FEATURES OF THE PATHOGENESIS OF PERINATAL CENTRAL NERVOUS SYSTEM LESIONS IN NEWBORNS

Nabieva Shokhista Mustafaevna
Assistant of the Department 1-Pediatrics and Neonatology Samarkand State Medical Institute, Samarkand, Republic of Uzbekistan

Abstract: *This study aimed to investigate the impact of intrauterine infection and maternal obstetric and gynecological history on the condition of newborns with perinatal lesions of the central nervous system. The study included 103 newborns with perinatal central nervous system lesions, and the findings indicate that the presence of intrauterine infection significantly affects the condition of the newborn at birth. Additionally, it was found that in newborns with perinatal central nervous system damage and hemostasis disorders, careful attention to the mother's pregnancy and clinical symptoms is crucial. Moreover, the study revealed that the burdened obstetric and gynecological history of mothers, particularly in cases of hypoxic-ischemic encephalopathy, can impact the intrauterine development of the fetus, leading to subsequent neurological changes in newborns. These findings underscore the importance of monitoring and addressing maternal health and obstetric history in the context of perinatal central nervous system lesions, as well as the need for targeted interventions to support the health of both mothers and newborns.*

Keywords: *newborns, perinatal lesions of the central nervous system, pathogenetic features.*

Relevance. Despite the progressive improvement of perinatal care and the development of early preventive methods for pathological conditions, the morbidity and mortality rate of newborn children worldwide remains high [2].

Severe complications of perinatal pathology of the central nervous system: intraventricular hemorrhages and periventricular leukomalacia are the main cause of deaths and disability since childhood [7,8]. The list of neuropsychiatric disorders of the brain is extremely wide: from minimal brain disorders (minor developmental delay and small brain dysfunctions) to severe forms of central nervous system damage with mental retardation, convulsive syndrome, hydrocephalus, paralysis [3,9,11].

Perinatal pathology of the central nervous system is represented by various etiopathogenetic causes: hypoxic-ischemic disorders of the central nervous system (cerebral ischemia), intracranial hemorrhages (traumatic and hypoxic etiology), toxic-metabolic disorders, congenital malformations, infectious pathology and others [5,14,15].

In the etiology and development of CNS lesions, hypoxia is one of the main factors that occurs due to chronic fetoplacental insufficiency, asphyxia during childbirth, persistent fetal communication syndrome, persistent convulsive syndromes and other

causes. Hemorrhagic lesions of the central nervous system are related to several groups at once, since the main cause of intracranial hemorrhages is hypoxia, and as a component of trauma they are always present in traumatic hemorrhages [1]. In the pathogenesis of hypoxic-traumatic and hypoxic-ischemic encephalopathies, hemodynamic disorders lead to metabolic shifts such as: violation of the acid-base state, electrolyte imbalance, destabilization of cell membranes, hypoxemia and tissue hypoxia, and these shifts, in turn, enhance microcirculation disorders [4,6]. Modern studies have shown the involvement of immune mechanisms in the pathogenesis of perinatal CNS lesions [10,12,13].

The purpose of the study: to study the features of the pathogenesis of damage to the central nervous system in newborns.

Research materials and methods.

The paper presents the results of a study of anamnestic, clinical, and laboratory studies in 103 newborns with perinatal central nervous system damage who were hospitalized in the Department of neonatal Pathology and neonatal intensive care unit of the Samarkand Regional Children's Multidisciplinary Medical Center in Samarkand.

The examined patients, depending on the pathogenetic features of the disease development, were divided into groups A, B, C. Group A, in turn, was divided into group I of 19 newborns with intrauterine infection and group II of 22 newborns without intrauterine infection. Group B consisted of group III, which included 15 patients without hemostasis disorders and group IV of 12 children who had changes in the hemostasis system. Group C consisted of group V, which included 35 patients with hypoxic lesions of the central nervous system. 23 healthy newborns were observed in the control group.

The following research methods were conducted: analysis of anamnestic data, epidemiological study of risk factors, examination of somatic and neurological status, determination of specific antibodies using enzyme immunoassay and polymerase chain reaction, analysis of hemostasis parameters (including fibrin, fibrinogen, prothrombin time, and prothrombin index), as well as neurosonographic studies.

Results of the study: When examining children of group, I the following nosological forms of intrauterine infections were detected in 19 newborns with perinatal damage to the central nervous system: cytomegalovirus was detected in 6 (31.6%) newborns, herpes virus was detected in 5 (26.3%), toxoplasmosis in 6 (31.6%) and 2 (10.5%) newborns Chlamydia infection has been identified.

When studying the conditions of newborns of groups, I and II with perinatal CNS damage combined with intrauterine infection at birth, they were assessed on the Apgar scale with low scores from 3-5 points – in 10 (52.63%) newborns, 5-7 points in 9 (47.37%), unlike group II, where only 5 (22.72%) newborns They were assessed with 3-5 points, 7 (31.82%) newborns with 5-7 points. 10 (45.45%) of group II newborns were rated 8-10 points on the Apgar scale, respectively.

The analysis of the neurological status and neurosonographic data of these children revealed a relationship between intrauterine infection and the severity of cerebral ischemia, the degree of intracerebral hemorrhages, and the frequency of periventricular leukomalacia. Cerebral ischemia was noted in all newborns in 19 (100%) I and 22 (100%) II groups. Group I children were characterized by a predominance of grade I cerebral ischemia – in 10 (52.63%), in 7 (36.84%) newborns with grade II cerebral ischemia, and only in 2 (10.52%) children with grade III cerebral ischemia. In this group, grade I intracerebral hemorrhages were detected in 3 (15.78%) newborns, grade II in 3 (15.78%), grade III in 1 (5.26%). The frequency of periventricular leukomalacia in this group was 15.79%, which corresponds to 3 newborns. In group II, the manifestation of grade I cerebral ischemia was noted in 9 children (45.4%) and grade II in 11 (54.6%) newborns, grade III cerebral ischemia was not detected in this group. At the same time, grade I intracerebral hemorrhages were noted in 3 (13.63%) newborns, grade II occurred in 2 (9.1%) newborns, grade III intracerebral hemorrhages were not found among children of this group.

The results of the study on newborns with perinatal CNS damage (group B) showed that there were alterations in the blood coagulation system. These changes included a decrease in the levels of fibrin and fibrinogen, an elongation of thrombin time, and a decrease in the prothrombin index among patients in group IV compared to those in group III.

The most frequent pregnancy complications among mothers included:

- Threat of termination in 4 (26.6%) mothers in group III and 4 (33.3%) in group IV
- Preeclampsia in 4 (26.6%) and 3 (25.0%)
- Eclampsia in 1 (6.6%) and 2 (16.6%)
- Fetoplacental insufficiency in 6 (40.0%) and 4 (33.3%)
- Chronic intrauterine fetal hypoxia in 5 (33.3%) and 7(58.3%)
- Premature rupture of the membranes in 2 (13.3%) and 3 (25.0%)
- Placental abruption in 2 (13.3%) and 3 (25%)
- Severe and moderate anemia was found in 6 (40.0%) mothers in group III and 8 (66.6%) in group IV
- Intrauterine infection in 3 (20%) and 4 (33.3%)
- Colds in 2 (13.3%) and 3 (25.0%)
- Medical abortions in 3 (20.0%) and 2 (16.6%)
- Inflammatory diseases of the reproductive system in 5 (33.3%) and 3 (25.0%)
- Extragenital pathology in 3 (20.0%) and 2 (16.6%) in the respective follow-up groups.

The most frequent pregnancy complications among mothers were as follows: threat of termination in 4 (26.6%) mothers in group III and 4 (33.3%) in group IV, preeclampsia in 4 (26.6%) and 3 (25.0%), eclampsia in 1 (6.6%) and 2 (16.6%), fetoplacental insufficiency in 6 (40.0%) and 4 (33.3%), chronic intrauterine fetal

hypoxia in 5 (33.3%) and 7 (58.3%), premature rupture of the membranes in 2 (13.3%) and 3 (25.0%), placental abruption in 2 (13.3%) and 3 (25%) mothers in the III and IV observation groups. Additionally, during pregnancy, severe and moderate anemia was detected in 6 (40.0%) mothers of group III and 8 (66.6%) women in group IV, intrauterine infection in 3 (20%) and 4 (33.3%), colds in 2 (13.3%) and in 3 (25.0%), medical abortions in 3 (20.0%) and 2 (16.6%), inflammatory diseases of the reproductive system in 5 (33.3%) and 3 (25.0%), extragenital pathology in 3 (20.0%) and 2 (16.6%) in the follow-up groups.

The main neurological syndromes were determined by the degree of lesion. In newborns, the following syndromes were observed:
- Depression syndrome was observed in 2 (13.3%) patients in group III and 3 (25.0%) children in group IV
- Arousal syndrome in 5 (33.3%) and 5 (41.7%)
- Convulsive syndrome in 3 (20.0%) and 4 (33.3%)
- Nystagmus in 2 (13.3%) and 3 (25.0%)
- Grefe's symptom in 3 (20.0%) and 4 (33.3%)
- Convergent strabismus in 2 (13.3%) and 3 (25.0%)
- Muscular hypotension syndrome in 3 (20.0%) and 4 (33.3%)
- Muscular hypertension syndrome in 6 (40.0%) and 6 (50.0%)
- Hypertension-hydrocephalus syndrome in 3 (20.0%) and 4 (33.3%)
- Vegeto-visceral syndrome in 2 (13.3%) and 3 (25.0%)
- Limb tremor in 5 (33.3%) and 7 (58.3%)
- Reflex disorders in 6 (40.0%) newborns in group III and 7 (58.3%) children in group IV.

In studying the maternal health, the course of pregnancy and childbirth in group C, a significant number of factors contributing to the unfavorable course of the antenatal period were revealed. In the structure of pregnancy complications, the most frequent were:
- Anemia in 30 (51.7%) mothers of Group V and 9 (39.1%) women in the control group
- Threat of termination of pregnancy in 20 (34.4%) and 8 (34.7%)
- Preeclampsia in 18 (31%) and 2 (8.6%)
- Eclampsia in 7 (12%) and 4 (17.3%), which was combined with the development of fetoplacental insufficiency in 16 (27.5%) and 7 (30.4%)
- Chronic intrauterine fetal hypoxia in 32 (55.1%) and 11 (47.8%)
- Intrauterine viral infection in 7 (12%) and 5 (21.7%)
- Abortions in 6 (10.3%) and 2 (8.6%)
- Inflammatory diseases of the reproductive system in 14 (24.1%) and 1 (4.34%), extragenital pathology was observed in 16 (27.5%) mothers of Group V and in 2 (8.6%) women in the control group. Placental abruption occurred in 15 (25.8%) and 1 (4.34%) mother, while nephropathy was observed in 8 (13.7%) and 3 (13%) mothers in Group V and the control group, respectively. Additionally, acute respiratory viral infection (ARVI) was identified in 17 (73.9%) mothers in Group V and 9 (15.5%) in the control group. Premature rupture of the amniotic membranes occurred in 17 (29.3%) and 1 (4.3%) mother in Group V and the control group, respectively.

The analysis of neurosonography revealed a high frequency of abnormalities in newborns of group V compared to the control group. Specifically:

- Increased echogenicity of the brain parenchyma was observed in 22 (37.9%) patients of group V and in 4 (17.4%) children of the control group.

- Uneven brain contours were found in 35 (60.3%) patients in group V and 2 (8.6%) in the control group.

- Primary subarachnoid hemorrhages were detected in 14 (24.1%) patients, increased vascular plexuses of the brain ventricles in 14 (24.1%), grade 1-2 periventricular hemorrhages in 9 (15.5%), and grade II intraventricular hemorrhages with severe central nervous system damage in 24 (41.3%) in group V. This pathology was not observed in newborns of the control group.

Conclusions: Based on the results of the study, it was concluded that the presence of intrauterine infection in newborns has an impact on the condition of the child at birth and the course of perinatal lesions of the central nervous system.

The study also highlighted the importance of paying special attention to the course of pregnancy and the clinical symptoms characteristic of mothers when dealing with newborns experiencing perinatal damage to the central nervous system and hemostasis disorders.

Moreover, it was found that in newborns with hypoxic-ischemic encephalopathy, the complicated obstetric and gynecological history of mothers affects the intrauterine development of the fetus, subsequently influencing the development of nervous system issues in newborns.

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