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EPIDEMIOLOGY AND RISK FACTORS OF INITIATION HYPOXIC-ISCHEMIC ENCEPHALOPATHY

ABSTRACT

A literature review of foreign and domestic studies on hypoxic-ischemic encephalopathy in recent years has been conducted to assess the epidemiological situation in various countries of the world and in Russia, as well as to consider the risk factors for this pathology. Despite some differences in the approaches to the diagnosis of hypoxic-ischemic encephalopathy, data on the prevalence of this disease in newborns are fairly homogeneous and depend little on geographical and medico-social factors. However, in connection with the unresolved issue of distinguishing hypoxic-ischemic encephalopathy and neonatal encephalopathy, diagnostic criteria in different neonatal and neurological schools differ, which also has an impact on the results of epidemiological studies. At present, discussions continue on pathogenesis, risk factors, prevalence of perinatal encephalopathy, as well as approaches to diagnosis, treatment and rehabilitation of children.

Keywords: hypoxic-ischemic encephalopathy, perinatal lesions of the central nervous system, epidemiology, prevalence, risk factors.

INTRODUCTION

A significant increase in the incidence of the child population is an urgent problem of modern health care. A special place in this case is occupied by perinatal lesions of the nervous system, which are currently diagnosed in 85% of full-term and almost 100% of premature infants [1, 3, 5]. Perinatal hypoxic lesions of the central nervous system cause a high percentage of neurological disorders: from mild functional disorders to severe, disabling conditions (cerebral palsy, epilepsy, oligophrenia, etc.) [2, 11].

Hypoxic-ischemic encephalopathy (HIE) is an acquired syndrome characterized by clinical and laboratory signs of acute brain damage after perinatal hypoxia and asphyxia in labor and manifested by breathing disorders, suppression of physiological reflexes, reduction of muscle tone, impaired consciousness with frequent occurrence of seizures [14]. Representations about the clinical manifestations of HIE, despite the obviousness of their main manifestations, are quite contradictory. At present, there is no unity in the notions of the duration of the current and the periods of GIE. At the present time, two basic principles have been formed in the approach to the diagnosis of hypoxic brain lesions: staged (phase) and syndromological. The first of these approaches prevails abroad, the second - in Russia. In connection with the foregoing, it seems relevant to study the prevalence and risk factors for hypoxic-ischemic brain.

Objective: to evaluate the epidemiological indicators of hypoxic-ischemic encephalopathy in various countries of the world and in Russia, and to consider the risk factors for the occurrence of this pathology.

METHODS OF RESEARCH

We conducted a strategic search for the MEDLINE database using such keywords as «hypoxic-ischemic encephalopathy», «epidemiology» and «prevalence» in various combinations. To search for domestic research, a search was used based on the RINC database (elibrary.ru) using the key words «hypoxic-ischemic encephalopathy», «perinatal lesions of the central nervous system», «epidemiology», «prevalence».

RESULTS AND DISCUSSION

According to WHO, 10% of children have neurological disorders of varying severity, caused by hypoxic-ischemic damage to the brain of the fetus and the newborn [15]. In the United States, hypoxic-ischemic encephalopathy is noted in 1-8 cases per 1000 births. In Western Australia, HIE and neonatal encephalopathy occur at a frequency of 1.9-3.8: 1000, with HIE due to only hypoxia in childbirth recorded in 1.6: 10,000 births [4]. The incidence of neonatal encephalopathy is 3.0: 1000 full-term live births with fluctuations from 2.7 to 3.3: 1000, and GIE - 1.5 (1.3-1.7): 1000 [6, 11]. Retrospective study of 1864 766 newborns \geq 36 weeks. Gestation in the state of California indicates that the incidence of neonatal encephalopathy is 1.1: 1000 births [12, 18].

Study of the incidence of HIE in the first decade of the XXI century. In Spain showed that it is 1.088: 1000 full-term newborns, and medium-heavy and severe HIE - 0.49: 1000, with a linear tendency to reduce the incidence [7, 17]. However, epidemiological studies conducted in Nepal showed that the clinic for neonatal encephalopathy occurs at a frequency of 28.1: 1000 births, with 2% of cases showing congenital anomalies, 25% having an infection, and 28% having intranatal causes. The incidence of neonatal encephalopathy due to

intranatal causes is 13.0: 1000 births [9, 12]. Along with this, there are data on the epidemiology of hypoxic brain lesions in preterm infants. So, among preterm infants who died at the 1st week of life, the detection of periventricular leukomalacia (PVL) is 7%; In children who died after 7 days of life, PVL is detected on autopsy in 75% of cases [12, 13]. In children who required a hardware breathing, the frequency of development of PVL can reach 60%, in contrast to 6% of cases of PVL in unventilated children. Prognostically the most unfavorable is the cystic form of PVL [8].

The occurrence of peri- and intraventricular hemorrhages (PIVK) largely depends on the survival of premature infants. In Canada and the United States, the proportion of live births of prematurity with a weight of less than 1500 g in the structure of all genera increased from the 1970s to the 1990s from 1.0-1.17 to 1.2-1.45%. Currently, about 85% of children born with a mass of 500-1500 g survive in developed countries [14].

In the Russian Federation, the frequency of GIE reaches 712: 1,000 children under 1 year [1].

Despite the fact that pregnancy and childbirth are natural and physiological events in human life, these underlying processes are extremely vulnerable and subject to numerous endo- and exogenous effects. The causes that adversely affect the course of pregnancy and childbirth are so diverse that it is difficult to find a factor that could not contribute to the disturbance of their harmonious course.

The most significant factors for the formation of HIE are the following:

1. Socio-demographic and prenatal factors: working mother or unemployed during pregnancy; Absence of private

(voluntary) health insurance; Epilepsy and / or neurologic diseases in a family history; Infertility treatment; Thyroid disease, preeclampsia, severe or moderate haemorrhage, viral infection during pregnancy; Gestational age less than 37 and more than 42 weeks; Birth weight less than 3 centiles; Pathology of the placenta; Late prenatal care or lack of it [12].

2. Intratinal factors: posterior view of the occipital presentation; Mother fever in childbirth; impetuous labor; Instrumental vaginal delivery or emergency cesarean section; The need for general anesthesia of the mother. Among the factors that impede the development of HIE, the authors indicate only two: delivery in time and elective cesarean section (according to indications) [2, 17]. At 70% of hypoxia-borne newborns, antenatal risk factors for HIE were detected, in 24% - a combination of antenatal and intranatal factors, and only 5% postnatal causes led to HIE [11]. Childbirth at night (from 19 to 7 hours) is associated with an increase in the development of neonatal encephalopathy, as well as asphyxia and seizures of newborns. Night delivery is an independent risk factor for the development of neonatal encephalopathy, along with a severe delay in prenatal development, the lack of prenatal care, the age of the mother, the male sex, the previous mother [13]. The protracted second stage of labor in pregnancy serves as a predictor of a decrease in Apgar scores at 5 min below 7 points and, together with it, increases the risk of developing a syndrome of respiratory distress, the need for ventilation and the development of HIE [3].

CONCLUSION

Data on the prevalence of hypoxic-ischemic encephalopathy are fairly homogeneous and depend little on geographical and medico-social factors in those cases when the criteria for diagnosing this condition are unified. However, in connection with the unresolved issue of discrimination between HIE and neonatal encephalopathy, diagnostic criteria in different neonatal and neurological schools differ, which also has an impact on the results of epidemiological studies. Discussions are ongoing on pathogenesis, risk factors, prevalence of perinatal encephalopathy, as well as approaches to the diagnosis, treatment and rehabilitation of children [1, 18]. In

addition, the relevance of the problem in question is also due to significant differences in the views of this pathology among Russian and foreign researchers.

Thus, the problem of perinatal hypoxic-ischemic injury of the central nervous system remains a serious scientific, medical and social significance.

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