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The state of vegetative regulation of heart activity and peculiarities of perinatal assessment in newborns after hypoxia

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The processes of autonomic control in newborns are influenced by various factors, but hypoxia leads to the most influential damage to the central nervous regulation of cardiac activity. Assessment of heart rate variability is a method of evaluating the state of mechanisms of the body physiological functions regulation.

The aim was to analyzing adverse perinatal factors and determine the state of autonomic regulation of cardiac activity in newborns after hypoxia by examining heart rate variability.

Material and methods. 187 newborns were examined in neonatal period. The study involved assessment of medical records, daily monitoring of ECG according to Holter with determination of the main temporal indicators of heart rate variability and statistical processing.

Results and discussion. Depending on the Apgar scale at the 1st minute, the children were divided into 2 main groups: newborns with Apgar score less than 6 points which comprised the 1st group (n=132), newborns with Apgar score of 7 points or more were included into the 2nd group (n=55). Depending on the gestational peculiarities at birth, children were subdivided into subgroups of full-term and preterm infants: group 1a (n=15) were full-term infants with hypoxia at birth, group 1b (n=117) were premature newborns with hypoxia at birth, group 2a (n=43) were full-term neonates without hypoxia at birth, group 2b (n=12) were prematurely born without hypoxia at birth.

Most mothers of newborns of group 1 had complications of obstetric and gynecological character (RR=3.823, 95 % CI (2.061; 7.092), $\chi^2=53.272$; $p<0.001$). Full-term infants of group 1 had the lowest Apgar scores ($p<0.02$) and umbilical cord

pH ($p < 0.0001$), which was reflected in a greater percentage of severe hypoxic central nervous system damage. 75 % of newborns in group 1 were diagnosed with various types of disturbances of cardiac rhythm to Holter. The temporal parameters of heart rate variability were lower in the group of infants who had hypoxia, with the lowest in the group of preterm infants.

Conclusions. Newborns with hypoxia have a decrease in heart rate variability temporal parameters compared to infants without hypoxia. Evaluation of RMSSD and PNN50 can be used to predict the risk of developing neonatal arrhythmias in premature infants after hypoxia.