

**PATHOMORPHOLOGICAL ANALYSIS OF LIVER CHANGES
IN NEONATES BORN TO MOTHERS WITH PREGNANCIES
COMPLICATED BY PREECLAMPSIA BASED ON AUTOPSY
MATERIALS**

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Preeclampsia is a severe pregnancy complication characterized by impaired blood circulation in the maternal–placental–fetal system, endothelial dysfunction, and tissue hypoxia. These pathological processes may adversely affect the morphofunctional development of fetal internal organs, including the liver. In neonates, the structural immaturity of the liver and increased metabolic demands necessitate a pathomorphological investigation of hepatocellular dystrophy, microcirculatory disturbances, and stromal reactions.

Objective. To perform a morphological analysis of parenchymal, stromal, and microcirculatory changes in the liver of neonates born to mothers with preeclampsia who died during the neonatal period, based on autopsy materials.

Materials and Methods. Liver tissue samples obtained from 25 neonates born to mothers with preeclampsia who underwent autopsy at the Republican Center of Pathological Anatomy between 2012 and 2024 were selected as a separate study sample for this conference abstract. The methodological approach included fixation of liver tissue in 10% neutral buffered formalin, preparation of 4-5 µm thick histological sections from paraffin-embedded tissue blocks, and staining with hematoxylin and eosin and the Van Gieson method. Hepatocellular dystrophy and necrobiosis, sinusoidal congestion, the

condition of the spaces of Disse, and changes in the periportal and perihepatocellular stroma were evaluated.

Results. Analysis of the dissertation materials revealed alterations in hepatic lobular histoarchitecture, fatty, protein, and hydropic degeneration of hepatocytes, necrobiosis, and focal hepatocellular necrosis in neonates who died during the early neonatal period (0-7 days). Irregular dilation and congestion of hepatic sinusoids, along with enlargement of the spaces of Disse, were observed. Focal accumulations of fibroblasts and histiocytes, as well as lymphocytic infiltration, were identified in the periportal regions.

In the control group, consisting of 9 neonates born to mothers without preeclampsia, the liver exhibited relatively preserved lobular histoarchitecture, uniform sinusoidal width, and foci of extramedullary hematopoiesis. In contrast, liver specimens from the preeclampsia group demonstrated hepatocellular dystrophic changes and microcirculatory disturbances accompanied by periportal stromal reactions. The distribution of these alterations across different morphofunctional zones of the liver indicates a heterogeneous pattern of hepatic tissue injury.

Table 1.

Morphometric Parameters of the Liver in neonates Born to Mothers with Preeclampsia

Parameter	Early neonatal period	Late neonatal period
Hepatocyte diameter, μm	35,22 $\pm$ 1,12	48,26 $\pm$ 4,13
Hepatic triad diameter, μm	78,61 $\pm$ 1,89	93,51 $\pm$ 2,36
Area occupied by connective tissue, μm^2	3611,11 $\pm$ 23,01	5019,59 $\pm$ 85,31

Parameter	Early neonatal period	Late neonatal period
Relative area of liver parenchyma, %	91,16	80,56

During the late neonatal period (8-28 days), in addition to dystrophic and necrobiotic changes in hepatocytes, an increase in loose fibrous connective tissue in the periportal, perilobular, and perihepatocellular regions, increased fibroblast activity, and disruption of hepatic lobular architecture were observed. Comparative morphometric analysis revealed that the relative area of the liver parenchyma decreased from 91.16% in the early neonatal period to 80.56% in the late neonatal period, representing a reduction of 10.60 percentage points, whereas the area occupied by connective tissue increased from $3611.11 \pm 23.01 \mu\text{m}^2$ to $5019.59 \pm 85.31 \mu\text{m}^2$.

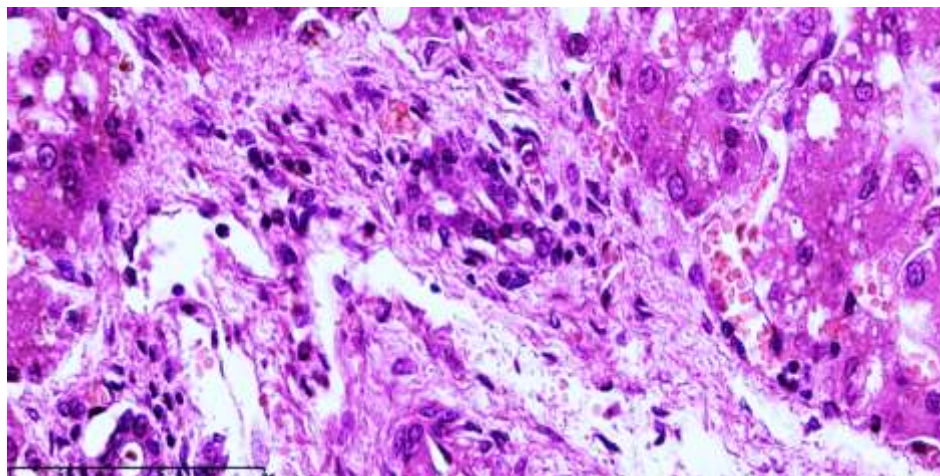


Figure 1. Liver of a 3-day-old neonate born against the background of preeclampsia: periportal fibroblast-histiocytic reaction, lymphocytic infiltration, fine-droplet fatty degeneration, and necrobiosis. Hematoxylin and eosin, 20×10.

Conclusion. In the liver of neonates born to mothers with preeclampsia, parenchymatous degeneration and necrobiosis, disturbances of sinusoidal microcirculation, and stromal reactions were observed in combination; in the late neonatal period, the changes associated with increased connective tissue in the periportal and perihepatocellular regions became more pronounced, which is morphologically substantiated.