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STUDY OF PERINATAL LESIONS OF THE CENTRAL NERVOUS SYSTEM IN NEWBORNS

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Introduction

The neonatal period and the first year of a child's life are characterized by the most active period of brain maturation, and the action of such an aggressive factor as hypoxia on the developing brain of a child dictates the need for further study of this pathology [1,3,9]. Achievements of fundamental sciences - pathomorphology, pathophysiology, biochemistry, methods of instrumental diagnostics and technologies for assisting newborn children have formed the basis for a serious change in the understanding of the pathogenetic mechanisms of perinatal pathology, algorithms for diagnostic search, therapy tactics and follow-up of newborns and young children [5,6,13,14].

The most significant changes in the statistical indicators of mortality and morbidity were noted among premature babies. The high frequency of severe concomitant perinatal pathology in this category of children led to an increase in childhood disability, in the structure of which the leading positions (21,2%) belong to the pathology of the nervous system and sensory organs Among the etiological factors that are most significant in the pathogenesis of perinatal cerebral injuries, the leading role belongs to hypoxia [2,4,8,10].

The issues of the features of the clinical, instrumental and laboratory course of hypoxic lesions of the central nervous system in newborns, depending on the gestational age, both in the acute period and in dynamics, as well as the further neuropsychic development of children, remain poorly studied and require additional scientific substantiation [7,11,12].

Purpose of the Study

To establish the nature of clinical, instrumental and psychomotor changes in hypoxic lesions of the central nervous system in newborns with different

gestational periods in the acute period and in dynamics.

Materials and Methods

Under our supervision there were 60 newborns with a gestational age of 28 to 41 weeks with hypoxic damage to the central nervous system of the early period. The children were divided into 3 groups: group 1 of 20 newborns with HIE with gestational age 28-31 weeks, group 2 of 20 newborns with HIE with gestational age 32-37 weeks, and group 3 of 20 newborns with HIE and gestational age 38-41 weeks. The control group consisted of 20 healthy full-term newborns.

The examination of children was carried out on the basis of the department of pathology of newborns of the regional children's multidisciplinary medical center from 2020 to 2021. At all stages of the study and observation of newborns, a gynecological and obstetric anamnesis was collected, the features of the course of pregnancy and childbirth were studied. The early neonatal period was assessed taking into account data on gestational age, birth weight and length, head and chest circumference, physiological loss of body weight, the state of the child at birth according to the Apgar scale, the presence of resuscitation measures, and the type of feeding were analyzed. In dynamics, the neuropsychic status of the examined children was assessed. The study of the neuropsychic status was carried out by the method of quantitative assessment of motor, speech and mental functions according to L.T. Zhurba.

The criteria for including children in the control group were:

1. The gestation period of newborns is 38 - 40 weeks, with an Apgar score of 8-10 points, the conformity of the physical development of the newborn to the gestational age;
2. Physiological course of pregnancy in the mother without exacerbation of chronic foci of infection, clinical and laboratory signs of the course of the infectious process (syphilis, toxoplasmosis, CMVI, herpes, chlamydia, etc.);
3. Absence of genetic pathology in a child (Down syndrome, Pattau, etc.);
4. Absence of congenital malformations of the central nervous system (microcephaly, congenital hydrocephalus, etc.) in the newborn according to the data of clinical examination and instrumental methods of research;
5. Absence of clinical and laboratory signs of TORCH syndrome in newborns and children of the first half of life;

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from 2020 to 2021.

Research Results and Their Discussion

According to the results of clinical and instrumental examination, all children were diagnosed with hypoxic damage to the central nervous system of varying severity: 14 newborns (in 23.3% of cases) had mild central nervous system damage, in 26 (43,3%) - moderate, and in 20 (33,3%) severe.

The severity of hypoxic encephalopathy was established on the basis of clinical syndromes and examination results according to the following criteria: - for mild degree, cerebral ischemia of the 1st degree (mild), intrapartum hypoxia, mild asphyxia at birth; excitation of the central nervous system is more common in full-term, depression - in premature, lasting no more than 5-7 days; moderate hypoxemia, acidosis; NSG - no pathological abnormalities;

for moderate severity: cerebral ischemia of the II stage, the syndrome of suppression of excitation, hypertensive-hydrocephalic syndrome, moderate periventricular edema or IVH of the I stage. on NSG;

- for severe degree: cerebral ischemia grade III, severe depression / excitement syndrome, convulsive syndrome, dense periventricular edema or IVH grade II. on the NSG.

Taking into account that the degree of gestational maturity of the fetus determines both the morphological features of cerebral injury and the spectrum of somatic pathology of the neonatal period, gestational age was used as the main grouping feature in the analysis and presentation of the results obtained. In accordance with the tasks set, the observed newborns were divided into the following groups: group 1 - 20 newborns with HIE with gestational age 28-31 weeks, group 2 - 20 newborns with HIE with gestational age 32-37 weeks and group 3 - 20 newborns with HIE and with a gestation period of 38-41 weeks.

Vital activity indicators of newborns at 5 minutes of life in 1

In 20% of children in group 3 and 1 child (5%) in group 2, clinical signs of CNS damage were not observed, all children had a mild degree of HIE (Table 1).

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Table 1. Dynamics of neurological syndromes in children of the compared groups during follow-up at 3 months of age.

Indicators	1st group	2nd group	Group 3
Intracranial hypertension syndrome	3 (15%)	3 (15%)	3 (15%)
Movement disorder syndrome	5 (25%)	4 (20%)	2 (10%)
Hyperexcitability syndrome	2 (10%)	3 (15%)	2 (10%)
Delayed motor development	10 (50%)	7 (35%)	3 (15%)
Convulsive syndrome	15%)		2 (10%)
No symptoms of CNS damage	-	15%)	4 (20%)

Thus, the recovery period after undergoing perinatal hypoxia for newborns of the observed groups in the neonatal period was characterized by the presence of intracranial hypertension and movement disorders, which were mostly observed in the groups of premature newborns.

To carry out differential diagnosis and clarify the severity of CNS lesions, a complex of laboratory and instrumental research methods was carried out. All newborns at the age of 5-7 days and 1, 3 months of life underwent ultrasound examination of the brain. The research results are presented in table 2.

Table 2. Characteristics of neurosonography data in newborns on the 5-7th day of life

Indicators	1st group	2nd group	Group 3
Periventricular edema	18 (90%)	16 (80%)	13 (65%)
IVH of 1 degree	5 (25%)	3 (15%)	2 (10%)
IVH of the 2nd degree	3 (15%)	2 (10%)	15%)
Dilation of the lateral ventricles	5 (25%)	4 (20%)	3 (15%)

Periventricular cerebral edema, which occurs as a result of intrauterine or intrapartum hypoxia, was found much more often among others in all examined children. In all comparison groups, both full-term and premature infants, periventricular edema was observed with approximately the same frequency. There was no significant difference between the groups.

Dilation of the lateral ventricles, as a manifestation of hypertensive syndrome, was detected both in full-term newborns - 15%, and in premature newborns of groups 1 and 2 (25% and 20%, respectively). Thus, in the early neonatal period in newborns with DIE, according to the data of ultrasound examination of the brain, dilatation of the lateral ventricles and the phenomenon of periventricular cerebral edema are quite often revealed, which indicates a deep degree of CNS

damage in newborns of this group. Hypoxic-hemorrhagic lesions of the central nervous system were significantly more frequent in premature infants.

At the age of one month in newborns with HIE, various changes in the structure of the brain persisted. According to the NSG, there was a significant decrease in the incidence of periventricular edema in dynamics, but it still persisted in 40% of children of group 1, full-term infants, in 30% of children born with a gestational age of 32-37 weeks, and in 20% of full-term infants. This indicator of hypoxic-ischemic damage to the central nervous system decreased by almost 2-3 times ($p < 0.01$) compared with the early neonatal period in all observation groups.

At the same time, the lowest values of psychomotor functions were observed in newborns of group 1 with gestational periods of 28-31 weeks (13.8 ± 0.9 points). So in the children of this group, the cry was absent, or was aphonic, it was difficult to wake them up, not all unconditioned reflexes were evoked and were quickly exhausted. Muscle hypotonia was observed, and in some children the posture of an embryo or a frog was observed. Sensory responses were reduced. Some children had a constant Graefe symptom, persistent squint, bulbar or pseudobulbar syndrome.

Conclusions

In this way in premature infants with a severe degree of HIE, psychomotor changes are observed, which in dynamics tend to normalize, but still significantly differ from the norm. These facts may contribute to the worsening of neurological symptoms in HIE in the acute period, as well as in the later period of the development of hypoxic - ischemic encephalopathy.

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