ANALYSIS OF PATHOGENETIC FEATURES OF HEPATITIS AND LIVER CIRROSIS AT THE ACTION OF DYSENTERIAL TOXIN

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Abstract*. Chronic intoxication white rats by intravenous administration of the toxin causes dysentery in animals within 2-4 months the development of cirrhosis. A particularly intensive development of cirrhosis observed while applying dysentery toxin and very small doses of heliotrope containing hepatotoxic alkaloids. According to the authors, the research results are considered as evidence of the etiological role of chronic toxic infectious intestinal diseases in the development of cirrhosis.*
Keywords*: hepatitis; cirrhosis; dysenteric toxin; heliotrope; alkoloid*

The etiology and pathogenesis of hepatitis and cirrhosis of the liver is one of the most important problems of modern medicine. The reasons for the transition of liver lesions to a chronic state, that is, the processes of progression of acute hepatitis, their “self-development” with the transition to chronic forms and outcome in cirrhosis have recently become the object of immunological research. Liver cirrhosis can develop as a result of various infectious and toxic effects on the body, but the leading role in the development of the disease is given to epidemic hepatitis and alcohol. Although the role of other factors is present and taken into account, in approximately 30% of patients the cause of cirrhosis cannot be determined. Clinical and experimental observations give reason to assume that chronic infectious-toxic intestinal diseases (enterocolitis, “chronic dysentery”, fermentative and putrefactive dyspepsia, nonspecific ulcerative colitis, etc.) can be of great importance in the etiology of liver cirrhosis. In the problem of regional pathology of Central Asia, in particular Uzbekistan, infectious-toxic hepatitis and cirrhosis occupy a central place. However, there is no precise clinical data or direct experimental evidence for this assumption. In this regard, we conducted experimental studies with chronic intoxication of animals with dysentery toxin, which was a killed, dried culture of Shiga bacilli.

Preliminary studies were carried out in search of possible experimental conditions. Tests were carried out on different types of animals (rabbits, dogs, rats) with different doses of the toxin. Chronic experiments were carried out on rats [1,2,3,4,5,6].

Purpose of the study

To determine the significance of infectious-toxic intestinal diseases in the development of hepatitis and cirrhosis of the liver in experimental animals.

Materials and methods

Experimental studies were carried out on 27 white male rats, weighing 180-220 g, which were divided into 3 groups of 9 animals.

The first group of rats received dysentery toxin (DT) at a dose of 0.0005 per rat. The required amount of DT was first carefully ground in an agate mortar with a few drops of saline solution until a homogeneous mass. Then the mixture was diluted with saline solution. The indicated dose of toxin was administered in a volume of one to 1 ml intravenously once every 10

days for two months. The dose of DT was then halved to 0.00025, but administered every 5 days for another two months. The total duration of DT use was 4 months.

The second group of animals received heliotrope seeds with food, under the influence of which cirrhosis of the liver develops. Heliotrope was mixed with food at a concentration of 3% by weight of food and given once every 7 days for four months.

The third group of animals received DT in combination with heliotrope seeds. Doses of DT and heliotrope corresponded to the previous groups.

On days 65-70 of the experiment, a liver biopsy was performed in all animals. Pieces of liver tissue were subjected to microscopic examination. Due to the beginning of the death of animals on days 62-125 of the experiment, the use of DT and heliotrope was canceled for 120 days. A secondary liver biopsy was performed on the remaining animals on day 208 and on day 225 all animals were sacrificed.

The blood and organs of animals were subjected to pathomorphological studies, as well as a number of biochemical indicators of protein, carbohydrate, fat metabolism and enzyme systems of blood and liver tissue with the T- and B-immunity systems, indicating functional changes characteristic of chronic hepatitis and cirrhosis of the liver.

Result and discussion

Microscopic examination of liver tissue obtained from biopsies from dead and slaughtered animals showed the following. In animals of the first group, under the influence of the use of DT, severe damage to the liver tissue was observed already on the 65th day of the experiment.

Against the background of severe circulatory disorders, some animals have foci of necrosis of the hepatic lobules, more often around the central veins, significant round cell infiltration, degeneration of the protoplasm of the liver cells with pyknotic or hypertrophied nuclei. Subsequently, a typical cirrhotic process with disruption of the lobular structure, the presence of regeneration nodes, intralobular proliferation of connective tissue and detachment of a group or even single, usually hypertrophied hepatocytes was discovered in these animals. Another part of the animals had only pronounced degeneration of protoplasm without regenerative and inflammatory phenomena.

Similar changes in the liver were observed in animals of the second group that received small doses of heliotrope. However, the most intense liver damage was observed in animals of the third group under the simultaneous action of DT and heliotrope.

In this group of animals, almost all of them had cirrhosis of the liver.

The simultaneous effect of DT and heliotrope reflects this kind of combined effect on the human body, when an infectious intestinal lesion is layered on an existing toxic liver lesion (hepatitis, fatty liver, etc.).

Thus, experiments have shown that under the influence of chronic intoxication with diesel fuel, severe degenerative-inflammatory processes occur in the liver of animals with the development of a typical picture of liver cirrhosis in some animals.

By using dysentery toxin, we did not intend to get the animal sick with “dysentery”; such attempts have so far remained unsuccessful. We considered intoxication with dysentery toxin as a painful condition when a strictly defined pathogen is not necessary.

In human pathology, this kind of disease picture is characteristic of dysentery. In addition to the numerous Shiga and Flexner groups, the causative agents of dysentery include parasitic bacilli, Pseudomonas aeruginosa, Proteus, hemolytic streptococcus, staphylococcus, etc.

Thus, dysentery is a type of reaction of the body under conditions of quite diverse microbiological factors. It is precisely this kind of “various microbiological factors” that are characteristic of chronic intestinal lesions, the course of which is accompanied by the absorption of various bacterial exo- and endotoxins and products of putrefactive and fermentative dyspepsia. At a certain degree of intensity and duration, this kind of intoxication will be accompanied by liver damage, causing structural and functional disorders, up to and including the development of cirrhosis. It seems to us that the research results obtained provide convincing experimental evidence of the role of chronic toxic-infectious intestinal lesions in the etiology of liver cirrhosis.

Along with pathomorphological changes in the liver, a number of biochemical changes in protein, carbohydrate, fat metabolism and enzyme systems in the blood and liver tissue were observed, as well as changes in the T and B immune system, indicating functional changes characteristic of chronic hepatitis and cirrhosis of the liver.

Conclusions

Thus, the results of the study are convincing experimental evidence of the role of toxic-infectious intestinal lesions in the etiology of hepatitis and cirrhosis of the liver, which determine the regional pathology of Uzbekistan.

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