

MODERN TECHNOLOGICAL POSSIBILITIES OF ETIOLOGICAL DIAGNOSTICS OF SEPSIS

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Annotation. Sepsis is currently considered to be the result of an uncontrolled systemic inflammatory response (generalized inflammatory response) to the presence of an infection. Diagnosis of sepsis includes the identification of an etiological infectious factor - the identification of the pathogen and the study of its sensitivity to antibacterial drugs, since it is the use of appropriate antibiotics that, *ceteris paribus*, is the key to the final cure of the patient.

Key words: sepsis, bacteriological research, serological method, Mass spectrometry, polymerase chain reaction, identification.

Traditional methods for the etiological diagnosis of sepsis include:

1. Bacteriological research (determination of the type of pathogen, its concentration and the most effective drug for antibacterial therapy);
2. Serological method (detection of antigen and antibodies);
3. Mass spectrometry;
4. Polymerase chain reaction (PCR);
5. Gas chromatography (an express method for diagnosing anaerobic infections).

For clinical practice, the most important information regarding the choice of effective antibiotic therapy is the bacteriological method. Despite significant technological progress in relation to bacteriological studies (use of selective media, automation, accelerated diagnostic panels), the time to establish the type of pathogen and determine its sensitivity to antibacterial drugs takes at best 24- 48 hours. At the same time, from the standpoint of evidence-based medicine, it has been established that every hour of delay in adequate antibiotic therapy in patients with septic shock reduces survival by 7.6% [2,4,10,12].

Modern technologies make it possible to reduce the time of etiological diagnosis and selection of effective antibacterial drugs for the treatment of patients with sepsis to several hours. New technological approaches in the diagnosis of sepsis can be divided into 3 groups:

1. Accelerated determination of sensitivity to antibacterial drugs and an individual

approach to treatment;

2. Accelerated identification of microorganisms and empirical therapy;

3. Combination of the optimal possibilities of 2 approaches (rapid identification and rapid determination of sensitivity to antibacterial drugs) and an individual approach to treatment.

Technologies belonging to the first group make it possible to monitor the growth of bacteria in broths designed specifically for human urine and biological fluids, starting from the moment of inoculation. Mathematical processing of the results of bacterial growth in real time makes it possible to obtain not only a qualitative assessment of the presence / absence of microorganisms in the sample, but also a quantitative assessment of the initial bacterial content in CFU / ml. The result of the study can be obtained within 3-6 hours, and sensitivity to antibacterial drugs can be established within the next 3 hours [13,14,15,6].

The second group of approaches is based on the use of modifications of the mass spectrometry method. The most actively used matrix-assisted laser desorption / ionization (MALDI). The colony material is mixed with an ionizing matrix, then the sample is irradiated with an ultraviolet laser, which ionizes the soluble proteins of microorganisms, which are distributed by mass / charge. Analysis of the mass spectrum of proteins from colonies with a database of spectra collected from known microorganisms using a database program allows you to identify the type of bacteria. Based on the established type of bacteria and analysis of the literature, the most effective antibacterial therapy is determined. Identification of the type of microorganism is carried out within a few minutes. The disadvantage of the method is that it takes time (at least 24 hours) to obtain a pure culture [7,8].

The combination of 2 approaches allows you to establish the type of microorganism in patients with sepsis for a maximum of 6 hours and determine the sensitivity to antibacterial drugs for the next 3 hours [1,3,5,11,9].

Conclusion. Thus, modern technologies make it possible to reduce the time for the etiological diagnosis of sepsis, the determination of sensitivity to antibacterial drugs, and the choice of an individual approach to treatment to one working day of bacteriological laboratory specialists.

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