



Introduction

Urgency of the deliquescent tuberculous infection and local forms of children tuberculosis early detection issue is unquestionable. Quantiferon test (QFT) and a Diaskintest (DST) are used along with the Mantoux Test for tuberculosis diagnosis (TB) in children in the Republic of Belarus. It is necessary to monitor and compare the diagnostic significance of these three tests.

DST is a recombinant tubercular allergen, which contains hybrid protein, combining two early proteins - ESAT 6 and CFP10, specific for *M.tuberculosis* and *M.bovis*. The fact that *M.bovis* BCG as well as the majority of nonpathogenic mycobacteria do not contain this antigen, makes DST highly sensitive and specific.

Thanks to this test it is possible to differentiate accurately among immune reactions, associated with the *M.tuberculosis* infection, artificial active immunity (after BCG immunization), and nonspecific reactions, arising due to non-tuberculous mycobacteria.

Prescription of Diaskintest:

- ◆ differential diagnostics of tuberculosis and nontuberculous diseases
- ◆ differential diagnostics of TB and of complicated BCG immunization
- ◆ differential diagnostics of bacterial allergy (conversion) and post-vaccinal allergy after BCG immunization
- ◆ TB diagnosis, tuberculous infection activity assessment, Identification of people having high risk of active tuberculosis development

The test doesn't require creation of laboratory infrastructure and extensive personnel training. Techniques, counterindications, analysis of results of DST (measure of papule/hyperemia in 72 hours after setting) are similar to PPD test with 2TE (Figure 1-2).



Figure 1



Figure 2

Materials and methods

It was conducted the analysis of medical documentation of patients aged 5-17 years old with active TB of respiratory organs, with spontaneously healed TB and with Serious Adverse Reactions to BCG vaccination. The patients underwent 3 tests – the Mantoux test, the Quantiferon test (QFT) and the Diaskintest (DST).

Clinical characteristics of the children under study

- 62 – patients aged 5-17 years old with active TB of respiratory organs
- 30 – with spontaneously healed TB was conducted
- 30 – with Serious Adverse Reactions to BCG vaccination

Results

- Each test showed high sensitivity with active TB: Mantoux positive results in 84.0%, QFT in 87.5%, DST in 88.9% of patients ($p > 0.05$). Totally, the results of 3 tests coincided in 52.6% of children, while for the rest of cases, diverging results were obtained. Concordant results of DST and QFT were noted in 89.5% of patients. Every third case of TB in 2014-2017 was detected during additional examination of the children in connection with DST positive result.
- In the group of children with spontaneously healed TB, small post-tuberculous changes were found in the form of small lung calcification and / or intrathoracic lymph nodes, and limited pneumofibrosis. Changes were detected on the radiograph of the respiratory organs in only 6 patients (20.0%), with an additional CT scan in 24 (80.0%). A high proportion of positive reactions to the Mantoux test was found in 100%, to DST – 60.0%; QFT was positive in 66.7% of the examined (Figure 3-4).
- It is important that all children with a positive QFT had hyperergic reactions to the DST.
- All children with BCG complications, in whom the Mantoux test was positive (100% of cases), had a negative reaction to QFT and DST (Figure 3).

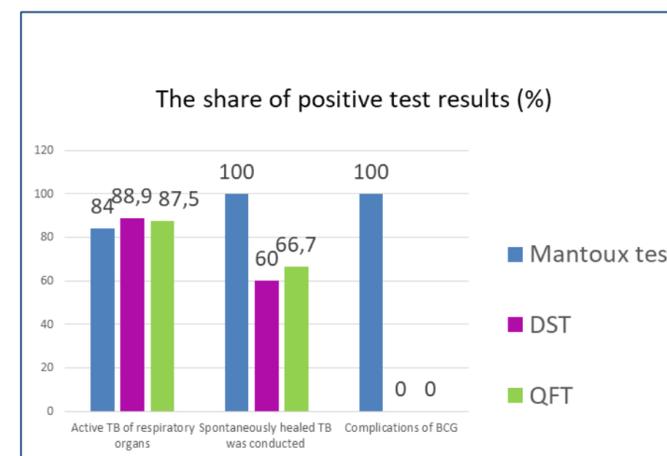


Figure 3. Sensitivity of the Mantoux test, DST and QFT in case of TB and BCG complications

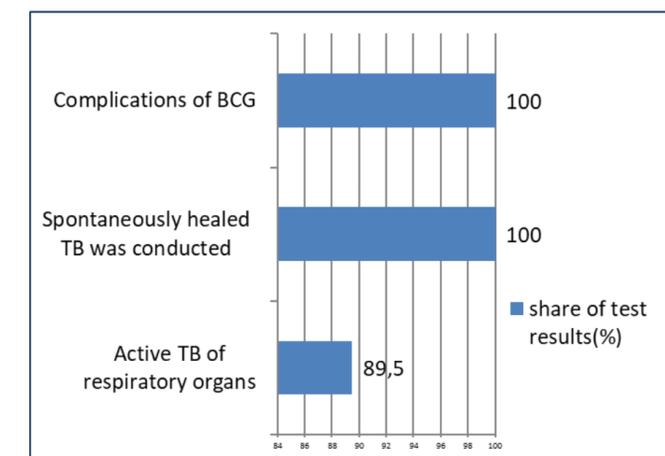


Figure 4. The proportion of concordant results of diagnostic tests

Conclusions

- The tests are highly sensitive with active TB (positive in 88-89% of cases).
- The results of Quantiferon test and Diaskintest with the active and spontaneously healed TB are comparable –89.5% and 100% of the results coincide, respectively.
- Each of the tests can be effectively used in the diagnosis of TB in children.

