux test revealed 218 (12.2%) of the 1793 children in the risk group to be positive. Tuberculosis was found in 18%, tuberculosis infection in 76.7%, and local forms of tuberculosis in 1.5% of the children who had undergone examination after receiving a positive Mantoux test result.

The percentage of positive reactions to tuberculin was 12.2% when comparing two different tests (the DST and the Mantoux skin test), while it was 5.4% for the DST. Children from areas with high tuberculosis infection rates (17.5%) showed the most favorable responses to DST.

Children with YATI and the tuberculin test curve had the lowest percentages of positive DST reactions—2.8% and 1.5 percent, respectively. Skin tests using DST and tuberculin produce noticeably different results. Local forms of tuberculosis were found in 10.4% of kids who had a positive DST response, compared to 1.5% of kids who had a positive Mantoux test.

DST allows for the identification of risk groups among patients with non-specific respiratory tract and urogenital system diseases, diabetes, as well as those receiving hormonal therapy, among others, and significantly increases the effectiveness of screening for tuberculosis infection. [2, 4, 5, 6]. The high specificity of the test, which shows that every tenth schoolchild with a positive reaction has local tuberculosis, supports the rationale for performing diagnostic testing on all school-aged children and adolescents using the DST drug. Comparing the drug DST to the Mantoux test with PPD-L for the diagnosis of local forms of tuberculosis, it demonstrated a significant improvement in accuracy. Healthy individuals who use DST do not experience any side effects, though BCG vaccine recipients can experience positive side effects. [6].

The goal of mass screening is to find children and adolescents who are in the early stages of infection, as opposed to those who are in the middle of the infection, in contact with the bacterial isolate, in high mycobacterial strain, or in the final stages of the disease.

In light of this, DST's specific sensitivity and specificity make it possible to use this skin test for diagnosis, differential diagnosis, and the clarification of the specifics of the activity of the tuberculosis process. The use of the recombinant tuberculosis allergen in high-risk populations and tuberculosis infection centers is explained by its high sensitivity and specificity.

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