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THE MORPHOFUNCTIONAL CHANGES IN INTERNAL ORGANS DURING ALCOHOL INTOXICATION

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Absract: *The study addresses the dynamic morpho functional changes in internal organ sand acute alcohol in toxic ationinrats. After a sing leintragastricadministrationofvariousdosesofethanol, them or phologicalc hangesin the liver, were evaluate devery30 day sduringsixconsecutive hours.Data showed tha tmanifestation and sever it yo fpatho logical changesinmorphologyofinternalorgansandvaluesofanumberofbiochemicalindicatorsdependedonalcoholdos eandexposuretime.Morphologicalchangesthatreflectedtoxiceffectofalcoholdevelopedin parallel and wereinterrelated.*

Keywords: *morphological changes in liver alcohol intoxication.*

Introduction: In recent years, against the background of a sharp increase in the total number of chronic poisonings, there has been a significant increase in the number of intoxications caused by the use of alcoholic beverages [3, 11]. At the same time, expert practice steadily indicates an increase in the number of cases of various types of death due to alcohol intoxication [6, 8, 9].In this regard, a particularly important task for forensic medical examination is the development of objective criteria for the post-mortem diagnosis of acute alcohol intoxication, not only as a cause of death, but also as a concomitant and / or background condition.In their practical activities in diagnosing alcohol intoxication, forensic medical experts use the data given in the “Methodological Guidelines on Forensic Medical Diagnosis of Fatal Ethyl Alcohol Poisoning and Mistakes” issued under the supervision of the chief forensic expert of the Ministry of Health. Along with this, there is an integrated approach to the diagnosis of fatal ethanol poisoning with the obligatory consideration of tolerance to it. It is recommended to use a combination of macroscopic and microscopic morphological features as criteria for such a diagnosis [4, 5, and 10].

The purpose of the study: to assess the morphofunctional changes in the liver in the dynamics of alcohol intoxication.

Material and methods

The study was carried out in the laboratory of the Department of Anatomy and Clinical Anatomy (OHTA). The object of the study were sexually mature (at the age of 3 months, 6 months) outbred white male rats weighing 250–280 g (n=20). The control group consisted of 10 intact male rats. The choice of this type of laboratory animals is primarily due to the possibility of extrapolation of alcohol-induced organ and tissue changes in rats to those in humans.

In addition, this was facilitated by the morphophysiological features of outbred white rats (lack of aversion to ethanol, the absence of a gag reflex to its action, the constant filling of the stomach with

food), the simplicity of maintenance and the ease of performing various procedures with them (fixation, the introduction of solutions of substances using a probe, etc.). d.). Animals were kept in cages with sawdust, 5 animals each, at a temperature of +20–22°C with free access to water and food, the same for all rats.

The experiment was carried out in the autumn period from July 2021 to September 2021. The day before the experiment, the animals were deprived of food. To study alcohol intoxication, 40% ethanol solution was injected intragastrically through a probe into rats at the rate of 2, 4, and 8 ml of 100% ethanol per 1 kg of animal weight. A single injection of ethanol to each animal was performed from 9 to 10 am. The rats were taken out of the experiment within 6 hours with an interval of 1 hour by decapitation under ether anesthesia.

At autopsy, the organs were isolated as a single organ complex, followed by weighing of each organ and a visual assessment of their condition (presence of signs of alcohol intoxication). The material for the histological study was liver fragments taken at autopsy from experimental animals.Organ fragments were fixed in neutral 10% formalin, standard paraffin wiring was performed, followed by staining of the resulting sections with hematoxylin and eosin. Microscopic examination was carried out on a standard binocular microscope.

When assessing the morphological changes in the liver, we took into account such criteria as the degree of dystrophic changes in hepatocytes, the severity of lipofuscinosis, the severity of necrosis, focal and diffuse infiltration, the degree of blood filling of the vessels, the presence of bile pigments, the severity of fibrosis and cholestasis.

Results and discussion: As a result of the microscopic examination carried out during the experiment, the following results were obtained. Chronic alcohol intoxication caused by the administration of ethanol at doses of 2, 4 and 8 ml/kg led to morphological changes reflecting the destructive effect of ethanol on the liver. This was manifested by focal mononuclear and lymphocytic infiltration, blood filling of the vessels of a high degree, as well as necrotic changes in the cells of the liver parenchyma.

These changes were recorded as early as 30 days after the introduction of alcohol, and their severity was higher with an increase in the dose of ethanol administered. Chronic alcohol intoxication caused by the introduction of ethanol at a dose of 8 ml/kg led to the formation of dystrophic changes in hepatocytes (the appearance of lipofuscin inclusions and increased development of lipofuscinosis with an increase in the duration of alcohol intoxication).

Diffuse lymphocytic infiltration of various structural and functional sections of the liver turned out to be mild, regardless of the dose of ethanol administered and the duration of exposure. Signs of the phenomena of cholestasis in the process of studying fragments of liver tissue were not noted in any individual.

The results of our study also showed that in the dynamics of alcohol intoxication, hepatocytes from different zones of the liver acinus enter into response. With alcohol intoxication caused by intragastric administration of a 40% ethanol solution at doses of 2 and 4 ml/kg of body weight, fatty vacuoles and lipofuscin granules were found in the cytoplasm of hepatocytes. Non-crotic cells of the liver parenchyma were located mainly in the centrilobular zone of the acinus.

With the introduction of ethanol at a dose of 8 ml/kg, hepatocytes with signs of alteration and necrosis were detected to a greater extent in the centrilobular and intermediate zones of the acinus. An increase in the functional load on the liver of experimental animals during alcohol intoxication led to the formation in it of single small lipofuscin granules in the peripheral zones of the cytoplasm of hepatocytes, in comparison with the control group.

But the experimental groups differed in the time of registration of the presence of lipofuscin granules: at a dose of ethanol of 2 ml/kg of body weight, lipofuscinosis was recorded by 4 hours of exposure, at a dose of 8 ml/kg of body weight - by 2 hours, and at a dose of 4 ml/kg of body weight - 1 hour after the start of the ethanol intoxication experiment. Primary granules of lipofuscin appeared perinuclearly in the zone of the most active metabolic processes. Intoxication with ethanol at doses of 2, 4 and 8 ml/kg revealed a statistically significant positive correlation ($r=0.43–0.49$; $p<0.05$) between the severity of lipofuscinosis and fatty degeneration of hepatocytes.

Conclusion: Thus, based on the data obtained as a result of an experimental study, it follows that chronic alcohol intoxication caused by repeated administration of ethanol leads to the development of morphological changes in the liver tissue, indicating the toxic and destructive effects of ethanol. These toxic and destructive changes at the cellular, tissue, and organ levels were characterized by varying degrees of severity, directly dependent on the dose of ethanol administered, the concentration of alcohol in the blood, and the duration of alcohol intoxication.

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