SECTION III. MEDICINE

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Analysis of the pregnancy course in mothers of newborns with perinatal brain injuries of ischemic-hemorrhagic nature

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Abstract

Perinatal brain injuries of newborns diagnosed as peri- and intraventricular hemorrhages are a common cause (15-20%) of deviations in the development of neuropsychiatric and motor functions in children [1, 2, 3, 11]. Clinical signs of severe brain injuries in the neonate, as a rule, are identified immediately after birth. In the structure of early neonatal mortality, injuries of the central nervous system (CNS) in the form of peri- and intraventricular hemorrhages in children in the early neonatal period rank second [5, 7, 8, 17]. Among all perinatal brain injuries intracranial hemorrhages are diagnosed in 30 – 40% of children. Mortality caused by intracranial hemorrhage in the neonate amounts from 27% to 57% [4, 10, 12]. The use of up-to-date neuroimaging methods provides early detection of intracranial hemorrhages in newborns and infants [6, 8, 9, 13]. This report presents the research conducted in newborns who had minimal neurological symptoms or did not have any of them at all, when the clinically silent structural changes of brain were diagnosed with the help of the neurosonography method. Such perinatal brain injuries are regarded as a consequence of chronic intrauterine fetal hypoxia and intranatal traumas [14, 15, 16].

The objective of our research is to study the peculiarities of the pregnancy course in mothers of newborns with perinatal brain injuries in the early neonatal period.

Key words: pregnancy, newborn, neurosonography, brain, perinatal injuries.

Research materials and methods

The analysis of the early neonatal period of 84 children with perinatal brain injuries of ischemic-hemorrhagic nature, born in the gestation period of 37-38 weeks with signs of somatic and neurological immaturity, was performed. Neurosonography was carried out to newborns on day 1 or 2 after birth with the help of the ultrasound diagnostic device ACUSON 128/XP4 (USA) by the sector transducer with a frequency of 5 MHz using the following method: the anterior fontanelle served as the acoustic window, scanning was performed in the frontal and sagittal planes. The standard study included 6 frontal and 5 sagittal images. Cardiotocography of the fetus was performed with the help of the Fetascan apparatus (Model 1400).

According to the results of neurosonography, all children were streamed into 2 groups: 1 – control group (46) included children who did not have any brain echopathology, 2 – primary group included 36 children who had intracranial hemorrhages: periventricular (53%) and intraventricular (47 %), hemorrhages in the form of clots of vascular plexuses (25%) and ventriculomegaly (19%).

The analysis of the course and management of pregnancy and childbirth in mothers of newborns in groups 1 and 2 was performed.

Findings

When analyzing the clinical and anamnestic characteristic of the groups formed, it was found that there were no differences in the age of mothers in both groups, but in group 2 there were patients giving birth for the third time (8.4% vs. 0%) (Table 1).

Table 1.

Distribution by age and parity of birth in mothers of newborns in groups 1 and 2

Indicators, %	Group 1	Group 2
Age - under 18	6.5	8.0
- 18-29	80.4	70.0
- 30 and older	13.0	22.0
Primigravidae	40.3	30.0
Multigravidae	59.7	70.0
Present childbirth:		
- first	5.6	77.8
- second	24.4	13.8
- third	0.0	8.4*

Note: * - here and in the following tables, significantly different values of indicators ($p < 0.05$)

The findings indicate that the majority of women in group 2 did not attend prenatal clinics on a regular basis, they had gestosis of severe degree diagnosed 3 times less often, acute intrauterine fetal hypoxia – 6 times more often and chronic intrauterine fetal hypoxia – 2 times more often.

Table 2.

The peculiarities of the pregnancy course and management in mothers of newborns in groups 1 and 2 (%)

Indicators, %	Group 1	Group 2
Management in Prenatal Clinic	95.6	94.0
- early attendance (under 12 weeks)	52.0	65.0
- late attendance	48.0	35.0
No Regular Management in Prenatal Clinic	24.0	59.0*
No Management in Prenatal Clinic	4.4	6.0
Pregnancy Complications:		
- late gestosis (preeclampsia)	89.0	89.0
of mild degree	58.5	65.6
of moderate degree	22.0	28.0
of severe degree	19.5	6.4*
- intrauterine fetal hypoxia	28.0	56.0*
acute	2.0	41.0*
chronic	26.0	15.0*
Number of Hospital Admissions:		
- 0 times	34.0	49.0*
- 1 time	9.0	38.0*
- 2 times	36.0	12.0*
- 3 times and more	11.0	1.0*

When analyzing the frequency of inpatient treatment of these pregnancy pathologies (Table 2), the fact of double hospitalization of patients of group 1 was revealed, which is 3 times more often than in group 2 (in mothers of newborns with perinatal brain injuries of ischemic-hemorrhagic character). The majority of pregnant women in group 2 were either not treated in a hospital (49%) or treated only once (38%).

When analyzing the management of pregnancy, it was found that women of group 1 in contrast to women of group 2 received outpatient and inpatient treatment for gestosis and

placental insufficiency throughout pregnancy. The therapy complex included osmotherapy of gestosis, antioxidants, membrane stabilizers, antiaggregants (including small doses of aspirin up to 37 weeks of pregnancy), anticoagulants.

When studying the frequency of extragenital pathology, there were no significant differences, except for cases of endocrinopathies that combined thyroid gland pathology, adrenal gland pathology and obesity of various genesis, which were diagnosed almost 3 times more often in pregnant women of group 1 (Table 3).

Table 3.

Frequency of extragenital pathology in mothers of newborns in groups 1 and 2 (%)

Diseases	Group 1	Group 2
Endocrinopathies (hypothyreosis, obesity)	34.8	12.0*
Chronic virus hepatitis	10.9	12.0
Neurocirculatory dystonia	13.0	14.0
Chronic anemia	4.3	6.0
Chronic pyelonephritis	4.3	6.0
Urolithiasis	6.5	0.0
Chronic glomerulonephritis	2.2	0.0

The frequency of delivery through the natural birth canal did not differ in both groups (group 1 – 65.2%, group 2 – 67%). However, complications of labor were more common in group 2: a) rapid and precipitated labor was significantly more frequent in group 2 (12% vs. 6.4%); b) protracted labor was not registered in group 1, and in group 2 it was observed in 4% of cases. Medical anesthesia of labor was performed in 90% of women in labor of group 1, and in 75% – of group 2.

The frequency of delivery by Cesarean section was the same in both groups (34.8% and 33%, respectively); however, deliveries in pregnant women of group 2 (whose newborns were diagnosed with intracranial hemorrhages) were more likely performed on an urgent basis (5.3 times more often than in the control group). The main indications for the emergency Cesarean section in group 2 were acute fetal hypoxia (57%), absence of effect and progression of gestosis severity (42%), threatening rupture of the uterus (28%), premature placental abruption (14%).

Pathoanatomical signs of chronic placental insufficiency were revealed in 65.2% of cases in group 1, in 67.0% of cases in group 2. In women of group 2 placental hypoplasia was significantly more common (22% vs. 6.5%). Morphological signs of the chronic inflammatory process in the placenta, amniotic and decidual membranes were revealed in half of patients of group 1 and in 39% of cases in group 2.

The condition of newborns at birth was assessed according to V.Apgar scale. Asphyxia of mild degree was diagnosed in 39% of newborns in the control group. In group 2 – in 52% of newborns. The birth of children with asphyxia of severe degree was not recorded in both groups. The diagnosis of cephalohematoma was made in newborns of group 1 in 4%, and in children of group 2 in 3% of cases.

When assessing the neurological status of children in both groups, no evidence of focal neurological symptoms was found. The clinical picture in newborns of groups 1 and 2 showed a slight increase in neuro-reflex excitability (motor anxiety, spitting up, hand tremor, activation of unconditioned reflexes, increased flexor tone (42% and 47%, respectively) or mild depression of the central nervous system (moderate muscular hypotension, oppression of unconditioned reflexes (58% and 53%, respectively).

Conclusions

Analysis of the course and management of pregnancy and childbirth in mothers of newborns with perinatal brain injuries of ischemic-hemorrhagic nature, as well as in mothers of newborns in the control group, did not reveal significant differences in the clinical and anamnestic characteristics (parity of delivery, management in the prenatal clinic or others), the frequency of pregnancy complications, the results of histological examination of the placenta, the method of delivery.

Delivery in an urgent order by Cesarean section was 5 times more often performed in group 2 than in the control group. The majority of the pregnant women of the control group were regularly observed in the prenatal clinic and systematically received pathogenetic therapy for gestosis and placental insufficiency in the maternity obstetric hospital or day prenatal clinic settings.

The frequency of hospitalizations for the pregnancy pathology treatment (2 times and more) in the second and third trimesters in the pregnant women of the control group is significantly higher (3.5 times) and is 46% compared to 13% in the group where perinatal brain injuries of ischemic-hemorrhagic nature were diagnosed in newborns.

Thus, the main cause for perinatal brain injuries of ischemic-hemorrhagic nature in newborns is inadequate (untimely or insufficient) therapy for such pregnancy complications as gestosis and chronic placental insufficiency.

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