

CLINICAL AND METABOLIC PECULIARITIES OF ADAPTATION OF NEWBORN CHILDREN IN THE EARLY NEONATAL PERIOD

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✓ **Resume,**

Perinatal pathology largely determines the postnatal development of a child, and then of an adult. Perinatal pathogenic factors distort the implementation of the genetic program and, as a result, there is a general deterioration in health, an increased incidence of the population throughout life.

Key words: neonatal period, perinatal pathology, adaptation, childhood, newborn.

ЧАҚАЛОҚЛАРДА ЭРТА НЕОНАТАЛ ДАВРДА МОСЛАНУВЧАНЛИКНИНГ КЛИНИК - МЕТАБОЛИК ХУСУСИЯТЛАРИ

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✓ **Резюме,**

Перинатал патология боланинг аввало постнатал даврини, сўнгра катта ёшдаги даврини ривожланишида келиб чиқадиган турли зарарланишларга аниқлик киритади. Перинатал патоген омиллар генетик дастур асосида шаклланади ва натижада болаларнинг умумий соғлиғи ёмонлашади. Аҳолини юқори касалланиш хавфини келтириб чиқаради.

Калит сўзлар: неонатал давр, перинатал патология, мослашиш, болалаик ёши, чақалоқлар.

КЛИНИКО-МЕТАБОЛИЧЕСКИЕ ОСОБЕННОСТИ АДАПТАЦИИ НОВОРОЖДЕННЫХ ДЕТЕЙ В РАННИЙ НЕОНАТАЛЬНЫЙ ПЕРИОД

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✓ **Резюме,**

Перинатальная патология в значительной мере предопределяет постнатальное развитие ребенка, а затем и взрослого человека. Перинатальные патогенные факторы искажают реализацию генетической программы и в результате наблюдается общее ухудшение здоровья, повышенная заболеваемость населения в течение всей жизни.

Ключевые слова: неонатальный период, перинатальная патология, адаптация, детского возраста, новорожденных.

Introduction

Maternal and child health is one of the priority areas of health care. Particular attention in this area belongs to preventive measures, the effectiveness of which is estimated according to the final result, namely, the birth of a healthy child, the incidence of child morbidity and mortality, the incidence of women during pregnancy [2,6,7].

The viability of a newborn child and his health are influenced by the most diverse factors of the external and internal environment. Their action can begin in the antenatal period, in the period of childbirth or in the postnatal period. That is why the physiologically occurring perinatal period is considered as the basis for creating "lifelong" health [4,5].

At each stage of development the child needs certain parameters of the environment. After fertilization, from the moment of the formation of the functional system of mother-fetus, women themselves become the habitat for another organism, that is, the ecosystem of a higher level.

At present, the first space of the human ecological environment - the mother's body - has changed for the

worse under the influence of existing working conditions, contaminated products, water, air, which results in a decrease in the level of health of newborns, the increase in the birth of small children. There are enough facts confirming a 1.5-2 times increase in perinatal morbidity. Hypoxia of the fetus and newborn have become more frequent, the incidence of congenital malformations, infections and other diseases has increased [1,4].

It is obvious that the health of the fetus and the baby is an integral value determined by a number of objective factors independent of human influence and factors that depend on our activity. To the first, independent factors, it is necessary to attribute, first of all, the genetic code of the developing organism. The second group of factors, the effect of which is mediated through human activity, is divided into nonmedical and, in fact, medical factors. Nonmedical factors include social, everyday, psychological and environmental impacts on the developing organism of the fetus and the newborn child. Their impact is mediated through the body, lifestyle and activity of the mother. These factors have a huge biological effect and can have such an impact as a violation of growth and development of the fetus, a violation of maturation of

organs and tissues, the formation of normal regulatory processes in the body and the mechanisms of adaptation to extrauterine existence.

The medical factors include the pathology of the mother, the pathology of pregnancy and childbirth. In the modern literature there is a constant increase in the frequency of pregnancy pathology. Over the past decade, the frequency of gestosis has increased by 41%, anemia by 2.6 times, renal pathology by 2 times, cardiovascular disease by 21.9% [2,3].

Until recently, overweight with the development of alimentary obesity was an epidemic problem in developed countries, but recently it spread to developing countries. The main reason is the transition to a high-fat diet and a decrease in physical activity of urban residents. It is believed that obesity and related diseases can become the main problem of the future also because "malnutrition" in the antenatal period is the determining factor of obesity in the future [5]. Children born to mothers with obesity deserve special attention because of their complex neurohormonal and metabolic disorders that result from the dysfunction of regulatory systems. The frequency of disruption of adaptation in the first days after birth in newborn children of obese mothers, according to the literature, reaches 68% [58].

Modern technologies for managing pregnancy and childbirth, nursing newborns should be considered as measures to protect the child's body from distortion of the ecological space of the first period of life and ensure its nursing [4, 7].

One of the most critical periods of ontogeny is the first month of life - the period of the newborn. This period is characterized by the greatest intensity of metabolic processes, the greatest danger of disruption of adaptation mechanisms in conditions of a sharp change in the external environment (the transition from intrauterine life to extrauterine life). Therefore, the concept of a newborn's health includes the concept of its optimal adaptation to changing environmental conditions and an assessment of the results of adaptation mechanisms for the next (first month of life) and a distant (future) life [2,6].

For modern pediatrics, it is important to predict the state of children's health, as it allows them to identify risk groups for certain diseases, and most importantly, to carry out preventive and curative interventions in a timely manner [1,2]. After the birth of the child, the mechanisms of metabolism regulation are included, and, first of all, the problem of the energy supply for the homeostasis of the newborn arises from its own (endogenous) sources of energy.

A significant role in protective-adaptive reactions belongs to humoral regulatory systems, among which the hypothalamic-adrenal system occupies a special place [4,5].

One of the most important constants of newborn metabolism is the provision of normoglycemia in the body. Within a few minutes after birth, there is a decrease in insulin concentration and an increase in glucagon content, which is associated with an increase in the level of catecholamines and cortisol in childbirth. These shifts stimulate glycogenolysis and gluconeogenesis in hepatocytes, which is aimed at maintaining normoglycemia in the blood of newborns [3].

Glucose is the main, and under normal conditions and the only substratum of energy metabolism in the brain. If the supply of the brain to the brain is stopped,

endogenous resources can ensure its normal metabolism only for 10-15 min [3,7].

At the heart of the damaging effect of hypoglycemia is exytotoxicity - one of the universal mechanisms leading to the death of neurons and associated with violations of homeostasis of calcium and processes of free radical oxidation. The study of the general mechanisms of brain damage in hypoglycemia and hypoxic-ischemic lesions opens up certain prospects in the development of methods for pharmacotherapy and the prevention of posthypoglycemic encephalopathy [1,3].

All of the above determines the importance of conducting research aimed at studying the clinical and metabolic features of glucose homeostasis in newborn children at risk and finding ways to correct adaptation failure in the early neonatal period.

Purpose of the study

The aim of the study was to determine the clinical and metabolic peculiarities of adaptation of newborn children from risk groups to the early neonatal period and to develop methods for correcting the disadapted syndrome.

Materials and methods

A group of newborns from mothers with obesity that developed before and during pregnancy: this group included 311 newborns from mothers with obesity of varying severity. 56 newborns were born in women with excess body weight of 20% or more, which developed before the onset of pregnancy. Women of this group added 10.3 ± 0.9 kg for pregnancy. In 255 newborn children, mothers were added over the period of pregnancy more than 12 kg (an average of 17,210.12 kg), gestational obesity. Obesity during pregnancy in women was characterized by excessive fat deposition in the area of the mammary glands, buttocks, thighs and abdomen. Obesity, which developed before pregnancy, was represented by exchange-alimentary form in all women of this group and had 3 degrees of severity. At the first degree, the actual body weight exceeded "ideal" by no more than 29.%, this group included 38 women. In 11 women, the actual body weight exceeded the "ideal" by 30-49%, 2 degree of obesity. At the 3rd degree of obesity, the excess weight of the body was 50-99%, this group included 7 women.

Results of own research

General characteristics of the examined newborns. 1518 full-term newborn babies were monitored.

The average weight gain for pregnancy in women was 11.9 ± 0.11 kg. 59% of women added 10-15 kg of body weight to the pregnancy and 25.8% - more than 15 kg. In 231 women (15.2%), the body weight during pregnancy increased by less than 10 kg.

According to the main anthropometric characteristics, the results are consistent with the data of Russian literature. Thus, the average body weight of the examined full-term newborn infants was 3438.4 ± 12.7 g; body length -52.3 ± 0.03 cm; head circumference 34.8 ± 0.08 cm. Body weight at birth less than 3 kg was registered in 265 full-term newborn infants (17.5%>). Body weight at birth more than 4000 g was observed in 217 newborns (14.3%). The length of the body of full-term newborns corresponded to

the average normative indices (from 48 to 52 cm) in 34% of cases. We found a slight increase in the incidence of body length in newborns over 52 cm in 66%. 407 newborns (26.8% a) were born with a body length of more than 54 cm. Head circumference from 32 to 35 cm was observed in 680 full-term newborn infants (44.8%)). In other babies, the head circumference was in the range from 35 cm to 40 cm, i.e. a little more than the average normative indicators.

The study of the characteristics of the course of pregnancies in women revealed a high incidence of complications. In 334 pregnant women (22%) of the entire population we surveyed, pregnancy was accompanied by gestosis. And, twice as often, gestosis was observed in women with excessive weight gain during pregnancy (more than 12 kg). The threat of interruption and, accordingly, hospital treatment for preserving the analyzed pregnancy, were registered in 339 women (22.3%), i.e. almost every fifth in the population. According to the data of G.M. Savelieva (1991), the complications of pregnancy and fetal development are more often observed with the expressed violation of fat metabolism. The frequency of violations of fat metabolism increases to 31% in the entire population, taking into account the excess weight gain during pregnancy (gestational obesity).

The overall status of newborn children in the general surveyed population was determined by the peculiarities of pregnancy in mothers. In the state of cardiorespiratory depression, 234 newborns were born (15.4%), Apgar scores were less than 7 in the first minute of life. Clinical manifestations of chronic intrauterine hypoxia in the form of dry skin, decrease in the expression of the subcutaneous fat layer, maceration of the palms and feet, as well as greenish staining of amniotic fluid, were noted in 286 full-term newborn infants (18.8%), with only 78 of them having declines in the Apgar scale at birth. In 137 newborn children (9%) of the entire surveyed population, clinical manifestations of local cutaneous hemorrhagic syndrome in the form of petchial rash were observed, mainly on the face skin.

The physiological loss of body weight of newborns was significantly correlated with body weight at birth ($r = 0.30$). A decrease in body weight of 3-6% of the original was observed in 968 full-term newborns (63.8%). In 356 newborns (23.5%), the body weight was reduced to 10% of the original weight, and only 81 (5.3%) of the whole surveyed population had a body weight loss of more than 10% of the original weight. At the same time, it should be noted that 113 full-term newborn infants (7.4%) had a transient loss of body weight of less than 3% of the original. On average, weight loss in term infants in the early neonatal period was 171.2 ± 2.22 g; which corresponds to 5% of the average body weight at birth in the surveyed population.

Conclusions

1. In newborns from mothers with gestational and alimentary-metabolic obesity, an increase in the incidence of acute intranatal asphyxia by a factor of 3, clinical manifestations of malnutrition at birth by a factor of 2, hemorrhagic syndrome by a factor of 1.5, is accompanied

by an increase in glycemia at birth and by 5-6 days life, a decrease in the insulin content and an increase in the cortisol content in the cord blood serum, an imbalance of the amino acid pool with its greater severity in the case of alimentary-metabolic obesity in mothers. In newborn children of mothers with gestational obesity, there is an increase in the content of malonic dialdehyde and total lipids in the serum of cord blood.

2. Increase in glycemia in newborns in the blood serum, initial changes in the pool of free amino acids, decrease in the disaccharidase activity of the small intestine in children from mothers with obesity suggest an earlier activation of the processes of gluconeogenesis and a significant degree of catabolic metabolism.

3. In newborns with malnutrition, there is an increase in glycemia at birth and at 5-6 days of life, as well as a decrease in insulin and an increase in cortisol in the cord blood serum. These changes are more pronounced in low-birth-weight children by the gestation period and depend on the degree of severity of their birth weight deficit.

4. The fund of free amino acids in the serum of cord blood in newborn children with clinical manifestations of malnutrition at birth varies in different directions, depending on the presence of a deficit in body weight. In low-birth-age babies, the pool of free amino acids at birth is increased, and in children with malnutrition at birth without a body weight deficiency, the content of free amino acids in the cord blood serum is reduced. The imbalance of the amino acid pool in the serum of cord blood is determined mainly by a change in the content of glycogen amino acids.

5. A special feature of newborn children with signs of malnutrition at birth without a deficiency of body weight is a more pronounced decrease in glycemia from birth to 5-6 days of life. The total reduction in their pool of free amino acids (by 21%) in the serum of cord blood is due to a decrease in the amount of threonine (by 23%), glutamine (by 25%), glycine (by 57%) and methionine (by 35%).

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