

Key Points of Laboratory Diagnostics of Chronic Diffuse Liver Diseases in the Management of Patients

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Annotation: Chronic diffuse liver diseases (CDLDs) represent a significant global health problem due to their progressive course and high risk of complications, including cirrhosis and hepatocellular carcinoma. Timely and accurate laboratory diagnostics play a crucial role in the effective management of patients with these conditions. This abstract highlights the key laboratory parameters essential for the diagnosis, staging, and monitoring of chronic diffuse liver diseases. Core biochemical markers include serum aminotransferases (ALT, AST), alkaline phosphatase, gamma-glutamyl transferase, bilirubin fractions, and indicators of synthetic liver function such as albumin and prothrombin time. Immunological markers, viral serology, and metabolic tests contribute to etiological identification, while non-invasive fibrosis assessment tools and composite scoring systems enhance disease staging and prognosis evaluation. Regular laboratory monitoring allows assessment of disease activity, therapeutic response, and early detection of complications. Integrating laboratory findings with clinical and instrumental data ensures a comprehensive, patient-centered approach, improving outcomes and guiding personalized treatment strategies in chronic diffuse liver diseases.

Keywords: liver, laboratory tests, chronic lesions.

I. INTRODUCTION

The problem of chronic diffuse liver diseases is one of the most pressing in modern gastroenterology. This pathology is becoming increasingly common, especially among people of working age [1, 4]. The main forms of chronic diffuse liver diseases, both in the Russian population and worldwide, include chronic viral hepatitis C and B, alcoholic liver disease (ALD), non-alcoholic fatty liver disease (NAFLD), autoimmune and cholestatic liver diseases, and drug reactions. All of them can progress with the development of severe fibrosis and liver cirrhosis (LC), which inevitably leads to disability [3, 6, 18]. The number of patients with chronic infection with hepatitis B and C viruses in the Russian population is quite high and shows no tendency to decrease: the prevalence of hepatitis C is approximately 7%, hepatitis B 5.3% [7, 10, 14, 19]. According to specialized medical centers, chronic alcohol intoxication is the leading cause of cirrhosis [3–5, 8, 11, 21], NAFLD occurs in 26.1% of patients, including cirrhosis in 3% of patients, steatosis in 79.9%, and steatohepatitis in 17.1% [2]. Often, two damaging factors are present in the same patient, for example, hepatitis C or B viruses and alcohol, cholestatic and autoimmune damage, which is characterized by features of both the clinical course of the disease and treatment. Infection with hepatitis B and C viruses is diagnosed in 52–54% of individuals suffering from alcoholism, while 25–28% of patients with ALD are infected with the hepatitis C virus, and in 25–30% of patients with chronic hepatitis C, the main factor worsening the prognosis of the disease is chronic alcohol intoxication [1, 3, 4, 22]. The incidence of primary biliary cirrhosis and primary sclerosing cholangitis, previously considered rare forms of cholestatic liver injury, is also increasing, according to international and Russian data [1, 8, 14, 15, 18, 23]. This may be due not only to the increasing number of cases but also to improved diagnostic quality. Early detection of chronic diffuse liver diseases and appropriate treatment strategies help prevent potential irreversible consequences. However, in Russia, there is still no unified registry of patients with liver disease. Only certain groups of people undergo prophylactic screening for viral hepatitis, which includes the determination of antibodies to the hepatitis C virus and HBsAg: these include pregnant women seeking medical care and individuals subject to medical examination (in particular, healthcare workers, military personnel, etc.). There is also no regulation for screening for alcohol consumption, high doses of which can lead to harmful somatic consequences, despite this being a particularly pressing issue for our population. Data on the prevalence of liver disease in the Russian population is fragmentary or virtually nonexistent. Therefore, an important task for general medical practice is to identify patients with diffuse liver disease in the early stages of the pathological process and screen risk groups. This will enable timely treatment, active systematic monitoring of the disease, prevention of its progression, and long-term reduction of economic losses to the state.

II. METHODOLOGY

Fifty residents of Samarkand aged 18 to 75 years were randomly selected for a medical examination as part of the "Check Your Liver" project. The social project "Check Your Liver" was organized by the Russian Society for the Study of Liver Diseases to draw people's attention to their health, in particular, to the exclusion of liver pathology. City residents received information about the project from outdoor advertising, brochures, and banners on specialized websites of medical organizations. They then made an appointment at the laboratory for testing certain blood parameters via a multi-line phone. The examination was conducted according to a unified plan, which included: 1) collection of demographic data - gender, height, and weight, followed by calculation of the body mass index (BMI - the ratio of weight in kilograms to height in meters squared); 2) collection of information on professional employment (workers, employees, pensioners, disabled people, housewives, students, healthcare workers, scientists or cultural figures, entrepreneurs, educators, military personnel, etc.); 3) habits (smoking, alcohol, including filling out the CAGE, AUDIT questionnaires), eating behavior - filling out a food

diary, with the help of which the characteristics of the patients' diet were identified; 4) drug history (use of any medications, herbal remedies, dietary supplements over the past 3 months); 5) laboratory tests using screening tests to exclude the most common liver diseases, including: - clinical blood test; - determination of alanine aminotransferase (ALT), aspartate aminotransferase (AST), total bilirubin, direct bilirubin, gamma-glutamyl transpeptidase (GGT), alkaline phosphatase (ALP), triglycerides, cholesterol, glucose; - electrophoresis of blood serum proteins (albumin, alpha1-globulins, alpha2-globulins, beta-globulins, gamma-globulins); - blood test for hepatitis virus markers - anti-HCV, HBsAg. All individuals examined according to the specified plan were examined by a physician and underwent ultrasound examination of the abdominal organs with assessment of the size of the liver, spleen, diameter of the common bile duct, portal and splenic veins. The obtained data were statistically processed and divided according to the following features: • gender – male, female; • age: young (18–44 years), middle (45–59 years), elderly (60–75 years) – WHO classification, 2012; • smoking (smoker, non-smoker); • alcohol consumption (2 points or more according to the CAGE questionnaire – latent alcohol dependence, ≤ 8 points according to the AUDIT questionnaire – moderate alcohol consumption, 8–15 points – the amount of alcohol in the diet should be reduced, >16 points – alcohol abuse or probable alcohol dependence); • BMI (malnutrition 40 kg/m^2); • time interval of main meals (6:00–12:00, 12:00–18:00, 18:00–23:00, 23:00–05:00), number of meals per day (1, 2, 3, 4, 5, 6 meals a day); • markers of hepatitis B and C viruses (anti-HCV and HBsAg) – positive and negative test results. At the next stage, individuals with abnormal liver function tests and the presence of viral hepatitis markers were selected from a total group of 50 people, namely: AST activity above 40 U/L, ALT above 40 U/L, GGT level above 60 U/L, ALP above 170 U/L and total bilirubin above $21 \mu\text{mol/L}$, positive HCVAb and HBsAg results in the blood. These individuals were included in the "suspected liver disease" group, Group A. All of them were given a preliminary diagnosis based on the following criteria. Non-alcoholic fatty liver disease: BMI $\geq 30 \text{ kg/m}^2$, no alcohol abuse (CAGE 2 points, AUDIT >16 points), no ongoing or past 3-month intake of medications and/or dietary supplements, and/or herbal remedies, medicinal herbs, or homeopathic remedies, BMI 1, normal alkaline phosphatase and gamma globulin levels, and a negative anti-HCV and HBsAg test result. Hepatitis C: positive anti-HCV test, increased ALT and/or AST, and/or total bilirubin, and/or GGT levels in combination with de Ritis index 1, normal globulin values, negative HBsAg and anti-HCV test, no systematic alcohol consumption (2 points or more according to the CAGE questionnaire - latent alcohol dependence, < 8 points according to the AUDIT questionnaire - moderate alcohol consumption, 8-15 points - the amount of alcohol in the diet should be reduced, >16 points - alcohol abuse or probable alcohol dependence).

III. RESULTS

The prevalence of diffuse liver diseases in the general population sample ($n=50$) according to preliminary diagnosis was as follows: NAFLD 7.4%, ALD 6.9%, hepatitis C 6.7%, hepatitis B 1.9%, drug-induced liver injury 0.82%, autoimmune hepatitis (AIH) 0.78%, cholestatic liver disease 0.69%, other 5.4%. Of these, 21 individuals were invited for further examination and treatment in the hepatology department. The average age was 47.5 ± 5.3 years; 34.26% were men and 65.74% were women. Based on the complaints presented, anamnesis data, examination, and the results of laboratory and instrumental studies, a final clinical diagnosis was formulated and treatment recommendations were given. Of the 21 patients who sought further examination, 80.1% required pathogenetic and etiotropic therapy, including patients with CHC (89.5%), CHB (22.2%), 5 patients examined with cholestatic liver disease (secondary biliary hepatitis after cholecystectomy, primary biliary cirrhosis), 3 patients with drug-induced hepatitis, with AIH (9), with ALD (3), with NAFLD (2) and with other liver diseases (7), including cryptogenic hepatitis, Gilbert's syndrome, liver dysfunction due to hypothyroidism, hepatitis in a patient with sigmoid colon cancer and liver metastases, and iron overload syndrome. In most cases (80%), prompt treatment of these patients leads to an improved prognosis and quality of life. It follows that

among residents of a large city, abnormal liver function tests (elevated ALT, AST, GGT, ALP, total bilirubin levels above the upper limit of normal, and positive HCVAb and HBsAg tests) occur in 30.6% of cases, with a significantly higher prevalence in men than in women – 49.7% and 25.5%, respectively ($p < 0.001$).

IV. DISCUSSION

Among those with abnormal screening tests, the proportion of those requiring etiotropic and pathogenetic therapy after clarification of the preliminary diagnosis was 80.3%. Given the high prevalence of abnormal liver biochemical test results found in the city's population—nearly every third resident—the need for preventive measures is clear. All individuals with risk factors—age 30 to 59 years (young and middle-aged), male gender, harmful alcohol consumption (>2 points on the CAGE questionnaire, >16 points on the AUDIT questionnaire), hypercholesterolemia, overweight and obesity (body mass index >25 kg/m²), hyperglycemia, hypercholesterolemia, and hypertriglyceridemia—are recommended to undergo outpatient screening of liver function tests to identify potential liver pathology and subsequent referral to specialists for further laboratory and instrumental testing and timely initiation of therapy

V. CONCLUSIONS

If the above risk factors are present, a screening examination should be performed using the following laboratory parameters: ALT, AST, GGT, ALP, total bilirubin, total cholesterol, gamma globulins, HCVAb, and HBsAg. If abnormalities are detected, a thorough medical history should be obtained, including alcohol use (using the CAGE and AUDIT questionnaires), medication use, and transfusion history. The patient's diet and daily physical activity should be determined, which is essential for the differential diagnosis of diffuse liver diseases.

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