THE ROLE OF CLINICAL LABORATORY AND PATHOLOGICAL PHYSIOLOGY IN DETERMINING ANTI-NUCLEAR ANTIBODIES (ANK) TITER

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Abstract: Determination of the titer of antibodies against nuclear antigens is important in the diagnosis of autoimmune diseases. This test is used to diagnose various autoimmune diseases, including systemic lupus erythematosus (SLE), rheumatoid arthritis, and other collagenoses, by detecting antibodies produced by the body's immune system against its own tissues. The clinical laboratory plays a central role in conducting tests for autoimmune diseases. Antibody titers and their specific types are determined using methods such as immunofluorescence (IF) and enzyme-linked immunosorbent assay (ELISA). The results of this test allow doctors to assess the patient's prognosis, determine treatment strategies, and monitor the course of the disease. Pathophysiology, on the other hand, helps to understand the mechanisms of autoimmune diseases by studying the causes and development processes of the disease. New diagnostic and therapeutic methods are developed by studying the stages of autoimmune reactions, inflammatory processes in the body, and pathological changes caused by the immune system.

Keywords: Antinuclear antigen antibodies, Autoimmune diseases, Systemic lupus erythematosus (SLE), Scleroderma, Sjogren's syndrome, Mixed connective tissue disease, Dermatomyositis, Polymyositis.

РОЛЬ КЛИНИЧЕСКОЙ ЛАБОРАТОРНОЙ И ПАТОЛОГИЧЕСКОЙ ФИЗИОЛОГИИ В ОПРЕДЕЛЕНИИ ТИРА АНТИТЕЛ ПРОТИВ ЯДЕРНЫХ АНТИГЕНОВ (АНК)

Аннотация: Определение титра антител к ядерным антигенам имеет важное значение в диагностике аутоиммунных заболеваний. Этот тест используется для диагностики различных аутоиммунных заболеваний, включая системную красную волчанку (СКВ), ревматоидный артрит и другие коллагенозы, путем выявления антител, вырабатываемых иммунной системой организма против собственных тканей. Клиническая лаборатория играет центральную роль в проведении тестов на аутоиммунные заболевания. Титры антител и их конкретные типы определяют с помощью таких методов, как иммунофлуоресценция (ИФ) и иммуноферментный анализ (ИФА). Результаты этого теста позволяют врачам оценить прогноз пациента, определить стратегию лечения и контролировать течение заболевания. Патофизиология же помогает понять механизмы аутоиммунных заболеваний, изучая причины и процессы развития заболевания. На основе изучения стадий аутоиммунных реакций, воспалительных процессов в организме и патологических изменений, вызванных иммунной системой, разрабатываются новые методы диагностики и терапии.

Introduction

Today, the widespread prevalence of autoimmune diseases remains one of the pressing problems of medicine. While the normal functioning of the immune system is aimed at protecting the body from various external and internal threats, in autoimmune diseases this system begins to attack its own healthy cells. This leads to the development of various systemic diseases. Early diagnosis of autoimmune diseases is of great importance in their prevention, control of the course and development of effective treatment methods. Determination of the titer of antibodies to nuclear antigens is one of the main laboratory tests in the diagnosis of autoimmune diseases. This test allows you to assess how the immune system responds to its own nuclear structures. The role of the test for autoimmune diseases is invaluable, especially in the diagnosis of systemic lupus erythematosus (SLE), scleroderma, Sjogren's syndrome and other collagen diseases. These laboratory tests are important not only for determining the presence of the disease, but also for monitoring its course and response to treatment. The clinical laboratory plays a central role in determining the titer of ANK. Modern technologies, in particular, immunofluorescence (IF), enzyme-linked immunosorbent assay (ELISA) and blotting methods, provide highly accurate results. Reliable and accurate clinical laboratory analysis results allow doctors to correctly diagnose patients and choose effective treatment methods for them. At the same time, pathological physiology contributes to the improvement of diagnostic and treatment methods by in-depth study of the causes and mechanisms of development of these diseases. Having a complete picture of how autoimmune reactions are formed, what factors provoke the disease and how they affect the body is important for developing disease prevention strategies. The relevance of this study is that autoimmune diseases have a complex pathogenesis, and the accuracy of diagnosis is of great importance for their effective treatment. Studying the role of the clinical laboratory and pathological physiology in determining the titer of autoimmune diseases will serve to further improve the processes of diagnosing and treating these diseases. Therefore, an in-depth analysis of this topic is one of the important directions in the field of modern medicine and diagnostics.

Literature review and method

Antibodies against nuclear antigens are autoantibodies produced by the immune system against various components of the cell nucleus. They are the main biomarkers of autoimmune diseases and are used to diagnose diseases such as systemic lupus erythematosus (SLE), scleroderma, and Sjogren's syndrome. Autoimmune diseases occur when the immune system perceives proteins, DNA, RNA, or other antigens in the cell nucleus as "foreign." This inappropriate immune response causes the body to attack its own healthy cells. Genetic predisposition, environmental factors, viral infections, and hormonal changes are considered factors that influence the development of autoimmune diseases. Autoimmune diseases are divided into several types depending on the type of antigen they bind to. Anti-dsDNA is produced against double-stranded DNA and is mainly associated with systemic lupus erythematosus (SLE). Anti-Smith (Sm) antibodies are specific for SLE and are rarely found in other diseases. Anti-RNP antibodies are associated with mixed

connective tissue diseases. Anti-SSA/Ro and Anti-SSB/La antibodies are found in Sjogren's syndrome and some other autoimmune diseases. Anti-centromere antibodies are associated with scleroderma and CREST syndrome, and anti-topoisomerase I (Scl-70) is associated with diffuse scleroderma. Autoimmune diseases are diagnosed in the laboratory using various methods. Immunofluorescence (IF) microscopy is the main method for diagnosing autoimmune diseases, which detects autoantibodies by visualizing the binding of autoantibodies to nuclear components. Enzyme-linked immunosorbent assay (ELISA) is a specific and sensitive method that allows you to distinguish between different types of autoimmune diseases. Western blot is used to distinguish specific antibodies produced against antigens. An increase in the titer of autoimmune diseases indicates the presence of autoimmune diseases, but autoimmune diseases can also be detected at low levels in healthy people. Therefore, the results of autoimmune diseases should be evaluated in conjunction with clinical signs and other laboratory tests. Autoimmune diseases play an important role in the diagnosis and monitoring of autoimmune diseases, and antibody titers vary depending on the course of the disease.

Antinuclear antigen antibody testing is one of the important laboratory tests for diagnosing and monitoring autoimmune diseases. This test helps to assess the body's immune response to its own cells by detecting autoantibodies produced by the immune system. Autoimmune disease testing is performed using several laboratory methods. Immunofluorescence (IF) is widely used to detect the presence of autoimmune diseases. In this method, blood serum taken from the patient is added to special nuclear substrates and the result is evaluated under a microscope.

Autoimmune diseases play an important role in the diagnosis and monitoring of autoimmune diseases, and antibody titers vary depending on the course of the disease. Antinuclear antigen antibody testing is one of the important laboratory tests for diagnosing and monitoring autoimmune diseases. This test helps to assess the immune response of the body against its own cells by detecting autoantibodies produced by the immune system. Autoimmune disease testing is performed using several laboratory methods. Immunofluorescence (IF) is widely used to detect the presence of autoimmune diseases. In this method, blood serum from the patient is added to special nuclear substrates and the result is evaluated under a microscope. Autoimmune diseases are classified based on different patterns and can be associated with different diseases. Enzyme-linked immunosorbent assay (ELISA) allows for the accurate measurement of the amount of autoimmune diseases. This method is highly sensitive and is used to detect a specific type of autoantibody. Autoimmune disease testing is important in the diagnosis and differential diagnosis of autoimmune diseases. The results of the analysis are used to determine the presence of autoimmune diseases, differentiate them from other diseases, assess the level of disease activity, and monitor the effectiveness of treatment. For example, anti-dsDNA antibodies are characteristic of systemic lupus erythematosus (SLE), and their titer increases with increased disease activity. Anti-centromere antibodies are associated with scleroderma and help determine the form of the disease. The results of the analysis for autoimmune diseases can be positive or negative. A positive result indicates the possibility of an autoimmune disease, but it must be evaluated in conjunction with clinical symptoms and other laboratory tests to make a final diagnosis. In some cases, low levels of autoimmune diseases can be detected even in healthy people, so it is important to interpret the results correctly. The analysis for autoimmune diseases is also used to monitor and assess the

prognosis of the disease. A decrease in the titer of autoimmune diseases during treatment may indicate that the disease has entered a remission stage. An increase in the titer of autoimmune diseases may also be associated with increased disease activity. Therefore, the analysis of autoimmune diseases provides doctors with important information in monitoring the course of the disease and determining the treatment strategy.

The role of pathological physiology

Pathological physiology studies the development of autoimmune diseases and the mechanisms of their effect on the body. The formation of autoimmune diseases in the body is associated with the following pathological processes:

- Autoimmune inflammation - Autoimmune diseases attack the body's own cells and tissues, initiating the inflammatory process.

- Genetic predisposition - In some people, the predisposition to autoimmune diseases may be due to genetic factors.

- Environmental factors - Viral infections, radiation, and exposure to toxic substances can trigger an autoimmune response.

- Immune system dysfunction - The immune system can become inappropriately activated, causing the body to attack itself.

Pathological physiology studies these processes in detail, helping to better understand autoimmune diseases and develop ways to prevent them. Autoimmune disease diagnostics are important in identifying autoimmune diseases, assessing their activity, and making differential diagnoses. This analysis is used to diagnose autoimmune diseases such as systemic lupus erythematosus (SLE), scleroderma, Sjogren's syndrome, mixed connective tissue disease, dermatomyositis, and polymyositis. An increase in the titer of autoimmune diseases may indicate the severity of the disease, for example, a high anti-dsDNA titer indicates an active phase of SLE. Autoimmune disease analysis also plays an important role in assessing the effectiveness of treatment, since a decrease in the titer indicates that the disease is entering remission. This analysis is also used in differential diagnosis to distinguish autoimmune diseases from other inflammatory or infectious diseases. For example, anti-centromere antibodies help distinguish scleroderma from other connective tissue diseases. Diagnosis of autoimmune diseases is carried out using various laboratory methods and is assessed in conjunction with clinical symptoms.

Conclusion

Diagnosis of antibodies to nuclear antigens is one of the important laboratory methods for detecting autoimmune diseases, assessing their activity level and making differential diagnosis. This analysis plays an important role in the diagnosis of autoimmune diseases such as systemic lupus erythematosus (SLE), scleroderma, Sjogren's syndrome, mixed connective tissue disease, dermatomyositis and polymyositis. The results of the analysis of autoimmune diseases are also used to assess the activity of the disease, the dynamics of its course and the effectiveness of treatment. An increase or decrease in the titer of autoimmune

diseases is associated with the clinical course of the disease and provides information about increased disease activity, remission or exacerbation processes. For example, a high titer of anti-dsDNA antibodies is detected in the active phase of systemic lupus erythematosus, while anti-centromere antibodies are associated with scleroderma. Therefore, determining the type and titer of autoimmune diseases is of great importance in determining the prognosis of the disease and developing an individual treatment plan. Autoimmune diseases are diagnosed using various laboratory methods, including immunofluorescence microscopy, ELISA, and Western blot. Each method has its own advantages and requires careful interpretation of the results. If the results of these tests are not evaluated in conjunction with clinical symptoms and other laboratory tests, there is a risk of misdiagnosis. Given the complexity and multifaceted nature of autoimmune diseases, autoimmune disease testing should not be used as the only diagnostic tool, but as a comprehensive assessment of the clinical situation. Properly performed autoimmune disease testing is of great importance for early detection of the disease, monitoring its course, and developing an effective treatment strategy for patients. Therefore, autoimmune disease testing is an integral part of clinical practice related to autoimmune diseases, and its correct use is of great importance for doctors in the diagnostic process.

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