

## Morphofunctional Characteristic of the Liver of Patients in Normal and at Different Stages of Alcohol Lesion

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**Abstract:** A morphology and function examination of the liver of patients at different stages of alcoholic lesions was carried out. A reduction in the average area of hepatocytes and their nuclei at the stage of hepatitis and an increased nuclear-cytoplasmic ratio in patients with cirrhosis were established. A toxic liver disease leads to the accumulation in this organ of pigment lipofuscin and the reduction of the enzyme activity of succinate dehydrogenase and cytochrome oxidase. The biochemical study of blood serum of patients showed an increase in the activity of alanine aminotransferase, aspartate aminotransferase, gamma glutamyl transpeptidase, total bilirubin and a decrease in the level of total cholesterol.

**Keywords:** liver, alcohol, morphology, biochemistry.

**Introduction.** In recent years, liver diseases have become an increasingly important factor in the mortality structure among people of the most active age. Alcoholism has no geographical boundaries. People all over the world continue to drink alcohol, causing irreparable harm to their health [1–5]. In addition to high morbidity and mortality, chronic liver diseases lead to significant economic losses associated with treatment, rehabilitation, and supportive therapy of this category of patients [6]. An analysis of literary sources indicates that data on energy metabolism disorders in alcoholic liver disease have not been sufficiently studied and are sometimes contradictory. There is also little information on the dynamics of cytomorphometric indices of hepatocytes in this pathology. Questions about the progression of fibrosis as a prognostic marker of fatal complications and methods for correcting such disorders remain unresolved. [7]. No single opinions on volume, which method follows use at assessment dynamics of fibrosis development against the background of chronic liver diseases [8]. Many researchers who studied flow fibrosis liver on background various schemes treatments, they think, What system Knodell as a test to assess the development of a process over time, it is uninformative [9, 10]. IN That same time quantitative morphometry With application specific methods coloring The analysis of liver tissue preparations for fibers that are part of fibrous tissue has a higher sensitivity and better reflects the changes occurring before and after treatment [8].

**The aim of this study** is to investigate the morphofunctional characteristics of the liver of patients in normal conditions and at various stages of alcohol damage.

**Materials and methods of the study.** The work was performed on the material of intravital puncture liver biopsies of patients with clinical, laboratory and morphological signs of chronic hepatopathy, who were in the UZ "regional clinical hospital". All patients underwent percutaneous liver trephine biopsies on an empty stomach (always at the same time) and the same time of day - from 10:00 to 11:00, under ultrasound control using SDU-500A devices from Shimadzu, equipped with linear and convex sensors with a frequency of 3.5-5.0 MHz. To obtain liver "columns" up to 21 mm long, Quick-Cut 14-16G needles and an automatic Bard 14G device were used. In addition, autopsy material from patients with chronic alcohol intoxication was studied. The size and fixation of the removed liver fragments were determined in accordance with the Rules of the UZ "regional clinical pathoanatomical bureau" (order Ministries health care Republics Uzbekistan No. 111 from 17.06.1993 G.). The criteria for selecting patients in the alcohol abuse group were a history of

regular alcohol consumption and clinical and biochemical test data. In the hospital, patients underwent a biochemical blood test, including the determination of alanine aminotransferase (ALT, U/l), aspartate aminotransferase (AST, E/l), gamma-glutamyl transpeptidase (GGTP, E/l), general cholesterol (mmol/l) and total bilirubin ( $\mu\text{mol/l}$ ). Liver material from relatively healthy individuals was used as a control. people (biopsies liver persons, directed military registration and enlistment offices For exceptions pathology, and persons who died from causes not directly related to liver pathology), in which there were no morphological, clinical and biochemical signs of liver damage.

The patients were divided into 4 groups: 1st – individuals with relatively normal parameters ( $n = 11$ , 6 men and 5 women); 2nd – patients with alcoholic steatosis ( $n = 12$ , 7 men and 5 women); 3rd – individuals with alcoholic hepatitis ( $n = 12$ , 6 men and 6 women); 4th – patients With alcoholic cirrhosis ( $n = 15$ , 5 men and 10 women). Total researched material from 24 men and 26 women aged 22 to 65 years.

For morphological research used next methods:

1. General histological: hematoxylin staining and eosin [11].
2. Histochemical methods. In unfixed liver sections of about  $10\ \mu\text{m}$  thickness, prepared on a microtome-cryostat HM525 (Germany) from material frozen in liquid nitrogen, studied activity succinate dehydrogenase (SDG; KF 1.3.99.1) By method Nakhlasa with nitro-ST and cytochrome oxidase (CHO; CF 1.9.3.1) according to the Burston method. Preparation of dyes, buffer solutions and staining of preparations were carried out in accordance with the prescriptions given in the manual [12]. Carrying out histoenzymological reactions to control the specificity of histochemical detection of enzymes was carried out using controls, included inactivation enzymes high temperature ( $+80\ ^\circ\text{C}$ ) and carrying out reactions without substrates. In both controls, a negative reaction was observed in cells possessing the corresponding enzymatic activity. Lipofuscin was detected in paraffin-embedded liver samples [13].
3. A special method for detecting connective tissue according to Mallory in his own modification [14].

For morphometric assessment of the content of SDH, CHO, lipofuscin and connective tissue The method of semi-quantitative computer analysis of the results was used for the tissue analysis. Using the Image Scope Color image analysis software, the percentage of the area of the total section area occupied by SDH, CHO, lipofuscin and connective tissue, respectively, was calculated. fabric. WITH this purpose produced microphotography random fields of vision histological preparations with an OLYMPUS XC 30 digital camera based on an OLYMPUS BX 51 microscope (Japan) at 200-fold magnification in at least 10 fields of view in each histological section. The average area of hepatocytes ( $S_g, \mu\text{m}^2$ ) and their nuclei ( $S_n, \mu\text{m}^2$ ) was determined. By determining the difference between  $S_g$  and  $S_n$ , the area of the cell cytoplasm was obtained, after which the nuclear-cytoplasmic ratio (NCR) was calculated. Cytomorphometry was performed at 600-fold magnification.

Statistical data processing and plotting of diagrams were performed using the licensed computer program Statistica 10.0 Advanced (Russian version). Since the number of patients in the groups did not exceed 50, the Shapiro–Wilk criterion [15] was used to determine the normality of the frequency distribution, the data of which corresponded to the results of the criterion Lilliefors. The influence of the stage of alcoholic liver disease and the sex of patients on the considered feature was studied using parametric two-factor analysis of variance [16]. When processing data using parametric statistics on the reliability of differences judged By  $t$ -criterion Student, A statistical data presented as means and corresponding confidence intervals (M (95% CI: j–q)). When processing data using nonparametric statistics, the Mann–Whitney  $U$  test was used. Data presented V view medians and meanings 15–85th percentile (Me (15%; 85%)). Differences were considered statistically significant at  $p < 0.05$ .

**Results and discussion.** *Morphological and biochemical features of the liver in normal patients.* The liver is a parenchymatous lobulated organ. Its stroma is represented by Glisson's capsule and layers of loose fibrous irregular connective tissue (LFICT), which divide the organ into lobules. In normal humans, interlobular LFICT is poorly expressed, as a result of which the lobules are not clearly defined. Directly under the capsule there is a layer of hepatocytes forming the external border plate. From the porta hepatis, this layer of hepatocytes, plunging into its depth, accompanies the branching portal vein and hepatic artery and is located between the connective tissue of the portal tracts and the parenchyma, forming the internal border plate from one row of hepatocytes. The structural unit of the liver is a lobule.

Currently, three models of structural units of the liver are considered: the classical, portal lobule and acinus. These models do not exclude each other, but reflect only different aspects of the structure and function of the liver. The classical lobule on histological preparations has the form of a hexagon ( hexagonal lobule), in the center of which is the central vein, and at the corners are portal tracts that contain branches of the portal vein, hepatic artery and bile duct, as well as nerves and lymphatic vessels. Hepatocytes are the main type of liver cells that perform its main functions. They are organized into hepatic beams, emanating radially from the central vein.

Hepatocyte contains set organelles: granular and agranular endoplasmic networks, mitochondria, Golgi complex , lysosomes, peroxisomes And centrioles . In the liver cell , depending on the daily rhythm, functional state and nature of nutrition , inclusions of glycogen are found And lipids. Except hepatocytes There are other cells in the liver: endothelial cells , liver macrophages, lipocytes (Ito cells), Pit cells [17, 18].

The results of this study showed that What histological paintingliver patients 1st groups V generally corresponds criteria norms During cytomorphometric studies it was revealed that the average area of hepatocytes in men was 484.66 (372.33; 667.84)  $\mu\text{m}^2$  · in women – 495.40 (377.68; 669.97)  $\mu\text{m}^2$  · Hepatocytes had a polygonal shape, their borders were clearly distinguishable, and the cytoplasm was homogeneous . On histological preparations stained with hematoxylin and eosin, hepatocytes were clearly divided into light and dark cells, and a sinusoidal And biliary (between neighboring hepatocytes) poles. Nuclei were located in the center of liver cells, but sometimes shifted to their periphery. Their shift to the sinusoidal pole is considered a sign of cell regenerative activity [18]. Cell nuclei varied in size and shape, most often having a regular round shape, but ellipsoid nuclei were not uncommon. According to the results of the present study, the average nuclear area was 58.58 (45.07; 80.95)  $\mu\text{m}^2$  in men and 61.20 (46.48; 77.87)  $\mu\text{m}^2$  in women · The nuclear- cytoplasmic ratio in both men and women was 0.13 (0.12; 0.16).

The content of connective tissue in the liver of relatively healthy patients was small . The results of the study showed that the percentage of connective tissue area from the total section area in both men and women was 2.00 (1.00; 3.00). On histological preparations, it was detected mainly around the portal tracts, to a lesser extent - around the perilobular vessels.

**Conclusion.** The obtained data on the nature of pathological changes in the development of toxic liver cirrhosis in patients at various stages of alcohol damage can be used in the search for ways to correct them.

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