THE SIGNIFICANCE OF MODERN LABORATORY DIAGNOSIS METHODS IN MEDICINE

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Laboratory studies are considered additional methods and are one of the most important parts of examining the patient.

In a number of cases, laboratory test data are crucial for diagnosis. The results of additional studies largely depend on the correctness of patient preparation. Some studies are conducted on all patients without exception, individual studies are conducted strictly according to indications, depending on the diagnosis.

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In global practice, laboratory testing ranks first among all diagnostic studies in terms of both frequency of use and the volume of information provided. The responsibility and professionalism of personnel also play a significant role [1,2].

But how do you know which laboratory testing methods give the most accurate results? Assessment and comparison of various diagnostic methods are carried out based on the criteria of sensitivity, specificity, and objectivity of the laboratory test.

Sensitivity is the percentage of true positive test results detected in patients with a particular disease. In other words, the sensitivity of the method is the percentage probability of detecting a disease in a patient using a specific test. Methods capable of measuring or detecting the studied property in its minimal quantities possess high sensitivity [2,3,4].

The specificity of the test is determined by the absence of erroneous (false positive) results. That is, the higher the specificity of the method, the greater the probability of confirming that the person is not sick.

Analysis objectivity is the correspondence of the average value of the results to the true value of the measured parameter [4,5,6].

Ideally, all tests should have 100% sensitivity, specificity, and objectivity, but in practice, not every method has such indicators. However, reputable laboratories utilize methods with the highest sensitivity and specificity in their work.

Laboratory examination is carried out in several stages, each of which affects the reliability of the result. The first stage is called pre-analytical [6,7,8].

It includes preparing for analysis, taking biomaterial, transporting it to the laboratory, and preparing samples. It is worth noting that the majority of all laboratory research errors - from 46 to 68% - occur at this stage.

Often, after receiving a referral from the doctor for analysis, we don't realize how important it is to prepare for laboratory tests independently [9,10].

However, there are strict rules that must be known and followed. For example, you must donate blood for biochemistry in the morning hours, on an empty stomach, and stop smoking for at least an hour before the procedure.

On the eve, it is necessary to avoid excessive physical and emotional exertion, refrain from alcohol and taking medications. It is worth coming to the procedure in advance, without rushing and nervousness. We must remember that not only the laboratory but also ourselves are responsible for the accuracy of the result [12].

The next stage of laboratory testing is analytical. It includes pre-collection analysis: adding reagents or dyes to the sample, chemical reactions, incubation, mixing, washing, and other actions with the biomaterial. Then, in most cases, instrumental analysis is carried out using various equipment.

The final stage of each laboratory examination is post-analytical. The attending physician receives the analysis results, interpreting them to confirm the diagnosis, adjust the course of treatment, and prescribe the necessary procedures and medications [1,12].

In what cases is it necessary to undergo laboratory diagnostics? Most often, laboratory examination methods are used to establish and clarify the diagnosis, determine the cause of the patient's condition (in genetic, infectious diseases, poisonings), characterize the form and severity of the disease, choose therapy, select optimal medications, as well as monitor treatment effectiveness and confirm complete recovery [4,5,6].

Moreover, during the entire treatment period, laboratory tests may be required repeatedly.

Laboratory diagnostics in medicine is represented by numerous methods, the number of which is constantly increasing, and the quality is improving.

Let's examine the most frequently used laboratory methods for examining patients in modern medical practice in more detail.

For laboratory testing, biological material is required - human tissues and secretions containing genomic information. Most often, blood, urine, feces, sputum,

tissue punctures, smears, and scraps of mucous membranes and even internal organs are used as biomaterial [7,8,9].

Often, blood is examined in laboratory settings. This biomaterial contains almost all the necessary information about a person, therefore it serves as the basis for dozens of different tests. Each of us has probably taken a finger blood test many times for a general blood test, which is used to determine hemoglobin levels, the number of platelets, erythrocytes, and leukocytes, as well as erythrocyte sedimentation rate (ESR).

For biochemical analysis, blood is taken from the vein. This analysis shows the state of the body's internal systems, the level of hormones, the content of glucose, bilirubin, proteins, amino acids, and other vital elements. Determining the level of various biochemical indicators is required in the diagnosis and treatment of pathologies of the endocrine system, kidney, gastrointestinal tract, cardiovascular system, musculoskeletal system [2,6,8].

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