

SCREENING METHODS IN TUBERCULOSIS

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Abstract: The study aims at emphasizing certain medical methods that are used for the screening of the infection with *Mycobacterium tuberculosis*. For this purpose, we have used the conventional radiological investigation, more specifically the standard pulmonary radiography, together with certain laboratory tests. The QuantiFERON – TB Gold (In-Tube Method) test successfully completes the radiological investigation, determining the quantity of γ -interferon released in the plasma, as a consequence of the interaction between the *Mycobacterium tuberculosis* and the CD4 lymphocytes. We used the data basis of the Hospital of Pneumology Brasov, certain relevant radiological images for the infection with *Mycobacterium tuberculosis*. Concerning the QuantiFERON – TB Gold (In-Tube Method) tests, we have taken into account the results of the investigation in 2009.

Cuvinte cheie:
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standard, teste de
laborator,
*Mycobacterium
tuberculosis*

Rezumat: Scopul studiului este de a evidenția unele metode medicale care se folosesc în screeningul infecției cu *Mycobacterium tuberculosis*. Pentru aceasta, s-a folosit tehnica investigației radiologice convenționale, mai precis radiografia pulmonară standard, împreună cu anumite teste de laborator. Testul QuantiFERON – TB Gold (In-Tube Method), completează cu succes investigația radiologică, determinând cantitativ γ -interferonul eliberat în plasmă, ca urmare a interacțiunii dintre complexul *Mycobacterium tuberculosis* și limfocitele CD4. S-au folosit din baza de date a dispensarului TBC, al Spitalului de Pneumofiziologie Brașov, câteva imagini radiologice sugestive pentru infecția cu *Mycobacterium tuberculosis*. Privind testul QuantiFERON – TB Gold (In-Tube Method), s-au luat în considerare rezultatele investigației din anul 2009.

INTRODUCTION

Because of the impact of tuberculosis on public health and taking into account the determinant factors in the occurrence of this disease, the people must be imposed protection measures for preventing the occurrence of this disease. (11) These are oriented towards the individual protection measures of every individual. We have taken into account first of all the aspects related to the life style, of the personal hygiene, of the relaxation and rest possibilities intercalated with intense professional activities. (3, 8) If a patient goes to the pulmonology and phthisiology profile specialty services institutions for investigations, in the context of certain symptoms that plead for the occurrence of tuberculosis, we shall carry on certain medical procedures, that may confirm or not the infection with *Mycobacterium tuberculosis*. (2,12) These are represented by the standard pulmonary radiology, bacteriological tests, by taking samples of the cultures in the Lowenstein-Jensen environment and of the bacilloscopy and also of the cutaneous tissue for tuberculin. (1,5,10) The imaging data may be successfully completed by laboratory tests, that may emphasize the presence within the blood of the patients of the INF- γ . (4,7) From this point of view, the QuantiFERON – TB Gold test represents a highly sensitive immune-enzymatic, modern, efficient screening technique of the disease. (6, 9)

THE AIM OF THE STUDY

The study aims at emphasizing certain medical

methods that are used for the screening of the infection with *Mycobacterium tuberculosis*.

MATERIAL AND METHODS

In order to carry on the herein study, we have used the imaging method, standard pulmonary radiography and the QuantiFERON – TB Gold laboratory method. Within TBC Dispensary of the Hospital of Pneumology Brașov, the standard pulmonary radiography is carried on by means of new devices, with rapid screening, by emphasizing and interpreting the radiological images by means of computerized devices, SWISSRAY- ddR model (direct diagnosis Rx.). Also, the modern endowment of the clinical hospital of the laboratory allows us to use new laboratory techniques as the ELISA technique in carrying on the QuantiFERON – TB Gold test.

The laboratory method is based on an immune-enzymatic technique, ELISA (Enzyme-Linked Immunosorbent Assay). This allows the confirmation of an active tubercles form, as in the case of the negative bacteriologic examinations, but that are clinically suggestive, and also for the identification of the latent diseases forms, which are metabolically active.

Without describing the technique of carrying on the QuantiFERON – TB Gold test, we remind you that the aspect of an ELISA plate on which it is carried on the conjugate's pipetting in the wok concentration, that was just prepared, there are the necessary buckets and it is accomplished, by means of a multi-channel pipette.

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The aspect of a complete ELISA plate, in approximately one working hour since the beginning of the procedure, contains a work concentration within all the buckets, the plasmas of the patients, respectively 3 plasma samples for every one: Control Nil, Antigen TB, Control Mitogen and the standards in the 8 green buckets.

The necessary time for carrying on the dosage is otherwise estimated according to the two main stages: the first, of incubation at 37°C of the blood tubes taken of the patient, lasting 16-24 hours and the second, by operating an ELISA plate that is valid in investigating the 28 individuals, that lasts approximately 4 hours.

Taking and subsequently processing the samples for the purpose of carrying on the QuantiFERON-TB Gold test needs special vacutainers.

RESULTS

According to the radiological screening made during each calendar year, the radiological information is stoked in a profile data basis. For this study we have chosen several relevant radiological images, carried on standard pulmonary radiographies (SPR), concerning tuberculosis forms in new cases, found in Braşov in 2009. We discovered cases of mild infections with the Koch bacillus but also advanced forms of the disease, hidden by a non-conclusive symptomatology, which is ignored by patients. The new tuberculosis cases plead for nodularly infiltrated, infiltrative-nodular form, cavitary form and the pleural reaction form. For the latter case the radiological aspect is expressed after the partially evacuated puncture, with hydro-air images, which are suggestive for the loculated pneumothorax. (figure 1, figure 2, figure 3, figure 4).

Figure no. 1. SPR Left Infiltrated apical tuberculosis



Figure no. 2 SPR Left nodular apical infiltrated tuberculosis

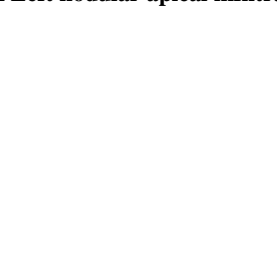


Figure no. 3. SPR Right cavitary tuberculosis



Figure no. 4. SPR Right pleurisy tuberculosis after the puncture



The study was completed by indirect screening methods, by using laboratory tests. The technique used was one of the most modern ones, which are currently used in the clinical laboratory of the Hospital of Pneumology Braşov. This is represented by the immune-enzymatic ELISA (Enzyme-Linked Immunosorbent Assay) method. The data of the laboratory study in 2009, using the QuantiFERON – TB Gold (In-Tube Method) test, successfully completed the radiological screening. The values obtained by means of tests during 2009 were appreciated according to the positive and negative results. For the undetermined tissue variant, we repeated it. We also estimated the results of the QuantiFERON – TB Gold (In-Tube Method) test, concerning the sex distribution, expressed on percentages, as a consequence of the results of the investigations, in 2009. (figure 5, figure 6).

Figure no. 5. Percentage values of the results of the QuantiFERON-TB Gold test

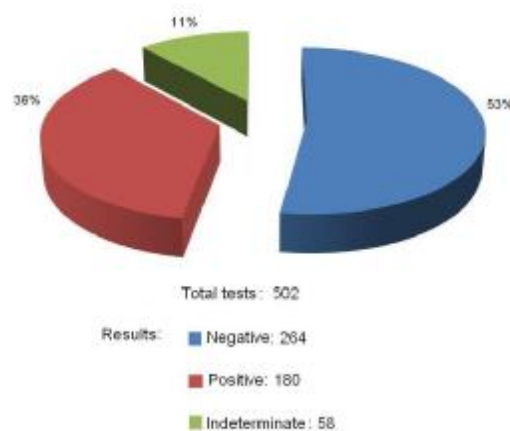
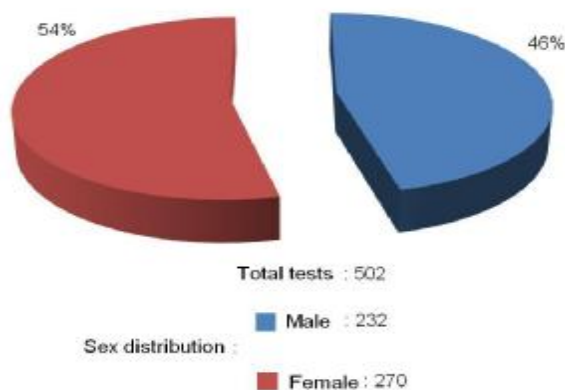


Figure no. 6. Percentage values expressed on sexes of the QuantiFERON-TB Gold test



CLINICAL ASPECTS

DISCUSSIONS AND CONCLUSIONS

The standard pulmonary radiography represents the accessible imaging method to all patients who are susceptible to get different types of pulmonary diseases. From these points of view, this method represents an accessible way, concerning the investigation of an infection by Koch bacillus, both in children and in adults. Also, the radiological screening of the tuberculosis must be completed by a direct bacteriological examination, in culture and also with other laboratory tests. From this point of view, the immune - enzymatic laboratory technique, QuantiFERON-TB Gold represents an indirect test, carried on in order to diagnose the infection with *Mycobacterium tuberculosis*, inclusively as active tuberculosis.

Due to this fact, the results of the test must be corroborated with clinical radiological and bacteriological evaluation aspects.

Tuberculosis represents at present an extended pathology type worldwide. On this basis we took into account the social aspects that occur at the moment of the disease, as migration, decrease of the life level of the population, social, economical and occupational factors that affect the population.

In order to protect the population of such a disease, that is comparable as gravity to the neoplasias or to the HIV infection, we take ample protection measures of public health. For these purposes, at the level of each country, the national control programs of tuberculosis.

Medical screening methods of tuberculosis play a major role in depicting the disease since its initial occurrence stages. These support the patient, by instituting the adequate treatment for the purpose of healing. For this purpose, the patient must cooperate, who must be adherent to the treatment for the rapid healing with minimum or no sequels of the disease. This fact allows the social reintegration of the tuberculosis patient, ignoring the stigmatization idea, given by the infection with the Koch bacillus.

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