ASPECTS OF METHODS FOR DETECTION OF RESISTANCE OF MYCOBACTERIUM FOR TB DRUGS

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Introduction. Resistance today is one of the major characteristics of the epidemic process of tuberculosis (TB) in the world. In the Kharkiv region as a whole in Ukraine, noted a tendency to increase the allocation of multiresistant strains, which amounted to 63.7% of the total array. Among the first-diagnosed TB patients steadily increasing number of drug-resistant forms of the pathogen.

According to reports of mycobacterias resistance the detection rate of resistance pathogen to the main TB drugs in the first-diagnosed TB patients reaches 25%, and in patients with recurrence - 47%, and patients re-treatment - 30%. The above requires the timely correction of medical treatment and treatment according to sensitivity of the pathogen and at first doing tests for sensitivity on time.

Aim. to analyze the methods of determining the resistance of mycobacteria to TB drugs.

Methods. Comparative analysis of direct and indirect methods of determining drug resistance of Mycobacterium tuberculosis (MBT).

Results. Determination of microbial sensitivity to chemotherapy in vitro antibacterial held in conditions that are significantly different from those in which the drug acts in the body. Its results are strongly affected by factors such as the composition and pH of the culture medium, size seeding dose, age, culture, cultivation conditions, etc.

Mediums to determine the sensitivity should be standard and provide optimal conditions for the growth of microorganisms not contain inhibitors of bacterial growth and excessive amounts of stimulants do not contain substances that inhibit the action of antibacterial chemotherapy.

The method of direct determination of drug resistance is that sputum or other clinical material sown directly in media containing extremal concentrations of antibiotics. Among the disadvantages of this method is the inability to standardize the method, the inability to use the specimen with negative result of microscopy, increased risk of contamination, deficient growth of culture that does not give reliable conclusions. Thus, the error rate can be 10-15%.

To indirect method of detect the sensitivity MBT uses pure culture obtained during sowing in groth medium. There are 3 classic cultural methods for detection the sensitivity of mycobacteria to drugs: by absolute concentration, by coefficient of

resistance and by proportions. The method of proportions is well known at present and its generally accepted in Ukraine.

Principle detect sensetivity of micobacteria to drugs by proportions method (Canetti) is in indication the ratio (proportion) between resistant and sensetive bacterias in population of micobacteria to extremal concentration of TB drugs. If the number of individuals resistant to antibiotics in a population of less than 1.0%, a strain considered sensetive to the drug. The method to evaluate bacterial population M.tuberculosis not only as sensitive or resistant, but also distribute it according to the degree of resistance.

Rapid diagnosis of resistance allows the molecular methods, which include polymerase chain reaction (PCR). The methods have their advantages: high specificity, high sensitivity (10-100 cells per 1 ml of sample), the identification of genetic markers of resistans of M.tuberculosis complex, universal procedures for all pathogens, a variety of detection formats.

To speed up the detection of the multydrug-resistunt TB, WHO recommends the use in the laboratory diagnosis of tuberculosis two technological approaches: PCR in real time using the cartridges Cepheid (GeneExpert, USA) and DNA strip technology GenoType® MTBDR (Hain Lifescience, Germany). Technology GeneExpert allow to detect MBT in the same time sensetivity to riphampicin that is one of the most efficient TB drugs. The results can be received through two hours after start assay.

Test GenoType® MTB plus system can detect Mycobacterium tuberculosis resistance to isoniazid and rifampicin, and GenoType® MTBDRsl indicate resistance to fluoroquinolones, ethambutol, aminoglycosides, cycl peptides.

The disadvantage of these methods can be false negative test results. This is due to the presence of a significant number of amplification inhibitors in the experimental samples (blood, pus, enzymes, DNA-polymerase and RNase). The presence of several types of bacteria in the test sample can interfere correct interpretation of the test. False positive results can be caused by using insufficiently specific test systems.

Conclusions. To detection the sensitivity of micobacteria to TB drugs, there are several bacteriological methods. The most common among them there is method of proportions, and several express methods using the equipment for molecular genetic diagnosis. As with other diagnostic tests, PCR results should be interpreted together with the other laboratory results and clinical data. Timeliness diagnosis with use of modern equipment affects at increasing the detection of TB cased by resistant forms of pathogens. Combining traditional and new research methods to optimize and speed up laboratory diagnostics, as well as contributes to the success in the treatment of mycobacterial infections.