ANATOMY OF PATHOLOGICAL CHANGES IN THE LIVER UNDER THE INFLUENCE OF ALCOHOL

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Annotation: This scientific article is about the anatomy of the pathological changes that occur in the liver under the influence of alcohol, and today, as a result of the researches of the specialists of the Health System, the symptoms of serious damage to the liver caused by the consumption of alcohol have been revealed. Specifically, more than 90% of all heavy drinkers develop fatty liver, 25% develop alcoholic hepatitis, and 15% develop cirrhosis. In the early stages, alcoholic fatty liver disease, i.e. fatty liver, later leads to alcoholic hepatitis, and in the final stages, liver cirrhosis.

Key words: fatty hepatosis, hepatitis, cirrhosis, neutrophil, leukocyte, fibrosis.

Instruction: Alcoholic liver disease, also called alcohol-related liver disease, is a term that includes manifestations of the liver caused by excessive alcohol consumption, including fatty liver, alcoholic hepatitis, and chronic hepatitis with fibrosis or cirrhosis of the liver. This is the main cause of liver disease in Western countries. Although steatosis (fatty liver) develops in anyone who consumes large amounts of alcohol over a long period of time, this process is temporary and reversible. More than 90% of all heavy drinkers develop fatty liver, 25% develop alcoholic hepatitis, and 15% develop cirrhosis.

Alcoholic liver disease (ALD), also called alcoholic liver disease (ARLD), is a term that includes liver manifestations of excessive alcohol consumption, including fatty liver, alcoholic hepatitis, and chronic hepatitis. fibrosis or cirrhosis of the liver.[1] This is the main cause of liver disease in Western countries. Although steatosis (fatty liver) develops in anyone who consumes large amounts of alcohol over a long period of time, this process is temporary and reversible. More than 90% of all heavy drinkers develop fatty liver, 25% develop alcoholic hepatitis, and 15% develop cirrhosis. [1] Currently (2010) known risk factors are:

Chronic alcohol consumption causes 3 types of liver damage, resulting in:

1. Fatty hepatosis, i.e. fatty liver
2. Alcoholic hepatitis
3. Cirrhosis of the liver

Each of these types of damage can be just one type of alcohol-related liver disease, or they can occur together. Fatty change or steatosis, accumulation of fatty acids in the liver cells. These can be seen under the microscope as fat globules. Alcoholism causes the development of large fat globules (left-vesicular

steatosis) throughout the liver and may appear after several days of heavy drinking.[3] Alcohol is metabolized by alcohol dehydrogenase (ADH) into acetaldehyde, then metabolized by aldehyde dehydrogenase (ALDH) into acetic acid, and finally oxidized to carbon dioxide and water. This process produces NADH and increases the NADH/NAD+ ratio. A high concentration of NADH induces fatty acid synthesis, while a decrease in NAD levels leads to a decrease in fatty acid oxidation. Then, the high level of fatty acids signals the liver cells to combine it with glycerol to form triglycerides. These triglycerides accumulate and result in fatty liver.

Fatty hepatosis is characterized by the fact that it passes without symptoms and is reversible. Hepatocyte necrosis and inflammatory processes are characteristic. The clinical course resembles viral or toxic hepatitis. Necrosis of hepatocytes is repeated over and over again, and then fibrosis is formed, which can lead to cirrhosis if it is not related to alcohol. Alcohol-related cirrhosis can develop without the presence of alcohol-related hepatitis. It should be mentioned that the number of people suffering from alcohol-related cirrhosis tends to increase in recent years. In the early stages of alcoholism, hepatosis is observed in the liver section, which does not differ from the initial stage of fatty dystrophy. But in chronic alcoholism, the liver increases in size and weighs 4-6 kilograms, the liver becomes soft, turns yellow and looks like fat. [1] During the observation of micropreparations, hepatocytes of the centrolobular region are prevented from being filled with fat, then the cells of the entire liver lobe are completely filled with fat, the nucleus of hepatocytes is transformed into lipocytes located in the periphery, as the fat accumulates, the membranes of the cells that stick to each other are destroyed and fatty acids are released. was found to have formed. The main morphological signs of alcohol-related hepatitis are: swelling and necrosis of hepatocytes, neutrophilic reaction in and around the necrotic area, appearance of alcohol-related hyaline-Mallori bodies in damaged hepatocytes. [1] Alcoholic hepatitis is characterized by inflammation of hepatocytes. Between 10% and 35% of heavy drinkers develop alcoholic hepatitis (NIAAA, 1993). Although the development of hepatitis is not directly related to the dose of alcohol, some people seem to be more prone to this reaction than others. This is called alcoholic steato-necrosis, and inflammation appears to predispose the liver to fibrosis. Inflammatory cytokines (TNF-alpha, IL6, and IL8) are believed to be important in the initiation and perpetuation of liver injury, causing apoptosis and necrosis. One possible mechanism for increased TNF-α activity is increased intestinal permeability due to liver disease.

This facilitates the absorption of endotoxin produced in the intestine into the portal circulation. Hepatic Kupffer cells phagocytose endotoxin and stimulate the release of TNF-α. TNF-α then triggers apoptotic pathways through the activation of caspases, resulting in cell death.[4] It was observed that these changes first started around the central veins and then spread to the entire centrolobular area, the necrosis of liver cells led to the start of an inflammatory reaction consisting mainly of neutrophils, and among the neutrophils there were lymphocytes and macrophages. Perivenular centrolobular sclerosis is known to cause the onset of portal hypertension, and if alcohol consumption continues, this process can cause recurrent alcoholic hepatitis. In response to necroses, inflammation and fibrosis, alcohol leads to cirrhosis.

Cirrhosis is a late stage of serious liver disease characterized by inflammation (swelling), fibrosis (hardening of cells), and damage to membranes that prevent the body from detoxifying chemicals, resulting in scarring and necrosis (cell death).[3] Between 10% and 20% of heavy drinkers develop cirrhosis (NIAAA, 1993). Acetaldehyde may be responsible for alcoholic fibrosis by stimulating collagen deposition in hepatic stellate cells.[4] The production of NADPH oxidase and/or derived oxidants cytochrome P-450 2E1 and the formation of acetaldehyde-protein adducts damage the cell membrane.[4]Symptoms include jaundice (yellowing), liver enlargement and damage pain and tenderness from structural changes in liver architecture. Without complete abstinence from alcohol consumption, cirrhosis eventually leads to liver failure. Late complications of cirrhosis or liver failure include portal hypertension (in high blood pressure due to increased resistance to flow through the damaged liver through the portal vein), blood coagulation disorders (due to impaired production of clotting factors), ascites (due to accumulation of fluid in the tissues of the abdominal cavity). ir swelling) and other complications, including hepatic encephalopathy and hepatorenal syndrome. Cirrhosis can be caused by other causes besides alcohol abuse, such as viral hepatitis and heavy exposure to toxins other than alcohol. The late stages of cirrhosis may appear clinically similar regardless of the cause. This phenomenon is called the "last common pathway" for the disease. Fat changes and alcoholic hepatitis can be reversed by abstinence. Later stages of fibrosis and cirrhosis become irreversible, but can usually be maintained for a long time. Alcoholic cirrhosis is the final and irreversible type of liver damage from alcohol, which develops in 17-30 percent of cases. Later, the surface becomes oil-like and has a micronodular (small nodule) structure when cut. The diameter of these nodules reaches 1-3 mm. The

liver slightly enlarges in the front and keeps its surface smooth, it is distinguished by its rust-brown color. The surface of the sebaceous gland is similar to oil and has a micronodular texture when cut[1]. Alcohol is metabolized in the liver mainly in 3 ways:

1. With the help of the primary alcohol dehydrogenase enzyme
2. With the help of the microsomal oxidation system
3. With the help of the catalase system.

Alcohol is oxidized to acetaldehyde using alcohol dehydrogenase. Aldehyde damages liver cells both by binding to oxides through a covalent bond and by oxidizing lipids in cell membranes to peroxide. The pathological anatomy of liver cirrhosis consists of a combination of dystopia, regeneration, connective tissue development, reconstruction and deformation processes. In the reconstruction of the liver, all its components: the location of cells in the lobes, the structure of the lobes, liver vessels, and connective tissue are reconstructed.[2] As the fibrous tissue that appears instead of lipocytes grows, its brown color (due to the decrease in the amount of fat in it) takes on a brown tint. In some late periods, some large (up to 1 cm) nodules appear throughout the parenchyma due to regenerative processes in hepatocytes. Fibrous tissue eventually leads to the onset of macronodular cirrhosis, which resembles postnecrotic cirrhosis. In this case, the liver does not swell and the weight remains light. Microscopically, the first stage of nodular cirrhosis is characterized by the appearance of a small number of thin fibrous barriers connecting the portal zone with the central veins.

Each part of the liver is surrounded by fibrosis and is very clearly visible. The growth of fibrotic tissue and regenerative processes lead to a violation of the architecture of the liver. As the process progresses, more and more fibrous tissue grows. The remaining liver cells contain lipocytes. The portal and central veins remain in the fibrous tissue. The parenchyma between the central veins disappears. Smaller lymphoid infiltrates can be seen in the fibrous tissue, reactive proliferation started in the bile ducts. Microscopically, alcoholic cirrhosis in such cases resembles post-necrotic cirrhosis. The nature of the cells that initiate fibrogenesis in the liver is unknown. It is known that fibrous tissue first appears in the centrolobular part of the liver. Collagen is thought to be secreted by myofiblasts, which are normally present in the subendothelial part of central veins and are increased in chronic alcoholism. According to another point of view, the Ito cells found in the space of Disse are important in the formation of fibrous tissue. In the early stages of alcohol-related liver disease, fat

accumulates in the Ito cells. Later, fat disappears and Ito cells turn into fibroblasts.

Conclusion: In this scientific article, conclusions were made about the anatomy of the pathological changes that occur in the liver under the influence of alcohol. Specifically, more than 90% of all heavy drinkers develop fatty liver, 25% develop alcoholic hepatitis, and 15% develop cirrhosis. Data were collected and analyzed that alcoholic fatty liver disease in the early stages, i.e. fatty liver, later leads to alcohol-related hepatitis, and liver cirrhosis in the late stages.

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