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LIVER AFFECTION IN HEMOCHROMATOSIS

Talibdjanova M. Kh.
Tashkent State Medical University, Tashkent, Uzbekistan

Abstract
Hemochromatosis is one of the most common inherited diseases. The prevalence of HFE gene mutations is approximately 1 in 8, and among carriers of the C282Y gene mutation — about 1 in 200. Overall, according to various studies, around 1 million people worldwide suffer from the clinical form of the disease, and approximately 4-5 million are carriers of predisposition to develop hemochromatosis [1]. The prevalence varies significantly across regions: in Northern Europe, the United Kingdom, Ireland, Scandinavian countries, Italy, and France, the carrier frequency of HFE mutations is particularly high. At the same time, in Asian, African, and South American countries, the disease is much rarer, which is associated with a lower frequency of mutations causing hemochromatosis [2].

Introduction

The genetic basis of the disease is associated with mutations in the HFE gene, located on the short arm of chromosome 6 (6p21.3). The most common mutations are C282Y (a cysteine to tyrosine substitution at position 282) and H63D (a histidine to aspartic acid substitution at position 63). Carriers of heterozygous forms usually do not exhibit significant symptoms, whereas the homozygous state C282Y/C282Y is the classic cause of hereditary hemochromatosis [3].

The main mechanism of pathogenesis involves disrupted regulation of iron absorption in the small intestine, leading to excessive entry into the systemic circulation. Persistent iron accumulation in the liver causes its deposition in hepatocytes, Kupffer cells, and the intercellular space, which promotes oxidative stress, damage to cellular membranes and structures, as well as inflammation and fibrosis [4].

The progression of liver damage includes stages: from initial changes with perineuronal iron deposits and hepatocyte hyperplasia to the development of fibrosis and cirrhosis. The mechanisms of fibrosis development involve activation of hepatic glial cells, collagen synthesis, and disruption of parenchymal structural organization. As a result, mature cirrhosis forms, which is a precancerous condition increasing the risk of hepatocellular carcinoma (HCC) [3].

Histological picture in hemochromatosis is characterized by massive hemosiderin deposits in hepatocytes and Kupffer cells, especially in the pericentral zone. In early stages, moderate iron accumulation is observed without significant tissue changes, but as the disease progresses, fibrosis develops, transitioning into cirrhosis. In the liver tissues, peri-sinusoidal and perineuronal zones with intense iron accumulation are noted, along with signs of portal hypertension — expansion of portal veins, formation of portosystemic shunts, esophageal and gastric varices [4].

In early stages, liver damage in hemochromatosis may be asymptomatic or have mild manifestations. As the disease progresses, signs of portal hypertension appear: ascites, esophageal

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and gastric varices, hemorrhoids, splenomegaly. Patients may experience fatigue, discomfort in the right hypochondrium, and dyspepsia.

Laboratory studies include measuring ferritin levels (increased over 300 mcg/L in men and 200 mcg/L in women), transferrin saturation with iron (>45%), as well as liver enzyme indicators (ALT, AST, alkaline phosphatase). Liver biopsy with iron content assessment via Bulyer method or spectroscopy allows for quantitative determination of iron overload and fibrosis stages [5].

Modern imaging techniques, such as magnetic resonance imaging (MRI) with specialized protocols, enable non-invasive assessment of iron deposition in the liver. This is particularly important for monitoring treatment effectiveness and the extent of damage without the need for biopsy [6].

The primary goal of treatment is to reduce iron stores and prevent the progression of fibrosis and cirrhosis. In cases of severe liver damage, especially with significant fibrosis or cirrhosis, the use of hepatoprotectors, antifibrotic agents, and correction of associated conditions is recommended. Early diagnosis and treatment can significantly reduce the risk of complications such as portal hypertension, ascites, bleeding, and hepatocellular carcinoma. Regular monitoring of ferritin levels, liver function, and ultrasound examination allows for timely detection of disease progression [7].

Prevention includes early detection of HFE gene mutation carriers, especially among individuals with a family history of hemochromatosis. Genetic screening and mass testing help detect the disease at early stages and prevent severe complications. An important aspect of prevention is informing patients about the importance of a diet rich in iron, as well as avoiding factors that promote iron accumulation (alcohol, toxic substances) [8].

References

1. Bacon BR, Adams PC, Kowdley KV, et al. Hemochromatosis: Etiology, clinical features, and management. Hepatology. 2011;54(1):328–343.
2. Pietrangelo A. Hereditary Hemochromatosis: Pathogenesis, diagnosis, and management. Gastroenterology. 2015;149(4):E16–E32.
3. Gurrin LC, Ames RW, Burton JL, et al. The genetics of hereditary hemochromatosis. Hematol Oncol Clin North Am. 2017;31(2):319–341.
4. Kowdley KV. Iron overload in chronic liver disease. Hepatology. 2016;64(2):574–585.
5. Bersucic A, Bilić-Zulle L, Bilić-Zulle B. Diagnostic approaches in hemochromatosis. J Clin Med. 2020;9(3):735.
6. Wood JD, Muir AJ. Modern imaging in hereditary hemochromatosis. Curr Opin Gastroenterol. 2018;34(3):162–167.
7. Tandon P, Tsochatzis E, Lopez A, et al. Management of iron overload: A comprehensive review. Hepatol Int. 2019;13(4):407–418.
8. Brissot P, Ropert M, Le Lan C, et al. Non-transfusional iron overload. J Hepatol. 2012;56(6):1153–1160.

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