



Informative value of diaskintest in screening of genitourinary tuberculosis

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ABSTRACT

For defining the informative value of diaskintest (DST) as a screening method 126 patients were divided into three groups: the 1st group included the patients with active genitourinary tuberculosis (GUTB), n = 31; the 2nd group included patients with inactive GUTB, n = 16; the 3rd group included the patients with chronic infections of urogenital tract, n = 79. Besides standard inspection, all patients underwent a skin test with diaskintest and Koch's provocative tuberculin test. Sensitivity of DST was 78.6% and sensitivity of Koch's skin test was 82.8%. Specificity of DST in the first group was 23.1%, Koch's skin test specificity was 100%. Thus, DST is not effective in GUTB screening.

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Introduction

Despite some depression of a share of genitourinary tuberculosis in structure of a case rate of extrapulmonary tuberculosis, its medical, epidemic and social value is of high importance [1].

Genitourinary tuberculosis is characterized by polymorphism of clinical implications and lack of pathognomonic symptoms that significantly complicates its recognition [2]. IGRA tests approved by the World Health Organization (QuantiFERON-TBGold, TB.SPOT.test) come into use as the modern methods of detection of latent tuberculosis infection which positive results are associated with process of active growth of *M. tuberculosis* [3–6]. However high cost of these techniques and their invasiveness do not allow considering them as screening.

Important method in GUTB diagnostics is provocative Koch test with hypodermic introduction of 20–50–100 tubercular units. Thermometry is carried out every 2 hours during 48 hours after administration of tuberculin; clinical blood analysis and Nechiporenko test are repeated twice, and bacteriological test is also performed. The result is estimated according to the general, stab and focal reactions. This test is included into a standard algorithm of examination of patients suspected to GUTB and also needed to define the degree of its activity for including to the other group of dispensary for diseases or removal from it, but Koch test is carried out permanently and is not suitable for screening [2].

Aim of the Research

To define the informative value of DST as screening method in differential diagnostics of GUTB.

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Materials and Methods

126 patients took part in the basic open cohort research, they were treated in the unit of extrapulmonary tuberculosis of The Novosibirsk Scientific Research Institute of Tuberculosis of the Ministry of Healthcare in 2014–2015. Sex structure: men — 51.6% (n = 65), women — 48.4% (n = 61). Average age of patients was 47.4 ± 1.34 years.

Patients were admitted to hospital according to the program of the antituberculous dispensaries; DST was carried out at a pre-hospital stage. Complete phthisiourological examination including full clinical tests were performed to the patients of the unit: clinical urinalysis, biochemical blood test, urine examination (clinical urinalysis, Nechiporenko test, 3 glass urine test), urine inoculation on nonspecific flora and derivatives of genital glands with definition of sensitivity of the revealed originators to germicides, research on *M. tuberculosis* (method of polymerase chain reaction, luminescent microscopy, inoculations on liquid and solid mediums, bacteriological researches concerning the usage of automated Bactec and GeneXpert systems). Men were performed extra tests of prostatic secretions and ejaculate, women were carried out research of endocervical smear, inoculation of menstrual blood. Radiological diagnostic methods included ultrasonography, radiological methods (urethrography, micturating cystography, excretory urography and/or multispinal computer tomography with intravenous contrasting agents). A biopsy of bladder and prostate with pathomorphological and bacteriological research of bioptic patterns were carried out according to indications.

As a result of the conducted examination the patients were distributed into three groups:

The 1st group consists of patients with active GUTB, n = 31 (24.6%);

The 2nd group consists of patients with inactive GUTB, n = 16 (12.7%);

The 3rd group consists of patients with chronic urinary tract infections who were hospitalized to the unit suspected of GUTB, but the diagnosis was dismissed after complex phthisiourological examination, n = 79 (62.7%).

Results and Discussion

The diagnosis of “Active GUTB” is verified bacteriologically in 9 patients (29.0%); on the basis of pathomorphologic aspect — in 2 patients (6.5%); on the strength of all the evidence of anamnesis, clinicoradiological and laboratory researches — in 20 patients (64.5%). Among 31 patients with active GUTB the disease was revealed in 25 patients (80.6%) for the first time, disease recurrence is diagnosed in 3 patients (9.7%), GUTB recidivation was also registered in three patients (9.7%). In group of active

GUTB tuberculosis of urinary system is revealed in 29 people (93.5%), genital tuberculosis is diagnosed in 2 patients (6.5%).

DST was performed for 14 patients (45.2%) with active GUTB. Result was positive in 11 people (78.6%), and the result was negative in 3 (21.4%).

Koch test was performed for 29 patients (93.5%) with active GUTB. Positive reaction to hypodermic introduction of 50 tuberculin units was registered in 24 patients (82.8%), doubtful result was registered in 4 patients (13.8%). Only one patient with active GUTB had negative Koch test (3.4%). Thus, DST sensitivity in patients with active GUTB was 78.6%, and sensitivity of hypodermic provocative tuberculin test was 82.8% that is slightly higher.

Urogenital tuberculosis (93.7%) was revealed among 16 patients with inactive GUTB (clinical treatment) in 15 of them before that, and one patient was observed concerning genital tuberculosis in female (6.3%). DST was carried out for two patients (12.5%) of this group, and positive reaction is registered in both cases. The small number of patients does not allow conclude reliably on informative value of DST in patients with inactive GUTB. Koch test was performed on all 16 patients; in 14 (87.5%) of them test was negative, 2 patients had doubtful result.

79 patients (69.7%) without confirmed tuberculosis were included into the group of patients with chronic nonspecific pyelonephritis. DST was performed for 26 of them (32.9%). The positive take was recorded in 20 (76.9%) patients.

72 people (91.1%) had negative hypodermic provocative tuberculin test, 6 patients (7.6%) had doubtful test result.

Thus, the false positive DST result in patients without tuberculosis was 76.9%, and in one case there was no false positive result of Koch test that testifies to extremely low specificity of DST (23.1%) concerning genitourinary tuberculosis at adults.

DST sensitivity at adult suffering from pulmonary tuberculosis was 74.5% that correlates with literature reports and this suggests the efficiency of a method. Specificity of DST is high at respiratory tuberculosis (86%).

Sensitivity of DST and hypodermic provocative tuberculin skin test of Koch in adult patients with genitourinary tuberculosis was comparable (78.6 and 82.8% respectively) with the prevalence of a traditional diagnostic method. Specificity of Koch test was 92.3% that allows to consider provocative tuberculin skin test to be important in differential diagnostics of genitourinary tuberculosis and nonspecific urogenital infections.

However DST specificity of was only 23.1% that testifies to high percent of false positive results. It has been established that tubercular recombinant allergen in standard dilution is produced by genetically modified inoculation of *Escherichia coli* BL21(DE3)/

pCFP-ESAT. As enteric bacterium fulfill the leading role in development of urinary tract infections, it is conceivable that the reason of false positive results is caused by the two-dimensional immunologic host response to Escherichia coli antigens which can be in DST structure.

Conclusions

DST can be used in GUTB screening. However the positive result is not the reason for establishment of the diagnosis but only a reason for profound phthi-siourological examination with usage of additional provocative tests, in particular, carrying out Koch tests, that showed high diagnostic efficiency. The reasons of low DST specificity at GUTB are the call for an additional research.

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