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MORRPOLOGICAL CONDITION OF GENERATIONS LIVER BORN UNDER CONDITIONS OF CHRONIC INTOXICATION OF THE MOTHERS ORGANISM

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✓ ***Resume***

Experiments have shown that chronic toxic hepatitis in the mother adversely affects the processes of postnatal growth, development and formation in the liver blood vessels and tissues of the offspring born from it. The pathomorphological changes that occur in the tissues and blood vessels of the azo lead to the development of processes that lag behind the development and formation in the later stages of postnatal development. These processes indicate the need to develop rational, science-based treatment and prevention measures in the treatment of the offspring born with existing pathology in the mother, the prevention of their diseases.

Key words: chronic toxic hepatitis, mother-offspring, hepatic vascular, tissue.

МОРФОЛОГИЧЕСКОЕ СОСТОЯНИЕ ПЕЧЕНИ ПОТОМСТВА, РОЖДЕННЫЕ В УСЛОВИЯХ ХРОНИЧЕСКОЙ ИНТОКСИКАЦИИ МАТЕРИНСКОГО ОРГАНИЗМА

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✓ ***Резюме***

Гепатотоксины, введенные в организм матери до беременности и образующиеся в нем при гепатите, попадая в кровь и с последующим в материнское молоко, способствуют развитию воспалительно-реактивных изменений в сосудисто-тканевых структурах аналогичного органа, т.е. в печени потомства в их ранние периоды жизни постнатального развития. Эти патоморфологические изменения в печени потомства, в последующем приводят к запаздыванию процессов постнатального роста и становления органа и систему органов в целом.

Ключевые слова: хронический токсический гепатит, мать-потомства, сосуды, ткани

ОНАДАГИ СУРУНКАЛИ ЗАҲАРЛАНИШ ШАРОИТИДА ТУҒИЛГАН БОЛАЛАРИ ЖИГАРИНИНГ МОРФОЛОГИК ҲОЛАТИ

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Эксперементал ҳайвонлардаги илмий изланишлар кўрсатдики, онага ҳомиладорликдан олдин юборилган ва кейинчалик гепатити сабабли организмида ҳосил бўлган гепатотоксинлар қон орқали ва она сути орқали бола организмига тушиб, унинг илк постнатал ривожланиш даврларида яллигланиш-реактив жараёнларини чақиради. Бу патоморфологик ўзгаришлар постнатал ривожланишнинг кечки даврларида авлод жигарида ва умуман аьзолар тизимида ўсиш ва шаклланиш жараёнларининг ривожланишдан орқага қолишига олиб келади.

Калит сўзлар: эксперементаль тадқиқотлар, сурункали токсик гепатит, она-авлод, жигар, қон томирлар, тўқималар

Relevance

The problem of preserving maternal health and offspring to this day remains the leading one in the policy of our state. The problem of the influence of various unfavorable factors on the offspring carries not only medical, but also enormous social significance. This is due to the fact that in recent decades, there has been a demographic crisis all over the world - the birth rate is decreasing and, despite the development of technologies in medicine, there is a high mortality rate of newborns. This problem can be attributed to the fact that the number of women of fertile age with various extragenital diseases has increased, among which diseases of the hepatobiliary system, including chronic hepatitis, which are one of the important causes of maternal and perinatal pathology, occupy a special place. Scientists are also sounding the alarm about the action of many drugs, adverse environmental factors, stress, viral and infectious diseases that have embryotoxic, fetotoxic and teratogenic effects, depending on which periods of embryo formation they act and how long they affect [1, 4, 5, 7, 10, 12].

The aim of the study was to study the effect of chronic toxic hepatitis in the mother on postnatal liver morphogenesis in the offspring of experimental animals.

Materials and methods

The experiments were carried out on white outbred Wistar rats. The animals were divided into 2 groups of 30 animals each: group 1 (control) – intact animals, group 2 – rats, which were injected weekly for 6 weeks with heliotrin at the rate of 0 to create a model of chronic toxic hepatitis in rats, 5 mg/100 g of mass. 10 days after the last injection, males were added to them and to the females of the control group. Rats born and fed by mothers with chronic toxic hepatitis on the 3rd, 7th and 21st and 30th days of postnatal development were decapitated and pieces of liver tissue were taken for histological examination. The material was subjected to general morphometric, electron microscopic studies. In order to study the intraorgan vessels of the liver, a solution of black ink was injected intracardiacally according to the original method of M.A. Kolesov through the left ventricle of the heart. Vascular lightening was performed according to the method of A.G. Malygin.

Results and discussions

On the 3rd-7th day of life of postnatal development of rat pups, born and fed by mothers with chronic toxic hepatitis, the following picture was observed in the vascular tissue structures of the liver: in the liver microstructure of newborn rat pups (3-7 days), hepatocytes were located loosely and randomly, dividing wide and full-blooded sinusoidal hemocapillaries. In some hepatocytes, the phenomena of hydropic dystrophy were noted, pycnosis and lysis of nuclei were observed in some cells. Morphometric studies showed that the size of hepatocytes increased (18.5 + 0.8), compared with the indicators of the control group of animals (in the control 12.0 + 0.4). The number of binucleated liver cells is relatively higher, 2.7 + 0.3 (in the control, 1.2 + 0.04). Hepatic lobules and beams are poorly contructed. At electron microscopic examination, the cytoplasm of hepatic cells was not grained, the nuclei of many hepatocytes had an oval shape. Mitochondria are abundant, with an electron-dense matrix. In some places in the interlobular connective tissue, infiltration and expansion of sinusoidal hemocapillaries were detected. After 21 days of postnatal development, the animals of the experimental group showed a slight increase in the severity of the pathomorphological changes described above. In some places, against the background of a distinct beam-lobular structure of the liver, places with discompletion of the liver parenchyma were revealed, liver cells were located randomly. Mononuclear cell infiltration was observed in the interlobular connective tissue (fig.1).

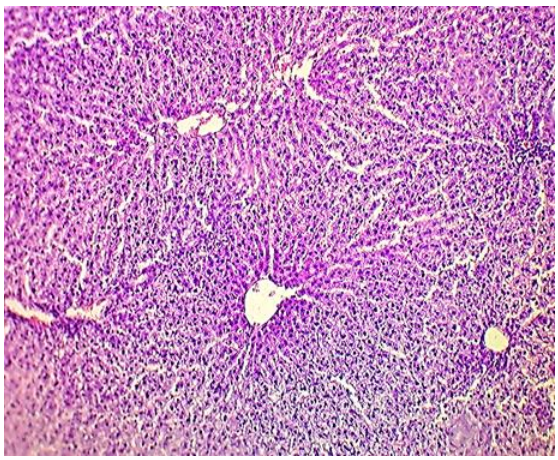

Figure 1. Liver of rat pups at 21 days of postnatal life. Hematoxylin and eosin stain. About 10x10.

Electron microscopically, the nuclei of hepatocytes are round, often oval in shape with two or three nucleoli located closer to the nuclear membrane. Kupffer cells are single. The endoplasmic reticulum is often represented by vacuoles, vesicles of various sizes. Disse space is slightly expanded in places. In some centers of the lobules, a decrease in the number of hepatocytes is noted, there is a slight increase in granulomas and small cell nodules adjacent to the portal tracts. Venous vessels of the liver are dilated in places, full-blooded. In the animals of the control group, a distinct beam-lobular structure of the liver was noted at this time. When studying animals in more distant periods of postnatal development (on the 30th day), the experimental group of animals showed significant individual fluctuations in the severity of pathomorphological changes in the liver and the nature of age dynamics. While in some rat pups these pathomorphological changes gradually subsided somewhat with age, in other animals they still persisted, as did some edema of the portal tracts. In some places, hepatocytes with destructively dystrophic changes in the nucleus and cytoplasm of the liver were found. The parenchyma was divided by thin layers. The interlobular connective tissue forms the stroma, in which the vessels and bile ducts are located, the bald and lobular structure is preserved. Vessels with moderate blood filling. Parenchymal cells are mononuclear in 70%, and in 30% cells have 2 nuclei (fig.2).

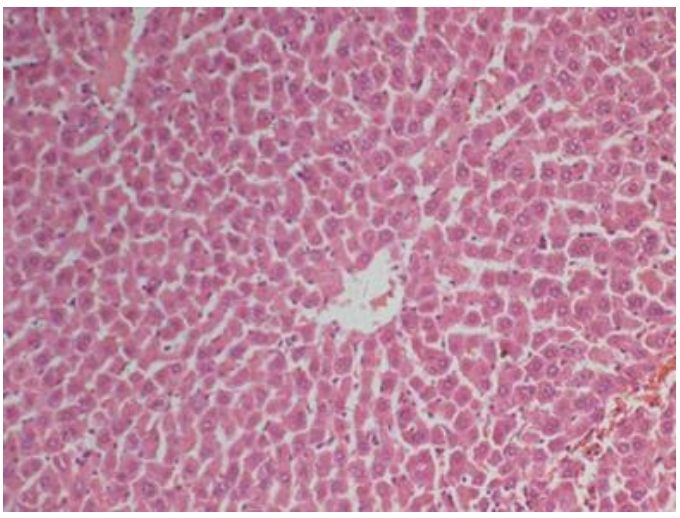

Figure 2. Liver of rat pups at 30 days of postnatal life. Hematoxylin and eosin stain. About. 10x10.

Liver of rat pups at 30 days of postnatal life. Electron microscopic endothelial stellate reticulum was enlarged and abundant. In animals of the control group, at this time, the liver microstructure acquired a typical lobular structure. Portal tracts, represented by loose fibrous connective tissue, were clearly identified. The vascular pattern of the liver was also consistent with that in adult intact rats.

Discussion of the results obtained

The results obtained show that the extragenital pathology of the mother has a negative effect on the postnatal development of the offspring organism. Among the numerous types of

extragenital diseases of the mother, a special place, due to its prevalence, is occupied by liver pathology [2, 3, 6, 8, 13]. It is known that children born to mothers with chronic liver pathology are predisposed to various diseases, including infectious ones, which implies a decrease in the nonspecific resistance [9, 11, 14, 15, 16 17,] of the offspring organism. The results of our research once again prove that the pathology of the mother's liver leads to pathomorphological changes in the analogous organ of the offspring both in the antenatal and postnatal periods of development and growth. These processes subsequently cause a delay and lag in the processes of postnatal development and formation, as evidenced by the morphological and morphometric parameters of the vascular tissue structures of the liver of the offspring [18,19,20].

Analyzing these processes, we believe that a violation of the detoxification function of the mother's liver is of great importance here. The fetal liver is not yet ready for sufficient detoxification of metabolic products. It is clear that in this case the accumulation in tissues, including the liver, of substances (pyruvic acid, lactic acid. Products of free radical oxidation, metabolites, etc.) is possible, which has a cytotoxic effect. A damaging effect on the internal organs of a developing fetus can also be exerted by such products that, when the placenta permeability is impaired, penetrate the fetus, but normally were detoxified in the mother's liver and did not arrive at the fetus. The consequences of such an effect are noted already in the early postnatal period of development in the form of a gradual dystrophic process in the vascular-tissue structures of the organs under study.

Another reason for the pathomorphological changes in the offspring, apparently, is due to certain immunopathological changes in the body, because the protein products of decaying hepatocytes cause an autoallergic reaction, the possibility of such a mechanism is indicated by destructive changes in the internal organs of the offspring. In addition, the structural disorders of the digestive system organs and their microvasculature in rat pups born to mothers with CTH, established by us, may be the result of a deficiency of plastic and a number of biologically active substances for the fetus during the embryonic period of development. This deficiency occurs when the mother's liver function is impaired, placental insufficiency, and the action of products of impaired metabolism. In the mother's blood, as a result of the inhibition of the antitoxic function of the liver, perverted metabolic products accumulate, which affect the embryos during the prenatal period of development. On the other hand, the developing hepatocellular failure leads to changes in the mother's body - this is reflected in the change in the quantitative and qualitative composition of the mother's breast milk and, subsequently, these factors affect the processes of postnatal growth, development and formation of offspring organs.

The combination of the above factors, in our opinion, is responsible for the violation of histogenesis and morphogenesis in the fetus, gradually developing dystrophic processes in postnatal ontogenesis, slowing down and lagging behind the growth, development and formation of organs and systems. It is possible that damage to the mother's liver can induce in the fetus a violation of the development of not only the digestive system, but also other internal organs. Endoxins (products of impaired metabolism) can enter the fetus, and then the newborn, not only through the placenta or breast milk, but also through the amniotic fluid, which is swallowed in the last 3 months of pregnancy: the fetus swallows about 750 ml of amniotic fluid per day. The result of this is the depletion of compensatory-adaptive mechanisms, slowing down and lagging behind in the development of organs and systems of the fetus and then in the newborn.

Thus, our studies contributed to the disclosure of some mechanisms and morphofunctional disorders in the prenatal and early postnatal periods of growth, development and formation of the vascular tissue structures of the liver of the offspring under conditions of maternal liver pathology.

Pathogenetically scientifically grounded therapy of chronic toxic hepatitis in mothers and offspring can normalize the morphological and functional state of the internal organs of mothers and postnatal growth, development and formation of internal organs of offspring born and fed by mothers with a burdened history (liver pathology, toxicosis, gestosis, IDA of pregnant women, etc. etc.).

Thus, concluding the discussion of the results of experimental studies, the features of ontogenesis of the offspring of animals with liver damage, it should be emphasized that these features are determined by the conditions of the fetus in the prenatal period, the state of the newborn, the degree and nature of these disorders and, finally, the individual properties of the developing organism and its ability to compensate for arising violations.

The results obtained are of fundamental theoretical importance for practitioners, they contribute to the development of scientifically

based pathogenetic therapy, as well as the prevention and treatment of possible consequences of mother's hepatitis for offspring. They point to the need to improve the health of the mother for the optimal development and formation of organs and body systems of the offspring. Further research in terms of correction of pathomorphological changes, regulation of postnatal development and formation of the body, prevention of morphological and functional disorders, in the development of scientifically based methods for predicting, preventing and treating diseases of the gastrointestinal tract in early childhood.

Conclusions

1. Chronic toxic damage to the mother's liver negatively affects the processes of postnatal growth, development and formation of tissue structures of the offspring liver.

2. Pathomorphological changes in the vascular-tissue structures of the offspring liver, subsequently lead to a delay in the processes of postnatal development and formation of the liver and the organ system of the offspring as a whole.

3. Mothers with chronic pathology give birth to offspring with impaired "start of health", all this indicates the need to develop scientifically based therapeutic and preventive measures in order to prevent pathology in children born to mothers with chronic liver pathology.

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