THE IMPORTANCE OF IMMUNODIAGNOSTICS IN THE DIAGNOSIS OF LIVER DISEASES IN MODERN MEDICINE

ЗНАЧЕНИЕ ИММУНОДИАГНОСТИКИ В ДИАГНОСТИКЕ ЗАБОЛЕВАНИЙ ПЕЧЕНИ В СОВРЕМЕННОЙ МЕДИЦИНЕ

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INTRODUCTION

Liver diseases are characterized by etiological diversity and diagnostic complexity. Viral hepatitis, autoimmune hepatitis, cholestatic disorders, drug-induced liver injury, and metabolic liver diseases may present with similar clinical and biochemical manifestations, while their pathogenetic mechanisms differ substantially [1]. One of the main challenges in clinical practice is that hepatic pathology often develops gradually and may remain asymptomatic for a long time. As a result, many patients are diagnosed at advanced stages, when structural and functional liver damage is already pronounced. This significantly reduces the effectiveness of treatment and worsens long-term prognosis [1]. In such conditions, laboratory methods capable of identifying disease-specific immune mechanisms acquire particular diagnostic importance [2].

MAIN PART

Immunodiagnostics is especially important in autoimmune and immune-mediated liver diseases, where the immune system plays a direct role in hepatocellular injury. Among these conditions, autoimmune hepatitis occupies a central place because its diagnosis depends on the integrated interpretation of biochemical, serological, and histological findings [2–4]. Current clinical recommendations indicate that autoimmune hepatitis should be suspected in patients with elevated aminotransferases and/or increased serum IgG after exclusion of competing causes of liver disease [3]. In adults, antinuclear antibodies (ANA) and anti-smooth muscle antibodies (ASMA) are the principal serologic markers, while anti-liver-kidney microsomal type 1 antibodies (anti-LKM1) may also be informative in selected cases [3,4].

The diagnostic value of immunoglobulins deserves particular emphasis. Serum IgG is one of the most clinically meaningful immunological markers in autoimmune hepatitis and is incorporated into simplified diagnostic criteria used in hepatology practice [4]. Increased IgG

levels reflect ongoing immune-mediated inflammatory activity and may support the diagnosis even when symptoms are mild or nonspecific. In practical terms, immunoglobulin profiling improves diagnostic sensitivity and helps clinicians distinguish autoimmune liver damage from viral, metabolic, or toxic etiologies [2–4]. Thus, immunoglobulin assessment is not secondary; it is one of the key elements in modern immunodiagnostic evaluation of liver disease [2,3].

In addition to autoimmune hepatitis, immunodiagnostics is valuable in overlap syndromes and cholestatic autoimmune liver disorders. Overlap conditions, particularly those involving autoimmune hepatitis together with primary biliary cholangitis or primary sclerosing cholangitis, require careful interpretation of serological and clinical data because they often combine features of more than one disease process [5]. In such cases, immunological markers improve diagnostic precision and help determine the dominant pathological component. This is important not only for diagnosis but also for treatment selection, because management approaches may differ depending on whether inflammatory hepatocellular or cholestatic features predominate [5].

At the same time, modern treatment of liver diseases still has several important shortcomings. First, treatment is often initiated late because many liver disorders remain clinically silent in early stages. Second, etiological clarification may be incomplete if immune markers are underestimated or interpreted in isolation. Third, in autoimmune hepatitis, conventional treatment based on corticosteroids and azathioprine remains effective for many patients, but it is associated with a number of limitations, including adverse effects, intolerance, incomplete response, and relapse after dose reduction or treatment withdrawal [3,4]. Therefore, therapeutic success depends not only on drug selection, but also on timely and accurate immunodiagnostic assessment [3].

Another major problem is insufficient individualization of follow-up. In real clinical practice, monitoring is still frequently based mainly on biochemical indicators, whereas immune activity may persist despite partial laboratory improvement. This creates the risk of underestimating inflammatory progression and delaying therapeutic adjustment. Immunodiagnostics can reduce this gap by allowing more refined assessment of disease activity, especially in patients with autoimmune inflammation, recurrent disease, or incomplete remission. From this perspective, immunological markers should be integrated more actively into long-term hepatology management algorithms [2–4].

Thus, the significance of immunodiagnostics in liver diseases extends beyond simple laboratory confirmation. It contributes to early recognition, differential diagnosis, disease stratification, and assessment of therapeutic response. In modern medicine, where precision and early intervention increasingly determine outcomes, immunodiagnostics represents one of the most promising directions in hepatology. Its value is especially evident in conditions where traditional biochemical or imaging methods alone are not sufficient for a confident etiological conclusion [2–5].

CONCLUSION

Immunodiagnostics plays an important role in the modern diagnosis of liver diseases. Its clinical significance is most evident in autoimmune and overlap liver disorders, where immunoglobulins and autoantibodies provide essential information for early and differential diagnosis [2–5]. Among immunological markers, serum IgG has particular diagnostic importance in autoimmune hepatitis and should be considered a core element of clinical

assessment [3,4]. Despite substantial advances in hepatology, liver disease treatment still faces serious challenges, including late detection, relapse, treatment-related adverse effects, and insufficiently individualized monitoring. Therefore, broader and more systematic use of immunodiagnostic methods can improve diagnostic accuracy, optimize treatment strategy, and enhance the long-term prognosis of patients with liver diseases [2–4].

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