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ULTRASTRUCTURE OF LIVER CELLS OF FETUS AND NEWBORN FROM MOTHERS WITH PRE-ECLAMPSIA

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Abstract: Electron microscopic examination of the liver of newborns from mothers with preeclampsia of varying severity revealed a variety of dystrophic and destructive disorders of hepatocyte organelles. The ultrastructural organization of hepatocytes changed as the severity of iron deficiency anemia increased from compensatory-adaptive to destructive forms. The trigger mechanism for the development of dystrophic and destructive processes in the liver is mitochondrial dysfunction.

Keywords:mitochondrial dysfunction, liver ultrastructure, preeclampsia.

INTRODUCTION: Preeclampsia is a complication of pregnancy that occurs in the second half and is characterized by the appearance of edema, proteinuria and arterial hypertension [3]. The incidence of preeclampsia according to the literature ranges from 7 to 16%. Preeclampsia develops in 6–12% of healthy pregnant women and in 20–40% of pregnant women with extragenital pathology [1]. According to WHO data, preeclampsia occupies one of the first places in the structure of maternal mortality [2], being the cause of premature birth, premature abruption of a normally located placenta [3], as well as the development of fetoplacental insufficiency, intrauterine growth retardation [2], and the birth of small children. body weight.

MATERIALS AND METHODS

According to experimental and clinical studies, the adverse effect of maternal preeclampsia on the formation of the endocrine, immune, cardiovascular and reproductive systems has been established [1, 4]. The morphological state of the intracellular structures of the fetal liver in maternal preeclampsia remains poorly understood today. Thus, we consider it necessary to conduct a study and comparative analysis of the effect of preeclampsia of varying severity on the ultrastructure of the fetal liver.

The purpose of the work was to identify ultrastructural changes in liver cells of fetuses and newborns from mothers suffering from preeclampsia of varying severity.

RESULTS AND DISCUSSION

A study of the submicroscopic organization of liver cells in the control group showed the adequacy of the methods used for histological processing of tissue, since their ultrastructural architecture corresponded to modern concepts.

The ultrastructure of liver cells of newborns from mothers with mild preeclampsia is dystrophically altered. The nuclei of hepatocytes were oval in shape and centrally located in the cytoplasm. Nuclear chromatin is presented in condensed and decondensed forms, its granules are unevenly distributed throughout the matrix. The nuclear membrane is loosened, without invaginations. The perinuclear spaces had a constant width. Foci of nuclear membrane lysis were found in a small number of hepatocytes.

Mitochondria of hepatocytes are quite numerous, with single cristae. The mitochondrial matrix is clarified with the presence of an electron-dense, coarse fibrous substance. Some mitochondria and cristae in them had foci of lysis. Accumulations of osmiophilic substance were found in the mitochondrial matrix.

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The granular endoplasmic reticulum is well developed, but its cisterns are significantly expanded and its membranes are greatly loosened. A small number of ribosomes were located on the membranes of the endoplasmic reticulum. The lamellar cytoplasmic Golgi complex is moderately reduced, its smooth membranes are disorganized. Their inherent parallel orientation is lost. They are surrounded by electron-transparent vesicles of various sizes. In the area of localization of the lamellar cytoplasmic Golgi complex, primary and sometimes secondary lysosomes are located. Small inclusions of lipids were found in the cytoplasm of individual hepatocytes. The cytoplasm contains a small amount of ribosomes, polysomes and glycogen granules. In general, the cytoplasm is significantly cleared. The cytoplasmic membrane of liver cells is smooth, loosened with foci of lysis. The bile capillaries are dilated and contain a large number of short microvilli. The space of Disse is filled with many convoluted microvilli. The microvilli of the bile capillaries and the space of Disse are susceptible to swelling and destruction.

In the group of newborns from mothers with moderate preeclampsia, polymorphism in the ultrastructural organization of liver cells is observed. Some hepatocytes had a moderately altered nuclear ultrastructure; diffusely distributed granules of decondensed chromatin were located in the matrix. Condensed chromatin was present in individual hepatocytes.

The preparations contained a small amount of binucleate hepatocytes. In individual liver cells, condensation of chromatin was observed, the clumps of which were more or less evenly distributed throughout the volume of the nucleus. Perinuclear spaces had local areas of expansion. Some hepatocyte nuclei had foci of nuclear membrane lysis. A significant portion of mitochondria had a focally cleared matrix and a small number of disorganized cristae. Some mitochondria had destroyed cristae. The outer membranes of a significant number of mitochondria are focally destroyed.

The nuclei of hepatocytes of newborns from mothers with severe preeclampsia retain a round shape. The nuclear matrix contains accumulations of condensed nuclear chromatin, which are diffusely scattered throughout the matrix. Decondensed chromatin in the form of individual granules is evenly distributed throughout the nuclear matrix. The nuclear membrane was significantly loosened, and foci of lysis were detected in places. The perinuclear spaces are in some places very greatly expanded and filled with an electron-transparent substance.

CONCLUSION

1. The ultrastructure of liver cells of newborns from mothers with mild preeclampsia is subject to dystrophic changes. The intracellular membrane structures of hepatocytes had foci of lysis.

2. In the group of newborns from mothers with moderate preeclampsia, the ultrastructure of hepatocytes passes from the dystrophic phase to the destructive one. Mitochondrial dysfunction continues to develop. The ultrastructure of the overwhelming number of stellate macrophagocytes is subject to pronounced dystrophic changes.

3. The nuclei of hepatocytes of newborns from mothers with severe preeclampsia contained diffusely scattered accumulations of condensed nuclear chromatin. The nuclear membrane was significantly loosened, and foci of lysis were detected in places. Mitochondria have low electron density, cristae are lysed, and destruction of the outer membranes is observed.

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